

Arkansas Department of Environmental Quality

Public Notice

The Arkansas Department of Environmental Quality (ADEQ) is publishing this Public Notice to provide interested persons the opportunity to comment on ADEQ's proposed state implementation plan (SIP) revision.

In this SIP proposal, Arkansas has included revisions to address disapproved portions of the Arkansas Regional Haze State Implementation Plan (AR RH SIP), submitted to EPA in 2008 and to replace emission limits for Arkansas subject-to-BART power plants and Entergy Independence included in the 2016 rule "Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Final Rule" (AR RH FIP). This SIP revises Arkansas's reasonable progress goals and Arkansas's long-term strategy for the first Regional Haze planning period ending in 2018.

ADEQ will hold a public hearing on Tuesday, January 2, 2017 to receive public comments on the SIP revision. The public hearing will begin at 2:00 p.m. in the Commission Room at the Arkansas Department of Environmental Quality headquarters building, 5301 Northshore Drive, North Little Rock, AR 72118. In the event of inclement weather or other unforeseen circumstances, a decision may be made to postpone the hearing. If the hearing is postponed and rescheduled, a new legal notice will be published to announce the details of the new hearing date and comment period.

ADEQ will accept written and electronic comments received by no later than 4:30 p.m. (Central Time) on Tuesday, January 2, 2017. Written comments should be mailed to Tricia Treece, Office of Air Quality, Arkansas Department of Environmental Quality, 5301 Northshore Drive, North Little Rock, AR 72118. Electronic comments should be sent to: treecep@adeq.state.ar.us.

A copy of Arkansas's proposed SIP revision is available for public inspection during normal business hours at the Office of Communications in the ADEQ headquarters building in North Little Rock. In addition, Arkansas's SIP revision is available for viewing or downloading on ADEQ's website at: <https://www.adeq.state.ar.us/air/planning/sip/regional-haze.aspx>. Public libraries hosting ADEQ information depositories will also be available to assist interested persons in accessing the SIP from ADEQ's website. These information depositories are located in public libraries at Arkadelphia, Batesville, Blytheville, Camden, Clinton, Crossett, El Dorado, Fayetteville, Forrest City, Fort Smith, Harrison, Helena, Hope, Hot Springs, Jonesboro, Little Rock, Magnolia, Mena, Monticello, Mountain Home, Pochahontas, Russellville, Searcy, Stuttgart, Texarkana, and West Memphis; in campus libraries at the University of Arkansas at Pine Bluff and the University of Central Arkansas at Conway; and in the Arkansas State Library, 900 W. Capitol, Suite 100 in Little Rock.



A R K A N S A S
Department of Environmental Quality

October 27, 2017

Dear Information Depository Librarian:

Please assist the Arkansas Department of Environmental Quality by assisting the public with accessing the materials relevant to the enclosed notice via Arkansas Department of Environmental Quality's web page: <https://www.adeq.state.ar.us/air/planning/sip/regional-haze.aspx>. The information concerns proposed changes to the Arkansas state implementation plan.

The proposed changes are subject to public comment until January 2, 2017. These documents may be removed from the depository after January 2, 2017.

Thank you for your continued service as an information depository for the Arkansas Department of Environmental Quality. If you have any questions, please contact me by telephone at 501-682-0916, or by e-mail at Robinson@adeq.state.ar.us.

Kindest regards,

Kelly Robinson

Public Information Officer

Enclosures

Arkansas Department of Environmental Quality

Public Notice: Correction

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Arkansas Department of Environmental Quality

Public Notice

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ADEQ will hold a public hearing on Friday, January 19, 2018 to receive public comments on the SIP revision. The public hearing will begin at 2:00 p.m. in the Commission Room at the Arkansas Department of Environmental Quality headquarters, 5301 Northshore Drive, North Little Rock, Arkansas 72118. In the event of inclement weather or other unforeseen circumstances, a decision may be made to postpone the hearing. If the hearing is postponed and rescheduled, a new legal notice will be published to announce the details of the new hearing date and comment period.

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Arkansas Democrat Gazette

STATEMENT OF LEGAL ADVERTISING

air

ADEQ
5301 NORTSHORE DR
NORTH LITTLE ROCK AR 72118

NOV 01 2017

REMIT TO:
ARKANSAS DEMOCRAT-GAZETTE, INC.
P.O. BOX 2221
LITTLE ROCK, AR 72203

ATTN: Kelly Robinson

DATE : 10/31/17 INVOICE #: 3167767
ACCT #: L844316 P.O. #:

BILLING QUESTIONS CALL 378-3547

AD COPY

STATE OF ARKANSAS,)
COUNTY OF PULASKI,) ss.

I, Yvette Hines, do solemnly swear that I am the Legal Billing Clerk of the Arkansas Democrat - Gazette, a daily newspaper printed and published in said County, State of Arkansas; that I was so related to this publication at and during the publication of the annexed legal advertisement in the matter of:

Hearing

pending in the Court, in said County, and at the dates of the several publications of said advertisement stated below, and that during said periods and at said dates, said newspaper was printed and had a bona fide circulation in said County; that said newspaper had been regularly printed and published in said County, and had a bona fide circulation therein for the period of one month before the date of the first publication of said advertisement; and that said advertisement was published in the regular daily issues of said newspaper as stated below.

DATE	DAY	LINAGE	RATE	DATE	DAY	LINAGE	RATE
10/31	Tue	123	1.35				

TOTAL COST ----- 166.05
Billing Ad #: 74327016

[Signature]
Subscribed and sworn to me this 31
day of Oct 20 17
[Signature]
Notary Public

OFFICIAL SEAL - #12347408
DEANNA GRIFFIN
NOTARY PUBLIC-ARKANSAS
PULASKI COUNTY
MY COMMISSION EXPIRES: 03-30-26

Arkansas Democrat Gazette

STATEMENT OF LEGAL ADVERTISING
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PAGE MAY BE BLANK

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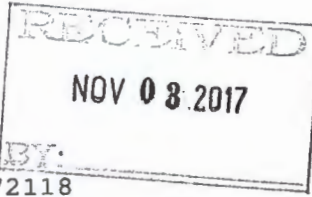
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<https://www.adeq.state.ar.us/air/planning/sip/regional-haze.aspx>.
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743270161

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Arkansas Democrat Gazette

STATEMENT OF LEGAL ADVERTISING

ADEQ/FISCAL DIVISION
5301 NORTHSHORE DR
NORTH LITTLE ROCK AR 72118



REMIT TO:
ARKANSAS DEMOCRAT-GAZETTE, INC.
P.O. BOX 2221
LITTLE ROCK, AR 72203

ATTN: Kelly Robinson

DATE : 11/02/17 INVOICE #: 3168886
ACCT #: L6016734 P.O. #:

BILLING QUESTIONS CALL 378-3547

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Hearing

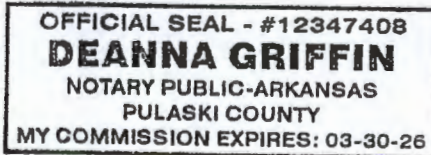
pending in the Court, in said County, and at the dates of the several publications of said advertisement stated below, and that during said periods and at said dates, said newspaper was printed and had a bona fide circulation in said County; that said newspaper had been regularly printed and published in said County, and had a bona fide circulation therein for the period of one month before the date of the first publication of said advertisement; and that said advertisement was published in the regular daily issues of said newspaper as stated below.

DATE	DAY	LINAGE	RATE	DATE	DAY	LINAGE	RATE
11/02	Thu	49	1.35				

TOTAL COST ----- 66.15
Billing Ad #: 74329251

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74329251

air

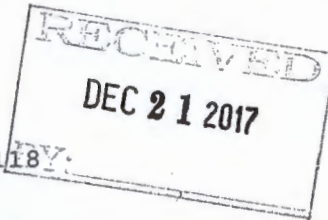


Subscribed and sworn to me this 2 day of Nov 20 17
Deanna Griffin
Notary Public

Arkansas Democrat Gazette

STATEMENT OF LEGAL ADVERTISING

ADEQ/FISCAL DIVISION
5301 NORTHSHORE DR
NORTH LITTLE ROCK AR 72118



REMIT TO:
ARKANSAS DEMOCRAT-GAZETTE, INC.
P.O. BOX 2221
LITTLE ROCK, AR 72203

ATTN: Kellyl Robinson
DATE : 12/18/17 INVOICE #: 3171749
ACCT #: L6016734 P.O. #:

BILLING QUESTIONS CALL 378-3547

AD COPY

STATE OF ARKANSAS,)
COUNTY OF PULASKI,) ss.

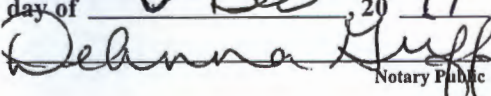
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DATE	DAY	LINAGE	RATE	DATE	DAY	LINAGE	RATE
12/18	Mon	117	1.35				

TOTAL COST ----- / 157.95
Billing Ad #: 74374037

OFFICIAL SEAL - #12347408
DEANNA GRIFFIN
NOTARY PUBLIC-ARKANSAS
PULASKI COUNTY
MY COMMISSION EXPIRES: 03-30-26

Subscribed and sworn to me this 18
day of Dec, 2017

Notary Public

Arkansas Democrat Gazette

STATEMENT OF LEGAL ADVERTISING

THIS PAGE USED FOR ADDITIONAL AD COPY SPACE AS NEEDED.

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743740371



FOR IMMEDIATE RELEASE:

January 12, 2018

**ADEQ to Host Public Hearing on Proposed Regional Haze SIP
and Extends Public Comment Period**

NORTHLITTLE ROCK—The Arkansas Department of Environmental Quality (ADEQ) will host a public hearing to receive comments on revisions to the Arkansas Regional Haze State Implementation Plan (SIP). The hearing will be held at 2:00 p.m. on Friday, January 19, 2018 in the Commission Room at ADEQ Headquarters, 5301 Northshore Drive in North Little Rock. The hearing, previously set for January 2, 2018, was rescheduled to provide the public additional time to review the proposal. ADEQ is also extending the comment period by two weeks in response to an additional request.

The Regional Haze Program seeks to address the combined visibility effects of various pollution sources over a wide geographic region with the goal of achieving natural visibility conditions at designated national parks and wilderness areas. In 2008, ADEQ submitted a SIP to address Regional Haze Program requirements for the first implementation period (2008–2018). The 2008 SIP was partially approved in 2012. In 2017, ADEQ submitted a SIP to address nitrogen oxides requirements for power plants for the first implementation period. The Environmental Protection Agency proposed approval of the nitrogen oxides SIP on September 11, 2017.

The current SIP proposal addresses Regional Haze requirements for sulfur dioxide and particulate matter at Arkansas power plants, evaluates controls necessary for ensuring reasonable progress toward natural visibility conditions, and sets reasonable progress goals for the first planning period ending in 2018. The SIP proposal also establishes a long-term strategy for improving visibility.

The hearing will provide the public with an opportunity to present oral and/or written comments on the proposed SIP for ADEQ's consideration. All comments must be received by no later than 11:59 p.m. (Central Time) on Friday, February 2, 2018. Written comments should be mailed to Tricia Treece, Office of Air Quality, Arkansas Department of Environmental Quality, 5301 Northshore Drive, North Little Rock, AR 72118. Electronic comments should be sent to: Treecep@adeq.state.ar.us .

CONTACT: Kelly Robinson (Robinson@adeq.state.ar.us or 501.682.0916)

RESPONSIVE SUMMARY FOR STATE IMPLEMENTATION PLAN REVISION:

Revisions to the Arkansas State Implementation Plan

Regional Haze SIP Revision for 2008–2018 Planning Period

Pursuant to Arkansas Code Annotated (Ark. Code Ann.) § 8-4-317(b)(2)(B)(i), the Arkansas Department of Environmental Quality (ADEQ or “Department”) must prepare a record of the public process in the form of a written response to each issue raised during the public comment period. A responsive summary groups public comments into similar categories and explains why ADEQ accepts or rejects the rationale for each category.

On October 31, 2017, ADEQ proposed a state implementation plan (SIP) revision to address certain disapproved portions of Arkansas’s 2008 Regional Haze SIP. The SIP revision has been referred to by commenters as the Phase II SIP, the draft SIP, and the proposed SIP. For consistency, the proposed SIP revision is referred to as the “Proposed SIP” in the comment summaries and responses below.

On January 19, 2018, ADEQ Associate Director Stuart Spencer acted as Hearing Officer and conducted a public hearing for SIP revisions. The public comment period ended February 2, 2018. Comments received during the public comment period are summarized and a response for each is provided below.

Comment 1:

Some commenters expressed concerns that their enjoyment of Class I areas was impacted by visibility impairment. One commenter recounted difficulty in getting good pictures at Class I areas due to haze along rivers and trails. Another commenter stated that Arkansas’s biggest asset is nearby wilderness, but that haze pollution obstructs views. Commenters expressed the desire not to see haze when visiting natural areas.

Response 1:

Visibility has dramatically improved in Arkansas since 2004. In fact, visibility in the Natural State is approaching natural background conditions much more rapidly than required under the Regional Haze Rule. Arkansas is making substantial progress in addressing regional haze in its Class I areas and is ahead of schedule in meeting its own proposed progress goals and the uniform rate of progress for this first planning period ending in 2018. This means that Arkansas is well on track to reaching background visibility conditions no later than 2064.

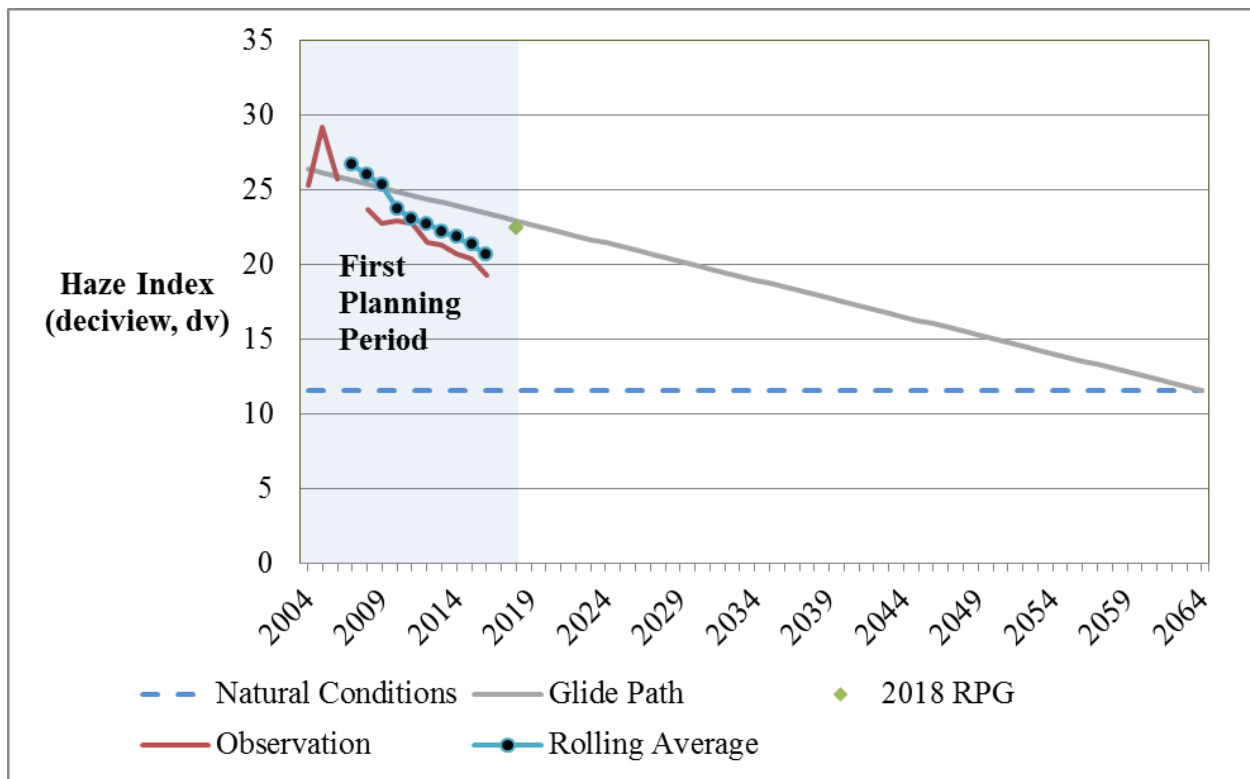
Arkansas has many beautiful natural assets that should be both appreciated and protected. The goal of the Regional Haze Program is to assist in collective appreciation and protection of those

assets. Haze is caused by particles, both natural and anthropogenic, which absorb and scatter light. Haze reduces the clarity and color of what can be seen. Particulate-caused haze is not the only culprit in obstructing the view of Arkansas’s natural beauty. Often, the very natural occurrence of fog or mist, tiny water droplets in the atmosphere, may be mistakenly categorized as haze. In addition, not all haze-forming particles come from anthropogenic sources of pollution. Some haze-forming particles, such as crustal material, soil, and sea salt, occur naturally.

The United States Environmental Protection Agency (EPA) established a goal for achieving natural visibility in Class 1 areas by 2064. Arkansas is on track to achieve this goal. Figures 1 and 2 show the progress toward achieving natural visibility in comparison to the glide path¹ toward natural visibility in 2064.²

This comment does not necessitate changes to the Proposed SIP.

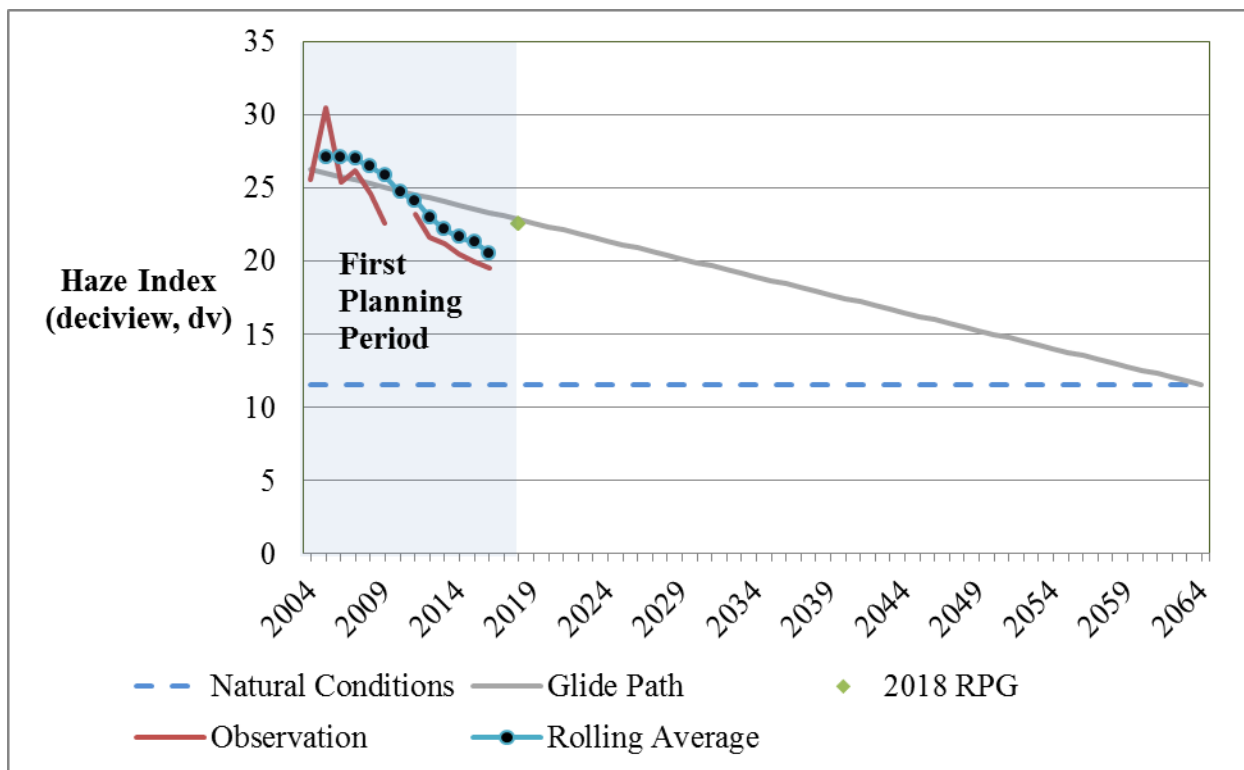
Figure 1 Visibility Progress at Caney Creek – 20% Worst Days



¹ The glide path is the rate of uniform progress needed to achieve natural visibility conditions by 2064.

² Figures 1 and 2 are updates to Figures 11 and 12 in the Proposed SIP. These figures have been updated so that the rolling average is inclusive of the current year and four previous years rather than reflecting the five previous years and to include 2016 data. 2000–2016 visibility data included in Figures 1 and 2 were obtained from: Visibility Status and Trends Following the Regional Haze Rule Metrics: IMPROVE Aerosol, Regional Haze Rule II (New Equation), with substituted data. Caney Creek, Upper Buffalo <http://views.cira.colostate.edu/fed/SiteBrowser/Default.aspx>.

Figure 2 Visibility Progress at Upper Buffalo – 20% Worst Days



Comment 2:

One commenter recommended a book entitled “What has Nature Done for Me Lately.” The commenter stated that the book illustrates the treatment of natural resources and asserts that natural capital is the base on which we all live. The commenter asserted that natural capital is more profitable and economically beneficial to Arkansas and to the world. One commenter noted the natural beauty of the Ozarks. Some commenters stated that Arkansas will not live up to the “Natural State” nickname. One commenter stated that Arkansas should be renamed the “Toxic State” and indicated the resulting impact on attracting businesses and employees to the state. One commenter stated that Arkansas will no longer be the “clean, pristine State that attracts tourists from all over the world as it does now.”

Response 2:

ADEQ agrees with the commenters that Arkansas’s natural capital is of both aesthetic and economic value to the State; however, ADEQ disagrees with those commenters that implied that the Proposed SIP will result in Arkansas no longer being clean or pristine. The Proposed SIP requires measures that will further enhance the natural beauty of Arkansas wilderness areas by reducing emissions of visibility-impairing pollutants. Arkansas Class I areas are already experiencing more visibility improvement progress than anticipated (See Figures 1 and 2) and the control measures included in the Proposed SIP, other Clean Air Act requirements, and

changes in generation due to market forces as described in the long term strategy of the Proposed SIP will result in further improvements in visibility at Arkansas's Class I areas.

See also Response to Comment 1.

This comment does not necessitate changes to the Proposed SIP.

Comment 3:

Some commenters expressed concerns with respect to public health as a result of emissions from coal-fired power plants. Specifically, commenters noted coal-fired power plants emit mercury, sulfur oxides (SO_x), nitrogen oxides (NO_x), particulate matter, and other noxious gases that can impact health. One commenter noted that Arkansans have high rates of diseases that can be linked to particulate matter and other noxious gases. Commenters also noted that these pollutants impact water and soil quality. One commenter explained that when smoke and fumes dissipate into the air, they are still there and we will continue to feel and see the effects.

Several commenters explained that they or their relatives had existing health conditions that can be exacerbated by pollution. Commenters asserted that current emissions from Arkansas coal plants are causing smog in St. Louis, MO. Some commenters noted that air quality in St. Louis was causing or exacerbating their health problems. One commenter noted that they changed filters on a CPAP machine more in Arkansas than in Mississippi as a result of the air quality. The commenter also compared the soil in South Arkansas to the ash heaps in Saltville, Virginia, which is now a superfund site. Commenters further noted that health impacts of pollution have economic costs.

Some commenters expressed concerns that the Proposed SIP would result in harming air quality and human health.

One commenter noted that new data about the Clean Air Act indicates that it saved 80,000 more lives than expected.

Response 3:

ADEQ acknowledges the commenter's concerns with respect to the impacts that pollutants have on public health; however, ADEQ disagrees with comments that the Proposed SIP will result in harming air quality and human health. The Proposed SIP directly addresses manmade visibility impairment in Arkansas and surrounding states in accordance with Clean Air Act §169A and EPA's Regional Haze Regulations. Nevertheless, ADEQ notes that all areas of Arkansas are in attainment with all national health-based air quality standards. EPA sets national ambient air quality standards (NAAQS) for six common pollutants—referred to as criteria pollutants. These pollutants include ozone, particulate matter, nitrogen dioxide (NO₂), sulfur dioxide (SO₂), carbon monoxide, and lead. The NAAQS are established based on a rigorous evaluation of controlled exposure studies, clinical studies, epidemiological studies, and health risk

assessments. The standards are set at a level to protect human health, including sensitive populations, with an adequate margin of safety and to protect public welfare, including protection against damage to animals, crops, vegetation and buildings and visibility degradation.

Arkansas monitoring data shows that all areas of Arkansas are in attainment with EPA’s NAAQS, including for those pollutants known to impact visibility or with precursor pollutants that impact visibility. ADEQ operates an ambient air quality monitoring network in accordance with federal requirements. Monitors are sited based on a number of factors:

1. Where the highest concentration is expected to occur in the area covered by the monitor (usually determined through modeling);
2. What the expected representative concentrations are in areas of high population density;
3. What impacts on ambient pollution levels significant sources or source categories may have; and
4. What the background concentration levels are.

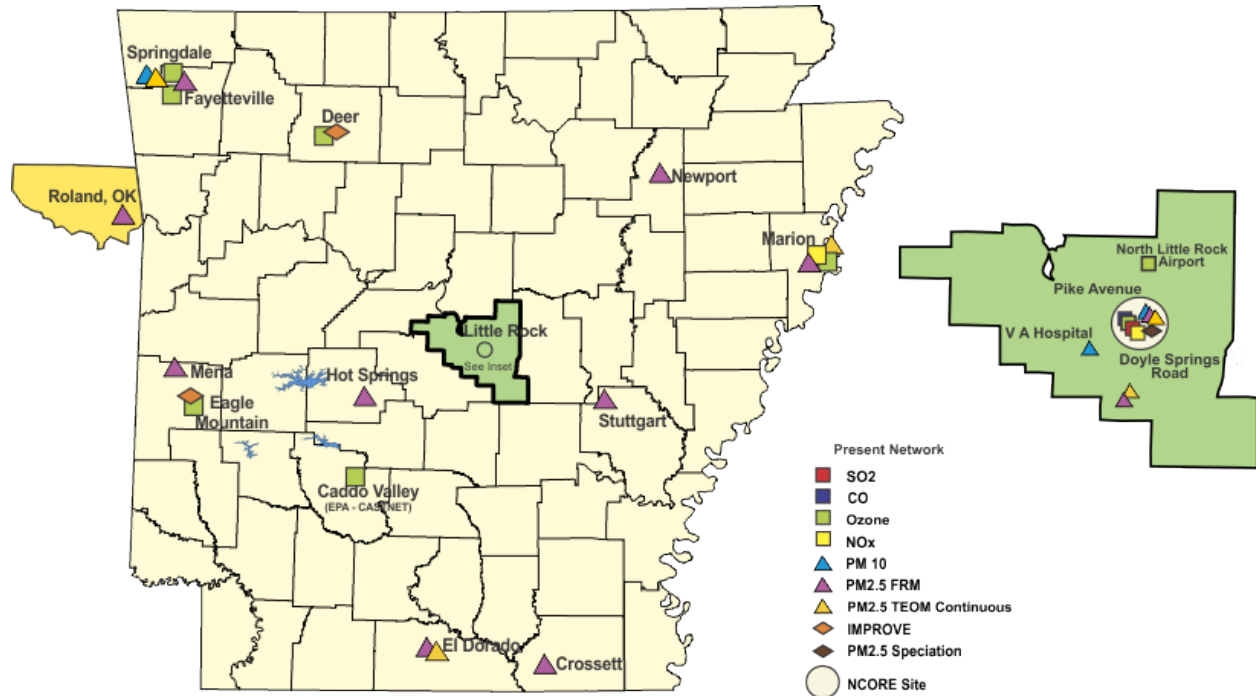
Locations of the various monitor types in Arkansas are listed in Table 1 and depicted in the Figure 3.

Table 1 Pollutants Monitored by the Arkansas Ambient Air Monitoring Network

Pollutant	Number of Monitors	Locations
Ozone	8	Clark County Crittenden County Newton County Polk County Pulaski County Washington County
Coarse Particulate Matter (PM ₁₀)	3	Pulaski County Washington County
Fine Particulate Matter (PM _{2.5})	14	Arkansas County Ashley County Crittenden County Garland County Jackson County Polk County Pulaski County Union County Washington County Sequoyah County (Oklahoma)
Carbon Monoxide	1	Pulaski County
Nitrogen Dioxide	2	Crittenden County Pulaski County

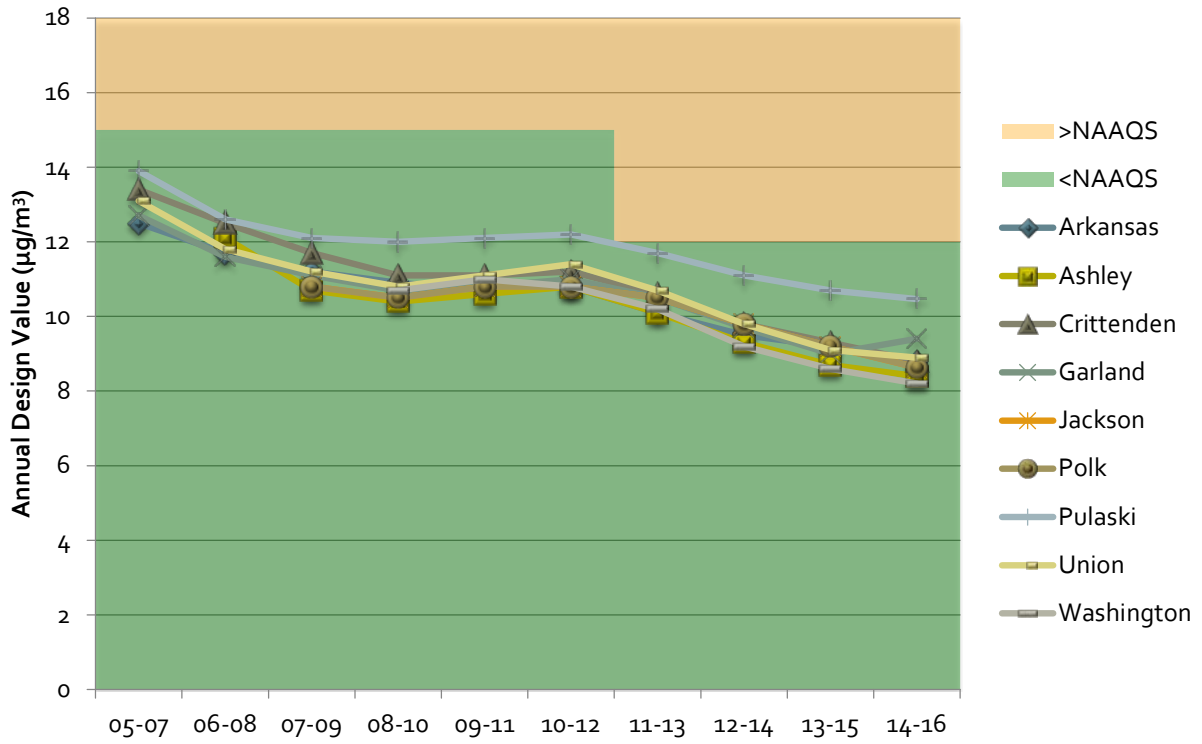
Sulfur Dioxide	1	Pulaski County
Lead	1	Pulaski County

Figure 3 Locations of Arkansas Regulatory Monitors



The figures below reflect the air quality for PM_{2.5}, ozone, NO₂, and SO₂. Decreasing design values are noticeable for PM_{2.5} and ozone. NO₂ and SO₂ design values have remained well below the level of the NAAQS. The figures represent a visual analysis of the overall quality of air over a ten-year period.

Figure 4 Annual PM_{2.5} Design Values by Year³



³ ADEQ (2018). "2017 State of the Air." Figures 3-6 at Pgs 28-37. <https://www.adeg.state.ar.us/air/state-of-air/>

Figure 5 Eight-Hour Ozone Design Values by Year

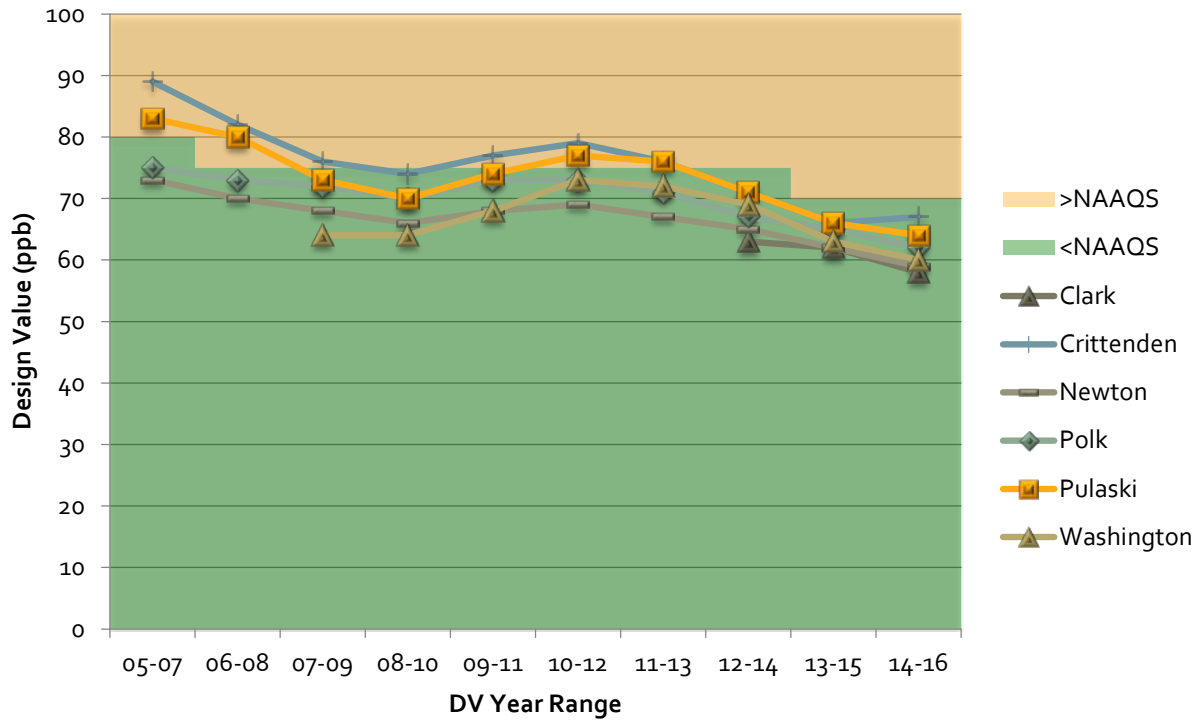


Figure 6 Annual Nitrogen Dioxide Design Values by Year

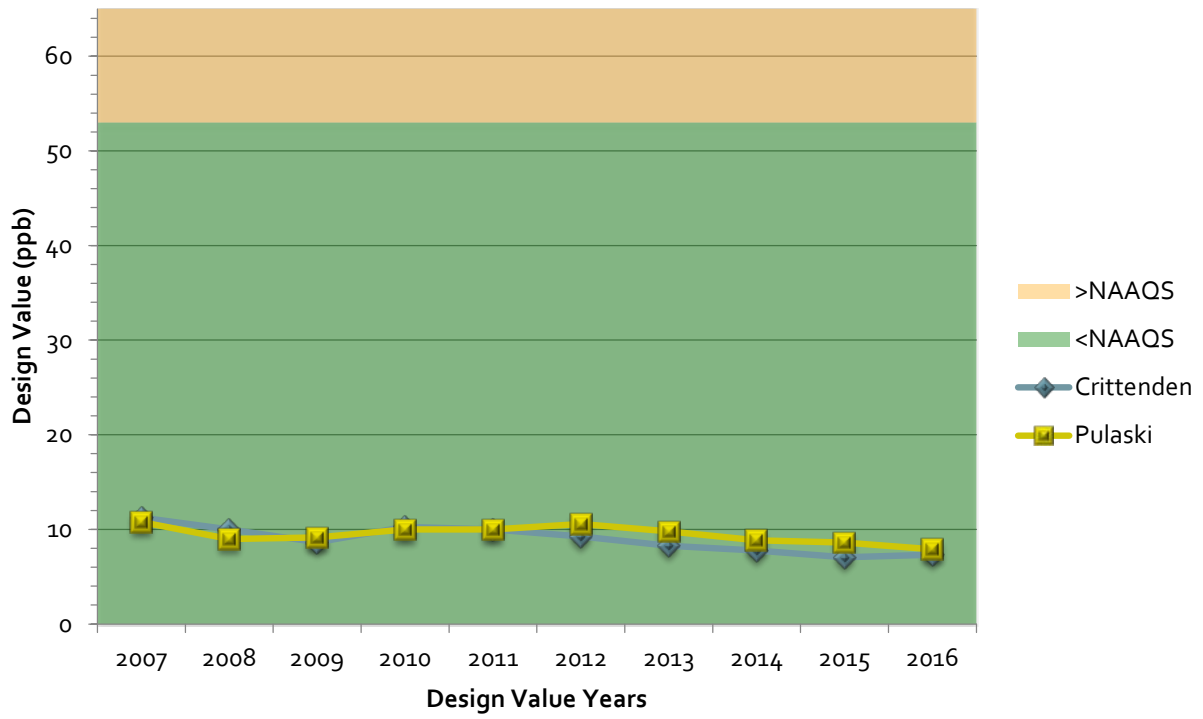
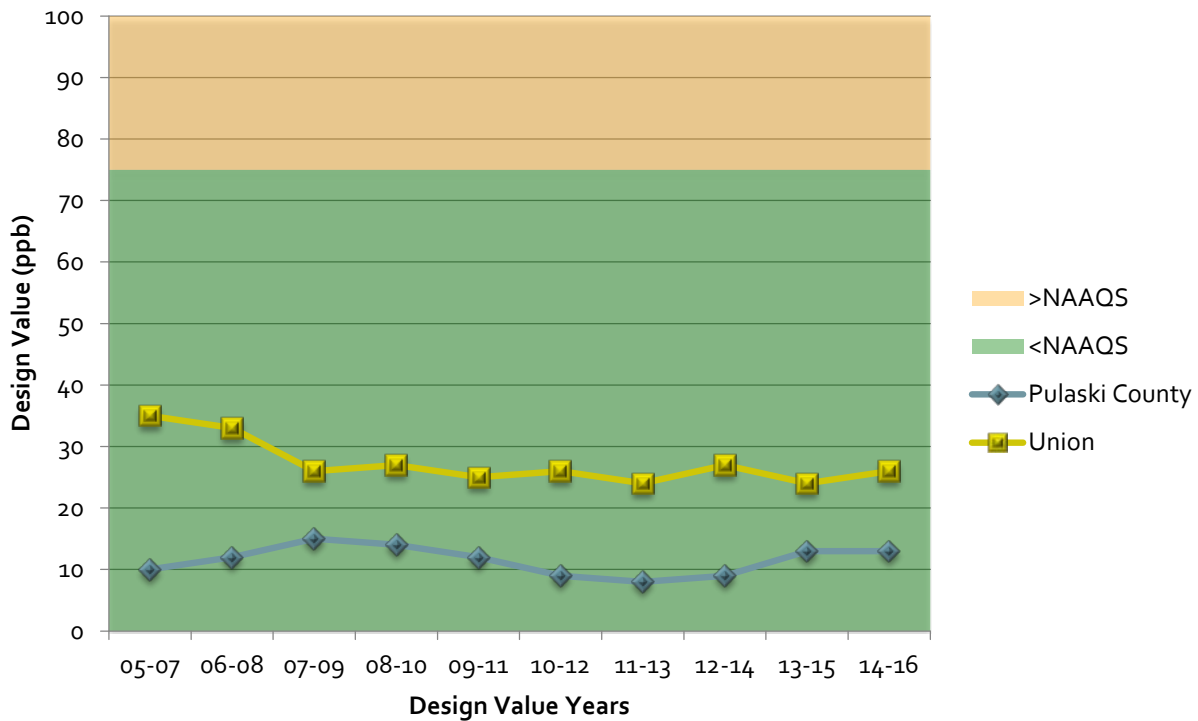


Figure 7 One-Hour SO₂ Design Values by Year



The goal of the Regional Haze Rule is to address man-made sources of visibility impairment in Class I Areas. The structure of Clean Air Act provides for the protection of human health through other EPA rules and programs. However, the Sierra Club’s effort with their October 10, 2017 memorandum entitled “*Ozone Impacts in 2011 from White Bluff and Independence Power Plants in Arkansas*” is not relevant to Regional Haze program because it attempts to address NAAQS interstate transport requirements under Clean Air Act Section 110(a)(2)(D)(i)(I). The Proposed SIP addresses visibility requirements under the Regional Haze Rule pursuant to Clean Air Act Section 169A. Sierra Club’s October 10, 2017 memorandum does not address visibility impairment to Class I Areas.

Furthermore, the information presented in the Sierra Club’s October 10, 2017 memorandum is based on outdated 2011 data that does not represent present day data. Sonoma Technology, Inc. (STi) used the Comprehensive Air Quality Model with Extensions (CAMx) photochemical model to describe ozone concentrations, relative to the 2008 ozone NAAQS in the St. Louis-St. Charles-Farmington, Missouri-Illinois Metropolitan Statistical Area (MO-IL MSA). Although this memorandum is dated October 10, 2017, STi used NOx emissions emitted during the 2011 ozone season (May to September) from four Electrical Generating Units (EGUs) located in Arkansas. Actual emission rates for these four EGUs are publicly available for every year, and the U.S. EPA’s 2011 CAMx modeling platform uses 2011 meteorological data, along with other 2011 data inputs. Comparisons of the 2011 data to the most recently available data (2017)

indicate that the 2011 data does not accurately represent more recent EGU emissions or ozone concentrations in the MO-IL MSA. From 2011 to 2017, ozone season NO_x emissions decreased by thirty-one percent at the White Bluff EGU and decreased by nineteen percent at the Independence EGU⁴. Similarly, the ozone NAAQS three-year design value concentration for the MO-IL MSA decreased from 0.082 parts per million (ppm) in 2011–2013 to 0.072 ppm in 2014–2016 (the most recent design value years available), which is below the 2008 NAAQS of 0.075 ppm.⁵ Based on 2013–2015 data, on June 27, 2016⁶ and March 1, 2018⁷ the U.S. EPA determined that both the Missouri and Illinois parts of the MO-IL MSA were below the 2008 ozone NAAQS.

In addition, it should be noted that Arkansas’s Regional Haze SIP Revision that was finalized on October 31, 2017 and approved by EPA on February 12, 2018 addressed NO_x requirements from EGUs for Regional Haze. The Proposed SIP addresses Regional Haze requirements with respect to SO₂ and particulate matter for EGUs, which are not precursors to ozone.

ADEQ also notes the commenters’ concerns with respect to soil quality and water quality. ADEQ considered, among other factors, energy and non-air environmental impacts of controls required in the Proposed SIP. None of the retrofit technologies considered in the Proposed SIP were eliminated based on this factor.

ADEQ acknowledges data providing evidence that the Clean Air Act has saved lives. The framework of the Clean Air Act provides for a system of cooperative federalism in which EPA sets standards and issues framework regulations that the states then use to develop robust air quality plans and programs based on state-specific circumstances and expertise. The roles of EPA and states in developing plans for protection of visibility are specified in Clean Air Act § 169A. The Proposed SIP complies with the requirements under Clean Air Act § 169A and the EPA regulations for the first planning period.

This comment does not necessitate changes to the Proposed SIP.

Comment 4:

One commenter stated that ADEQ is required under Ark. Code Ann. § 8-4-312(9) and (12) to take into account “the effect on normal human health of particular air contaminants” and “the interference with reasonable enjoyment of life by persons in the area and conduct of established enterprises that can reasonably expected.” The commenter further stated that the purpose of the Clean Air Act is to “protect and enhance the quality of the Nation’s air resources so as to promote the public health and welfare and the productive capacity of its population.”⁸ The

⁴ <https://ampd.epa.gov/ampd/>

⁵ <https://www.epa.gov/air-trends/air-quality-design-values#previous>

⁶ Federal Register Vol. 81, No. 123, 41444

⁷ Federal Register Vol. 83, No. 41, 8756

⁸ H.R. Conf. Rep. 95-564, 1977 U.S.C.C.A.N. 1502, 1570

commenter points out that visibility impairing pollutants also cause significant health impacts. The commenter notes that the emission reductions that would have been required under EPA's 2016 Arkansas Regional Haze federal implementation plan (FIP) would have resulted in quantifiable health benefits across fourteen states. The commenter asserts that replacement of EPA's FIP with ADEQ's proposed SIP would allow Arkansas EGUs to continue to emit sulfur dioxide (SO₂) at the same level as in previous years resulting in harm to public health in Arkansas and neighboring states.

Response 4:

ADEQ agrees that Ark. Code Ann. § 8-4-317 requires ADEQ to take into consideration the factors set forth in Ark. Code Ann. § 8-4-312, which include the two factors raised by the commenter. ADEQ included an explanation of how these factors were considered in the Proposed SIP.

ADEQ analyzed the factor of “[i]nterference with reasonable enjoyment of life by persons in the area and conduct of established enterprises that can reasonably be expected from air contaminants” in the following manner:

Visibility improvements are expected to occur at Arkansas Class I areas in the State as a result of the emissions limitations included in this SIP. Visitors to Caney Creek and Upper Buffalo are expected to enjoy these improvements. Persons that conduct tourism enterprises may also benefit as a result of the [Best Available Retrofit Technology (BART)] controls required in this SIP. Costs of control may be passed on to customers of the sources for which ADEQ is establishing emissions limitations; however, these costs are anticipated to be lower in this SIP than in the AR RH FIP that this SIP seeks to replace.⁹

However, Ark. Code Ann. § 8-4-317 states that the Ark. Code Ann. § 8-4-312 factors must only be considered “as applicable.” With regard to “the effect on normal human health of particular air contaminants,” ADEQ determined that “[t]his factor is not applicable to the regional haze program, which targets visibility improvements.”¹⁰ Ark. Code Ann. § 8-4-312 does not compel the Department to apply these factors without regard to applicability in the implementation of a federal program such as regional haze intended specifically to address visibility when a separate program exists to address the factors mentioned by the commenters.

The Clean Air Act sets forth standards and emissions limitations intended to address the impact to human health in sections that are separate and distinct from the sections intended to address visibility impact on Class I areas through the regional haze program. EPA sets NAAQS to address concentrations of certain air pollutants considered harmful to public health and welfare

⁹ Proposed SIP at p. 13.

¹⁰ *Id.*

under sections 109 and 110 of the Clean Air Act. Arkansas is currently in attainment for all NAAQS. See Response 3. In contrast, the regional haze program was developed under authority provided by Congress in Section 169A and B of Clean Air Act specifically to address visibility. As a result of this structure, ADEQ is not required perform a written consideration of “the effect on normal human health of particular air contaminants.” This factor is not “applicable” within the meaning of Ark. Code Ann. § 8-4-317.

This comment does not necessitate changes to the Proposed SIP.

Comment 5:

One commenter related the Regional Haze Rule to the Clear Skies Act of 2003, which was not passed. The commenter stated that the Regional Haze Rule would have accomplished similar benefits in terms of reductions in illnesses, missed work days, and missed school days as were estimated for the Clear Sky Act and that the benefits would outweigh the costs.

Response 5:

The Clear Sky Act of 2003 was a federal initiative that, if passed, laid out a path for the reduction of power plant emissions. However, the Act did not pass. In addition, the Clear Sky Act of 2003 is not part of the Clean Air Act § 169A and B and EPA Regional Haze Regulations framework with which the Proposed SIP must comply.

The Proposed SIP meets the requirements for the Arkansas of Clean Air Act § 169A and EPA Regional Haze Regulations. Although the Proposed SIP addresses visibility, ADEQ notes that Arkansas is in full attainment of federal health-based air quality standards. See Response 3.

This comment does not necessitate changes to the Proposed SIP.

Comment 6:

Some commenters expressed their views on the role of the State in protecting natural resources. One commenter exhorted that given the climate of national government, it falls to state and local governments to do everything they can to help protect natural resources. Another commenter stated that ADEQ is in a position to preserve fragile ecosystems that sustain life, to protect the beauty of the natural world and visibility in wilderness areas. Another commenter stated that ADEQ is best equipped to consider how to make measurable and reasonable progress toward natural visibility goals by considering the key characteristics of individual facilities, applicability of specific technologies, economic considerations, and site-specific characteristics.

Response 6:

ADEQ acknowledges the commenters views on the role of the State in protecting natural resources. The Proposed SIP is consistent with the mission statement of ADEQ. This Proposed SIP is developed with the goal of assuring “reasonable progress toward meeting the national goal

of preventing any future, and remedying any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution” as stated in the Regional Haze Rule.¹¹ ADEQ anticipates that the improvements from the Proposed SIP will create more visibility improvement than is necessary to achieve the reasonable progress goals for the 2008–2018 planning period. See Response 1.

ADEQ agrees that we are best equipped to consider how to make measurable and reasonable progress toward natural visibility goals by considering the key characteristics of individual facilities, applicability of specific technologies, economic considerations, and site-specific characteristics. In fact, Congress recognized that states should have the primary role in implementing air quality programs for these reasons. Under Section 110(a)(3), the Clean Air Act states that “Congress finds [...] that air pollution prevention [...] and air pollution control at its source is the primary responsibility of States and local governments.” ADEQ intends for this SIP revision to restore the primary role for implementing the Regional Haze Program to Arkansas, consistent with Congressional intent for Clean Air Act programs for stationary sources. Regional Haze programmatic requirements with respect to NO_x emissions from EGUs have already been returned to the State as a result of EPA’s February 12, 2018 approval of ADEQ’s 2017 Regional Haze SIP revision.

This comment does not necessitate changes to the Proposed SIP.

Comment 7:

Some commenters expressed concerns with the 2064 goal of achieving natural visibility conditions. One commenter noted that there are fifty-six years between the submission of the 2008 plan and 2064. The commenter asserted that this was not a reasonable length of time to work on this problem. Another commenter stated that taking baby steps is not enough to make reasonable progress and is the same as doing nothing. The commenter stated that the Proposed SIP is too little, too late for the Natural State.

Response 7:

ADEQ did not establish the 2064 goal for achieving natural visibility conditions. This date was established in the EPA 1999 Regional Haze Regulations, which instructed States to conduct certain analyses and set reasonable progress goals covering ten-year periods aimed at reaching natural background conditions on the haziest days within sixty years.¹² This target date was set in part based on EPA’s expectation that continued visibility progress will be possible as “industrial facilities built in the latter half of the 20th century will reach the end of their ‘useful lives’ and are retired and/or replaced by cleaner, more fuel-efficient facilities.”¹³ In addition, EPA noted the

¹¹ 40 C.F.R. § 51.300

¹² EPA (1999). “Regional Haze Regulations; Final Rule” (64 FR 35714)

¹³ Id. at 35732

agency's anticipation that further innovations in control technologies will enable new facilities to achieve lower emissions rates.¹⁴

Arkansas Class I areas are making greater progress toward natural visibility than would result from a uniform rate of progress (URP or "glide path") toward the 2064 goal, even before consideration of the controls included in the Proposed SIP. See Figures 1 and 2. The visibility improvements observed in these Class I areas are a result of reductions from State and federal programs; including new source performance standards for a variety of source types, vehicle emissions standards, changes in NAAQS; innovations in emissions control technologies; retirement or reconstruction of older facilities; and market-driven changes in electricity generation. The Proposed SIP includes further emissions controls that will keep Arkansas Class I areas on track for achieving natural visibility conditions on or before 2064. In a SIP due in 2021, ADEQ will revisit whether additional controls beyond those included in the Proposed SIP, the 2008 Regional Haze SIP, the 2017 Regional Haze SIP Revision addressing NO_x, and emission limits for Domtar Ashdown Mill¹⁵ are necessary to ensure continued reasonable progress toward natural visibility.

This comment does not necessitate changes to the Proposed SIP.

Comment 8:

Some commenters recommended that ADEQ revise its proposed plan to include dry flue gas desulfurization ("Dry FGD" or "scrubbers") at Entergy's White Bluff and Independence power plants. Commenters pointed out that SWEPCO recently installed a scrubber at its Flint Creek coal-fired power plant and that it was time for the same pollution control equipment at White Bluff and Independence. Some commenters also pointed out that ADEQ's 2008 SIP contemplated scrubbers for White Bluff and asserted that the State is now backtracking. Commenters noted that the White Bluff and Independence are among the largest coal-burning units in the country that lack modern pollution controls. One commenter asserted that, by not requiring scrubbers, the Proposed SIP is ensuring continued damage to people and the environment as a result of continued haze and particle pollution.

Another commenter opposed Dry FGD for White Bluff and Independence due to the generation of waste from this technology. The commenter specifically referred to scrubber waste from the John W. Turk Jr. coal-fired power plant. The commenter stated that scrubber waste is diluted with river water and then released into streams.

¹⁴ Id. at 35732

¹⁵ Emission limitations for Domtar are contained in EPA's 2016 "Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Final Rule." ADEQ is working with Domtar to re-evaluate limitations based on changes in their operations that have reduced emissions at the Ashdown Mill; however, ADEQ did not propose any changes to emission limits for the Ashdown Mill in the Proposed SIP.

Response 8:

ADEQ assessed available retrofit technologies for both White Bluff and Independence. ADEQ's assessment of available control technologies and determinations were discussed in Section IV.D. of the Proposed SIP for White Bluff and in Section V.C.&D. of the Proposed SIP for Independence. Based on ADEQ's assessment, the Department determined that Dry FGD should not be required for White Bluff or Independence for the 2008–2018 Regional Haze Planning Period.

Circumstances between the SWEPCO Flint Creek power plant and the White Bluff and Independence power plants differ. Both Flint Creek and White Bluff are subject to BART requirements based on their emissions, source category, 2001–2004 visibility impact, and age; however, Flint Creek has not indicated any anticipated changes in operation that are State or federally enforceable that would impact its remaining useful life. Entergy has indicated for White Bluff that they anticipate ceasing coal-fired operations by the end of 2028 and have requested to take an enforceable requirement to that effect. Therefore, the remaining useful life factored into ADEQ's BART is much shorter for White Bluff than for Flint Creek. As such, the amortization period for the controls results in much higher annual costs due to the period of time that White Bluff would still be operational. Unlike White Bluff and Flint Creek, Independence does not fall within the age range of facilities that are subject to BART. ADEQ did assess whether controls were necessary to ensure reasonable progress in Section V of the Proposed SIP and determined that no additional controls beyond BART were necessary to achieve reasonable progress during the 2008–2018 planning period.

ADEQ disagrees with the commenter that not requiring scrubbers in the Proposed SIP will ensure continued damage to people and the environment. Arkansas monitoring data shows that all areas of Arkansas are in attainment with EPA's NAAQS. See Response 3. Dry FGD controls at White Bluff and Independence are not necessary to ensure continued attainment with the NAAQS. The Proposed SIP is intended to address visibility in accordance with Clean Air Act §169A and EPA's Regional Haze Regulations.

The responses to Comments 20 and 25 in this document further explain ADEQ's consideration of comments regarding Dry FGD at White Bluff and Independence.

ADEQ notes the commenter's concern with waste generated by scrubbers entering streams. Waste generated by control technologies was considered pursuant to the statutory requirement for consideration of energy and non-air quality environmental impacts. The Dry FGD technology considered in this Proposed SIP would result in a solid waste, which is disposed of through landfilling, and thus there would be no new discharge into streams.

This comment does not necessitate changes to the proposed SIP.

Comment 9:

Some commenters requested that ADEQ retain source-specific NOx limits in place of a trading program. Commenters noted that the trading program would allow Entergy to buy pollution reduction credits in other states while continuing to pollute in Arkansas. The commenters also asserted that the trading program allow some areas of the state to be more polluted than others.

One commenter stated that ADEQ should not retain source-specific NOx limits in place of the trading program.

Response 9:

ADEQ did not include in the Proposed SIP any changes to previous determinations with respect to NOx for subject-to-BART EGUs and reasonable progress. On October 31, 2017, ADEQ submitted to EPA a final SIP revision that relied upon the Cross-State Air Pollution Rule (CSAPR) in place of source-specific NOx emission limits for EGUs. The 2017 SIP is consistent with federal requirements for an alternative to BART limits under 40 CFR 51.308(e)(4). Furthermore, EPA provided evidence demonstrating that implementation of the CSAPR program would achieve greater reasonable progress than BART.¹⁶ EPA further affirmed the continued validity of the use of CSAPR in place of source-specific BART determinations on September 29, 2017.¹⁷ On March 20, 2018, the United States Court of Appeals for the District of Columbia denied the petition for review of EPA's final action to allow states to use CSAPR in place of source-specific BART.¹⁸ ADEQ's 2017 SIP, which established the use of CSAPR as an alternative to source-specific BART NOx emission limitations for Arkansas EGUs was approved by EPA on February 12, 2018.¹⁹ EPA also withdrew source-specific NOx emission limitations for EGUs from the FIP on February 12, 2018.²⁰

This comment does not necessitate change to the Proposed SIP.

Comment 10:

Some commenters recommended replacement of White Bluff and Independence—and coal plants in general—with other generation technology, particularly renewable energy technology, such as wind and solar. One commenter also recommended transitioning to natural gas. Another commenter recommended replacement of coal, gas, and nuclear with solar and wind power. One commenter stated that we can grow the economy, invest in clean energy jobs, and have cleaner air and water. One commenter questioned why utilities are “dragging their feet” in adopting new renewable technologies. Some commenters noted that availability and cost-savings potential of renewable energy technologies. One commenter asserted that until the transition to a clean

¹⁶ 77 FR 33642

¹⁷ 81 FR 7894

¹⁸ USCA Case #12-1342 Document #1722974 Filed: 03/20/2018

¹⁹ 83 FR 5915

²⁰ 83 FR 5927

renewable energy economy is complete, there will still be people, nature, and natural areas exposed to pollution at unacceptable levels.

Some commenters criticized continued use of coal as a fuel. One commenter stated that a massive amount of haze in Arkansas is caused by exhaust in coal-fired electric power in Arkansas. Some commenters noted short-and long-term effects of pollution from coal. Others stated that coal was outdated.

Response 10:

The commenter's requests and comments regarding the composition of the energy-generating portfolio of utilities and the transition to renewable energy are beyond the scope of the authority of ADEQ, as well as the scope of the Regional Haze Rule. Under Title 23 of the Arkansas Code, Arkansas law vests the Arkansas Public Service Commission with the authority to regulate public utilities, which includes electric utilities.

The regional haze program is intended to address the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas that results from manmade air pollution.²¹ The program is not intended to address the composition of a state's electricity-generating portfolio.

This comment does not necessitate changes to the Proposed SIP.

Comment 11:

Several commenters suggested that clean air, health, and lives should be prioritized. Commenters indicated that clean air is one of the most basic issues for quality of life and that all living things deserve to breathe clean air. Commenters expressed the need to recognize the damage people are causing to the planet and to find solutions to fix it. Commenters urged ADEQ to prioritize the health of people over the wealth of energy companies.

Response 11:

ADEQ acknowledges and shares the commenters' priorities of clean air, as well as human and environmental health. The ADEQ Office of Air Quality works to implement programs that protect air quality to enhance the lives and health of all Arkansans and visitors to the State, while fostering responsible economic expansion opportunities. This is achieved through planning, regulatory development, permitting, inspection, and enforcement of State and federal rules. ADEQ has developed plans to ensure attainment and maintenance of the NAAQS, which protect public health and the environment. Arkansas is in full attainment of all the NAAQS. See Responses 3 and 8.

²¹ 42 U.S.C.A. § 7491

The Proposed SIP covers a different program area: visibility. The Proposed SIP seeks to address EPA Regional Haze Regulations and Clean Air Act §169A requirements for state plans to improve visibility at Class I areas. The Proposed SIP was written within the framework established by the Regional Haze Regulations and statute—and in accordance with EPA guidance for the first planning period (2008–2018)—which require ADEQ to consider, among other things, the cost of compliance. ADEQ notes that, under Arkansas law, energy companies are permitted to recover costs related to installation of emissions control technologies at EGUs required by the final SIP from electricity ratepayers subject to approval by the Arkansas Public Service Commission.

This comment does not necessitate changes to the Proposed SIP.

Comment 12:

Some commenters agreed with ADEQ’s determination that the Proposed SIP satisfied interstate transport requirements for visibility impairing pollutant; however, some commenters disagreed.

Some commenters supported ADEQ’s determination that no additional controls, provisions, or measures are necessary to satisfy interstate visibility transport provisions of 42 USC 7410(a)(2)(D)(i)(II) because ADEQ has not identified any measures included in any other state’s implementation plan to protect visibility that would be interfered with by emissions from any sources within Arkansas.

Other commenters stated that ADEQ’s analysis of measures for out-of-state Class I areas is inconsistent with both the statute and the Regional Haze Rule, both before and after the 2017 RHR Amendments. The commenters claimed that ADEQ attempts to avoid the “contribute to visibility test” of 40 CFR 51.308(f)(3)(II)(B) by substituting a non-interference standard. The commenters argued that ADEQ’s Proposed SIP fails to demonstrate that there are no additional emission reduction measures for sources that contribute to out-of-state Class I area visibility impairment that would be appropriate to include in the SIP. The commenters claimed that the contribution of Arkansas sources to light extinction at Missouri Class I areas was projected to increase between 2002 and 2018. The commenters asserted that ADEQ must require Independence units 1 and 2 to meet an emission limit of 0.06 lb SO₂/MMBtu, based on Dry FGD, to improve visibility in Missouri’s Class I areas.

The commenters likened the Proposed SIP’s explanation of why no additional controls are necessary to make reasonable progress in Missouri’s Class I areas to Nebraska and EPA’s rationale in considering whether controls were required at the Gerald Gentleman power plant (GGS) in Nebraska to make reasonable progress.²² The commenter asserted that the State of Nebraska and EPA relied upon the same arguments that ADEQ makes in the Proposed SIP. The

²² 77 FR 40150-at 40155-40156

commenters stated that EPA sought and the court granted a remand to reconsider this rationale for its reasonable progress control determination for GGS.

Some commenters requested that ADEQ take responsibility as a good neighbor to stop pollution from Arkansas coal plants from impacting Missouri. These comments were in association with a description of a study by Sonoma Tech, funded by the Sierra Club, which indicated that White Bluff and Independence contributed to nonattainment for the 2008 ozone standard in St. Louis.

One commenter stated that the scientific facts prove that what we do in one place has effects positively or adversely elsewhere.

Response 12:

ADEQ acknowledges those commenters who agree with ADEQ's determination that no additional controls are necessary to satisfy interstate visibility transport obligations for the first planning period.

ADEQ disagrees with those commenters that claimed that the Proposed SIP fails to demonstrate that there are no additional emission reduction measures for sources that contribute to out-of-state Class I area visibility impairment that would be appropriate to include in the SIP. As monitoring data included in the Proposed SIP demonstrates, Hercules Glades and Mingo Wilderness Areas are well on their way to achieve Missouri's reasonable progress goals. Therefore, no additional controls from Arkansas sources are necessary to ensure reasonable progress at Missouri Class I areas during the first planning period. More recent data for 2016, illustrated in Figures 8 and 9 below, demonstrates that Hercules Glades and Mingo Wilderness areas continue to be on track to achieve Missouri's reasonable progress goals.²³ In fact, both the 2016 observed twenty percent worst (haziest) average and the most recent five-year average (2012–2016) deciview values on the twenty percent worst days for 2016 were below Missouri's reasonable progress goals at both Missouri Class I areas.

²³ Figures 7 and 8 are updates to Figures 13 and 14 in the Proposed SIP. These figures have been updated so that the rolling average is inclusive of the current year and four previous years rather than reflecting the five previous years and to include 2016 data. 2000–2016 visibility data included in Figures x and y were obtained from: Visibility Status and Trends Following the Regional Haze Rule Metrics: IMPROVE Aerosol, Regional Haze Rule II (New Equation), with substituted data. Hercules Glades, Mingo <http://views.cira.colostate.edu/fed/SiteBrowser/Default.aspx>. Note: Missouri DNR revised its natural baseline conditions for Mingo on the twenty percent haziest days from 12.4 deciviews to 11.3 deciviews in their 2012 technical supplement to their 2009 Regional Haze SIP. <https://dnr.mo.gov/env/apcp/reghaze/regional-haze-jan-30-2012.pdf>.

Figure 8 Hercules Glades Reasonable Progress Assessment – 20% Worst Days

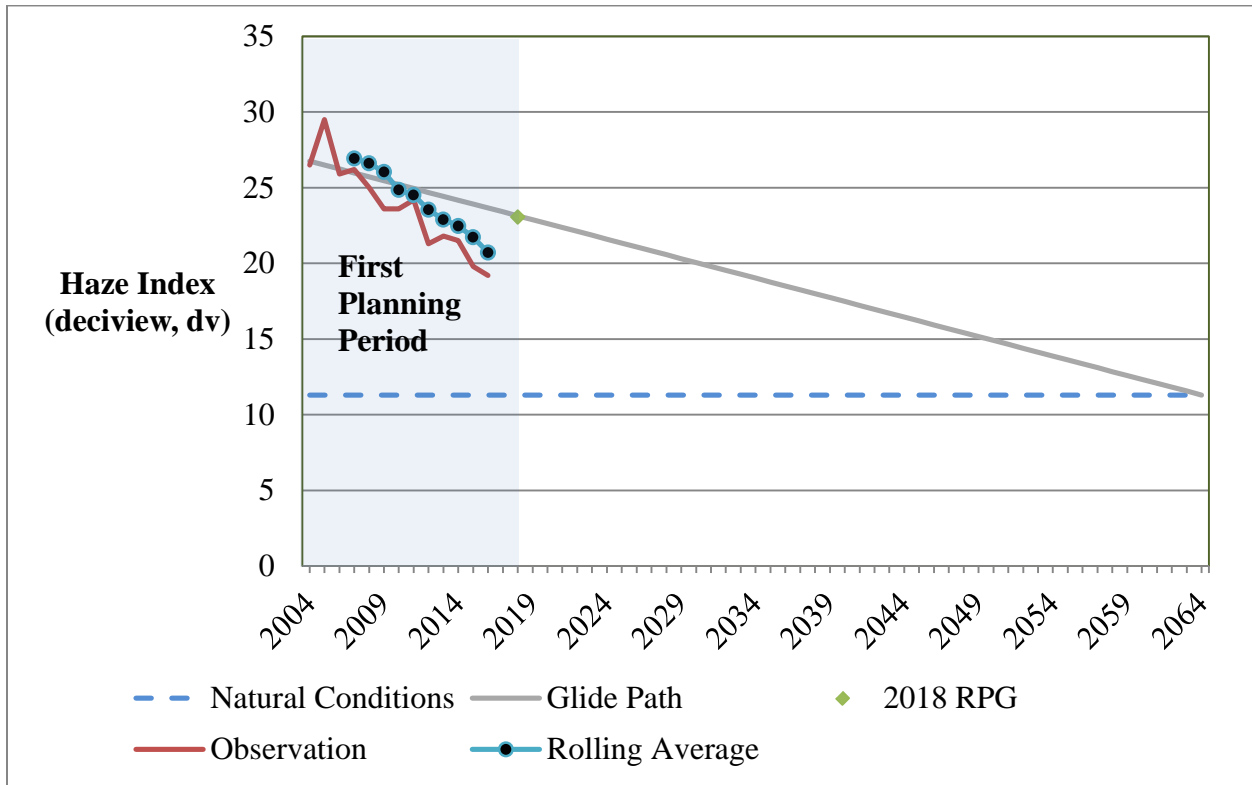
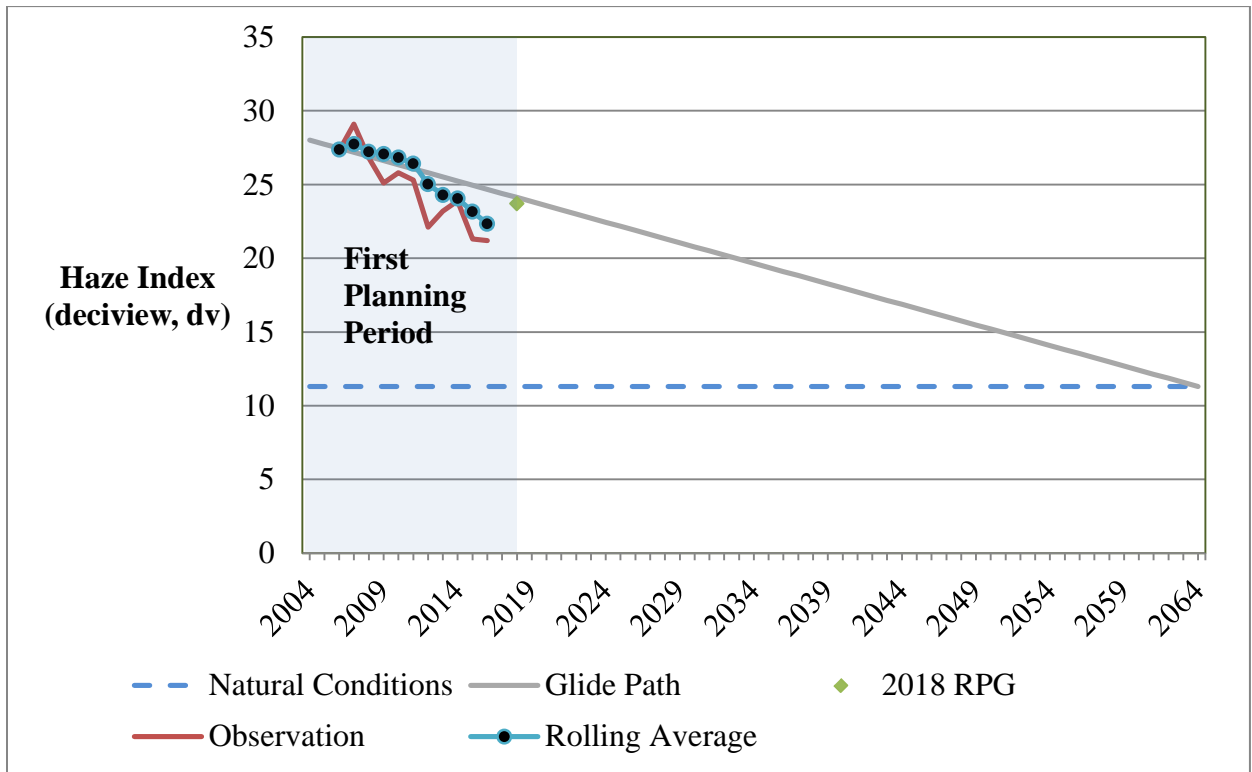


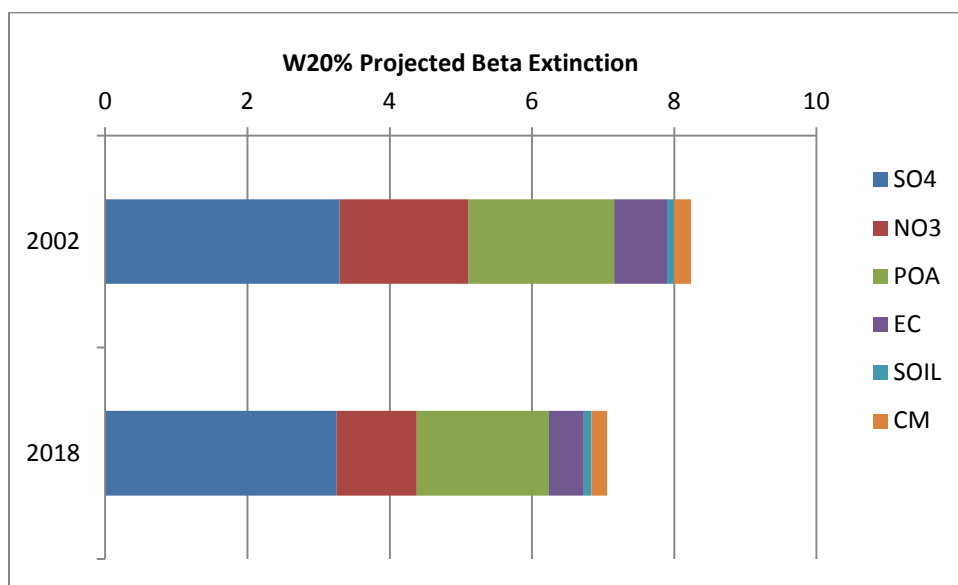
Figure 9 Mingo Reasonable Progress Assessment – 20% Worst Days



On October 27, 2017, ADEQ sent a letter to Missouri Department of Natural Resources (Missouri DNR) to provide the opportunity for consultation on the Proposed SIP. As part of this consultation, Missouri had the opportunity to inform ADEQ whether they thought any additional controls were necessary to achieve reasonable progress at Missouri Class I areas. Missouri DNR did not provide comments on the Proposed SIP. In addition, ADEQ also engaged in interstate consultation during the development of the State’s 2008 Regional Haze SIP.

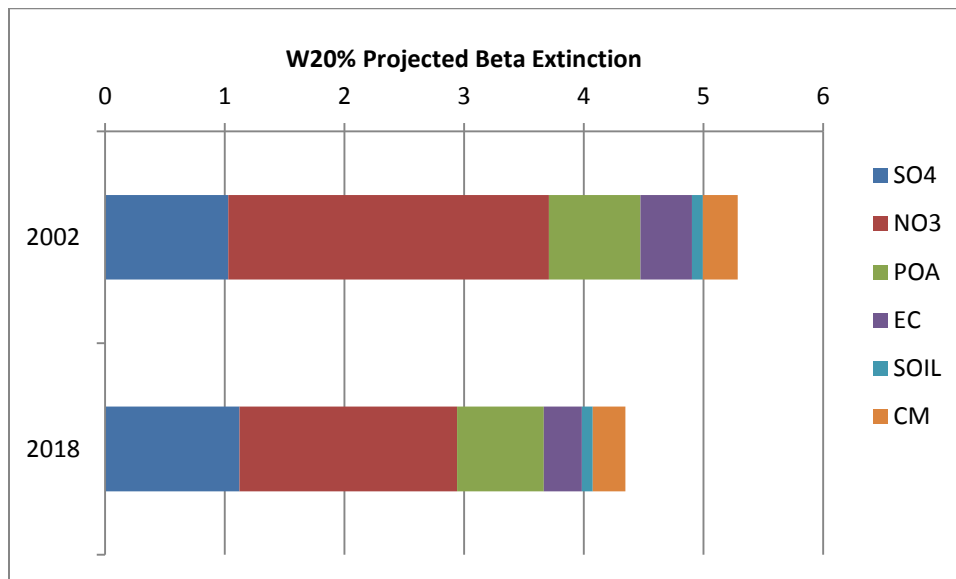
ADEQ disagrees with those commenters that asserted modeling data projected an increase between 2002 and 2018 in contribution from Arkansas sources to light extinction at Missouri Class I areas. CENRAP projections demonstrate a fourteen percent reduction between 2002 and 2018 in light extinction attributed to Arkansas sources for Hercules Glades and an eighteen percent reduction in light extinction attributed to Arkansas sources for Mingo Wilderness.²⁴ See Figures 9 and 10.

Figure 10 Comparison of Projected Light Extinction at Hercules Glades on the Hazeiest Twenty Percent Days Due to Particulate Species Attributed to Arkansas Sources



²⁴ Percent change in total light extinction associated with particulate species attributed to Arkansas sources from CENRAP PSAT Tool worst 20% projected extinction for Mingo and Hercules Glades 2002 and 2018 data sets, queried source region: Arkansas.

Figure 11 Comparison of Projected Light Extinction at Mingo on the Haziest Twenty Percent Days Due to Particulate Species Attributed to Arkansas Sources



ADEQ notes that the 2017 RHR Amendments specified requirements, including a four factor analysis, for sources that are reasonably anticipated to contribute to visibility impairment in a Class I area in another State. However, the 2017 RHR Amendments only apply to the second period and beyond. The preamble to the 2017 RHR Amendments explicitly states that “EPA is making changes to the requirements that states [] have to meet for the second and subsequent implementation periods.”²⁵ Prior to the 2017 RHR Amendments, the Regional Haze Rule stated:

Where the State has emissions that are reasonably anticipated to contribute to visibility impairment in any mandatory Class I Federal area in another State or States, the State must consult with the other State(s) in order to develop coordinated emission management strategies. The State must consult with any other State having emissions that are reasonably anticipated to contribute to visibility impairment in any mandatory Class I Federal area within the State.²⁶

ADEQ has met this obligation to consult with Missouri in order to develop coordinated emission management strategies. The Regional Haze Regulations further stated that:

The State must document the technical basis, including modeling, monitoring and emissions information, on which the State is relying to determine its apportionment of emission reduction obligations necessary for achieving reasonable progress in each mandatory Class I Federal area it affects. The State

²⁵ 82 FR 3078- at 3080

²⁶ 40 CFR 51.308(d)(3)(ii)

may meet this requirement by relying on technical analyses developed by the regional planning organization and approved by all State participants.²⁷

In the 2008 Arkansas Regional Haze SIP, ADEQ relied upon the technical analyses developed by CENRAP and approved by all State participants. CENRAP visibility projections indicated that the emission reductions planned for CENRAP states were sufficient to achieve the reasonable progress goals for Class I areas located in Missouri Class I areas.²⁸ In addition, CENRAP contracted with Alpine Geophysics to evaluate control strategies for reasonable progress. Alpine Geophysics recommended reasonable progress control strategies for six Class I areas within the CENRAP region: Big Bend National Park, Breton Island, Boundary Waters, Guadalupe Mountains, Wichita Mountain, and Voyageurs.²⁹ Neither Hercules Glades nor Mingo were included in the list of regions for which additional control strategies were recommended for reasonable progress. In addition, no specific measures were requested by Missouri for achieving reasonable progress in each mandatory Class I Federal area affected by Arkansas.

With respect to EPA's request for voluntary remand without vacatur of the long-term strategy contained in their Nebraska FIP, ADEQ notes that EPA did not concede that the long-term strategy aspect of the Nebraska FIP was erroneous, but rather that EPA stated that they may not have fully explained their reasoning and that EPA may not have fully responded to comments raised during the comment period regarding this issue.³⁰ EPA also noted in their request for remand that EPA's "present explanation could potentially be construed in a manner that is inconsistent with EPA's interpretation of the relevant statutory and regulatory requirements."³¹ In the request for remand, EPA stated that they will provide stakeholders with notice and opportunity to comment if EPA determines that it is necessary to introduce new evidence into the records or change its final decision.³² To date, EPA has not introduced new evidence—subsequent to their request for remand—into the docket or proposed changes to their final decision regarding the long-term strategy of the Nebraska FIP.

ADEQ notes certain differences between the circumstances regarding reasonable progress determinations with respect to GGS and ADEQ's determination in the Proposed SIP. First, GGS was a subject-to-BART facility. EPA disapproved the long-term strategy for Nebraska's Regional Haze SIP to the extent that it relied on what EPA stated was a flawed BART determination for GGS.³³ EPA promulgated a FIP for Nebraska reliant on the Transport Rule as an alternative to BART for SO₂ and determined that no source-specific emission limit was

²⁷ 40 CFR 51.308(d)(3)(iii)

²⁸ Technical Support Documentation for CENRAP Emissions and Air Quality Modeling to Support Regional Haze State Implementation included as Exhibit A of this Responsive Summary

²⁹ Alpine Geophysics, LLC (2006) "CENRAP Regional Haze Control Strategy Analysis Plan" included as Exhibit B of this Responsive Summary

³⁰ *Nebraska v. EPA*, No. 12-3084 (8th Cir. motion filed Feb. 6, 2015) at pages 11–12

³¹ *Id.* at page 12

³² *Id.* at page 12

³³ 77 FR 40150

necessary for GGS.³⁴ ADEQ's determination in the Proposed SIP was made after consideration of particulate source apportionment data, visibility progress at Missouri's Class I areas in relation to their goals, BART controls contained in the Proposed SIP, control measures included in the 2008 AR RH SIP, and the 2007 NOx SIP revision. The CENRAP technical support documents further support ADEQ's determination that no additional controls at Arkansas sources are necessary to make reasonable progress at Missouri's Class I areas.

ADEQ will continue to consult with Missouri DNR on the development of any future Regional Haze SIP.

Response 3 addresses comments referring to the STi study funded by Sierra Club.

This comment does not necessitate changes to the Proposed SIP.

Comment 13:

One commenter advocated for community planning to reduce energy use.

Response 13:

ADEQ acknowledges the commenter's recommendation that community planning can be used to reduce energy use; however, city planning and zoning are not within the scope of ADEQ's regulatory authority.

This comment does not necessitate changes to the Proposed SIP.

Comment 14:

Some commenters opposed replacing the EPA FIP with the proposed SIP. These commenters asserted that the Proposed SIP is too weak. In particular, the commenters objected to replacing the requirements for White Bluff and Independence from the FIP with the requirements included in the Proposed SIP. One commenter requested that ADEQ put in place changes that will improve the air quality in our wild areas, as well as for the whole state. Other commenters recommended that ADEQ scrap the weak proposed plan and adopt the stronger plan that EPA wrote.

Response 14:

ADEQ disagrees with commenters that the Proposed SIP is too weak and that ADEQ should scrap the Proposed SIP in favor of EPA's FIP. The controls required in the Proposed SIP are consistent with Clean Air Act §169A, EPA's Regional Haze Regulations, and EPA's guidance for the first planning period. In comments on EPA's FIP and Arkansas's Petition for

³⁴ Id.

Reconsideration of the FIP, ADEQ raised objections with respect to controls required in the FIP for White Bluff and Independence.³⁵

In making control determinations for subject-to-BART facilities, ADEQ evaluated facility specific information in arriving at Proposed BART determinations in accordance with the five statutory BART factors and EPA regulations and guidance for the first planning period. ADEQ factored new information—which was not included in the FIP—regarding Entergy’s planned changes in coal-fired operations at White Bluff into its analysis and reasonably concluded that a different BART determination was appropriate and warranted.

In determining whether additional controls were necessary for reasonable progress, ADEQ examined the CENRAP particulate source apportionment data, visibility improvement progress, emissions relative to distance from Class I areas, and the four statutory reasonable progress factors.. Based on ADEQ’s assessment of the combined evidence of these evaluations, ADEQ determined that no additional controls beyond BART and existing programs are necessary to achieve reasonable progress during the first planning period. This determination is consistent with EPA guidance which instructs that it is reasonable for states to defer more expensive controls to later planning periods in order to maintain a consistent glide path toward the long-term goal.³⁶ ADEQ will reevaluate whether additional controls are necessary for maintaining reasonable progress for future planning period Regional Haze SIPs. SIPs for the next Regional Haze Planning Period are due in 2021.

Although this comment does not necessitate changes to the proposed SIP, ADEQ is revising the reasonable progress analysis to discuss additional factors described in other comments received as well as comments regarding whether LSC at Independence should be considered an existing control. See Responses 25(c) and (d).

Comment 15:

Some commenters expressed concern with ADEQ’s previous and current actions with respect to implementation of the Regional Haze Program in Arkansas. Commenters asserted that haze reduction in Arkansas is more than a decade overdue. These commenters attributed this delay in implementation to ADEQ’s actions. Specifically, the commenters argue that ADEQ submitted a deficient plan in 2008 which was then disapproved by EPA in 2012. The commenters allege that

³⁵ ADEQ (2015) Re: Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Docket No. EPA-R06-OAR-2015-0189

ADEQ (2017) Petition for Reconsideration and Request for Administrative Stay in re: Promulgations of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan Final Rule (Docket No. EPA-R06-OAR-2015-0189)

The objections raised in the aforementioned documents to EPA’s FIP are hereby incorporated by reference and included as Exhibits C and D to this Responsive Summary.

³⁶ EPA (2007) “Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program” at page 1-4

instead of submitting a revised plan, ADEQ affirmatively chose to do nothing. As a result, EPA issued a FIP which Arkansas has sued to block and has issued the proposed plan to replace. The commenters argue that implementation of the haze program would be well underway if not for ADEQ's decade of delay and obstruction.

Several commenters asserted that ADEQ could do a better job at protecting air quality. One commenter stated that the proposed plan contradicts ADEQ's mission to "protect, enhance, and restore the natural environment for the well-being of all Arkansans." The commenter asserted that the Department has repeatedly ignored the requests and desires of the people in its decisions on environmental regulations. Other commenters expressed similar sentiments and urged ADEQ to take action to now to protect the people the agency serves and to abide by Clean Air Act requirements for reducing haze. Commenters also urged ADEQ to think about future generations. Commenters requested that ADEQ strengthen protections against pollution through regulation. Commenters asserted that money ADEQ receives from the U.S. Environmental Protection Agency (EPA) and state tax dollars need to be allocated to doing more to reduce smog in our parks. Another commenter stated that ADEQ needs to take into account the highest quality of education and utilize that knowledge to make a future that can make a difference in the lives of all Arkansans.

One commenter stated that the people of Arkansas love our natural state, but that they also love having a job. The commenter stated that ADEQ is doing an increasingly better job at striking that difficult balance.

Response 15:

ADEQ acknowledges the commenters concerns regarding the timeliness of a complete SIP submittal and is working to expeditiously meet all Clean Air Act requirements regarding the regional haze program for the first planning period. Air quality in Arkansas has substantially improved in recent years. Arkansas is in attainment for all of the NAAQS and is well below both the Proposed SIP's and the EPA's 2018 regional haze reasonable progress goals for Caney Creek and Buffalo River Wilderness Areas. See Responses 1 and 3.

ADEQ disagrees that the Proposed SIP contradicts the Department's mission statement. The Proposed SIP includes measures necessary to ensure progress in improving visibility at Class I Areas in Arkansas. Arkansas is well below its 2018 goal and is projected to remain under the glide path until well into the second planning period.³⁷ This plan assures reasonable progress toward achieving background visibility conditions by 2064, which will ensure that future generations will benefit from the increasing visibility at affected Class I areas.

ADEQ held a public comment period as well as a public hearing in order to solicit input from the public into its decisions. ADEQ finds this input to be a valuable aid in making its decisions and

³⁷ See Responses 1 and 3; See also IMPROVE Data Statistical Analysis, Trinity Consultants (July 2015).

thanks the commenters for sharing their thoughts with the Department. ADEQ is making certain changes to the Proposed SIP in response to other comments received to further strengthen the plan. The SIP, including the revisions ADEQ has made in response to public comment, meets all applicable Clean Air Act and Regional Haze Program requirements.

ADEQ acknowledges the commenters' preferences to allocate greater funding to address visibility. However, the Proposed SIP does not allocate funding, but instead requires certain controls and retrofit technology to assure reasonable progress toward background visibility conditions by 2064.

ADEQ acknowledges the comment that ADEQ is doing an increasingly better job at striking an appropriate balance in its regulatory duties and thanks the commenter for this input.

This comment does not necessitate changes to the Proposed SIP.

Comment 16:

Some commenters asserted that low sulfur coal (LSC) was an existing control at White Bluff and Independence; whereas, Entergy asserted that ADEQ's conclusion that LSC is an existing control at White Bluff and Independence is inaccurate.

Commenters provided differing reasons about why they viewed LSC as an existing control. One commenter asserted that the main requirement for Entergy in the proposed SIP is to burn LSC, which the commenter stated Entergy is already doing. Commenters noted that maximum monthly emission rates for White Bluff and Entergy could be rounded down to the tenths place to show compliance with a 0.6 SO₂/MMBtu emission limit. Other commenters stated that LSC is an existing control based on sulfur content limits approved for White Bluff pursuant to the Arkansas Utility Facility Environmental and Economic Protection Act (Ark. Code Ann. § 23-18-501, *et seq.*). The commenters noted that average monthly emission rates were less than permitted emission rates.

Entergy explained in its comments that an emission limit of 0.6 lb SO₂/MMBtu based on LSC does not reflect existing controls. Entergy stated that ADEQ improperly compared emission rates on a monthly basis to a three-hour permit limit. Entergy asserted that longer term emission rates must be lower than the short-term three-hour limit due to the natural variability in the sulfur content of coal. Entergy noted that the maximum three-hour average emission rate at White Bluff from 2014–2016 was 1.1 lb SO₂/MMBtu even though the monthly averages were lower.

Response 16:

ADEQ notes that a 1974 APC&EC order issued pursuant to the Arkansas Utility Facility Environmental and Economic Protection Act stated that LSC should be used at White Bluff.^{38,39} However, Entergy is not currently required to comply with a 0.6 lb SO₂/MMBtu thirty-boiler-operating day average pursuant to that order. Current permitted emission limits for White Bluff under their ADEQ Title V permit are 1.2 lb SO₂/MMBtu on a three-hour average.

In the Proposed SIP, ADEQ noted that thirty-boiler operating day average SO₂ rates for White Bluff and Independence were frequently below 0.6 lb SO₂/MMBtu; whereas, permitted emission limits for the two facilities were 1.2 lb SO₂/MMBtu and 0.93 lb SO₂/MMBtu, respectively. ADEQ acknowledges that the data provided by Entergy in comments on the Proposed SIP indicate that lower long term rates, which were often below 0.6 lb SO₂/MMBtu, may be necessary to ensure compliance with the higher short term limits due to the natural variability of sulfur content in coals. Therefore, ADEQ concedes that it is reasonable to assume that an emission limit of 0.6 lb SO₂/MMBtu does not represent an existing control for either White Bluff or Independence. ADEQ also notes that Entergy estimates that a \$ 0.50/ton cost premium would be required to ensure that all coals have sulfur content below 0.6 lb SO₂/MMBtu. ADEQ will revise the SIP to clarify that such an emission rate is not based on an existing control at either White Bluff or Independence.

With respect to the commenters' assertion that emission rates greater than 0.6 lb SO₂/MMBtu could be rounded to the tenths place and show compliance, ADEQ will revise the SIP to indicate that any emission limit based on LSC is based on an emission limit of 0.60 lb SO₂/MMBtu because the assessments of this limit evaluated emission reductions based on this limit without rounding to the tenth's place.

Comment 17:

Some commenters expressed general support for the Proposed SIP. Some commenters stated that as proposed, the SIP is a very beneficial improvement over EPA's FIP.

³⁸ A description of Arkansas Power and Light's proposed use of low-sulfur Wyoming coal with an average sulfur content of 0.48% was included in the order for issuance of a certificate of environmental compatibility and public need. (Document Number 131 in Arkansas Public Service Commission Docket #73-048-U http://www.apscservices.info/EFilings/Docket_Search_Documents.asp?Docket=73-048-U&DocNumVal=131)

During 2016, White Bluff units used coal with average heat content per unit coal of 8518.754 Btu/lb coal based on monthly short tons of coal and MMBtu reported to the Energy Information Administration (EIA Form 923 <https://www.eia.gov/electricity/data/eia923/>). If the average sulfur content were assumed to be 0.48% as proposed by Arkansas Power and Light, the average monthly emission rate based on the heat content per unit coal would be 1.125 lb SO₂/MMBtu—assuming 100% conversion of the sulfur in the coal to SO₂ in the exhaust gas.

³⁹ Document Number 131 in Arkansas Public Service Commission Docket #73-048-U http://www.apscservices.info/EFilings/Docket_Search_Documents.asp?Docket=73-048-U&DocNumVal=131

Response 17:

ADEQ acknowledges and appreciates this comment. This comment does not necessitate changes to the Proposed SIP.

Comment 18:

Some commenters noted in the Proposed SIP language that should be revised to more accurately represent the age of subject facilities. Commenters recommended that ADEQ revise the language describing White Bluff as “installed in 1974” to say “in existence in 1974.” The commenters pointed out that the units were not commissioned until 1980 and 1981. Other commenters recommended that ADEQ should similarly revise the language describing Independence. The commenters noted that construction on Independence commenced in 1978 and commercial operation began in 1983 for unit 1 and 1984 for unit 2. Commenter requested that ADEQ remove any language that may indicate that the two Independence units are nearing the end of their remaining useful life. Specifically, the commenters requested that ADEQ remove the term “aging” on page 57 of the Proposed SIP. The commenters noted that the Independence units were designed to operate for sixty or more years if maintained properly and have several decades of remaining useful life.

Response 18:

ADEQ acknowledges the commenters recommendations for language revisions to more accurately characterize the age of the White Bluff and Independence facilities. ADEQ will revise the Proposed SIP accordingly.

Comment 19:

Some commenters asserted that ADEQ’s assessment of reasonable progress relied upon or utilized elements of EPA’s 2017 “Protection of Visibility: Amendments to Requirements of State Plans” (“2017 RHR Amendments”) and associated draft guidance. The commenters pointed out that the 2017 RHR Amendments are the subject of litigation and that EPA has recently published notice of its intent to reconsider certain aspects of the rule. Commenters asserted that it is appropriate to use the same regulations as EPA used in addressing the disapproved elements of the 2008 SIP. The commenters recommended that ADEQ avoid reliance on the 2017 RHR Amendments and associated draft guidance in the SIP and revise any portions of the Proposed SIP that rely upon the draft guidance and/or the challenged 2017 RHR Amendments.

Some commenters expressed concern with moving forward with the Proposed SIP now given the legal challenge to the 2017 RHR Amendments and EPA’s notice of intent to reconsider the rule. The commenters asserted that moving forward with the plan now will only result in a requirement to withdraw the SIP changes and redo the effort to conform to a revised rule. The

commenters noted that a “stop/start” approach is not likely to achieve results helpful to the Arkansas business community and the residents of Arkansas.

Response 19:

ADEQ disagrees with commenters’ assertions that ADEQ’s assessment of reasonable progress relied on, or utilized elements of, EPA’s 2017 RHR Amendments and associated draft guidance. As noted in Response 12, the preamble to the 2017 RHR Amendments explicitly stated that “EPA is making changes to the requirements that states [] have to meet for the second and subsequent implementation periods.”⁴⁰ ADEQ relied upon the requirements for the first planning period as promulgated in the 1999 “Regional Haze Regulations”⁴¹ and amended in the 2005 “Regional Haze Regulations and Guidelines for Best Available Retrofit (BART) Determinations”⁴² in the Proposed SIP.

ADEQ formulated the approach to evaluating whether additional controls were necessary for reasonable progress after consideration of key pollutants impacting visibility at Arkansas Class I areas, the 2007 “Guidance for Setting Reasonable Progress Goals under the Regional Haze Program,” and reasonable progress analyses performed for other states for the first planning period.⁴³ The Proposed SIP is consistent with this guidance and the Regional Haze Rule as codified in the first planning period. ADEQ agrees that it is appropriate to use the same regulations as EPA used in addressing the disapproved elements of the 2008 SIP. ADEQ did not rely on the 2017 RHR Amendments or associated draft guidance in constructing its reasonable progress assessment.

Because ADEQ did not rely on the 2017 RHR Amendments or associated draft guidance in constructing the Proposed SIP, the ongoing litigation and reconsideration surrounding the 2017 RHR Amendments is not germane to this proposal as the 2017 RHR Amendments provide changes that affect the second planning period and beyond only; whereas, the Proposed SIP addresses first planning period requirements. Therefore, there is no need to delay finalization of the Proposed SIP.

This comment does not necessitate changes to the Proposed SIP.

⁴⁰ 82 FR 3078- at 3080

⁴¹ 64 FR 35714

⁴² 70 FR 39104

⁴³ See EPA (2007). “Guidance for Setting Progress Goals under the Regional Haze Program” included as Exhibit E to this Responsive Summary.

See also Section 10.3.2 of Michigan’s 2010 Regional Haze SIP. http://www.michigan.gov/documents/deq/AOD-Oct-2010-SIP-final-HAZE-BART-SIP_337956_7.pdf

See also EPA’s proposed FIP for Arizona (79 FR 9318 -at 9352- 9360)

See also Section 3.2 of the “Federal Land Managers’ Air Quality Related Values Work Group (FLAG): Phase I Report—Revised (2010). https://www.nature.nps.gov/air/Pubs/pdf/flag/FLAG_2010.pdf

See also Appendix H Section 5 of Georgia Environmental Protection Division’s 2010 SIP https://epd.georgia.gov/air/sites/epd.georgia.gov.air/files/related_files/document/appendixh.pdf.

Comment 20:

ADEQ received several comments regarding the proposed BART analysis and emission limit determination for White Bluff. Some commenters suggested revisions were necessary to the analysis based on additional information provided by Entergy that was included in a notice of data availability issued by ADEQ on December 18, 2017 after proposal of the SIP. Some commenters stated that there were flaws in Entergy's analyses included in the notice of data availability and in the redacted version of Entergy's 2017 updated BART analysis for White Bluff that ADEQ used in its BART analysis and determination in the Proposed SIP. Some commenters asserted there were flaws in ADEQ's evaluation and proposed conclusions with respect to Entergy's 2017 updated BART analysis for White Bluff.

20(a):

Some commenters took issue with the remaining useful life assumptions for White Bluff included in the Proposed SIP based on a 2030 cessation of coal use date. Some commenters argue that ADEQ failed to utilize critically important facility-specific information provided by a Permittee regarding planned operating conditions of permitted facilities. In particular, Entergy submitted a document to ADEQ in which it stated that it has a planned cease-to-use-coal date for White Bluff for 2028 and that Entergy will take an enforceable restriction in that regard. The commenters alleged that ADEQ did not consider this key fact in developing its long-term strategy, including planned controls. The commenters urged ADEQ to revise its BART analysis to reflect Entergy's expectation that it will cease combusting coal at White Bluff on or before December 31, 2028. The commenters stated that neither statute nor the Regional Haze Regulations provide ADEQ with the authority to reassess and redefine the remaining useful life of a source. Other commenters stated that the remaining useful life assumptions used in the SIP are unlawful unless ADEQ adds a provision to the SIP that makes enforceable the requirement for White Bluff to cease burning coal or cease all operations by the date used in the remaining useful life analysis. Commenters asserted that the 2030 date assumed by ADEQ in the Proposed SIP has no support in the administrative record. Other commenters asserted that ADEQ's selection of a later date than contained in Entergy's updated five factor analysis is supported.

Response 20(a):

ADEQ acknowledges the commenters assertions regarding the December 31, 2028 date and agrees that, given Entergy's withdrawal of confidentially claims on their updated five factor analysis for White Bluff, it is appropriate to revise the SIP to reflect cessation of coal-fired operations by that date. On October 31, 2017, ADEQ proposed a December 31, 2030 cessation of coal-fired operations date based on a seven year remaining useful life for White Bluff and an assumed compliance date based on ADEQ's anticipation of the timeframe for approval of the final SIP by EPA. At that time, Entergy had provided ADEQ a copy of their updated BART analysis for White Bluff with certain information, including their proposed cessation of coal

dates, held confidential. Based on Entergy's assertion of confidentiality, ADEQ determined that it was not appropriate to disclose information held as a trade secret in the Proposed SIP. Therefore, ADEQ related the cost information provided by Entergy in the updated analysis to a previous letter from Entergy providing cost-effectiveness estimates for various remaining useful life assumptions.

Entergy's withdrawal of confidentiality claims on its updated five factor analysis substantively impacts ADEQ's assessment of the five BART factors.⁴⁴ Specifically, it alters ADEQ's evaluations with respect to compliance date assumptions and cessation of operations. ADEQ assumed a compliance date of 2023 based on five years after an anticipated 2018 approval of the SIP; however, Entergy's updated analysis used 2021 as an assumed compliance date. This coincides with the October 27, 2021 compliance date required by EPA's FIP. In addition, Entergy has now made public the proposal in the updated five factor BART analysis for White Bluff the 2028 cessation date; therefore, no back calculation based on the previous April 21, 2017 letter is necessary.

ADEQ will revise both the SIP narrative and administrative order to reflect the remaining useful life assumptions and a cessation of coal-fired operations by no later than December 31, 2028 consistent with Entergy's updated five factor analysis for White Bluff.

20(b):

Some commenters stated that ADEQ's BART analysis and determination should not be premised on any plan for early retirement or cessation of the use of coal at White Bluff during the next or any future planning period. The commenters asserted that such a requirement is outside the scope of the Proposed SIP because it would take place after the end of the first planning period. The commenters noted that BART guidelines and guidance do not require premature retirement or fuel switching. The commenters argued that the extent to which the Proposed SIP's BART determination for White Bluff is based on a premature retirement date that has not been approved, but would otherwise result in significant costs that would affect the continued viability of White Bluff before the end of its actual remaining useful life, is contrary to the intent of the Clean Air Act and BART guidelines. The commenters further asserted that early closure or cessation of coal-fired operations at White Bluff would require approval of other regulatory authorities. The commenters stated that any requirement to fuel switch or close is not practically or finally enforceable at this time and should not be included in the final Phase II SIP.

Response 20(b):

⁴⁴ Entergy's Updated Five Factor Analysis for White Bluff was public noticed as a notice of data availability (NODA) on December 21, 2017. ADEQ also extended the comment period on the SIP at that time to allow the public to consider Entergy's updated analysis as they developed comments on the Proposed SIP. This NODA and associated documents are included in Tab E of the final SIP.

ADEQ acknowledges that the BART guidelines and guidance do not require premature retirement or fuel switching as BART. However, both the guidelines and the guidance require ADEQ to consider the remaining useful life of the facility for which controls are being evaluated. The BART guidelines state that remaining useful life is the difference between “the date that controls will be in place” and “the date the facility permanently stops operations. Where this affects the BART determination, this date should be a federally- or State-enforceable restriction preventing further operation.”⁴⁵

Other states have included in their Regional Haze SIPs an enforceable requirement to cease operations by a date certain at the request of subject facilities.⁴⁶ For example, Oregon reopened their BART regulations at the request of PGE to include an alternative to BART for PGE Boardman in which PGE would commit to cease burning coal at PGE Boardman by December 31, 2020.⁴⁷ Pursuant to this request, Oregon Department of Environmental Quality (ODEQ) performed an updated BART analysis based on a shorter remaining useful life for PGE Boardman and determined that their previous BART determinations for SO₂ of semi-dry flue gas desulfurization was not cost-effective based on the revised remaining useful life.⁴⁸ EPA approved ODEQ’s revised BART determination for PGE Boardman.⁴⁹ PGE’s operation cessation date for PGE Boardman was rendered enforceable through a revision to Oregon’s BART regulations at OAR 340-223-030(1)(e). Similarly, ADEQ is revising its disapproved 2008 BART determination for White Bluff—which was based on Dry FGD—to LSC after consideration of the revised remaining useful life of White Bluff as indicated by Entergy’s proposed commitment to cease coal-fired operations at White Bluff. Cessation of coal-fired operations will be rendered enforceable via a final, signed administrative order that will be submitted with the final SIP.

This comment does not necessitate changes to the Proposed SIP.

20(c):

Some commenters took issue with ADEQ’s proposed compliance date assumptions included in cost-effectiveness calculations for retrofit technologies at White Bluff in the Proposed SIP. One commenter stated that it is arbitrary to use a 2023 compliance date for Dry FGD in determining remaining useful life because Entergy is already required to comply with an emission limit for Dry FGD by October 27, 2021 by EPA’s FIP. The commenters noted that EPA has not reconsidered or stayed this requirement and that the court has also not stayed this requirement. The commenters further explain that Entergy should have been planning for the installation of Dry FGD since at least 2013 when Entergy proposed such controls to ADEQ and EPA to meet

⁴⁵ (70 FR 39104- at 39169)

⁴⁶ Oregon (76 FR 12561), Washington (77 FR 72742), Oklahoma (79 FR 12944)

⁴⁷ 76 FR 12561

⁴⁸ Id.

⁴⁹ 76 FR 38997

BART requirements. In addition, the commenters noted that Dry FGD has been installed at other similar facilities in less than five years. The commenters stated that it was appropriate for Entergy to assume in its updated five factor analysis for White Bluff a 2021 compliance date for Dry FGD and a 2019 compliance date for DSI based on the timing of installation at other units.

Commenters disagreed on the amortization period based on the cessation of coal-fired operations date included in the SIP, the cessation date proposed by Entergy, and the assumed compliance date. One commenter suggested that ADEQ's calculated costs under the proposed compliance date assumptions would be greater if they were based on Entergy's anticipated cease to use coal date of 2028 because it would yield a five-year amortization period for installation of Dry FGD at White Bluff. Another commenter stated that Entergy's updated BART analysis for White Bluff should have used a 7.17 year remaining useful life for Dry FGD and a 9.17 year remaining useful life for DSI given their proposal to cease coal-fired operations by December 31, 2028 and an assumed compliance date of October 27, 2021 for Dry FGD based on the FIP.

Response 20(c):

ADEQ is revising its compliance date assumptions to reflect the assumed compliance dates for controls at White Bluff used in the now publicly available updated five-factor analysis for White Bluff. See Response 20(a). ADEQ also notes that compliance dates for Dry FGD at White Bluff in the FIP were stayed by the Eighth Circuit Court of Appeals on March 7, 2018.⁵⁰

ADEQ acknowledges that the FIP compliance date for Dry FGD is October 27, 2021; therefore, a remaining useful life based on this date rounded to the second decimal place would be 7.17 years (seven years and two months). It should be noted that Table A.2 in Appendix A to Chapter 2 of the EPA Control Cost Manual includes capital recovery factors on a yearly basis.⁵¹ ADEQ estimates that the average cost-effectiveness of Dry FGD based on 7.17 years of remaining useful life and the cost information provide by Entergy in Table 4-4 of the updated White Bluff BART analysis would be \$5,331/ton for White Bluff Unit 1 and \$5,298/ton for White Bluff Unit 2.⁵² This rounding difference would not put the cost-effectiveness for Dry FGD at White Bluff within the range typically found cost-effective and does not alter ADEQ's determination.

ADEQ disagrees with the commenter that asserts that remaining useful life assumptions for DSI should be based on 9.17 years. There is nothing in the record to support such an assertion. The commenter agreed that Entergy's assumption that DSI could be installed and operating by the end of 2019 was appropriate; therefore, the remaining useful life for DSI would be nine years, not 9.17 years.

⁵⁰ Appellate Case : 16-4270 Entry ID: 4636668

⁵¹ Annualized Capital Cost = Capital Costs x Cost Recovery Factor. Cost-Recovery Factor for 7.17 years = 0.182115

⁵² Cost-effectiveness values included in approved SIPs and FIPs for BART are typically below \$5,000/ton. This is illustrated in Exhibit B to the National Parks Conservation Association, Earthjustice, and Sierra Club comments on the Proposed SIP.

20(d):

One commenter asserted that the emission reduction and cost-effectiveness calculations in Entergy's 2017 updated five-factor analysis for White Bluff that ADEQ relied upon in the Proposed SIP were flawed. In particular, the commenter disagreed with Entergy's change in baseline period, approach to calculating emission reductions from LSC, approach to calculating emission reductions from dry sorbent injection (fifty percent control and eighty percent control), and cost-effectiveness calculations.

i. Baseline Period

The commenter objected to certain baseline assumptions Entergy included in its 2017 updated BART analysis for White Bluff. The commenter stated that there was no basis provided by Entergy for the use of a 2009–2013 baseline for evaluating SO₂ controls rather than a 2001–2003 baseline. The commenters further argue that use of a 2001–2003 baseline is necessary because the annual average SO₂ emission rate for the more recent baseline period is below the assumed controlled emission rate for LSC of 0.60 lb SO₂/MMBtu used in the cost-effectiveness calculations. The commenter also questioned why Entergy's proposed emission limits for DSI were based on 2014–2016 data when Entergy used a 2009–2013 baseline for costs. The commenter also questioned Entergy's use of the updated baseline for visibility impact modeling and stated that Entergy did not provide any basis for deviating from the 2001–2003 baseline for SO₂ emissions for its BART visibility modeling. The commenter also supported their questioning of the baseline change with the following quote by EPA from their July 1, 1999 action:

After considering public comments on the baseline issue, EPA has determined that the most appropriate "baseline period" would be a fixed, 5-year period extending from calendar year 2000 through calendar year 2004. The EPA concluded that a standard baseline period provides for greater national consistency in establishing this important value, and therefore, is preferable to a provision allowing the baseline period to be a variable number of years. Using a common number of years and data points to calculate the baseline value for each site is consistent with fundamental statistical principles and will provide for easy comparison of data from multiple sites as the program is implemented.⁵³

ii. Alternative Cost-Effectiveness Calculation Methodology

The commenter objected to Entergy's approach to calculating cost-effectiveness for LSC. The commenter points out that this method deviates from the BART guidelines and argues that the approach improperly inflates the cost-effectiveness value of LSC. The commenter asserts that the cost-effectiveness for LSC should be zero if using a baseline of 2009–2013 based on annual average emissions at White Bluff. The commenter further argues that comparing cost-

⁵³ 64 FR 35729

effectiveness for add-on controls calculated according to the BART guidelines with cost-effectiveness for LSC calculated according to the alternative methodology is not an “apples-to-apples” comparison. The commenter states that ADEQ must ensure that cost-effectiveness and incremental cost-effectiveness analysis for all controls are evaluated based on the same methodology for calculating annualized cost of control and annualized emission reductions.

iii. Control Efficiency Design Assumptions

The commenter asserted that the costs of DSI included in Entergy’s 2017 updated BART analysis for White Bluff were overstated. The commenter argued that the design and cost of controls should be based on the average annual reductions in SO₂ emission rate, not the highest five percent of SO₂ emissions over the baseline period. In addition, the commenter asserts that the proposed emission limits evaluated are based on a lower percentage of control than assumed for cost. The commenter also questioned the assumptions that upgrades to Entergy’s existing electrostatic precipitator, which is factored into the cost of controls, would be necessary. The commenter points out that their assessment of White Bluff’s historic particulate loading based on Energy Information Administration Data, is less than assumed for the inlet ash loading to the electrostatic precipitator (ESP) in the evaluation by Fuel Tech included with the updated BART analysis of whether upgrades to the ESP are necessary to accommodate the additional particulate loading from DSI. The commenter also stated that the assumed outlet particulate matter (PM) emission rate included in Fuel Tech’s analysis were lower than permitted limits and is not supported by stack test data.

iv. Overnight Costing Methodology

The commenter also stated that it is unclear whether the cost-effectiveness numbers relied upon by ADEQ comport with the overnight costing methodology of EPA’s Control Cost Manual. In Entergy’s 2017 updated BART analysis for White Bluff, Entergy two cost-effectiveness tables, one based on Entergy’s assessment of actual costs and one adjusted for EPA-exclusions. The commenter noted that ADEQ utilized in the proposed SIP the cost-effectiveness values adjusted for EPA-exclusions, yet did not explicitly state this. The commenter states that it is unclear whether all other costs not consistent with EPA costing methodology, besides AFUDC, were excluded.

v. Alternative Integrated Planning Model Cost Modules-Based Cost-Effectiveness Calculations

The commenter provided revised calculations of the cost-effectiveness of DSI and Dry FGD at White Bluff based on their own assessment of costs for these retrofits. For these calculations, the commenter revised assumptions for remaining useful life, baseline, and costs. The commenter calculated cost-effectiveness values for 11, 9.17, 7.17, and 5 years of remaining useful life. The commenter revised cost of controls to be based upon Integrated Planning Model (IPM) cost modules. The commenter asserted that based on their calculations, DSI and Dry FGD would be cost-effective at any of the remaining useful life values evaluated.

Response 20(d):

i. Baseline Period

For the Entergy White Bluff cost effectiveness analyses, ADEQ used the SO₂ baseline period of 2009–2013. One commenter stated that the original baseline period of 2001–2003 was a more appropriate baseline period and that using the 2001–2003 baseline period “is most consistent with the baseline period that EPA has stated is to be used for baseline visibility conditions in EPA’s regional haze rules.” ADEQ disagrees with this assertion. At the request of ADEQ, Entergy provided an updated BART five-factor SO₂ analysis for White Bluff (dated August 18, 2017) to supplement previous BART analyses (dated February 2013, October 2013, August 2015, and August 2016) submitted to EPA for their consideration in development of the AR RH FIP. Among the specific updates incorporated into Entergy’s August 18, 2017 BART analyses, Entergy updated the original 2001–2003 SO₂ baseline period (36,723 tons per year (tpy) average) to 2009–2013 (31,972 tpy average) for consistency because in EPA’s development of the AR RH FIP⁵⁴, EPA also had revised White Bluff’s Unit 1 and Unit 2 baseline emissions by using both NO_x and SO₂ (EPA calculations as part of a response to comments received on the draft FIP) emissions from the five year period of 2009–2013 and excluded the maximum and minimum years.

With regard to the commenter’s questioning of why Entergy’s proposed emission limits for DSI was based on 2014–2016 data when Entergy used a 2009–2013 baseline for costs, ADEQ re-reviewed the DSI Cost Report and asked Entergy to also review this document again. Subsequent to ADEQ’s request to Entergy, Entergy provided ADEQ with a response indicating that the 2014–2016 reference in the Sargent & Lundy Cost Report was a typographical error: the 0.66 lb SO₂/MMBtu thirty-day average was, in fact, calculated from 2009–2013 SO₂ emissions, and Entergy also provided to ADEQ a revised Cost Report that corrects the typographical error.⁵⁵

Entergy’s modeled visibility improvement from evaluated SO₂ controls were based on an updated baseline of 2009–2013 emissions rather than the 2001–2003 baseline emissions EPA used in the AR RH FIP to project visibility improvements from Dry FGD and Wet FGD. This change in baseline emissions impacts the modeled visibility benefit from Dry FGD. The modeled visibility benefit of Dry FGD at each unit is fifteen to twenty-six percent lower in Entergy’s updated analysis than estimated in the AR RH FIP. EPA did not evaluate visibility improvements associated with DSI, enhanced DSI, and LSC in the AR RH FIP; however, ADEQ expects that the relative difference in cost-per-deciview among the control options evaluated would be similar across both baseline emissions periods. The difference in visibility impact estimates due to differences in estimated baseline emissions between the AR RH FIP and Entergy’s updated five factor analysis does not change ADEQ’s ultimate decision for its SO₂ BART determination for White Bluff, which is based on an assessment of all five statutory BART factors.

⁵⁴ From the EPA-RO6-OAR-2015-0189-0205 docket “White Bluff_R6 cost revisions2-revised” at Regulations.gov

⁵⁵ The revised Cost Report has been included in Appendix D of the final SIP.

ADEQ finds that the commenter took the July 1, 1999 EPA quote out of context.⁵⁶ The quote provided by the commenter described EPA's determination with respect to the five-year baseline period used for the tracking of progress for each Class I area, using monitor data, toward the goal of obtaining natural conditions. This quote is not associated with a three-year baseline period to be used for visibility impact modeling.⁵⁷

ii. Alternative Cost-Effectiveness Calculation Methodology

ADEQ disagrees with the commenters' assertions that the cost-effectiveness of LSC should be zero for White Bluff. If the traditional approach of using annual emission reductions were used, as opposed to the maximum thirty-day emissions rate, the cost-effectiveness value would near infinity. This would not provide a meaningful framework for comparison since there would be low cost emission reductions as a result of compliance with a 0.6 lb SO₂/MMBtu emission rate at White Bluff.

iii. Control Efficiency Design Assumptions

At the request of ADEQ, Entergy provided an updated BART five-factor SO₂ analysis for White Bluff (dated August 18, 2017) that included cost estimates based on design parameters that were developed by Sargent & Lundy. Sargent & Lundy used an SO₂ inlet rate of 0.76 lb SO₂/MMBtu, which was the highest five percent of SO₂ emissions for the baseline period of 2009–2013 (see our separate response to a commenters assertion that 2009–2013 is an inappropriate baseline period) and based their size and cost calculations on this emission rate.

Because control systems are designed based on reasonable estimates of maximum potential emissions, ADEQ finds that Sargent & Lundy's design of the DSI control system based on an inlet SO₂ rate of 0.76 lb SO₂/MMBtu, which was calculated from the highest five percent of SO₂ emissions during the baseline period of 2009–2013, is appropriate. Otherwise, sizing control systems based on average conditions, as the commenter suggests, would result in undersized and inadequate control equipment during times when the actual emissions are greater than the average emissions.

Increases in PM loading to ESPs require additional control of PM emissions and as the commenter acknowledged: "Entergy would want to ensure that actual PM emissions do not increase above PSD significance levels and trigger PSD permitting." Upgrades to the ESP PM ash handling system should be sized based on an estimate of the maximum SO₂ inlet rate and not by calculating ash loading using EPA's AP-42 emission factors, which can result in undersizing the control equipment. Furthermore, in their analysis the commenter also referenced stack test data results of controlled PM emission rates of 0.019 and 0.016 lb/MMBtu for the two units and Sargent & Lundy estimated a controlled PM emission rate of 0.0155 lb/MMBtu based on a

⁵⁶ 64 FR 35728.

⁵⁷ See 64 Fed. Reg. 35728 and the "Guidance for Tracking Progress Under the Regional Haze Rule", Section 1.5, Page 1-4 (<https://www3.epa.gov/ttnamti1/files/ambient/visible/tracking.pdf>)

modeling simulation. Based on the stack test data and Sargent & Lundy's modeling, ADEQ finds that a design target of 0.015 lb/MMBtu is reasonable and that upgrades to the ESP are not an "unrealistic" component of the evaluated DSI project.

iv. Overnight Costing Methodology

EPA's BART Guidelines suggest, when possible, that cost estimates should be based on EPA's Control Cost Manual, which describes a cost-estimating methodology. From Entergy's August 17, 2017 updated BART analysis that included Cost Basis Reports prepared by Sargent & Lundy for White Bluff, ADEQ understands that Sargent & Lundy did prepare cost estimates for White Bluff using the BART Guidelines and the Control Cost Manual methodology in addition to cost-estimates relied upon based on Entergy's claimed actual costs. Therefore, ADEQ's evaluation of costs based on the information contained in Table 4-4 of Entergy's updated White Bluff BART analysis does conform to EPA costing methodology requirements. Entergy's cost estimates in Table 4-4 did not include "Allowance for Funds Used During Construction" and "Owner's Costs."

v. Alternative Integrated Planning Model Cost Modules-Based Cost-Effectiveness Calculations

While the IPM cost modules do provide BART control technology unit-specific costs, using IPM's cost modules solely with information from publicly available sources does have unit-specific limitations and should be used with caution when more appropriate and detailed site-specific information is available. IPM was developed to provide generic costs to allow "in the ballpark" comparisons of various control technologies and not to be relied on for unit-specific costs when more appropriate unit-specific and site-specific information is available and was not intended to be used as a substitute for otherwise known site-specific cost information. See Sargent & Lundy's comments for an additional discussion of the IPM model and using the *Chemical Engineering Plant Cost Index* (CEPCI) to adjust IPM-generated costs. This comment does not necessitate changes to the Proposed SIP.⁵⁸

20(e):

ADEQ received some comments affirming and some comments disagreeing with ADEQ's cost-effectiveness determinations for retrofit technology at White Bluff. Some commenters disagreed with ADEQ's assessment of cost-effectiveness for Dry FGD and DSI. Other commenters agreed with ADEQ's determination that in light of remaining useful life (seven years for Dry FGD and nine years for DSI) for White Bluff, DSI and Dry FGD are not cost-effective.

⁵⁸ Sargent & Lundy Comments on the Conservation Organization's Technical Support Document Arkansas Department of Environmental Quality's October 2017 Proposed Revisions to the Arkansas State Implementation Plan Regional Haze SIP for 2008–2018 Planning Period Prepared by Victoria R. Stamper, February 1, 2018 (included as Exhibit F to this Responsive Summary)

One commenter asserted that ADEQ had inaccurately calculated the average dollar per deciview values in Table 4. Specifically, the commenter alleged that ADEQ had included the annualized cost for LSC in its annualized costs for DSI, enhanced DSI, and Dry FGD. The commenter stated that ADEQ assumed LSC would be implemented in addition to the other assess controls.

Some commenters stated that, because there is no enforceable requirement for White Bluff Units 1 and 2 to cease burning coal or cease all operations by a date certain, a thirty-year remaining useful life is more appropriate for assessing control options at White Bluff. The commenters stated that the resulting cost-effectiveness of Dry FGD \$2,565/ton for unit 1 and \$2,421/ ton for unit 2 are well within the range of costs that EPA and other states have typically found cost-effective. The commenters noted that ADEQ did not specify a threshold for considering controls cost-effective. The commenters further explained that, based on their revised calculations, Dry FGD and DSI would be cost-effective even with a five, seven, or nine year remaining useful life. The commenter notes that Dry FGD would improve visibility more than DSI or LSC. Commenters stated that it is EPA's policy that control costs incurred at similar sources to meet BART or regional haze control requirements should not be considered unreasonable.

Response 20(e):

ADEQ disagrees with the commenters that the annualized costs for DSI, enhanced DSI, and Dry FGD used to calculate the values in Table 4 included the annualized cost of LSC. ADEQ did not assume that LSC would be implemented in addition to the other assessed controls. The White Bluff Cost Calculations Datasheet provided with the Proposed SIP includes formulas that demonstrate ADEQ's calculations in translating the incremental cost-effectiveness values provided in Table 4-4 of the updated White Bluff five factor analysis. The formulas back-calculate the incremental annualized costs for DSI, Enhanced DSI and Dry FGD from incremental cost-effectiveness relative to LSC and incremental emission reductions relative to LSC. Incremental annualized costs are the difference in costs between two control technologies. Below is an example formula for calculating the incremental annualized cost of DSI relative to LSC.

Formula 1:

$$\begin{aligned} & \textit{Incremental Annualized Cost of DSI relative to LSC} \\ & = (\textit{Annualized Cost of DSI}) - (\textit{Annualized Cost of LSC}) \end{aligned}$$

The formula below shows how the incremental annualized cost of DSI was back-calculated from the information that was not redacted in Table 4-4 of the updated White Bluff analysis.

Formula 2:

Incremental Annualized Cost of DSI

$$= (\text{Incremental Cost-effectiveness of DSI vs LSC}) \times (\Delta \text{Emissions DSI} - \Delta \text{Emissions LSC})$$

To calculate the actual annualized cost from the incremental cost of DSI relative to LSC, one must add the LSC to the incremental cost of DSI. This is a simple rearrangement of Formula 1. Therefore, the commenter is incorrect in their statement that ADEQ mischaracterized the annualized costs for DSI, Enhanced DSI, and Dry FGD at White Bluff.

Although ADEQ's back calculated values were accurate for the assumptions upon which they were premised, ADEQ is revising its evaluation of costs for White Bluff based on the costs included in Entergy's updated five-factor analysis for White Bluff. ADEQ did not rely on Entergy's values in the Proposed SIP because Entergy had specifically redacted the values and requested that they be considered a trade secret when they originally submitted the analysis on August 18, 2017. Entergy has since withdrawn confidentiality claims with respect to their cost calculations. Therefore, it is now appropriate to use those values included in Table 4-4 of Entergy's updated five factor analysis for White Bluff, which are based on allowed costs under EPA's control cost methodology.

ADEQ disagrees with those commenters that state that ADEQ should base cost-effectiveness calculations for White Bluff on a thirty-year remaining useful life. ADEQ included in the proposed SIP an AO including Entergy's proposed cessation-of-coal-fired-operations date for White Bluff; therefore, truncation of the remaining useful life assumed for cost-effectiveness calculations is consistent with the BART guidelines. The cessation of operations date will be rendered enforceable through administrative order.

ADEQ also disagrees with the commenters assertions that Dry FGD is cost-effective given five or seven years remaining useful. Specifically, ADEQ disagrees with the commenters' calculations, which improperly rely upon generic IPM cost data when facility-specific data is available. ADEQ also finds that Entergy's use of a more recent baseline for evaluating emission reductions is reasonable. See Response 20(d).

ADEQ acknowledges that in assessing BART controls, the control costs incurred at similarly situated sources to meet BART are relevant in determining whether a control is cost-effective. Given a seven year remaining useful life, the Dry FGD at White Bluff is not within the range typically found cost-effective for BART. In the Regional Haze FIP for Montana, EPA rejected lime spray drying as BART because EPA determined that at \$5,442/ton, the control was not cost-effective. Therefore, ADEQ's rejection of Dry FGD as a BART based on an average cost-effectiveness of \$5,403/ton has precedent. ADEQ also notes that all of the cost-effectiveness values for BART included Exhibit B to comments on the Proposed SIP submitted by the National Parks Conservation Association, Earthjustice, and Sierra Club are below \$5,000.

This comment does not necessitate changes to the Proposed SIP.

20(f):

Some commenters noted concerns with ADEQ's evaluation of visibility anticipated from retrofit technology controls at White Bluff that were assessed in Entergy's 2017 updated BART analysis.

Some commenters noted that cost of control is only one of the five factors that must be considered at arriving at a BART determination and that an over-reliance on cost-effectiveness calculations based on an arbitrary remaining useful life does not properly take into account or give proper effect to the other BART factors. The commenters noted that the Entergy's modeling demonstrates that the difference in visibility improvement anticipated from LSC versus the most stringent technology is less than 0.5 deciviews. The commenters further pointed out their ongoing concerns regarding modeling bias of the CALPUFF model. The commenters noted that previous CALPUFF modeling has produced modeled visibility impacts greater than CAMx modeling. The commenters argued that the overall visibility improvement from the use of control technologies at White Bluff, as well as the differences in control technologies, is negligible.

Other commenters asserted that Entergy's approach to modeling LSC in the 2017 updated BART analysis for White Bluff does not follow the approach outlined by EPA. The commenter asserts that Entergy's projection of the maximum hourly SO₂ rate for LSC resulted in a much lower emission rate than a properly calculated maximum hourly rate based on a 2009–2013 baseline. The commenters stated that the maximum daily pound per hour SO₂ emission rates should have been calculated based on maximum daily pound per hour rates over the baseline rather than based on maximum permitted heat input capacity. The commenter asserted that this deviation assumes that White Bluff will not emit SO₂ at daily emission rates any higher than what the proposed BART limit would require on a thirty-boiler-operating day average. The commenters further noted that the form of the emission limit of 0.6 lb SO₂/MMBtu could result in a smaller reduction than assumed because SO₂ emission rates as high as 0.64 lb SO₂/MMBtu could be rounded down to 0.6 lb SO₂/MMBtu. The commenters provided their own estimates of visibility improvement from LSC by scaling Entergy's projections based on the ratio of the reduction from baseline emissions using their projected maximum daily rate to Entergy's projected reduction in maximum daily emission rates.

Response 20(f):

With regard to Entergy's August 17, 2017 updated five factor analysis for White Bluff, one commenter discusses the reliabilities of the CALPUFF and CAMx models and concludes that LSC is justified as BART. ADEQ recognizes the inherent assumptions associated with the use of predictive models and that these assumptions can differ by specific models. ADEQ thanks the commenter for their input.

ADEQ will clarify in the final SIP that the emission rate for LSC is based on an emission limit of 0.60 lb SO₂/MMBtu. This limit will preclude the rounding down of values higher than 0.6 lb SO₂/MMBtu to show compliance. This clarification is necessary because all cost, emission

reduction, and visibility improvement assumptions were based on an emission limit equal to 0.6 lb SO₂/MMBtu.

ADEQ disagrees with the commenter's assertions that the revised modeling analysis included in Entergy's August 17, 2017 BART Update that was based on baseline emissions from 2009–2013 should have been based on emissions from the original baseline period of 2001–2003 and also that Entergy's revised modeling analysis "overstated the visibility benefits of [LSC]". See Response 20(d)(i).

It appears that this commenter may be confusing the "consistency" rationale of use of a baseline period to determine BART controls with the necessary consistent use of a baseline period to establish baseline visibility conditions that determine the glide path associated with reasonable progress.

The commenter incorrectly states that "[i]n its previous BART modeling which EPA relied on in issuing its FIP, Entergy relied on 2001–2003 emissions for baseline SO₂ emissions." While it is correct that for the FIP, Entergy submitted information using the original baseline period for SO₂, in the final AR RH FIP and based on comments received, the EPA updated calculations for Entergy's White Bluff based on a SO₂ baseline emissions period to 2009–2013 and excluded the maximum and minimum years⁵⁹.

ADEQ finds that Entergy's use of an updated SO₂ baseline period of 2009–2013 to evaluate BART controls is appropriate.

20(g):

Some commenters supported ADEQ's determination that would establish a SO₂ BART emission limit for White Bluff units 1 and 2 of 0.6 lb SO₂/MMBtu, calculated as a thirty-day rolling average over each boiler operating day, based on LSC. Some commenters stated that this determination was supported even without taking into account Entergy's proposed retirement date or cessation of use of coal date.

Other commenters asserted that the BART determination for White Bluff should be Dry FGD. The commenters argued that ADEQ's proposed BART determination for White Bluff is inconsistent with its BART finding for Flint Creek. The commenters stated that Dry FGD and enhanced DSI are within the cost-effective range and would achieve visibility benefits when considering a remaining useful life of five, seven, nine, or eleven years. The commenters stated that under any BART analysis in which the remaining useful life is five years or greater, SO₂ BART for White Bluff is an emission limit of 0.06 lb SO₂/MMBtu. Some commenters stated that if ADEQ does not adopt a clearly enforceable deadline for White Bluff units to cease firing

⁵⁹ From the EPA-RO6-OAR-2015-0189-0205 docket "White Bluff_R6 cost revisions2-revised" at Regulations.gov

coal by December 31, 2028, then installation of Dry FGD is warranted. Commenters stated that if ADEQ does not determine SO₂ BART to be Dry FGD, then SO₂ BART for White Bluff must, at a minimum be based on the use of DSI.

Response 20(g):

After consideration of the comments, ADEQ's evaluation of the BART factors yields the same conclusion as was proposed in the Proposed SIP that BART for White Bluff units 1 and 2 should be based on LSC; however, ADEQ will clarify in the final SIP that the emission rate for LSC is based on an emission limit of 0.60 lb SO₂/MMBtu. ADEQ acknowledges that certain commenters would support this determination even without taking into account Entergy's proposed retirement date or cessation of the use of coal date. See Response 20(f).

ADEQ disagrees with those commenters that Dry FGD is cost-effective for a remaining useful life of seven years. Based on facility specific cost-information, neither Dry FGD nor either DSI option are cost-effective for the given remaining useful life assumptions included in the updated five factor analysis for White Bluff.

ADEQ's analysis regarding the proposed BART determination for Entergy White Bluff is consistent with ADEQ's BART finding with respect to SWEPCO's Flint Creek. Flint Creek has no enforceable cessation of operations date and did not request that ADEQ include such a requirement in the SIP. Therefore, the amortization period for installation of Dry FGD at Flint Creek is based on the thirty year life of the Dry FGD equipment because the remaining useful life of Flint Creek is anticipated to be at least as long as the capital recovery period for the Dry FGD equipment. In contrast, Entergy proposed that ADEQ include in the SIP an enforceable requirement for cessation of operations at White Bluff by the end of 2028. Therefore, the amortization of Dry FGD for White Bluff units was based on seven years of remaining useful life and Dry FGD was found not to be cost-effective.

20(h):

Some commenters supported ADEQ's proposal that Entergy be allowed three years after EPA's approval of the SIP revision to meet BART is LSC at White Bluff while others stated that three years was inconsistent with the record and the Clean Air Act.

In comments on the Proposed SIP, Entergy agreed with ADEQ that a three year timeline is reasonable for compliance with a BART limit based on LSC to ensure that sufficient time is provided to ensure that all contracted coal supply at White Bluff meets the SO₂ BART limit. Entergy stated that it is their practice to project how much coal will be needed in future years and to contract for a portion of the coal supply up to three years in advance. Entergy noted that they had a requirement to keep a reserve supply of coal at White Bluff to ensure that units can operate in the event of fuel disruption supply. Entergy stated that a three year timeline complies with the Regional Haze Regulations, which allow up to five years for compliance with BART.

Other commenters stated that ADEQ cannot allow Entergy three more years to comply with an emission limit that it is already capable of achieving. The commenters referred to EPA guidance stating that the time necessary for compliance should generally be considered on a source-by-source basis, with “each source required to comply by the soonest date that can be considered reasonable.”⁶⁰ The commenters stated that “as expeditiously as practicable” for the purposes of installing BART should meet the same standard as its meaning in EPA’s reasonable available control measures guidance. The commenters posited that ADEQ cannot rely on Entergy’s assertion about their contracting practices because no specific technical or economic evidence in the record supports Entergy’s assertion that more time is necessary to meet an emission limit based on LSC. The commenter indicated that nothing in the record demonstrates that it would be impracticable to meet a thirty-day rolling average of 0.6 lb SO₂/MMBtu right now. The commenter stated that neither Entergy nor ADEQ considered alternatives to extending the compliance deadline by three years. Specifically, the purchase of fuel blending equipment or longer averaging times were not considered. The commenter also stated that the Proposed SIP implies that Entergy has the technical ability to blend its coal supply because the company has been purchasing and using lower-sulfur coal for several years.

Response 20(h):

ADEQ disagrees with the commenter’s assertion that a three year compliance time frame with emission limit of 0.6 lb SO₂/MMBtu based on LSC for White Bluff is inconsistent with the record and the Clean Air Act. ADEQ’s understanding is that guaranteed compliance with such an emission rate cannot be achieved with Entergy’s existing fuel stocks at White Bluff and those for which Entergy has already contracted. As such, ADEQ determined that a three year compliance time frame was reasonable and appropriate.

In response to the comment, ADEQ requested additional documentation regarding the time necessary for compliance with an emission limit of 0.6 lb SO₂/MMBtu based on LSC for White Bluff. On April 3, 2018, Entergy submitted a letter providing further detail on the information described in the Proposed SIP regarding coal contracts for White Bluff, reserve supply requirements, and fuel blending capabilities.⁶¹ In particular, the letter further explains why the existing stocks and contracts limit Entergy’s ability to guarantee compliance with a 0.6 lb SO₂/MMBtu thirty-boiler operating day emission limit even after consideration of the limited fuel blending capability at White Bluff. ADEQ finds that the additional information provided by Entergy supports ADEQ’s proposed determination that three years for compliance with a 0.6 lb SO₂/MMBtu based on fuel switching to lower sulfur coal is as expeditious as practicable.

This comment does not necessitate changes to the Proposed SIP.

⁶⁰ EPA, 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 at 114 (July 2016)

⁶¹ Entergy’s April 3, 2018 letter is included as Exhibit G to this Responsive Summary.

Comment 21:

In comments on the Proposed SIP, SWEPCO expressed appreciation for ADEQ's willingness to consider all of the technical information submitted to EPA in support of the BART determination made for Flint Creek for SO₂. SWEPCO stated that the information amply supports ADEQ's determination that the equipment already installed at Flint Creek satisfies the requirements of the Regional Haze Program at this facility and that achieving an emission rate of 0.06 lb SO₂/MMBTU will reduce visibility impacts at Class I areas.

Response 21:

ADEQ acknowledges and appreciates this comment. This comment does not necessitate changes to the Proposed SIP.

Comment 22:

Some commenters asserted that ADEQ's proposed reasonable progress analysis is unnecessary and in conflict with positions taken by ADEQ and the State of Arkansas in comments on the FIP, ADEQ's Petition for Reconsideration, and the State of Arkansas's Petition for Judicial Review and arguments.

The commenters argued that a reasonable progress analysis is not required because Arkansas is already meeting its reasonable progress goals for the first planning period and the two Class I areas are below the glide path. The commenters noted that EPA's 2007 guidance on reasonable progress for the first planning period provides that the emission reductions anticipated from BART and other Clean Air Act programs may be all that is necessary to achieve reasonable progress in the first planning period. The commenters asserted that if ADEQ had assessed whether controls beyond BART or other Clean Air Act programs are necessary to make reasonable progress for the first planning period, ADEQ would have concluded that controls are not necessary and no further analysis is required.

The commenters stated that by performing a reasonable progress analysis ADEQ is taking a position that is inconsistent with the position ADEQ took in its Petition for Reconsideration of EPA's FIP and the State of Arkansas's Petition for Judicial Review of the SIP. Commenters pointed out that ADEQ urged EPA to reconsider whether controls are necessary at Independence given the 2015 monitoring data showing that Arkansas Class I areas are already meeting the reasonable progress goals in the FIP. The commenter pointed out that ADEQ argued that the FIP should be vacated because EPA ignored evidence that Arkansas would achieve reasonable progress without any additional controls.

The commenters asserted that if EPA approves ADEQ's proposed reasonable progress analysis, it might limit ADEQ's discretion in deciding against performing a reasonable progress analysis under similar conditions in the future. The commenters also stated that conducting an

unnecessary reasonable progress analysis now could limit ADEQ's ability to take advantage of technological developments, improvements in economic performance, and other improvements in subsequent planning periods. The commenters stated that ADEQ might be forced to assess reasonable progress controls even if visibility improvement exceeds the goals, increasing the likelihood that unnecessary controls would be imposed upon Arkansas point sources.

Response 22:

ADEQ disagrees with commenters who allege that ADEQ's proposed reasonable progress analysis is unnecessary and in conflict with positions taken by ADEQ and the State of Arkansas in comments on the FIP, ADEQ's Petition for Reconsideration, and the State of Arkansas's Petition for Judicial Review and arguments. A reasonable progress analysis is required under Clean Air Act 169A(g)(1) and EPA regulations and guidance for the first planning period. In the Arkansas Petition for Reconsideration of the FIP, Arkansas argued that EPA should reconsider whether reasonable progress controls are necessary on Independence based on then newly-released IMPROVE monitoring data showing that Arkansas was already under its 2018 reasonable progress goals.⁶² This request to consider more recent monitoring data in the Petition for Reconsideration is consistent with positions taken in the Proposed SIP. The Petition for Judicial Review filed in *Arkansas v. EPA* did not make substantive arguments that contradict the Proposed SIP. While the State's broader arguments in *Arkansas v. EPA* reflect a disagreement with EPA regarding the manner in which EPA performed its reasonable progress analysis and its ultimate conclusion, the State did not argue that EPA erred simply by performing an analysis.

Furthermore, ADEQ's conclusion in the Proposed SIP that no additional controls are necessary for reasonable progress is consistent with ADEQ's arguments. ADEQ is revising its requirement for LSC at Independence, which was meant to lock in visibility improvements already achieved, in response to other comments.

ADEQ disagrees with commenters that disregarded ADEQ's evaluation of whether additional controls were necessary for reasonable progress beyond BART and Clean Air Act programs and presumed that we should have come to the conclusion that no further analysis was required because Arkansas Class I areas were below the glide path. The implication that ADEQ did not consider whether additional controls were necessary for reasonable progress beyond BART and Clean Air Act programs is false. In addition, the reasonable progress analysis for ADEQ's 2008 SIP was disapproved because ADEQ reasoned that no four factor analysis was required because BART and other Clean Air Act programs would result in greater visibility improvement than the glide path.

ADEQ disagrees with commenters that performing a reasonable progress analysis limits the State's future discretion for future planning periods. The 2017 RHR Amendments apply to the second planning period and beyond. As a result, precedential value of this SIP, which is

⁶² Pet. For Recon., Docket No. EPA-R06-OAR-2015-0189, at p.2.

developed under the prior version of the Regional Haze regulation, is limited. In addition, EPA has stated an intention to revisit aspects of the 2017 RHR Amendments.⁶³

ADEQ concludes that, based on evaluation of the statutory reasonable progress factors and other relevant factors, it is reasonable to defer potential controls beyond BART and other Clean Air Act programs to future planning periods. This decision will allow ADEQ to take advantage of technological developments, improvements in economic performance, and other improvements in subsequent planning periods. ADEQ notes that states are required under regulations for the first planning period and the 2017 RHR Amendments to assess whether controls are necessary for reasonable progress even if the rate of visibility improvement exceeds that of the glide path.

This comment does not necessitate changes to the Proposed SIP.

Comment 23:

Commenters suggested corrections to ADEQ's characterization of CENRAP particulate source apportionment data. The Commenters pointed out an error in ADEQ's description of total light extinction contribution to Arkansas Class I areas on page 29 of the Proposed SIP. The commenter pointed out that "six percent" should be corrected to "seven percent." On page 31 of the Proposed SIP, the commenters suggested that ADEQ clarify that the cumulative contribution of natural, on-road, and non-road sources is approximately five percent of total light extinction rather than categorizing their contributions as "very small." The commenter points out that "very small" is a subjective characterization. The commenters also stated that values presented as "0" in Figures 6, 7, 8, and 9 should be expanded to show at least one non-zero digit, or should be footnoted to clarify that they are not zero.

Response 23:

ADEQ will make the recommended changes.

Comment 24:

Some commenters voiced concerns that ADEQ's reasonable progress analysis was a source-specific analysis focused solely on Independence. The commenters stated that Arkansas is not legally required to conduct a reasonable progress analysis on a source-specific basis and should not do so in the SIP. The commenters asserted that reasonable progress provisions are intended to address contributions for a wide range of sources and should be addressed on a source-category basis. Commenters stated that ADEQ's focus on a source-specific reasonable progress analysis sets a precedent that could force more sources to install controls in the second planning period.

Response 24:

⁶³ <https://www.epa.gov/visibility/epas-decision-revisit-aspects-2017-regional-haze-rule-revisions>

ADEQ disagrees with the commenters that object to ADEQ's proposed reasonable progress analysis stating that it is a source-specific analysis focused solely on Independence. Nevertheless, ADEQ is availing itself of the flexibility described in the EPA's 2007 Reasonable Progress Guidance to revise the SIP to more clearly apply the factors both broadly to the State as a whole as well as to Independence.

ADEQ began its proposed reasonable progress analysis by broadly looking at the various contributors to visibility impairment in Arkansas. See Section V.A. of the Proposed SIP. Through an examination of particulate source attribution, ADEQ narrowed the range of sources to consider for further analysis to point sources with SO₂ emissions greater than 250 tons per year averaged over the most recent three year period for which data was available. Three of the eleven point sources with recent emissions greater than 250/tons per year were subject-to-BART and were therefore eliminated from consideration of further controls. ADEQ then performed an SO₂-specific Q/D analysis of the eight remaining sources and selected any source with a Q/D value greater than or equal to ten for further analysis. Three sources had a Q/D value greater than or equal to ten: Independence, FutureFuel Chemical Company, and John W. Turk. FutureFuel was a BART-eligible facility that was eliminated because it did not meet the 0.5 dv subject-to-BART threshold in the 2008 Arkansas Regional Haze SIP. Therefore, ADEQ determined that a four factor analysis for FutureFuel was unnecessary during this planning period. John W. Turk began operation in 2012 with the best available control technology. Therefore, ADEQ determined that a four factor analysis for John W. Turk was unnecessary during this planning period. The only remaining source with a Q/D greater than or equal to ten was Independence, which the record demonstrates impacts Arkansas Class I areas and has no SO₂ control technology in place.

These circumstances as well as the unique circumstances surrounding EPA's arbitrary selection and analysis of Independence resulting in the selection of Dry FGD resulted in ADEQ determining that it is necessary to perform a four factor analysis for Independence to ensure a thorough and accurate record of the decisions in the SIP. Although a reasonable progress analysis is required, ADEQ's ultimate determination, which is further explained in Response 26 is that no further controls were necessary for reasonable progress.

ADEQ agrees with commenters that a four factor analysis can be performed for a broad source category. However, ADEQ disagrees with those commenters that assert that a four factor analysis should only be performed for broad source categories or that ADEQ's analysis in the Proposed SIP is precedent setting. ADEQ formulated the approach to evaluating whether additional controls were necessary for reasonable progress after consideration of key pollutants impacting visibility at Arkansas Class I areas, the 2007 "Guidance for Setting Reasonable

Progress Goals under the Regional Haze Program,” and reasonable progress analyses performed for other states for the first planning period.⁶⁴

Although ADEQ disagrees with the commenters’ characterization of ADEQ’s proposed reasonable progress analysis, ADEQ is making revisions in the final SIP to the reasonable progress analysis to reframe the analysis, more clearly apply relevant factors state-wide, and discuss additional factors described in other comments received. See Response 25(d).

Comment 25:

Commenters voiced concerns with respect to ADEQ’s four-factor analysis of Independence. Specifically, commenters took issue with ADEQ’s evaluation of two of the statutory factors: the cost of compliance and remaining useful life. In addition, commenters recommended changes to ADEQ’s evaluation of factors beyond the four statutory factors.

25(a):

Commenters suggested that, if the final SIP includes a source-specific reasonable progress analysis for Independence, ADEQ should account for all relevant information in its reasonable progress analysis, including the anticipated cease-to-use coal date. In particular the commenters asserted that the remaining useful life of Independence in any four-factor analysis should be based on Entergy’s anticipated cessation of coal-fired operations at Independence units by the end of 2030.

Response 25(a):

ADEQ disagrees with the commenter that ADEQ should base its four-factor analysis for Independence on a remaining useful life ending in 2030. Entergy’s proposed cessation of coal-fired operations date is not State or federally enforceable. The circumstances for Independence are different than those for White Bluff. White Bluff is a subject-to-BART facility for which ADEQ is compelled by statute to require installation of BART. That BART determination is influenced by the enforceable curtailment of the remaining useful life of the facility. Independence is not a subject to BART facility. ADEQ has determined that no controls are necessary for reasonable progress even without truncation of remaining useful life for Independence.

⁶⁴ See EPA (2007). “Guidance for Setting Progress Goals Under the Regional Haze Program” included as Exhibit E to this Responsive Summary.

See also Section 10.3.2 of Michigan’s 2010 Regional Haze SIP. http://www.michigan.gov/documents/deq/AOD-Oct-2010-SIP-final-HAZE-BART-SIP_337956_7.pdf

See also EPA’s proposed FIP for Arizona (79 FR 9318 -at 9352- 9360)

See also Section 3.2 of the “Federal Land Managers’ Air Quality Related Values Work Group (FLAG): Phase I Report—Revised (2010). https://www.nature.nps.gov/air/Pubs/pdf/flag/FLAG_2010.pdf

See also Appendix H Section 5 of Georgia Environmental Protection Division’s 2010 SIP https://epd.georgia.gov/air/sites/epd.georgia.gov/air/files/related_files/document/appendixh.pdf.

This comment does not necessitate changes to the Proposed SIP.

25(b):

Commenters took issue with ADEQ's evaluation of the cost of compliance for retrofit technology at Independence.

Some commenters suggested that ADEQ should have relied on costs and modeling results from Entergy based on CAMx modeling and certain costs that were disallowed by EPA in calculating the cost of controls. The commenters stated that based on Entergy's anticipated cease-to-use coal date and EPA control cost estimates, that the cost-effectiveness for Dry FGD at Independence would be \$5,026/ton at unit 1 and \$4,640/ton at unit 2. The commenters noted that these cost-effectiveness values exceed those that EPA agreed could be rejected for reasonable progress purposes for other state plans. The commenters explained that EPA has indicated that control costs found to be reasonable in the BART context may nonetheless be considered too costly in the context of reasonable progress.

Some commenters noted Entergy's cost-effectiveness estimates for Dry FGD at Independence in their 2015 comments on EPA's FIP, which was referred to in the Proposed SIP, do not comport with EPA's Control Cost Manual. The commenters also stated that Entergy's calculations were based on an unrealistically high uncontrolled SO₂ rate for design and cost determination of Dry FGD systems. The commenters stated that ADEQ must not rely on Entergy's 2015 cost-effectiveness calculations for Dry FGD at Independence.

Some commenters stated that ADEQ's analysis of the cost-effectiveness of LSC as a control for Independence is flawed. In particular, the commenters asserted that the cost-effectiveness should be zero because Independence units are already meeting 0.6 lb SO₂/MMBTU on an annual basis. The commenters noted that ADEQ evaluated emission reductions resulting from LSC based on the maximum 30-boiler operating day average emission rate over 2009–2013; whereas EPA's evaluation of anticipated emission reductions for Dry FGD for White Bluff was based on annual average SO₂ emissions over a 2009–2013 baseline with the minimum and maximum years excluded. The commenter stated that if ADEQ had excluded 2012 and 2010, as was done in EPA's analysis, none of the maximum 30-boiler operating day emission rates during the 2009–2013 baseline were above 0.6 lb SO₂/MMBtu. The commenter also noted that ADEQ used a longer period (2009–2016) over which to evaluate tons of fuel burned at each unit. The commenter stated that it is not clear why ADEQ used a longer period of data on tons of fuel burned at each unit compared to the 2009–2013 period used for baseline emissions. The commenter also noted that emission reductions were calculated based on reducing emissions to 0.6 lb SO₂/MMBtu; however, the commenter pointed out that Independence units' maximum thirty-boiler-operating-day averages over 2009–2016 would show compliance with a 0.6 lb SO₂/MMBtu rate if rounded to the nearest tenth.

Some commenters objected to ADEQ's rejection of scrubbers as reasonable progress controls in part because of Entergy and EPA's cost-effectiveness and the high capital costs of new scrubbers. The commenter asserted that ADEQ appears to claim that EPA cost-effectiveness estimates for Dry FGD were not reasonable costs of control based on screening threshold for reasonable progress used by Kentucky in their Regional Haze SIP. The commenter noted that in EPA's approval of the \$2000/ton threshold used by Kentucky, that their approval was used "[f]or the limited purpose of evaluating the cost of compliance for the reasonable progress assessment in this first regional haze SIP for non-EGUs."⁶⁵ The commenters pointed out that the cost-effectiveness for Dry FGD at Independence units 1 and 2 are well within the range of cost-effectiveness of other reasonable progress decisions finalized by other states or EPA. The commenters asserted that even if operated at lower capacity factors in the future, Dry FGD at Independence is still cost-effective compared to previous reasonable progress determinations finalized by other states or EPA. The commenters also argued that ADEQ failed to consider the possibility that Entergy might choose to meet a new SO₂ limit based on Dry FGD by retiring Independence and that the capital cost of replacement generation might be lower than the cost of new scrubbers.

Response 25(b):

ADEQ acknowledges that Entergy's CAMx modeling shows little impact on visibility at Arkansas Class I areas by Independence; however, ADEQ disagrees with the assertion that ADEQ should have relied on costs from Entergy's 2015 comments on the FIP. Entergy's analyses of costs for Dry FGD included certain costs that EPA has disallowed for consideration in cost-effectiveness calculations. As such, ADEQ relied upon EPA's costs for Dry FGD for Independence. To rely upon costs from Entergy's 2015 comments is unnecessary and inconsistent with EPA guidance and precedent in Regional Haze program cost-effectiveness calculations.

ADEQ disagrees with the use of cost-effectiveness of Dry FGD at Independence based on Entergy's cease-to-use coal date. Entergy's cease-to-use coal date for Independence is not a federally or state enforceable requirement. See Response 25(a). ADEQ will consider Entergy's plans to cease coal-fired operations at Independence as an additional relevant factor and will acknowledge these plans in the long-term strategy.

ADEQ agrees that control costs found to be reasonable in the context of BART may be considered too costly in the context of reasonable progress.

ADEQ disagrees with the commenters' assertions that the cost-effectiveness of LSC should be zero for Independence. If the traditional approach of using annual emission reductions were used, as opposed to the maximum thirty-day emissions rate, the cost-effectiveness value would near infinity. This would not provide a meaningful framework for comparison since there would

⁶⁵ 76 FR 78194 at 78206 (Dec. 16, 2011).

be low cost emission reductions as a result of compliance with a 0.6 lb SO₂/MMBtu emission rate at Independence. Although ADEQ does not agree with the commenter regarding the approach for calculating cost-effectiveness for LSC in the Proposed SIP, ADEQ will revise the baselines for emission rates and fuel burned to reflect 2009–2013 consistent with the baseline used for calculating cost-effectiveness of Dry FGD.

ADEQ will also replace EPA estimates of Dry FGD cost-effectiveness for Independence with estimates derived from Table 3.1 of Exhibit I to Entergy Arkansas's comments. In Table 3.1, Entergy calculated cost-effectiveness values based on nine years of remaining useful life. ADEQ estimates that, based on thirty years of remaining useful life, the cost-effectiveness of Dry FGD at Independence would be \$2,970/ton for unit 1 and \$2,742/ton for unit 2.⁶⁶ ADEQ will also specify that all calculations for LSC are based upon a compliance assumption of 0.60 lb SO₂/MMBtu.

In the Proposed SIP, ADEQ does not claim that cost-effectiveness estimates for Dry FGD fall outside the range of reasonable progress decisions finalized by other states and EPA. ADEQ does however note that states may set a reasonable progress threshold at lower levels, such as in the case of Kentucky, than are typical for BART. ADEQ also acknowledges that Dry FGD might be in the range considered cost-effective in other states even with a lower dispatch rate. Change in dispatch is one of the relevant factors considered by ADEQ in determining whether controls are necessary for reasonable progress. ADEQ also acknowledges that Entergy might choose to meet a new SO₂ limit by retiring Independence and that the capital cost of replacement generation might be more economic than the cost of Dry FGD. ADEQ has determined that, after consideration of the statutory reasonable progress factors—as well other relevant factors—that it is reasonable to defer further consideration of controls for Independence to subsequent planning periods. This determination is consistent with EPA guidance.

25(c):

Commenters asserted that ADEQ's consideration of visibility improvement anticipated from installation of controls at Independence was flawed. Specifically, commenters stated that ADEQ's characterization of SO₂ emission rates at Independence is misleading and should be deleted. The commenters noted that CALPUFF modeling demonstrates that an emission rate of 0.6 lb SO₂/MMBtu on a thirty-day rolling average at Independence based on the use of LSC

⁶⁶ ADEQ revised the annualized capital cost for Dry FGD at Independence included in Exhibit I to Entergy's comments based on a thirty-year remaining useful life for the Dry FGD equipment because no enforceable commitment to cease operations by 2030 is in place for Independence. The revised annualized capital cost is based on a capital recovery factor calculated for a thirty-year amortization period in accordance with Chapter 2 of the EPA Control Cost Manual. ADEQ's calculations are included in Appendix F of the final SIP.

<https://www.epa.gov/sites/production/files/2017-12/documents/epacmcostestimationmethodchapter_7thedition_2017.pdf>

would yield a visibility improvement of 0.112 deciviews for Caney Creek and 0.302 deciviews for Upper Buffalo.

Response 25(c):

ADEQ proposed to require LSC for Independence to lock in visibility improvements already observed at Arkansas and Missouri Class I areas due to Entergy's choice to burn lower sulfur coals than required by permit at Entergy Independence Unit 1 and Unit 2. After evaluation of comments received, ADEQ understands that an emission rate of 0.6 lb SO₂/MMBtu based on LSC would not be locking in an existing emission rate for Independence and therefore does not represent locking in existing visibility improvements. ADEQ acknowledges the modeled visibility impacts at Arkansas Class I areas of LSC provided by commenters. ADEQ will revise the reasonable progress analysis to reflect that LSC at Independence would be an additional control that is not necessary to achieve reasonable progress and remove the comparison of thirty-day SO₂ emission rates to Independence's three-hour SO₂ emission limit.

25(d):

Some commenters suggested that ADEQ consider other relevant factors to justify reasonable progress. Commenters noted that it is clear that the four reasonable progress statutory factors set forth in Clean Air Act 169A(g)(1) must be considered by states in a reasonable progress analysis; however, the commenters also noted that EPA guidance is clear that states have the authority to consider other relevant factors. The commenters stated that there is no requirement for a reasonable progress analysis to mirror a BART analysis. The commenters asserted that ADEQ's approach to evaluating controls for reasonable progress endorses the 2017 RHR Amendments, which limits state discretion in conducting a reasonable progress analysis, and that ADEQ is unnecessarily setting a precedent that may be difficult to avoid in future planning periods.

Specific other relevant factors (beyond the statutory four factors) that commenters suggested ADEQ consider included the implication of compliance costs to the health and vitality of industries within the state, the fact that Arkansas Class I areas are already below the glide path for the first planning period, the relative contribution of light extinction to Arkansas Class I areas from point sources located within the Arkansas, the overall contribution to visibility impairment by source categories within and outside of Arkansas, and impacts on electricity rates in Arkansas communities. Commenters stated that given the small effect of light extinction in Arkansas Class I areas from Arkansas point sources, installing emission controls on Independence would not result in meaningful change at either Class I area. Commenters supported this assertion by noting that EPA has approved a similar conclusion by another state and recently approved ADEQ's decision to screen out Arkansas point sources from further evaluation of NO_x for reasonable progress controls in light of (1) the low level of visibility impairment due to NO_x emissions from those sources and (2) the fact that additional NO_x controls are not anticipated to yield meaningful visibility improvements. Commenters also noted that installation of Dry FGD at

Independence would result in \$1 billion dollars in costs which could increase electricity rates, with significant impacts on Arkansas communities, many of which are already facing economic hardship.

Some commenters recommended that ADEQ and sources within the state should be given an opportunity to consider more broadly the complete set of relevant factors and await resolution of the challenge to EPA's 2017 RHR Amendments.

Other commenters stated that it is arbitrary and capricious for ADEQ to purport to consider visibility improvement, but then not weigh the visibility benefits gained against the cost of controls when making its control determination. The commenter asserts that ADEQ does not mention the visibility benefits of new scrubbers when it weighs all of the information considered.

Response 25(d):

ADEQ agrees with commenters that other relevant factors beyond the statutory four reasonable progress factors can be considered by states in determining whether additional controls are necessary for reasonable progress. ADEQ agrees with the commenters that there is no requirement for a reasonable progress analysis to mirror a BART analysis; however, ADEQ disagrees with commenters' assertions that ADEQ's approach to evaluating controls for reasonable progress in the SIP endorses the 2017 RHR Amendments. ADEQ also disagrees with the commenters that ADEQ's approach is precedent setting. See Response 19.

ADEQ recognizes the commenters' suggestions for additional factors to consider. The Proposed SIP discusses some of the suggested factors in the reasonable progress analysis, such as the relative contribution to light extinction by source categories (including point sources) within and outside of Arkansas as well as the fact that Arkansas Class I areas are below the glide path. The information provided by commenters concerning additional relevant factors further supports ADEQ's conclusion that no additional controls are necessary to ensure reasonable progress during the first planning period. Although many of the factors brought up by commenters are referenced in the SIP, ADEQ will reframe the reasonable progress discussion in the SIP to clarify our consideration of the four factors and other relevant factors.

ADEQ disagrees with those commenters that suggested that ADEQ wait to finalize the SIP until the resolution of challenges and administrative changes to the 2017 RHR Amendments. The Proposed SIP complies with Regional Haze requirements for the first planning period. The 2017 RHR Amendments apply to the second planning period and beyond. See Response 19.

ADEQ acknowledges that, in its proposed determination of reasonable progress controls for Independence, ADEQ did not include language regarding the visibility benefits of new scrubbers. Due to other comments, ADEQ has determined that no additional controls are necessary to ensure reasonable progress; however, ADEQ will provide further explanation of the

Department's rationale, including discussion of visibility benefits that would be anticipated for new scrubbers.

Comment 26:

Some commenters agreed with ADEQ's determination that no add-on controls beyond BART are necessary for reasonable progress for the 2008–2018 planning period, while others thought that Independence should be required to install Dry FGD. In addition, commenters opposed requiring LSC at Independence as a control for reasonable progress.

Some commenters opposed any controls beyond BART, both add-on and LSC, for reasonable progress during the first planning period. Commenters stated that, given the pace of visibility improvement in Arkansas Class I areas in comparison to the uniform rate of progress and the reasonable progress goals in EPA's FIP, the imposition of reasonable progress controls are unnecessary for the first planning period and should not be required in the Proposed SIP. Some commenters pointed out inherent limitations and uncertainty in CALPUFF modeling with respect to visibility improvements anticipated from controls at Independence. The commenters also pointed out that Arkansas point sources contributed less than 3.5% of sulfate light extinction at Arkansas Class I areas and that White Bluff contributes only a fraction of statewide point source SO₂ emissions. Commenters stated that historic and continued use of LSC at White Bluff (and other Arkansas coal-fired power plants) has been sufficient to meet reasonable progress visibility requirements. Some commenters stated that no controls that would be installed after 2018 should be included in the SIP for reasonable progress because the controls could not be implemented before the end of the first planning period.

In comments on the Proposed SIP, Entergy disagreed with ADEQ's proposed determination that LSC should be required for Independence as a reasonable progress control, but stated that they would agree to take an emission limit based on LSC at Independence as a SIP strengthening measure. Entergy argues that LSC is not existing control and could not be implemented until the second planning period due to existing contracts which dictate Entergy's coal supply through 2019.

Some commenters alleged that ADEQ's determination that no additional controls are required at Independence in part because the state is on the glide path toward natural visibility is unlawful. The commenters noted EPA's explanation of its 2012 disapproval of Arkansas's 2008 Regional Haze SIP in which EPA states that "being on the 'glide path' does not mean that a state is allowed to forgo an evaluation of the four statutory factors." The commenters asserted that being on the glide path does not relieve the state from conducting a reasoned analysis and that if it is reasonable to make more progress than the uniform rate of progress a state must do so.

Response 26:

In response to comments received, ADEQ will revise its reasonable progress controls determination. The information provided by commenters regarding the \$1 billion cost of Dry FGD that would be passed on to ratepayers, the fraction of the relative contribution from Arkansas point sources to light extinction at Missouri and Arkansas Class I areas, and market-driven changes in the electricity generation mix—including Entergy’s planned cessation of operations at Independence by the end of 2030—further support ADEQ’s determination that it is not reasonable or necessary to require further controls beyond BART and existing Clean Air Act requirements for reasonable progress during the first planning period. See Response 25(d). As discussed in Response 25(c), ADEQ’s proposed emission limit of 0.6 lb SO₂/MMBtu does not represent locking in an existing voluntary emission reduction choice by Entergy at Independence, which was the basis for requiring such an emission limit for the purposes of reasonable progress in the Proposed SIP. ADEQ further agrees with the commenters that neither Dry FGD nor LSC could be implemented at Independence before the end of the 2018 planning period. Therefore, ADEQ finds that it is reasonable to defer requirements for emission reductions from Independence to future planning periods.⁶⁷

ADEQ disagrees with those commenters that asserted that ADEQ’s determination that no additional controls are required at Independence in part because the state is on the glide path toward natural visibility is unlawful. ADEQ considered the four statutory reasonable progress factors, as well as other relevant factors, in a reasoned analysis of whether additional controls are reasonable and necessary to ensure reasonable progress during the first planning period. Based on this consideration, and the additional information provided in comments, ADEQ has determined that no additional controls are reasonable or necessary at Independence for reasonable progress during the first planning period. In addition, ADEQ notes that the reasonable progress goals included in the Proposed SIP do show more progress than the uniform rate of progress.

ADEQ will revise its long-term strategy to reflect Entergy’s proposal to require LSC at Independence as a SIP-strengthening measure; however, after evaluation of the comments, ADEQ does not find that LSC at Independence is required for reasonable progress during the first planning period.

Comment 27:

Some commenters asserted that ADEQ may only require additional controls for reasonable progress if further action beyond BART and other Clean Air Act programs is necessary for reasonable progress in this planning period. The commenters noted that the Clean Air Act

⁶⁷ In EPA’s 2007 “Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program,” EPA states: “In deciding what amount of emissions reduction is appropriate in setting the RPG, you should take into account the fact that the long-term goal of no manmade impairment encompasses several planning periods. It is reasonable for you to defer reductions to later planning periods in order to maintain a consistent glidepath toward the long-term goal.”

requires plans to “contain such emission limits, schedules of compliance, and other measures as may be necessary to make reasonable progress.”⁶⁸ The commenter also pointed out that EPA’s 2007 reasonable progress guidance makes clear that reasonable progress controls may not be necessary in the first planning period, noting that “[g]iven the significant emission reductions that we anticipate to result from BART” and other Clean Air Act programs “it may be all that is necessary to achieve reasonable progress in the first planning period.” The commenters further pointed out the guidance states that it is reasonable to defer reductions to later planning periods in order to maintain a consistent glide path toward the long-term goal.

Other commenters asserted that being on the glide path does not relieve the state from conducting a reasoned analysis and that if it is reasonable to make more progress than the uniform rate of progress, a state must do so.

Response 27:

ADEQ acknowledges the comment regarding reasonable progress in the first planning period and agrees with the Commenters’ interpretation of reasonable progress. ADEQ acknowledges the commenters’ accurate statement that EPA’s 2007 reasonable progress guidance makes clear that reasonable progress controls may not be necessary in the first planning period, noting that “[g]iven the significant emission reductions that we anticipate to result from BART” and other Clean Air Act programs “may be all that is necessary to achieve reasonable progress in the first planning period.”

Given this statutory authority and associated guidance, ADEQ finds that the emissions reductions anticipated from BART and other Clean Air Act Programs are all that is necessary to achieve reasonable progress in the first planning period. ADEQ has revised the SIP to reflect both this determination and the interpretation of reasonable progress. As set forth in the revised reasonable progress analysis, ADEQ has determined that it is not necessary for any controls to be installed in order to make reasonable progress in the first planning period based on an analysis using the four reasonable progress factors.

ADEQ agrees with the commenters that being on the glide path does not relieve the state from conducting a reasoned analysis and making additional progress if it is reasonable to do so. ADEQ has performed a reasoned analysis and determined in the Final SIP that it is not necessary or appropriate to require additional controls to make additional progress during the first planning period.

No revisions to the SIP are necessary due to this comment.

Comment 28:

⁶⁸ 42 USC 7491(b)(2)

Some commenters supported ADEQ's proposed revisions to the long-term strategy and other suggested revisions to account for anticipated changes in nitrogen oxide emissions and operations of Entergy power plants. Some commenters noted that the long-term strategy recognizes planned retirements of large power plants in Texas during 2018 that affect Arkansas Class I areas. Commenters pointed out that there is another retirement anticipated for 2018 in Tennessee. The commenters stated that the combined emission reductions resulting from the retirements of these plants in Texas and Tennessee would result in greater emission reductions than anticipated from EPA's FIP or the Proposed SIP. The commenters also pointed out that the combined emission reductions anticipated from the Texas and Tennessee power plant retirements is greater than the maximum emissions from White Bluff and Independence combined. The commenters asserted that these emission reductions are predicted to ensure that visibility will remain well below the glide path until the end of the second planning period. Some commenters stated that ADEQ should include in its long-term strategy Entergy's planned cease-to use coal dates for White Bluff and Independence, Entergy's planned retirement date for Lake Catherine, and the low NOx burners Entergy is installing at White Bluff and Independence. Other commenters state that any future retirements of stationary sources that may occur after the end of the first planning period should be addressed in long-term strategies of future planning periods.

Response 28:

ADEQ acknowledges and appreciates the commenters support for recognition of planned retirements of large power plants in Texas during 2018. ADEQ also appreciates the additional information the commenters provided regarding a planned retirement in Tennessee during 2018. ADEQ will acknowledge in the long-term strategy, but will not render enforceable Entergy's planned changes in operations at Independence and Lake Catherine and the additional NOx control technology that Entergy is installing at White Bluff and Independence. The future changes in operation at Independence and Lake Catherine take place in the second planning period and third planning period and will factor into Arkansas's consideration of reasonable progress and long-term strategy for future planning periods. ADEQ has in place an EPA-approved SIP that addresses NOx from EGUs by reliance on CSAPR; therefore, enforceable facility-specific NOx emissions are not required for EGUs under Arkansas's Regional Haze program.

ADEQ disagrees with those commenters that instructed that retirements occurring after 2018 should be deferred to the second planning period SIP. ADEQ has factored into its BART analysis the cessation of coal-fired operations for White Bluff and thus proposed the inclusion of an administrative order that would render such cessation enforceable in the long-term strategy. See Response 20(c).

Comment 29:

Some commenters objected to ADEQ's proposed request for EPA to replace previously SIP-approved emission limits in Regulation No. 19 with the same limits contained in administrative orders. Commenters asserted that ADEQ is attempting to rescind and re-propose the already approved limits. The commenters stated that this was confusing, unnecessary, and re-opens long settled BART determinations for additional review and comment. The commenters state that BART is a one-time requirement and that neither the Clean Air Act nor EPA's Regional Haze Regulations provide a basis to review and re-evaluate approved BART determinations. The commenter recommends that if ADEQ is interested in moving these BART limitations into a different section of chapter of its SIP-approved regulations, that ADEQ can do so through administrative changes to Arkansas's regulations rather than asking EPA to eliminate them from the SIP and reapprove them. Commenters also stated that ADEQ's proposed request potentially exposes ADEQ and subject facilities to legal challenges when no change is occurring. The commenters noted that these emission limits are in the current Title V permits for the respective facilities.

Response 29:

ADEQ acknowledges the comment and disagrees that ADEQ is attempting to rescind and re-propose already-approved limits. ADEQ is merely incorporating previously-approved limits in a new enforceable mechanism. ADEQ is not seeking to alter EPA's approval of those limits. For example, ADEQ specifically states on the second page of the introduction to the Proposed SIP that "Arkansas is not revising portions of the 2008 AR RH SIP that were approved."⁶⁹ Similarly, ADEQ specifically states when no changes are needed with regard to a determination that has been previously approved by EPA when addressing that particular pollutant in the SIP introduction.⁷⁰ While ADEQ acknowledges that the inclusion of these limits in this action may be subject to public notice and comment, the BART determinations were included in the 2008 Arkansas Regional Haze SIP and approved in EPA's March 12, 2012 final rule.⁷¹

Although ADEQ disagrees with the commenters regarding their assertions regarding the "reopening" of previously approved provisions, ADEQ will revise the administrative orders to remove previously approved BART determinations, which match those included in APC&EC regulations, in order to alleviate further confusion.

Comment 30:

Some commenters asserted that the Proposed SIP violates Clean Air Act anti-backsliding requirements. Specifically, the commenters stated that the proposed SIP would authorize significantly more SO₂ emissions and produce worse air quality than the existing FIP without including emission reductions beyond those required in the FIP to compensate for allowing for

⁶⁹ Proposed SIP at page 2.

⁷⁰ See e.g. Proposed SIP at p. 25.

⁷¹ 77 FR 14,604

higher SO₂ emission rates from Independence and White Bluff. The commenters asserted that Clean Air Act Section 110(l) prohibits plan revisions that would interfere with an existing requirement to make reasonable further progress, including a BART determination, as the Clean Air Act's applicable requirements included the Regional Haze Program's BART requirements. The commenters supported their assertions with citations to court decisions upholding EPA's interpretation of Section 110(l) as prohibiting plan revisions that would increase emissions or worsen air quality.

Response 30:

ADEQ disagrees that the Proposed SIP violates the Clean Air Act's anti-backsliding requirements and that the Proposed SIP would interfere with any existing requirement to make reasonable further progress or any other applicable requirement under Section 110(l). The Sixth Circuit Court of Appeals has held that, under section 110(l), an agency may approve a SIP revision unless it will make air quality worse.⁷² This holding does not apply to this Arkansas Regional Haze SIP revision. If approved, the Proposed SIP would not affect any emission controls impacting visibility that are already in place. The SO₂ emission limitations for White Bluff and Independence included in the FIP have been judicially stayed and had not yet become effective at the time of the stay.⁷³ Because the FIP's requirements have not yet, and may never, become effective, the standard that allows an agency to approve a SIP revision unless the agency finds it will make air quality worse does not apply.

In addition, the commenters have not provided any information in support of their claim that the FIP would interfere with any reasonable further progress requirements under 40 CFR 51.1012. "Reasonable Further Progress" is a requirement that only applies to nonattainment areas.⁷⁴ Arkansas is in full attainment with all NAAQS, including the SO₂ NAAQS, and therefore does not have any nonattainment areas or reasonable further progress requirements.

Finally, ADEQ finds commenters projected emissions contain an inherent degree of uncertainty. Actual SO₂ emissions from EGUs vary based upon how much they dispatch onto the grid. These dispatch trends are often unpredictable to the impact of factors include overall economic growth, energy prices, and economic conditions. This comment does not necessitate changes to the Proposed SIP.

Comment 31:

Some commenters expressed concerns that electricity and manufacturing costs could increase due to the approaches in the Proposed SIP. Commenters pointed out that the cost of installing pollution controls or taking other actions required under the Proposed SIP will be the initial responsibility of the public utility plant owners and operators; however, the owners and operators

⁷² *Kentucky Res. Council, Inc. v. E.P.A.*, 467 F.3d 986, 995 (6th Cir. 2006)

⁷³ Order granting Am. and Sub. Mot. for Stay, Case No.16-4270, March 7, 2018.

⁷⁴ 40 C.F.R. § 51.1003

are permitted under Arkansas law to directly pass through and recover the costs and expenses of installing, operating and maintaining pollution controls from electric utility customers and ratepayers through electricity rates and tariffs filed with the Arkansas Public Service Commission. The commenters noted that the utility plant owners and operators are permitted to seek approval from the Arkansas Public Service Commission to recover from electric utility customers and ratepayers the cost of replacement power or capacity needed to replace the premature retirement of power plants or the cost of switching fuels. The commenters noted that providers of goods and services to power plants would be harmed financially, if instead of installing additional controls, any of the power plants were to curtail or modify operations or close pursuant to the Proposed SIP.

Response 31:

ADEQ appreciates the remarks of the commenters and acknowledges their concerns regarding costs that could be passed on to the utility customers. Requiring installation of scrubbers at White Bluff and Independence, as some have suggested and required by EPA’s FIP, would likely result in much greater electricity rate impacts due to the cost of purchase and installation of equipment, an increase in parasitic load, and disposal of waste products. The inclusion of an enforceable cessation of coal-fired operations date for White Bluff in the Proposed SIP was necessary to comply with BART guideline requirements for taking into account the planned operational changes for White Bluff by Entergy as part of ADEQ’s BART analysis. See Response 20(b). In comparison to the FIP, the Proposed SIP would eliminate over two billion dollars in costs for installation of scrubbers at White Bluff and Independence or the replacement generation costs in 2021 should Entergy choose to close White Bluff and Independence instead of complying with FIP emission limits.⁷⁵

Whereas it may be true that utility plant owners may seek permission from the Arkansas Public Service Commission to recover costs of replacement generation, it is equally true that the Arkansas Public Service Commission can deny such requests if not deemed prudent. Another function of the Arkansas Public Service Commission is “ensuring that customers are not charged excessive rates for service.”⁷⁶ The approach that ADEQ has chosen ensures compliance with Regional Haze Rule requirements at a lower cost than EPA’s FIP while continuing to protect the visibility at Class I areas into the future.

This comment does not necessitate changes to the Proposed SIP.

Comment 32:

⁷⁵ Entergy (2017). “Updated Five-Factor Analysis for SO₂ for Units 1 and 2” included in Appendix D. Entergy (2018) “Supplemental Information Analysis of Reasonable Progress Arkansas Regional Haze Program First Planning Period” included as Exhibit I to Entergy Arkansas Inc., comments on the Proposed SIP

⁷⁶ Arkansas Public Service Commission. Welcome to the Arkansas Public Service Commission’s Website. <http://www.arkansas.gov/psc/>.

Some commenters argued that reliance on an unsigned administrative order in the Proposed SIP is improper because it is not enforceable and others recommended revisions to specific findings of fact or orders included in the proposed Entergy administrative order.

Some commenters suggested modification or deletion of certain provisions in the proposed Administrative Order for Entergy. Specifically, the commenters stated that both the SIP and administrative order should explicitly recognize that early closure or cessation of coal at White Bluff is not required in connection with the use of LSC as BART. The commenters also recommended that the administrative order in Paragraph 10 of the Findings of Fact should explicitly recognize that no additional controls or emission limitations are necessary at Independence in order to achieve reasonable progress during the first planning period. The commenters stated that clarification is needed to emphasize that the reference to future White Bluff operations is informational and is not intended to create mandatory, federally enforceable requirements of the SIP that the commenter argues would be contrary to law. The commenters stated that Paragraph 3 of the Order should be modified to recognize that any early retirement or cessation of the use of coal at White Bluff is contingent on other regulatory approvals for Entergy and the co-owners of White Bluff, and thus cannot be the basis of an enforceable limitation under the administrative order. The commenters suggest that Paragraph 5 of the Order should be removed or modified. The commenters applauded ADEQ's use of Paragraph 10 of the Order to allow modification of the Administrative Order during future Regional Haze Program planning periods to account for ever-changing circumstances that could materially impact future reasonable progress assessments or long-term strategies. The commenters stated that the administrative order should also include a provision for public notice and comment on any future modifications to the administrative order so as to ensure that stakeholders are able to fully scrutinize such modifications and provide the Department with valuable input.

In comments on the Proposed SIP, Entergy asserted that ADEQ should include in the administrative order other requirements for planned changes in operation at Entergy units. Specifically, Entergy stated that the administrative order should include and render enforceable their proposed cessation of coal-fired operations dates for White Bluff and Independence and their anticipated retirement date for Lake Catherine. Entergy also states that the administrative orders should include and make enforceable reduced NO_x emission rates for White Bluff and Independence based on their installation of low NO_x burners. Entergy states that inclusion of these developments in the administrative order applicable to Entergy will make them enforceable, as required by regulations, and ensure that ADEQ has a defensible long-term strategy that maintains Arkansas's Class I areas on the glide path.

Entergy also recommended revisions to specific provisions of the proposed administrative order for Entergy. Specifically, Entergy stated that Order 7 should be removed because Lake Catherine Unit 4 no longer has the capability to burn fuel oil. Entergy stated that this was reflected in its Title V permit for Lake Catherine. Entergy also stated that the discussion of the impacts of the White Bluff and Lake Catherine units on Arkansas Class I areas should be revised or omitted.

Entergy also pointed out that Order 8 would require installation of a CEMS on White Bluff Auxiliary Boiler, which is unnecessary because it operates infrequently and was not required by EPA. Entergy also stated that the administrative order language could be interpreted to require Lake Catherine Unit 4 to install a CEMS, which was not required by EPA. EPA determined that a different methodology based on currently installed monitoring equipment at Lake Catherine Unit 4 was acceptable.

Commenters also suggested that ADEQ should remove the previously approved particulate matter and SO₂ limits from the administrative order.

Some commenters stated that ADEQ improperly relied on an administrative order for enforceability of the SIP that is vague and unenforceable. The commenters argued that the order violates both the requirements that BART include enforceable emission limits as well as the requirement that BART be installed and operated as expeditiously as possible. The commenters asserted that ADEQ cannot rely on a draft administrative order in the Proposed SIP. The commenters argued that even if the administrative order were not in draft form, the terms of the administrative order would still be vague and unenforceable. The commenters stated that the draft order does not create an affirmative obligation to shut down White Bluff. The commenter states that the limit in the order, which is contingent upon Entergy's execution of intended changes as indicated in their comments to EPA on the FIP, is not an enforceable limit under BART guidelines. The commenters stated that, in their comments on the FIP, Entergy merely proposes to cease burning coal and is prepared to take a commitment. The commenters also observed a discrepancy between the administrative order's requirement for compliance with execution of intended changes in operation by the end of 2030; whereas, Entergy's updated BART analysis is based on an assumption that White Bluff will cease firing coal by December 31, 2028. The commenters further pointed out that there is a reopener included in the administrative order for consistency with unspecified future state plans. The commenters also pointed out that whether Entergy ceases to burn coal appears contingent on receiving approval from the Arkansas Public Service Commission and approval of the SIP by EPA. The commenters asserted that the contingent nature of ADEQ's BART determination is unlawful. The commenters also stated that the proposed order's failure to require White Bluff to take a specific action by a specific date violates the statutory requirements for the timing of installation and operation of BART. The commenters noted that EPA's BART guidelines make clear that where the remaining useful life of a source affects the BART determination, the date the facility permanently stops operations "must be assured by a federally- or state-enforceable restriction preventing further operation."

Some commenters noted that the Proposed SIP and Administrative order allow Entergy three years to burn through existing stocks of higher sulfur coal. The commenters stated that if ADEQ selects LSC for Entergy, this technology is available regardless of existing stocks of dirtier, higher sulfur coal.

Response 32:

ADEQ agrees with the commenter that an unsigned order is not enforceable. ADEQ intends to execute the administrative orders (AOs) prior to finalization of the SIP. ADEQ presented the unsigned administrative orders for public notice prior to execution for the purpose of soliciting input from the public on the substance of the orders. The orders will become enforceable prior to an EPA decision on approval or disapproval into the Arkansas SIP.

ADEQ agrees with the commenters that the early closure or cessation of coal at White Bluff is not an explicit BART determination. The BART determination for White Bluff of LSC is based on analysis of the five factors that took into consideration the remaining useful life. ADEQ has incorporated Entergy's enforceable closure commitment into the AO to reflect the plans that Entergy has made publicly available. See Response 20(b).

ADEQ disagrees with the commenters that clarification is needed to emphasize that the reference to future White Bluff operations is informational and is not intended to create mandatory, federally enforceable requirements of the SIP that the commenter argues would be contrary to law. As previously stated, the reference to future White Bluff operations is not informational, but is an enforceable requirement incorporated into the administrative order to accurately reflect Entergy's planned cessation of coal-fired operations at the facility and guarantee timely action on that commitment. This certainty is necessary to allow consideration of Entergy's planned changes under the remaining useful life factor of the BART five-factor analysis. If approved into the SIP, all requirements of the administrative orders will become federally enforceable including the requirements that Entergy carry out its planned cessation of coal.

ADEQ disagrees with the commenter's recommendations that the Findings of Fact—referred to as “Statement of Basis” in the final AO—in the White Bluff administrative order should explicitly recognize that no additional controls or emission limitations are necessary at Independence in order to achieve reasonable progress during the first planning period. ADEQ has revised its reasonable progress analysis and determined that no additional controls are necessary for the first planning period. This determination is sufficiently clear and does not need to be reflected in the Entergy administrative order.

ADEQ also disagrees that Paragraph 3 of the Order should be modified to recognize that any early retirement or cessation of the use of coal at White Bluff is contingent on other regulatory approvals for Entergy and cannot be the basis of an enforceable limitation under the administrative order. Entergy is responsible for obtaining any other regulatory approvals in order to meet its commitment to cease the use of coal at White Bluff. The existence of any other applicable regulatory requirements does not preclude the use of this administrative order as an enforceable mechanism to ensure that Entergy carries out its planned cessation of coal. In addition, the BART guidelines clearly allow the compliance date for BART to be contingent upon EPA approval. ADEQ will modify the administrative order to include a severability

provision in the event of a requirement or provision in the administrative orders is held illegal or unenforceable in a judicial proceeding or is disapproved by EPA.

ADEQ disagrees with the commenters that suggested that Paragraph 5 of the Order should be removed or modified. As previously discussed in Response 25(c), 25 (d), and 26, ADEQ has determined that no further controls are needed to achieve reasonable progress in the first planning period. Nevertheless, Entergy has voluntarily proposed that ADEQ include LSC as a control for Independence in the long-term strategy. Therefore, no changes to Paragraph 5 of the Proposed Entergy order are necessary in response to this comment.

ADEQ agrees with the commenters that applauded ADEQ's use of Paragraph 10 of the Order to allow modification of the Administrative Order during future Regional Haze Program planning periods to account for ever-changing circumstances that could materially impact future reasonable progress assessments or long-term strategies. However, ADEQ notes that it has moved this statement to the Findings of Fact because it is factual statement of the potential impact of reasonable progress analyses in future planning periods. ADEQ has modified the statement to clarify that this is merely a statement of the regulatory requirement to perform a reasonable progress analysis for each planning period. As such, the substance of Paragraph 10 of the Order section of the administrative order is more appropriate in the Findings of Fact due to its factual nature. This relocation will not preclude ADEQ from taking the actions stated in that paragraph. In addition, ADEQ has added a provision addressing the effect of specific circumstances that might lead to the modification of the order or otherwise affect the future enforceability of provisions in the AOs including if federal legislation or a federal court modifies that regional haze program or the Arkansas SIP, respectively.

ADEQ disagrees that the administrative order should include a specific provision for public notice and comment on any future modifications to the administrative order so as to ensure that stakeholders are able to fully scrutinize such modifications and provide the Department with valuable input. However, it is appropriate to clarify how it will address potential future modifications, circumstances that might lead to future modifications, and provide assurances in the SIP that such changes will be made only after notice and comment. In order to do this, ADEQ has added language on page 2 that clarifies the steps ADEQ will take if the parts of the AOs are modified and provides assurances that ADEQ will provide a notice and comment period for any changes to the SIP or AOs. ADEQ has also added an additional provision in the AOs to clarify circumstances that may lead to future modifications including the effect of legislation or federal court decisions on the AOs.

In addition, the AOs included with the final SIP will be public noticed consistent with ADEQ's practice regarding other types of administrative orders, and the public notice requirements in the

Clean Air Act regarding SIP revisions.⁷⁷ No additional language is necessary to the AO as a result of this comment.

ADEQ disagrees that other requirements for planned changes in operation at Entergy units should be included in the administrative order. Based on an analysis using the reasonable progress factors, ADEQ has concluded that no other requirements are necessary to achieve reasonable progress including any planned changes at Entergy Independence or Lake Catherine. As a result, it is not necessary for ADEQ to include any such changes in the administrative order. However, ADEQ has revised the Proposed SIP to take into account the impacts of these planned changes regarding Lake Catherine and Independence in the long-term strategy.

ADEQ acknowledges the commenter's request for enforceable reduced emissions rates based on their installation of low NOx burners. However, ADEQ has already proposed and received approval of a Regional Haze SIP revision intended to address NOx requirements.⁷⁸ No additional NOx requirements are necessary for inclusion in this SIP revision or administrative orders. As a result, ADEQ disagrees with the commenter.

ADEQ disagrees that Order Paragraph 7 should be removed because Lake Catherine Unit 4 no longer has the capability to burn fuel oil. Its inclusion in the order provides assurance that, should changes occur such that Lake Catherine Unit 4 is capable of burning fuel oil, a new BART determination for fuel oil would be required before such fuel is burned. ADEQ notes that compliance with Order Paragraph 7 will not be an added burden on the facility due to its inability to burn fuel oil.

ADEQ agrees that Paragraph 8 of the Findings of Fact—referred to as Statement of Basis in the final AO—should be revised to simply specify that the four units were determined to be subject-to-BART in the 2008 SIP. ADEQ notes the commenter disputes that accuracy of the impacts of Lake Catherine.

ADEQ agrees that the requirement in Paragraph 8 of the Order section of the administrative order is not necessary as applied to White Bluff Auxiliary Boiler due to the infrequent operation of that unit. ADEQ will revise the order to reflect this.

ADEQ will remove these limits from the administrative orders. See Response 29.

ADEQ agrees that certain elements of the Entergy Administrative Order were insufficiently clear and has revised the proposed Entergy Administrative Order to clarify Entergy's planned closure of White Bluff is an enforceable requirement. This change is necessary to properly apprise the public of Entergy's planned changes and ensure enforceability of the administrative order. These

⁷⁷40 C.F.R. § 51.102; APC&EC Regulation No. 8.

⁷⁸

changes are consistent with Entergy's Updated BART Five-Factor Analysis for White Bluff Units 1 and 2, which is now publicly-available. Previously, Entergy's specific commitment to closure by December 31, 2028 had among information that had been asserted to have been a trade secret within the meaning Arkansas Pollution Control and Ecology Commission (APC&EC) regulations and the Arkansas Trade Secrets Act.⁷⁹ Now that this information can become subject to public scrutiny, ADEQ has incorporated the specific date into administrative order and the SIP generally.

ADEQ disagrees that whether Entergy ceases to burn coal is contingent on approval of the SIP by EPA. The requirement for Entergy to cease the use of coal is not conditional, and it is Entergy's responsibility to obtain any regulatory approvals needed to meet the commitment in the Entergy Administrative Order. Nevertheless, ADEQ's clarification to the administrative order should ensure that there is no further confusion regarding the requirement that Entergy complete its intended cessation of coal no later than December 31, 2028.

As previously stated, the provision acknowledging ADEQ's ability to revise this administrative order in future planning periods for consistency with future requirements and plans has been modified to clarify that it is intended to reflect existing regulatory requirements and relocated to the findings of fact section to ensure that it will not be interpreted as anything other than a statement of fact. In addition, any other applicable requirements necessary to allow Entergy to lawfully cease the use of coal at White Bluff are the responsibility of Entergy to meet. ADEQ agrees that the BART guidelines make clear that where the remaining useful life of a source affects the BART determination, and that the date the facility permanently stops operations "must be assured by a federally- or state-enforceable restriction preventing further operation." ADEQ has clarified the language in the Entergy administrative order to ensure there is an understanding that Entergy's commitment meets this requirement.

Some commenters noted that the Proposed SIP and Administrative order allow Entergy three years to burn through existing stocks of higher sulfur coal. After consideration of the comments and the additional information provided by Entergy on April 3, 2018 in response to ADEQ's request for more information, ADEQ has determined that a three year compliance time frame is still appropriate for compliance with LSC for Entergy White Bluff and Independence. See Response 20(h).

Comment 33:

Commenters argued that the Proposed SIP is unlawful because it was not reviewed and approved by the Arkansas legislative committees. The commenters asserted that ADEQ's Proposed SIP is plainly a rule within the meaning of Ark. Code Ann. 10-3-309; therefore, ADEQ must submit the Proposed SIP for legislative approval. The commenters argued that ADEQ cannot bypass the legislative approval process by labeling elements of the SIP revision as mere "administrative

⁷⁹ Ark. Code Ann. §§ 4-75-601 *et seq.*

orders” under Ark. Code Ann. 8-4-103(d)(4), which the commenter claimed only applies to civil penalties and to parties that violate provisions of the Chapter 4 of Title 8 of the Arkansas Code and regulations, rules, permits, or plans issued pursuant the Chapter. The commenters pointed out that none of the sources at issue in the administrative orders have violated any provision of Arkansas’s regulations; therefore, the State lacks the authority to invoke Ark. Code Ann. 8-4-103 (d)(4). The commenters state that declaratory orders under Arkansas law pertain to the enforcement or applicability of any rule, not to the establishment of a rule, which the Proposed SIP does. The commenter further argued that Arkansas’s request that EPA withdraw from the SIP currently active Regional Haze Program requirements represents and amendment or repeal of a prior rule, which requires legislative approval without limitation pursuant to Ark. Code Ann. 10-3-309(b)(1)(A).

Response 33:

ADEQ disagrees that the Proposed SIP is unlawful and subject to review and approval under Ark. Code. Ann. § 10-3-309. A SIP is a collection of state provisions that, once approved by EPA, is codified or incorporated by reference into the Code of Federal Regulations in order to meet certain Clean Air Act requirements such as requirements to address visibility under the Regional Haze program. This SIP revision is not subject to legislative approval because neither the state-enforceable legal mechanisms in the administrative orders, nor the federally-enforceable legal mechanisms in the Code of Federal Regulations, are subject to the requirements of Ark. Code. Ann. § 10-3-309.

The Proposed SIP does not require legislative approval under Ark. Code. Ann. § 10-3-309 because each administrative order does not fall within the definition of a “rule.” “Rule” means a state agency statement *of general applicability* and future effect that implements, interprets, or prescribes law or policy or describes the organization, procedure, or practice of a state agency and includes without limitation the amendment or repeal of a prior rule.” Ark. Code. Ann. § 10-3-309 (emphasis added). In this instance, “general applicability” is intended to distinguish a requirement that applies broadly to the public or groups of people or sources of air pollution from those that are intended to be specific an individual entity or facility. The SIP does not set forth any statements or requirements of general applicability to multiple facilities or categories of facilities, but instead each requirement is specific to an individual facility or entity as set forth in the proposed administrative order.

In addition, the Proposed SIP does not require legislative approval under Ark. Code. Ann. § 10-3-309 because the statutory construction of provisions pertaining to SIPs exhibits an intent on the part of the Arkansas legislature to create a separate and distinct set of requirements for SIPs.

Both the definition of the SIP and the roles assigned to ADEQ and the APC&EC indicate that a SIP is not a rule. Subchapter 3 of the Water and Air Pollution Control Act provides the following definition of a SIP: “a plan that specifies measures to be used in the implementation of the state’s

duties under the Clean Air Act, 42 U.S.C. § 7401 et seq., and that is *developed by the [D]epartment and submitted to the United States Environmental Protection Agency* for review and approval.” Ark. Code Ann. § 8-4-303 (emphasis added). Unlike a rule, a SIP is defined as a “plan,” and it is developed by ADEQ rather than the APC&EC. A rule promulgated under the Water and Air Pollution Control Act must be promulgated by the APC&EC.⁸⁰

More detailed requirements for SIPs are set forth in Ark. Code Ann. § 8-4-317, which prescribes a distinct appeals process from that of a rule. Commenters on SIP revisions have “standing to appeal the final *decision of the [D]epartment* to the [APC&EC] upon written application.”⁸¹ An appeal of a SIP “shall be processed *as a permit appeal* under § 8-4-205.” *Id.* ADEQ may “raise all relevant issues of regulatory concern upon adjudicatory review by the [APC&EC].” *Id.*

In addition, ADEQ disagrees that the Proposed SIP constitutes “the amendment or repeal of a prior rule.” The Proposed SIP includes a request for EPA to take certain action including the withdrawal of certain previous provisions of included in the SIP. If EPA chose to take those actions, they would be performed in an action published in the Federal Register, which modifies the Code of Federal regulations provisions that constitute the Arkansas SIP. ADEQ itself is not rescinding or repealing any previous requirements. In contrast, ADEQ is requesting that EPA take certain federal actions with regard to federal regulations. ADEQ’s request for EPA to modify the SIP does not constitute a rule because the request is not a statement of general applicable and future effect. ADEQ’s proposed request, which ADEQ is removing from the final SIP, to withdraw certain provisions from the SIP has no “effect” unless and until EPA takes an altogether separate action modifying federal law. EPA’s actions in withdrawing provisions from the Arkansas SIP are not subject to Ark. Code. Ann. § 10-3-309 because EPA does not fall within the definition of “state agency.” (“State agency” means an office, board, commission, department, council, bureau, or other agency *of state government* having authority to promulgate or enforce rules.) (emphasis added). ADEQ is not proposing in this action to take any action with regard to the state regional haze requirements set forth in APC&EC Reg. 19.1501–19.1507.

ADEQ disagrees with the commenters that it is relying on Ark. Code. Ann. § 8-4-103, which pertains to ADEQ’s authority to issue penalties. ADEQ is not relying on authority set forth in Ark. Code. Ann. § 8-4-103 in the promulgation of the Proposed SIP, but instead ADEQ is relying on the authority provided to it in Ark. Code Ann. § 8-4-311. Ark. Code Ann. § 8-4-311 states that ADEQ has the authority to “[m]ake, issue, modify, revoke, and enforce orders prohibiting, controlling, or abating air pollution.” In addition, ADEQ is provided with the authority to “[d]evelop and implement state implementation plans.” ADEQ is relying on these and other powers delineated in Arkansas statutes in the issuance of these administrative orders in support of its Proposed SIP.

⁸⁰ Ark. Code Ann. § 8-4-202

⁸¹ Ark. Code Ann. § 8-4-317

Similarly, other statutes do not require ADEQ to submit the Proposed SIP for legislative review. Ark. Code Ann. § 8-4-317, which sets forth specific requirements for SIPs, does not require any form of legislative approval. Instead, this statute set forth notice and comment requirements and a method for commenters to appeal Final SIPs to the APC&EC.

Comment 34:

One commenter stated that ADEQ should work with State and local areas to get the most up-to-date equipment and only work with facilities that do the same.

Response 34:

ADEQ must work within the framework of its regulatory authority and the requirements for SIPs under the Regional Haze Regulations. ADEQ based emission limits included in the Proposed SIP on reasoned consideration of analyses of feasible retrofit technologies for subject-to-BART facilities. The factors assessed in these analyses are mandated by statute.⁸² In addition, ADEQ assessed in accordance with factors required by statute whether any additional controls are needed for reasonable progress during the 2008–2018 planning period.⁸³ Emission limits based on control equipment were established within the framework of Clean Air Act 169A, EPA’s Regional Haze Regulations, and EPA guidance for the first Regional Haze planning period.

This comment does not necessitate changes to the Proposed SIP.

Comment 35:

Some commenters submitted comments on the Proposed SIP that were directed toward parties other than ADEQ.

Some commenters questioned Entergy’s choices with respect to management of coal plants. Commenters exhorted power plants to be responsible and stop polluting.

One commenter called on EPA to prove that air quality is its new focus. Some commenters encouraged teamwork in making decisions that will save lives and keep companies from muddying up the air and water. One commenter also stated that Corporate America should play a part for clean air.

Response 35:

⁸² Clean Air Act Section 169A(g)(2) states that in determining BART, the State shall “take into consideration the costs of compliance, the energy and nonair quality environmental impact of compliance, an existing pollution control technology in use at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.”

⁸³ Clean Air Act Section 169A(g)(1) states that “in determining reasonable progress there shall be taken into consideration the costs of compliance, the time necessary for compliance, and the energy and nonair quality environmental impacts of compliance, and the remaining useful life of any existing source subject to such requirements.”

The comments summarized in Comment 35 were not directed at ADEQ or any specific provision, requirement, or evaluation contained in the Proposed SIP. This comment does not necessitate changes to the Proposed SIP.

Comment 36:

Some commenters demanded that selective catalytic reduction be required for Entergy coal plants. Commenters asserted that this technology has been around for twenty years and ADEQ should know about this technology that prevents pollution.

Response 35:

ADEQ did not include in the Proposed SIP any changes to previous determinations with respect to NO_x for subject-to-BART EGUs and reasonable progress. See Response 9. This comment does not necessitate changes to the Proposed SIP.

Exhibits

Exhibit A

Environ (2007) Technical Support Documentation for CENRAP Emissions and Air Quality Modeling to Support Regional Haze State Implementation

Exhibit B

Alpine Geophysics, LLC (2006) “CENRAP Regional Haze Control Strategy Analysis Plan”

Exhibit C

ADEQ (2015) Re: Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Docket No. EPA-R06-OAR-2015-0189

Exhibit D

ADEQ (2017) Petition for Reconsideration and Request for Administrative Stay in re: Promulgations of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan Final Rule (Docket No. EPA-R06-OAR-2015-0189)

Exhibit E

EPA (2007) “Guidance for Setting Progress Goals under the Regional Haze Program”

Exhibit F

Sargent & Lundy’s February 1, 2018 comments

Exhibit G

Entergy’s April 3, 2018 letter

Exhibit A

CENRAP Technical Support Document

Draft Report**Technical Support Document for CENRAP Emissions
and Air Quality Modeling to Support Regional Haze
State Implementation Plans**

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September 12, 2007

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1.0 INTRODUCTION

This Technical Support Document (TSD) describes the Central Regional Air Planning Association (CENRAP) regional emissions and air quality modeling to support the central states Regional Haze Rule (RHR) State Implementation Plans (SIPs). The CENRAP 2002 annual emissions and air quality modeling was performed by the contractor team of ENVIRON International Corporation (ENVIRON) and the University of California at Riverside (UCR).

1.1 Background

The 1977 Clean Air Act Amendments (CAAA) added a new Section 169A for the protection of visibility in Federal Class I areas (specific national parks, wilderness areas and wildlife refuges). Section 169A(a)(1) of the CAAA established the national goal for visibility protection: “Congress hereby declares 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.” The CAAA require States to submit SIPs containing emission limits, schedules of compliance and to “promulgate regulations to assure reasonable progress toward meeting the national goal” (Section 169A(a)(4)). In response to these mandates EPA promulgated the Regional Haze Rule (RHR) on July 1, 1999 that requires States to “establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions” at Class I areas. The States’ RHR SIPs are due December 17, 2007 and an important component of the SIP will be the 2018 Reasonable Progress Goals (RPGs) toward achieving natural conditions in 2064. Regional air quality models are used to project visibility to 2018 to determine the level of visibility improvement that is expected to be achieved in 2018. This information, along with other sources, can be used by the states to assist in setting their 2018 RPGs.

CENRAP is one of five Regional Planning Organizations (RPOs) that have responsibility for coordinating development of SIPs and Tribal Implementation Plans (TIPs) in selected areas of the U.S. to address the requirements of the RHR. CENRAP is a regional partnership of states, tribes, federal agencies, stakeholders and citizen groups established to initiate and coordinate activities associated with the management of regional haze and other air quality issues within the CENRAP states. The CENRAP region includes states and tribal lands located within the boundaries of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma and Texas.

The CENRAP Emissions and Air Quality Modeling Team is composed of staff from ENVIRON and UCR, with assistance and coordination from the CENRAP states, tribes, federal agencies and stakeholders. The ENVIRON/UCR Team performs the emissions and air quality modeling simulations for states and tribes within the CENRAP region, providing analytical results used in developing implementation plans under the RHR. Figure 1-1 shows the states included in each of the five RPOs in the U.S., including CENRAP. Table 1-1 lists the Class I areas within the CENRAP states.

CENRAP is performing emissions and air quality modeling to project visibility to 2018. The modeling results will be used to determine the level of visibility improvement expected in 2018

under various emission scenarios. States will use these results to assist in determining their 2018 RPGs toward achieving natural conditions in 2064.



Figure 1-1. Regional Planning Organizations engaged in Regional Haze Modeling.

Table 1-1. Federal Mandated Class I Areas in the CENRAP States.

Class I Area	Acreage	Federal Land Manager	Public Law
Arkansas			
Caney Creek Wilderness Area	14,460	USDA-FS	93-622
Upper Buffalo Wilderness Area	12,018	USDA-FS	93-622
Louisiana			
Breton Wilderness Area	5,000+	USDI-FWS	93-632
Minnesota			
Boundary Waters Canoe Area Wilderness	810,088	USDA-FS	99-577
Voyageurs National Park	114,964	USDI-NP	99-261
Missouri			
Hercules-Glade Wilderness Area	12,314	USDA-FS	94-557
Mingo Wilderness Area	8,000	USDI-FWS	95-557
Oklahoma			
Wichita Mountains Wilderness	8,900	USDI-FWS	91-504
Texas			
Big Bend National Park	708,118	USDI-NP	74-157
Guadalupe Mountains National Park	76,292	USDI-NP	89-667

1.2 CENRAP Organizational Structure and Work Groups

The governing body of CENRAP is the Policy Oversight Group (POG) that is made up of voting members representing states and tribes within the CENRAP region and non-voting members representing local agencies, the EPA and other federal agencies. The work of CENRAP is accomplished through five standing workgroups:

- Monitoring;
- Emissions Inventory;
- Modeling;
- Communications; and
- Implementation and Control Strategies.

Participation in workgroups is open to all interested parties and the POG may form additional ad hoc workgroups to address specific issues (e.g., a Data Analysis workgroup was formed).

The RHR requires the states, and the tribes that may elect to, submit the first SIPs and TIPs that address progress toward natural conditions at federally mandated Class I areas by December 17, 2007. 40 CFR 51.308 (Section 308) discusses the following four core requirements to be included in SIPs/TIPs and Best Available Retrofit Technology (BART) requirements:

1. Reasonable progress goals;
2. Calculations of baseline and natural visibility conditions;
3. A Long-term strategy for regional haze;
4. A Monitoring strategy and other implementation plan requirements; and
5. BART requirements for regional haze visibility impairment.

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One of CENRAP's goals is to provide support to states and tribes to meet each of these requirements of the RHR and to develop scientifically supportable, economical and effective control strategies that the states and tribes may adopt to reduce anthropogenic effects on visibility impairment at Class I areas. One component of CENRAP's support to states and tribes as part of compliance with the RHR is performing emissions and air quality modeling. These activities were implemented to:

- obtain a better understanding of the causes of visibility impairment and to identify potential mitigation measures for visibility impairment at Class I areas;
- to evaluate the effects of alternative control strategies for improving visibility; and
- to project future-year air quality and visibility conditions.

In October 2004, CENRAP selected the team of ENVIRON and UCR to perform their Emissions and Air Quality Modeling.

The CENRAP Emissions and Air Quality Modeling Team performs regional haze analyses by operating regional scale, three-dimensional air quality models that simulate the emissions, chemical transformations, and transport of gaseous and particulate matter (PM) species and consequently the effects on visibility in Class I Areas in the central U.S. A key element of this work includes the integration of emissions inventories and emissions models with regional transport models. The general services provided by the CENRAP Emissions and Air Quality Modeling Team include, but are not limited to:

- Emissions processing and modeling;
- Air quality and visibility modeling simulations;
- Analysis, display, and reporting of modeling results; and
- Storage/quality assurance of the modeling input and output files.

The CENRAP 2002 annual Emissions and Air Quality Modeling Team performs work for the CENRAP Modeling Workgroup through direction from the CENRAP Technical Director and CENRAP Executive Director.

1.3 Overview of 2002 Annual Emissions and Air Quality Modeling Approach

The CENRAP 2002 annual emissions and air quality modeling was initiated on October 16, 2004 and involved the preparation of numerous databases, model simulations, presentations and reports. Much of the modeling analyses have been posted to the CENRAP modeling website at: <http://pah.cert.ucr.edu/aqm/cenrap/index.shtml>. There were numerous versions and iterations of the modeling and interim results. The results presented in this TSD focus on the final modeling results and key findings in their development. The reader is referred to the modeling website for interim products.

1.3.1 Modeling Protocol

A Modeling Protocol was prepared at the outset of the study to serve as a road map for performing the CENRAP emissions and air quality modeling and to communicate the modeling

plans to the CENRAP participants. The Modeling Protocol was prepared following EPA guidance for preparation at the time it was prepared (EPA, 1991; 1999, 2001) and took into account CENRAP's long-term plan (CENRAP, 2003) and the modeling needs of the RHR SIPs. The first version (Version 1.0) of the Modeling Protocol was dated November 19, 2004. Based on comments received from CENRAP, the Modeling Protocol was updated to the current Version 2.0 (Morris et al., 2004a) that was dated December 8, 2004. This Modeling Protocol can be found on the CENRAP modeling Website at:

http://pah.cert.ucr.edu/aqm/cenrap/docs/CENRAP_Draft2.0_Modeling_Protocol_120804.pdf

1.3.2 Quality Assurance Project Plan (QAPP)

A Quality Assurance Project Plan (QAPP) was prepared for the CENRAP emissions and air quality modeling study that described the quality management functions performed by the modeling team. The QAPP was prepared and was based on the national consensus standards for quality assurance (ANSI/ASQC, 1994), followed EPA's guidelines for quality assurance project plans for modeling (EPA, 2002) and for QAPPs (EPA, 2001) and took into account the recommendations from the North American Research Strategy for Tropospheric Ozone (NARSTO) Quality Handbook for modeling projects (NARSTO, 1998). The EPA and NARSTO guidance documents were developed specifically for modeling projects, which have different quality assurance concerns than environmental monitoring data collection projects. The work performed in this project involves modeling at the basic research level and for regulatory/planning applications. In order to use model outputs for these purposes, it must be established that each model is scientifically sound, robust, and defensible. This is accomplished by following a project planning process that incorporates the following elements as described in the EPA modeling guidance document:

- A systematic planning process including identification of assessments and related performance criteria;
- Peer reviewed theory and equations;
- A carefully designed life-cycle development process that minimizes errors;
- Documentation of any changes from original plans;
- Clear documentation of assumptions, theory, and parameterization that is detailed enough so others can understand the model output;
- Input data and parameters that are accurate and appropriate for the analysis; and
- Output data that can be used to help inform decision makers.

The CENRAP QAPP can be found at:

http://pah.cert.ucr.edu/aqm/cenrap/docs/CENRAP_QAPP_Nov_24_2004.pdf.

A key component of the CENRAP emissions and air quality modeling QAPP was the graphical display of model inputs and outputs and multiple peer-review of each step of the modeling process. This was accomplished through use of the CENRAP modeling website where modelers posted displays of work products (e.g., emissions plots, model outputs, etc.) for review by the CENRAP modeling team, modeling workgroup and others. This website can be found at: <http://pah.cert.ucr.edu/aqm/cenrap/index.shtml>.

1.3.3 Model Selection

The selection of the meteorological, emissions and air quality models for the CENRAP regional haze modeling was based on a review of previous regional haze modeling studies performed in the CENRAP region (e.g., Pitchford et al., 2004; Pun, Chen and Seigneur, 2004; Tonnesen and Morris 2004) as well as elsewhere in the United States (e.g., Morris et al, 2004a; Tonnesen et al., 2003; Baker, 2004). The CENRAP emissions and air quality Modeling Protocol (Morris et al., 2004a) provides details on the justification for model selection and the formulation of the different models. Based on previous work (e.g., CENRAP, WRAP, VISTAS, MRPO, BRAVO and EPA), CENRAP selected the following models for use in modeling PM and regional haze in the central states:

- **MM5:** The Pennsylvania State University/National Center for Atmospheric Research (PSU/NCAR) Mesoscale Meteorological Model (MM5 Version 3.6 MPP) is a non-hydrostatic, prognostic meteorological model routinely used for urban- and regional-scale photochemical, fine particulate, and regional haze regulatory modeling studies (Anthes and Warner, 1978; Chen and Dudhia, 2001; Stauffer and Seaman, 1990, 1991; Xiu and Pleim, 2000).
- **SMOKE:** The Sparse Matrix Operator Kernel Emissions (SMOKE) modeling system is an emissions modeling system that generates hourly gridded speciated emission inputs of mobile, non-road, area, point, fire and biogenic emission sources for photochemical grid models. (Coats, 1995; Houyoux and Vukovich, 1999). As with most 'emissions models', SMOKE is principally an *emission processing system* and not a true *emissions modeling system* in which emissions estimates are simulated from 'first principles'. This means that, with the exception of mobile and biogenic sources, its purpose is to provide an efficient tool for converting an existing base emissions inventory data into the hourly, gridded, speciated, and formatted emission files required by an air quality model.
- **CMAQ:** EPA's Models-3/Community Multiscale Air Quality (CMAQ) modeling system is a 'One-Atmosphere' photochemical grid model capable of addressing ozone, PM, visibility and acid deposition at a regional scale for extended periods of time (Dennis, et al., 1996; Byun et al., 1998a; Byun and Ching, 1999, Pleim et al., 2003).
- **CAMx:** ENVIRON's Comprehensive Air Quality Model with Extensions (CAMx) modeling system is also a state-of-science 'One-Atmosphere' photochemical grid model capable of addressing ozone, PM, visibility and acid deposition at a regional scale for extended periods of time. (ENVIRON, 2006).

1.3.3.1 MM5 Meteorological Model Configuration for CENRAP Annual Modeling

Application of the MM5 for the 2002 annual modeling on a 36 km grid for the continental US was performed by the Iowa Department of Natural Resources (IDNR; Johnson, 2007). Details of the 2002 36 km MM5 model application and evaluation procedures carried out by IDNR may be found in Johnson, 2007. Application of the MM5 model on a 12 km grid covering the Central States for portions of 2002 was performed by EPA Region VII and the Texas Commission on Environmental Quality (TCEQ).

The MM5 (Version 3.63) configuration used in the generation of the meteorological modeling datasets consists of the following (see Table 1-2 for more details):

- 36 km grid with 34 vertical layers;
- 12 km nested grid for episodic modeling;
- For 12 km runs use two way nesting (without feedback) within the 36 km grid;
- Initialization and boundary conditions from Eta analysis fields;
 - Eta 3D and surface analysis data (ds609.2);
 - Not using NCEP global tropospheric SST data (ds083.0) ;
 - Observational enhancement (LITTLE_R)
 - NCEP ADP surface obs (ds464.0)
 - NCEP ADP upper-air obs (ds353.4)
- Pleim-Xiu (P-X) land-surface model (LSM);
- Pleim-Chang Asymmetric Convective Mixing (ACM) PBL model;
- Kain-Fritsch 2 cumulus parameterization;
- Mixed phase (Reisner 1) cloud microphysics;
- Rapid Radiative Transfer Model (RRTM) radiation;
- No Shallow Convection (ISHALLO=0);
- Standard 3D FDDA analysis nudging outside of PBL; and
- Surface nudging of the winds only.

1.3.3.2 SMOKE Emissions Model Configuration for CENRAP Annual Modeling

SMOKE supports area, mobile, fire and point source emission processing and includes biogenic emissions modeling through a rewrite of the Biogenic Emission Inventory System, version 3 (BEIS3) (see, <http://www.epa.gov/ttn/chief/software.html#pcbeis>). SMOKE has been available since 1996, and has been used for emissions processing in a number of regional air quality modeling applications. In 1998 and 1999, SMOKE was redesigned and improved with the support of the U.S. Environmental Protection Agency (EPA), for use with EPA's Models-3/CMAQ (<http://www.epa.gov/asmdnerl/models3>). The primary purposes of the SMOKE redesign were support of: (a) emissions processing with user-selected chemical mechanisms and (b) emissions processing for reactivity assessments.

As an emissions processing system, SMOKE has far fewer 'science configuration' options compared with the MM5 and CMAQ models. Table 1-3 summarizes the version of the SMOKE system that was used and the sources of data that were employed in constructing the required modeling inventories.

1.3.3.3 CMAQ Air Quality Model Configuration for CENRAP Annual Modeling

CENRAP used CMAQ Version 4.5 with the "SOAmods enhancement", described below, and used the model configuration as shown in Table 1-4. The model was set up and exercised on the same 36 km grid that was used by WRAP and VISTAS, the 36 km RPO national grid. CENRAP performed 12 km CMAQ sensitivity tests and found little change in model performance with a large penalty in computation time. Consequently, at the February 7, 2006 CENRAP Modeling

Workgroup Meeting a decision was made to proceed with the CENRAP emissions and air quality modeling using just the 36 km national RPO grid (Morris et al., 2006a).

Initial CMAQ 2002 simulations performed by VISTAS found that the model greatly underestimates organic mass carbon (OMC) concentrations, especially in the summer. A review of the CMAQ formulation found that it failed to treat Secondary Organic Aerosol (SOA) formation from sesquiterpenes and isoprene and also failed to account for the fact that SOA can become polymerized so that it is no longer volatile and stays in the particle form. Thus, VISTAS updated the CMAQ SOA module to include these missing processes and found much improved OMC model performance (Morris et al., 2006c). CENRAP tested the CMAQ Version 4.5 with SOAmods enhancement and found it performed much better for OMC than the standard versions of CMAQ Version 4.5. Therefore, CMAQ Version 4.5, with the enhanced SOAmods (Morris et al., 2006c), was adopted for the CENRAP modeling. CMAQ Version 4.5 is available from the CMAS center (www.cmascenter.org).

1.3.3.4 CAMx Air Quality Model Configuration for CENRAP Annual Modeling

CAMx Version 4.40 was applied using similar options as used by CMAQ. CAMx was used initially in side-by-side comparisons with CMAQ. Comparative model performance results and other factors for CAMx V4 and CMAQ V4.4 with SOAmods were presented at the February 7, 2006 CENRAP modeling workgroup meetings that found (Morris et al., 2006b):

- No one model was consistently performing better than the other over all species and averaging times.
- Both models performed well for sulfate.
- CMAQ's winter nitrate over-prediction tendency not as large as CAMx's.
- CAMx performed slightly better than CMAQ for elemental carbon (EC).
- CMAQ performed much better than CAMx for organic mass carbon (OMC).
- Both models over-predicted Soil and under-predicted coarse mass (CM).
- CMAQ ran faster than CAMx due to MPI multi-processing capability.
- CAMx required much less disk space than CMAQ.

Based on these factors, CMAQ was selected as the lead air quality model for the CENRAP regional haze modeling with CAMx the secondary corroborative model. However, CAMx also contained a PM Source Apportionment Technology (PSAT) capability that was used widely in the CENRAP modeling. Table 1-4 lists the main CAMx configuration used for the CENRAP annual modeling that was selected, in part, to be consistent with the CMAQ model configuration (Table 1-4). One exception to this was that the CAMx PSAT simulations used the Bott advection solver rather than the PPM advection solver. The PPM advection solver is typically used in the standard CAMx and CMAQ runs. Bott, however, is more computationally efficient and the high computational requirements of the CAMx PSAT runs dictated this choice.

Table 1-2. MM5 Meteorological Model Configuration for CENRAP 2002 Annual Modeling (Johnson, 2007).

Science Options	Configuration	Details/Comments
Model Code	MM5 version 3.63	Grell et al., 1994
Horizontal Grid Mesh	36 km	
36 km grid	165 x 129 dot points	RPO MM5 Grid
Vertical Grid Mesh	34 layers	Vertically varying; sigma pressure coordinate system
Grid Interaction	No Feedback	IFEED=0
Initialization	Eta first guess fields/LittleR	
Boundary Conditions	Eta first guess fields/LittleR	
Microphysics	Reisner I Mixed Ice	Look up table
Cumulus Scheme	Kain-Fritsch 2	On 36 and 12 km Grids
Planetary Boundary Layer	ACM PBL	
Radiation	RRTM	
Vegetation Data	USGS	24 Category Scheme
Land Surface Model	Pleim-Xiu Land Surface Model (LSM)	
Shallow Convection	None	
Sea Surface Temperature	Eta Skin	Spatially varying
Thermal Roughness	Garratt	
Snow Cover Effects	None	
4D Data Assimilation	Analysis Nudging on 36 and 12	
Surface Nudging	Wind Field Only	
Integration Time Step	90 seconds	
Simulation Periods	Annual 2002 for 36 km	12 km episodic only
Platform	Linux Cluster	Done at IDNR ¹

¹ Twelve km episodic modeling completed by EPA Region VII and the Texas Commission on Environmental Quality.

Table 1-3. SMOKE Emissions Model Configuration for CENRAP Annual Modeling.

Emissions Component	Configuration	Details/Comments
Emissions Model	SMOKE Version 2.3	Several versions of SMOKE used during course of the study
Horizontal Grid Mesh	36 km	
36 km grid	148 x 112 cells	RPO National Grid
Area Source Emissions	CENRAP Domain: CENRAP State 2002 EI	Updated '02 developed by CENRAP states (Pechan, 2005d,e)
	Other States: '02 NEI augmented with other 2002	Generated from EPA NEI02 v.1 and RPO interaction (Pechan, 2005c)
On-Road Mobile Sources	CENRAP Domain: CENRAP VMT data	Updated '02 developed by CENRAP states (Reid et al., 2004a)
	Other States: EPA '02 NEI augmented with other 2002	Generated from EPA NEI02 v.1 and RPO interaction (Pechan, 2005c)
Point Sources	CENRAP Domain: CENRAP State 2002 EI	Updated '02 developed by CENRAP states and stakeholders (Pechan, 2005a,b)
	Other States: EPA '02 NEI augmented with other 2002	Generated from EPA NEI02 v.1 and RPO interaction (Pechan, 2005c)
Off-Road Mobile Sources	CENRAP Domain: CENRAP State 2002 EI	Updated '02 developed by CENRAP states (Pechan, 2005d,e)
	Other States: EPA '02 NEI augmented with other 2002	Generated from EPA NEI02 v.1 and RPO interaction (Pechan, 2005c)
Biogenic Sources	SMOKE BEIS-3	BELD3 vegetative database
Mexican Sources	1999 Emissions for 2002 and 2018	http://www.epa.gov/ttn/chief/net/mexico.html ; (ERG, 2006)
Canadian Sources	2000 Emissions for 2002 and 2020 Emissions for 2018	http://www.epa.gov/ttn/chief/net/canada.html
Temporal Adjustments	Seasonal, day, hour	Based on latest collected information and CEM-based profiles
Chemical Speciation	Revised CBM-IV Chemical Speciation	Updated January 2004
Gridding	Revised EPA Spatial Surrogates Used	Gridding of surrogates from http://www.epa.gov/ttn/chief/emch/spatial/
Growth and Controls	CENRAP developed	Pechan (2005a,b)
Quality Assurance	QA Tools in SMOKE 2.0	Follow QAPP (Morris and Tonnesen, 2004) and QA refinements (Morris and Tonnesen, 2006)
Simulation Periods	Annual 2002 for 36 km	Episodic periods at 12 km

Table 1-4. CMAQ Air Quality Model Configuration for CENRAP Annual Modeling.

Science Options	Configuration	Details/Comments
Model Code	CMAQ Version 4.5 w/ SOAmods	Secondary Organic Aerosol enhancements as described by Morris et al., (2006c)
Horizontal Grid Mesh	36 km annual	36 km covering continental U.S; some episodic 12 km sensitivity runs were also performed
36 km grid	148 x 112 cells	RPO National Grid
Vertical Grid Mesh	19 Layers	First 17 layers sync'd w/ MM5
Grid Interaction	One-way nesting	
Initial Conditions	~15 days full spin-up	Separately run 4 quarters of 2002
Boundary Conditions	2002 GEOS-CHEM day-specific	2002 GEOS-CHEM day specific 3-hour average data
Emissions		
Baseline Emissions Processing	See SMOKE model configuration	MM5 Meteorology input to SMOKE, CMAQ
Sub-grid-scale Plumes	No Plume-in-Grid (PinG)	
Chemistry		
Gas Phase Chemistry	CBM-IV	
Aerosol Chemistry	AE3/ISORROPIA	
Secondary Organic Aerosols	Secondary Organic Aerosol Model (SORGAM) w/ SOAmods update	Schell et al., (2001); Morris et al., (2006c)
Cloud Chemistry	RADM-type aqueous chemistry	Includes subgrid cloud processes
N2O5 Reaction Probability	0.01 – 0.001	
Meteorological Processor	MCIP Version 2.3	Includes dry deposition and snow cover updates
Horizontal Transport		
Numerical Scheme	PPM advection solver	
Eddy Diffusivity Scheme	K-theory with Kh grid size dependence	Multiscale Smagorinsky (1963) approach
Vertical Transport		
Eddy Diffusivity Scheme	K-theory	
Diffusivity Lower Limit	Kzmin = 0.1 to 1.0	Land use dependent Kzmin
Deposition Scheme	M3dry	Directly linked to Pleim-Xiu Land Surface Model parameters
Numerics		
Gas Phase Chemistry Solver	Euler Backward Iterative (EBI) solver	
Horizontal Advection Scheme	Piecewise Parabolic Method (PPM) scheme	
Simulation Periods	Annual 2002 for 36 km	Episodic periods at 12 km
Integration Time Step	Calculated Internally	15 minute coupling time step

Table 1-5. CAMx Air Quality Model Configuration for CENRAP Annual Modeling.

Science Options	Configuration	Details
Model Code	CAMx Version 4.40	Available at: www.camx.com
Horizontal Grid Mesh	36 km annual	36 km covering continental U.S
36 km grid	148 x 112 cells	
Vertical Grid Mesh	19 Layers	17 Layers sync'd w/ MM5
Grid Interaction	Two-way nesting	
Initial Conditions	~15 days full spin-up	Separately run 4 quarters of 2002
Boundary Conditions	2002 GEOS-CHEM day-specific	2002 GEOS-CHEM day specific 3-hour average data
Emissions		
Baseline Emissions Processing	See SMOKE model configuration	MM5 Meteorology input to SMOKE, CAMx
Sub-grid-scale Plumes	No Plume-in-Grid (PinG)	Consistent with CMAQ
Chemistry		
Gas Phase Chemistry	CBM-IV	with Isoprene updates
Aerosol Chemistry	ISORROPIA equilibrium	Dynamic and hybrid also available but not used
Secondary Organic Aerosols	SOAP	
Cloud Chemistry	RADM-type aqueous chemistry	Alternative is CMU multi-section aqueous chemistry
N2O5 Reaction Probability	None	
Meteorological Processor	MM5CAMx	
Horizontal Transport		
Eddy Diffusivity Scheme	K-theory with Kh grid size dependence	
Vertical Transport		
Eddy Diffusivity Scheme	K-Theory	
Diffusivity Lower Limit	Kzmin = 0.1 to 1.0	Land use dependent Kzmin
Planetary Boundary Layer	No Patch	
Deposition Scheme	Wesely	
Numerics		
Gas Phase Chemistry Solver	CMC Fast Solver	
Horizontal Advection Scheme	Piecewise Parabolic Method (PPM) scheme. PSAT w/ Bott scheme.	
Simulation Periods	Annual 2002 at 36 km	
Integration Time Step	Wind speed dependent	

1.3.4 Modeling Domains

The CENRAP emissions and air quality modeling was conducted on the 36 km national RPO domain as depicted in Figure 1-2. This domain consists of a 148 by 112 array of 36 km by 36 km grid cells and covers the continental United States. Sensitivity simulations were also performed for episodes on a 12 km modeling domain covering the central states, however the results were very similar to the 36 km results so CENRAP elected to proceed with the 2002 annual modeling using the 36 km domain for computational efficiency (Morris et al., 2006a).

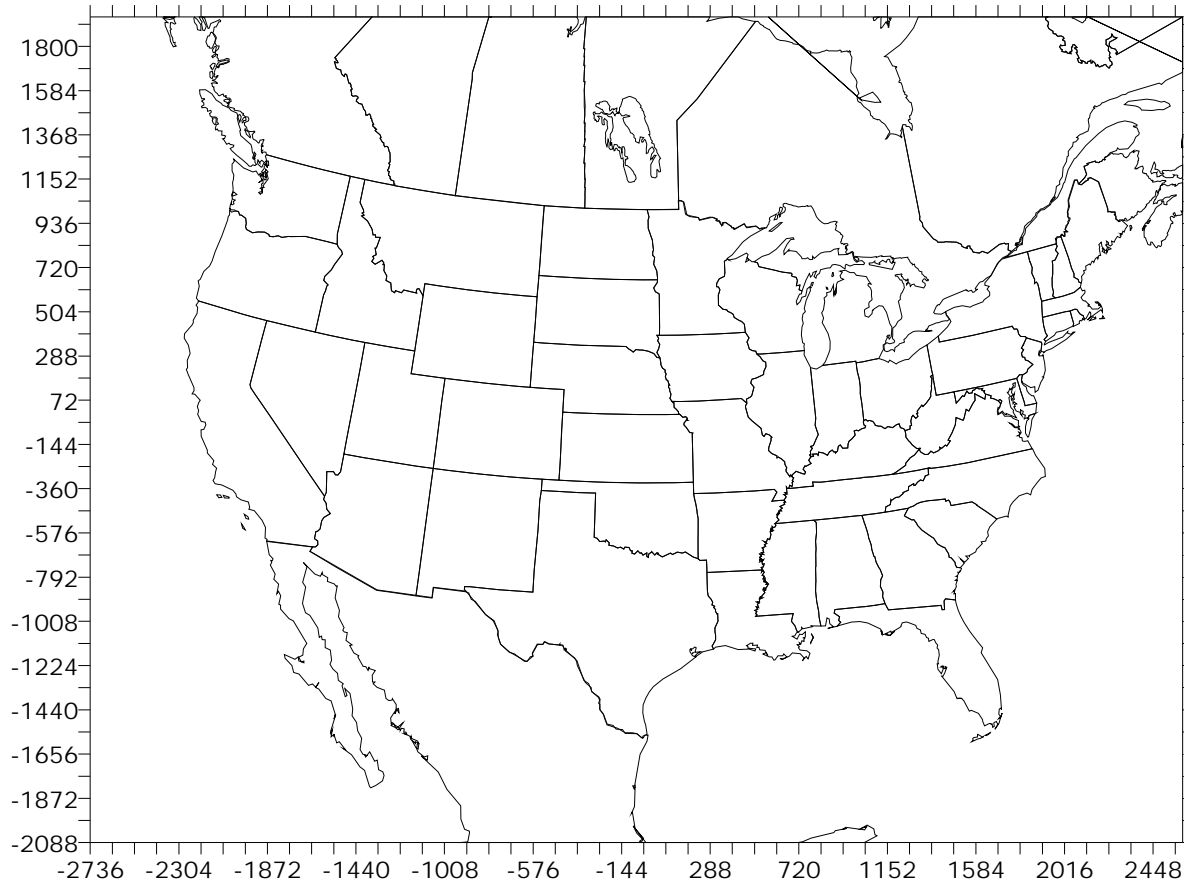


Figure 1-2. National Inter-RPO 36 km modeling domain used for the CENRAP 2002 annual SMOKE, CMAQ and CAMx modeling.

1.3.5 Vertical Structure of Modeling Domain

The MM5 meteorological model was exercised using 34 vertical layers from the surface to a pressure level of 100 mb (approximately 15 km above ground level). Both the CMAQ and CAMx air quality models can employ layer collapsing in which vertical layers in the MM5 are combined in the air quality model, which improves computational efficiency. The sensitivity of the CMAQ model estimates to the number of vertical layers was evaluated by the Western Regional Air Partnership (WRAP) and Visibility Improvements State and Tribal Association of the Southeast (VISTAS) (Tonnesen et al., 2005; 2006; Morris et al., 2004a). CMAQ model simulations were performed with no layer collapsing (i.e., the same 34 layers as used by MM5) and with various levels of layer collapsing. These studies found that using 19 vertical layers up

to 100 mb (i.e., same model top as MM5) and matching the eight lowest MM5 vertical layers near the surface produced nearly identical results as with no layer collapsing. They also found that very aggressive layer collapsing (e.g., 34 to 12 layers) produced results with substantial differences compared to no layer collapsing. Therefore, based on the WRAP/VISTAS sensitivity analysis, CENRAP adopted the 19 vertical layer configuration up to the 100 mb model top. Figure 1-3 displays the definition of the 34 MM5 vertical layers and how they were collapsed to 19 vertical layers in the air quality modeling performed by CENRAP.

MM5					CMAQ 19L				
Layer	Sigma	Pres(mb)	Height(m)	Depth(m)	Layer	Sigma	Pres(mb)	Height(m)	Depth(m)
34	0.000	100	14662	1841	19	0.000	100	14662	6536
33	0.050	145	12822	1466		0.050	145		
32	0.100	190	11356	1228		0.100	190		
31	0.150	235	10127	1062		0.150	235		
30	0.200	280	9066	939		0.200	280		
29	0.250	325	8127	843	18	0.250	325	8127	2966
28	0.300	370	7284	767		0.300	370		
27	0.350	415	6517	704		0.350	415		
26	0.400	460	5812	652		0.400	460		
25	0.450	505	5160	607	17	0.450	505	5160	1712
24	0.500	550	4553	569		0.500	550		
23	0.550	595	3984	536		0.550	595		
22	0.600	640	3448	506	16	0.600	640	3448	986
21	0.650	685	2942	480		0.650	685		
20	0.700	730	2462	367	15	0.700	730	2462	633
19	0.740	766	2095	266		0.740	766		
18	0.770	793	1828	259	14	0.770	793	1828	428
17	0.800	820	1569	169		0.800	820		
16	0.820	838	1400	166	13	0.820	838	1400	329
15	0.840	856	1235	163		0.840	856		
14	0.860	874	1071	160	12	0.860	874	1071	160
13	0.880	892	911	158		0.880	892	911	158
12	0.900	910	753	78	10	0.900	910	753	155
11	0.910	919	675	77		0.910	919		
10	0.920	928	598	77	9	0.920	928	598	153
9	0.930	937	521	76		0.930	937		
8	0.940	946	445	76	8	0.940	946	445	76
7	0.950	955	369	75	7	0.950	955	369	75
6	0.960	964	294	74	6	0.960	964	294	74
5	0.970	973	220	74	5	0.970	973	220	74
4	0.980	982	146	37	4	0.980	982	146	37
3	0.985	986.5	109	37	3	0.985	986.5	109	37
2	0.990	991	73	36	2	0.990	991	73	36
1	0.995	995.5	36	36	1	0.995	995.5	36	36
0	1.000	1000	0	0	0	1.000	1000	0	0

Figure 1-3. MM5 34 vertical layer definitions and scheme for collapsing the 34 layers down to 19 layers for the CENRAP CMAQ and CAMx 2002 annual modeling.

1.3.6 2002 Calendar Year Selection

The calendar year 2002 was selected for CENRAP regional haze annual modeling as described in the CENRAP Modeling Protocol (Morris et al., 2004a). EPA's applicable guidance on PM_{2.5}/Regional Haze modeling at that time (EPA, 2001) identified specific goals to consider when selecting modeling periods for use in demonstrating reasonable progress in attaining the regional haze goals. However, since there is much in common with the goals for selecting episodes for annual and episodic PM_{2.5} attainment demonstrations as well as regional haze, EPA's current guidance addresses all three in a common document. (EPA, 2007) At the time of the modeling period selection EPA had also published an updated summary of PM_{2.5} and Regional Haze Modeling Guidance (Timin, 2002) that served, in some respects, as an interim placeholder until the final guidance was issued as part of the PM_{2.5}/regional haze NAAQS implementation process that was ultimately published in April 2007 (EPA, 2007). The interim EPA modeling guidance for episode selection (EPA, 2001; Timin, 2002) was consistent with the final EPA regional haze modeling guidance (EPA, 2007).

EPA recommends that the selection of a modeling period derive from three principal criteria:

- A variety of meteorological conditions should be covered that includes the types of meteorological conditions that produce the worst 20 percent and best 20 percent visibility days at Class I areas in the CENRAP States during the 2000-2004 baseline period;
- To the extent possible, the modeling data base should include days for which enhanced data bases (i.e. beyond routine aerometric and emissions monitoring) are available; and
- Sufficient days should be available such that relative response factors (RRFs) can be based on several (i.e., ≥ 15) days.

For regional haze modeling, the guidance goes further by suggesting that the preferred approach is to model a full, *representative* year (EPA, 2001, pg. 188). Moreover, the required RRF values should be based on model results averaged over the 20 percent worst and 20 percent best visibility days determined for each Class I area based on monitoring data from the 2000 – 2004 baseline period. More recent EPA guidance (Timin, 2002) suggests that states should model at least 10 worst and 10 best visibility days at each Class 1 area. EPA also lists several 'other considerations' to bear in mind when choosing potential PM/regional haze episodes including: (a) choose periods which have already been modeled, (b) choose periods which are drawn from the years upon which the current design values are based, (c) include weekend days among those chosen, and (d) choose modeling periods that meet as many episode selection criteria as possible in the maximum number of nonattainment or Class I areas as possible.

Due to limited available resources CENRAP was restricted to modeling a single calendar year. The RHR uses the five-year baseline of 2000-2004 period as the starting point for projecting future-year visibility. Thus, the modeling year should be selected from this five-year baseline period. The 2002 calendar year, which lies in the middle of the 2000-2004 Baseline, was selected for the following reasons:

- Based on available information, 2002 appears to be a fairly typical year in terms of meteorology for the 5-year Baseline period of 2000-2004;

- 2003 and 2004 appeared to be colder and wetter than typical in the eastern US;
- The enhanced IMPROVE and IMPROVE Protocol and Supersites PM monitoring data were fully operational by 2002. Much less IMPROVE monitoring data was available during 2000-2001, especially in the CENRAP region;
- IMPROVE data for 2003 and 2004 were not yet available at the time that the CENRAP modeling was initiated; and
- 2002 was being used by the other RPOs.

1.3.7 Initial Concentrations and Boundary Conditions

The CMAQ and CAMx models were operated separately for each of four quarters of the 2002 year using a ~15 day spin up period (i.e., the models were started approximately 15 days before the first day of interest in each quarter in order to limit the influence of the assumed initial concentrations, e.g., start June 15 for quarter 3 whose first day of interest is July 1). Sensitivity simulations demonstrated that with ~15 initialization days, the influence of initial concentrations (ICs) was minimal using the 36 km Inter-RPO continental U.S. modeling domain. Consequently, clean ICs were specified in the CMAQ and CAMx modeling using a ~15 day spin up period.

Boundary Conditions (BCs) (i.e., the assumed concentrations along the later edges of the 36 km modeling domain, see Figure 1-2) were based on a 2002 simulation by the GEOS-CHEM global circulation/chemistry model. GEOS-CHEM is a three-dimensional global chemistry model driven by assimilated meteorological observations from the Goddard Earth Observing System (GEOS) of the [NASA Global Modeling and Assimilation Office](#). It is applied by [research groups around the world](#) to a wide range of atmospheric composition problems, including future climates and planetary atmospheres using general circulation model meteorology to drive the model. Central [management and support](#) of the model is provided by the [Atmospheric Chemistry Modeling Group](#) at Harvard University.

A joint RPO study was performed, coordinated by VISTAS, in which Harvard University applied the GEOS-CHEM global model for the 2002 calendar year (Jacob, Park and Logan, 2005). The University of Houston (UH) was retained to process the 2002 GEOS-CHEM output into BCs for the CMAQ model (Byun, 2004). The GEOS-CHEM simulations for the RPOs used GEOS meteorological observations for the year 2002. These were obtained from the Global Modeling and Assimilation Office (GMAO) as a 6-hourly archive (3-hour for surface quantities such as mixing depths). The data through August 2002 were from the GEOS-3 assimilation, with horizontal resolution of $1^{\circ} \times 1^{\circ}$ and 55 vertical layers. The data after August 2002 were from the updated GEOS-4 assimilation, with horizontal resolution of $1^{\circ} \times 1.25^{\circ}$ and 48 vertical layers (note 1° latitude is equal to approximately 110 km). The GEOS-CHEM output was processed by mapping the GEOS-CHEM chemical compounds to the species in the CBM-IV chemical mechanism used by CMAQ/CAMx and mapping the GEOS-CHEM vertical layers to the 19 layer vertical layer structure used by CMAQ/CAMx in the CENRAP modeling (Byun, 2004). The results were day-specific three-hourly BC inputs for the CMAQ model. The CMAQ2CAMx processor was then used to transform the CMAQ day-specific 3-hourly BCs to the format used by CAMx.

There were several quality assurance (QA) checks of the BCs generated from the 2002 GEOS-CHEM output. The first QA/QC check was a range check to assure reasonable values. The BCs were compared against the GEOS-CHEM outputs to assure the mapping and interpolation was performed correctly. The code used to map the GEOS-CHEM output to the CMAQ BC format was obtained from UH, reviewed and the BC generation duplicated for several time periods during 2002.

1.3.8 Emissions Input Preparation

The CENRAP SMOKE emissions modeling was based on an updated 2002 emissions data for the U.S. (Pechan, 2005c,e; Reid et al., 2004a,b), 1999 emissions data for Mexico (ERG, 2006), and 2000 emissions data for Canada. These data were used to generate a final base 2002 Base G Typical (Typ02G) annual emissions database. Numerous iterations of the emissions modeling were conducted using interim databases before arriving at the final Base G emission inventories (e.g., Morris et al., 2005). The 2018 Base G base case emissions (Base18G) for most source categories in the U.S. were based on projections of the 2002 inventory assuming growth and control (Pechan, 2005d). 2018 EGU emissions were based on the run 2.1.9 of the Integrated Planning Model (IPM) updated by the CENRAP states. Canadian emissions for the Base18G scenario were based on a 2020 inventory, whereas the Mexican 1999 inventory was held constant for 2018.

The Typ02G and Base18G emission inventories represent significant improvements to the preliminary emissions modeling performed by CENRAP (Morris et al., 2005). While the preliminary 2002 modeling served its purpose to develop the infrastructure for modeling large emissions data sets and producing annual emissions simulations, much of the input data (both as inventories and ancillary data) were placeholders for actual 2002 data that were being prepared through calendar year 2005. As these actual 2002 data sets became available, they were integrated into the SMOKE modeling and QA system that was developed during the preliminary modeling, to produce a high-quality emissions data set for use in the final CMAQ and CAMx modeling. The addition of entirely new inventory categories, like marine shipping, added complexity to the modeling. By the end of the emissions data collection phase, there were 23 separate emissions processing streams covering a variety of sources categories necessary to general model-ready emission inputs for the 2002 calendar year.

Details on the emissions modeling are provided in Chapter 2 with additional information contained in Appendix B.

1.3.9 Meteorological Input Preparation

The 2002 36 km MM5 meteorological modeling was conducted by the Iowa Department of Natural Resources (IDNR) who also performed a preliminary model performance evaluation (Johnson, 2007). CENRAP performed an additional MM5 evaluation of the CENRAP 2002 36 km MM5 simulation that included a comparative evaluation against the final VISTAS 2002 36 km MM5 and an interim WRAP 2002 36 km simulation (Kemball-Cook et al., 2004). Kemball-Cook and co-workers (2004) found the following in the comparative evaluation of the CENRAP, WRAP and VISTAS 2002 36 km MM5 simulations, (details are provided in Appendix A):

Surface Meteorological Performance within the CENRAP Region

- The three MM5 simulations (CENRAP, VISTAS and WRAP) obtained comparable model performance for winds and humidity that were within model performance benchmarks.
- The WRAP MM5 simulation obtained better temperature model performance than the other two simulations due to the use of surface temperature data assimilation.
 - In the final WRAP MM5 simulation the use of surface temperature assimilation was dropped because it introduced instability in the vertical structure of the atmosphere.
- For all three runs, the Northern CENRAP domain had a cold bias in winter and a warm bias in summer.

Surface Meteorological Performance outside the CENRAP Region

- All three runs had similar surface wind model performance in the western U.S. that was outside the model performance benchmarks
- For temperature, the WRAP MM5 simulation had the best performance overall due to the surface temperature data assimilation that was dropped in the final WRAP run.
- The three runs had comparable humidity performance, although WRAP exhibited a larger wet bias in the summer and the southwestern U.S.

Upper-Air Meteorological Performance

- The VISTAS and CENRAP MM5 simulations were better able to reproduce the deep convective summer boundary layers compared to the WRAP MM5 simulations, which exhibited a smoother decrease in temperature with increase in altitude.
- CENRAP and VISTAS MM5 simulations better simulated the surface temperature inversions than WRAP.
- WRAP was better able to simulate the surface temperature.
- All three models exhibited similar vertical wind profiles.

Precipitation Performance

- In winter, all three MM5 simulations exhibited similar, fairly good, performance in reproducing the spatial distribution and magnitudes of the monthly average observed precipitation.
- In summer, all runs had a wet bias, particularly in the desert southwest where the interim WRAP run had the largest wet bias.

In conclusion, the VISTAS simulation appeared to perform best, the CENRAP MM5 model performance was generally between the VISTAS and WRAP performance, with performance more similar to VISTAS than WRAP. Although the interim WRAP MM5 simulation performed best for surface temperature due to the surface temperature data assimilation, the surface temperature assimilation degraded the MM5 upper-air performance including the ability to assimilate surface inversions and was ultimately dropped from the final WRAP MM5 simulations (Kemball-Cook et al., 2005).

The IDNR 12 km² MM5 simulations were also evaluated and compared with the performance of the 36 km MM5 simulation (Johnson et al., 2007). The IDNR 36 km and 12 km MM5 model performance was similar (Johnson, 2007), which supported the findings of the CMAQ and CAMx 36 and 12 km sensitivity simulations that there was little benefit of using a 12 km grid for simulating regional haze at rural Class I areas (Morris et al., 2006a). However, as noted by Tonnesen and co-workers (2005; 2006) and EPA modeling guidance (1991; 1999; 2001; 2007) this finding does not necessarily hold for 8-hour ozone and PM_{2.5} modeling that is characterized by sharper concentration gradients and frequently occurs in the urban environment as compared to the more rural nature of regional haze.

1.3.10 Photolysis Rates Model Inputs

Several chemical reactions in the atmosphere are initiated by the photodissociation of various trace gases. To accurately represent the complex chemical transformations in the atmosphere, accurate estimates of these photodissociation rates must be made. The Models-3/CMAQ system includes the JPROC processor, which calculates a table of clear-sky photolysis rates (or J-values) for a specific date. JPROC uses default values for total aerosol loading and provides the option to use default ozone column data or to use measured total ozone column data. These data come from the Total Ozone Mapping Spectrometer (TOMS) satellite data. TOMS data that is available at 24-hour averages was obtained from <http://toms.gsfc.nasa.gov/eptoms/ep.html>. Day-specific TOMS data was used in the CMAQ radiation model (JPROC) to calculate photolysis rates. The TOMS data were missing or erroneous for several periods in 2002: August 2-12; June 10; and November 18-19. Thus, the TOMS data for August 1, 2002 was used for August 2-7 and TOMS data for August 13 was used for August 8-12. Similarly, TOMS data for June 9 was used for June 10 and data for August 17 was used for August 18-19. Note that the total column of ozone in the atmosphere is dominated by stratospheric ozone which has very little day-to-day variability so the use of TOMS data within a week or two of an actual day introduces minimal uncertainties in the modeling analysis.

JPROC produces a "look-up" table that provides photolysis rates as a function of latitude, altitude, and time (in terms of the number of hours of deviation from local noon, or hour angle). In the current CMAQ implementation, the J-values are calculated for six latitudinal bands (10°, 20°, 30°, 40°, 50°, and 60° N), seven altitudes (0 km, 1 km, 2 km, 3 km, 4 km, 5 km, and 10 km), and hourly values up to √8 hours of deviation from local noon. During model calculations, photolysis rates for each model grid cell are estimated by first interpolating the clear-sky photolysis rates from the look-up table using the grid cell latitude, altitude, and hour angle, followed by applying a cloud correction (attenuation) factor based on the cloud inputs from MM5.

The photolysis rates input file was prepared as separate look-up tables for each simulation day. Photolysis files are ASCII files that were visually checked for selected days to verify that photolysis are within the expected ranges.

² The IDNR twelve 12 km annual simulation domain was not sufficient for CENRAP's needs, thus Bret Anderson with EPA Region 7 in cooperation with Texas completed an episodic 12km simulation on a larger domain.

The Tropospheric Ultraviolet and Visible (TUV) Radiation Model (<http://cprm.acd.ucar.edu/Models/TUV/>) is used to generate the photolysis rates input file for CAMx. TOMS ozone data and land use data were used to develop the CAMx Albedo/Haze/Ozone input file for 2002. As for CMAQ, the missing TOMS data period in the fall of 2002 was filled-in using observed TOMS data on either side of the missing period using the same procedures as described above for CMAQ. Default land use specific albedo values were used and a constant haze value used, corresponding to rural conditions over North America.

1.3.11 Air Quality Input Preparation

Air quality data used with the CMAQ and CAMx modeling systems include: (1) Initial Concentrations (ICs) that are the assumed initial three-dimensional concentrations throughout the modeling domain.; (2) the Boundary Conditions (BCs) that are the concentrations assumed along the lateral edges of the RPO national 36 km modeling domain; and (3) air quality observations that are used in the model performance evaluation (MPE). The MPE is discussed in Section 3 and Appendix C of this TSD.

As noted in Section 1.3.7, CMAQ default clean Initial Concentrations (ICs) were used along with an approximately 15 day spin up (initialization) period to eliminate any significant influence of the ICs on the modeled concentrations for the days of interest. The same ICs were used with CAMx as well. Both CMAQ and CAMx were run for each quarter of the year. Each quarter’s model run was initialized 15 days prior to the first day of interest (e.g., for quarter 3, Jul-Aug-Sep, the model was initialized on June 15, 2002 with the first modeling day of interest July 1, 2002). The CMAQ Boundary Conditions (BCs) for the Inter-RPO 36 km continental U.S. grid (Figure 1-2) were based on day-specific 3-hour averages from the output of the GEOS-CHEM global simulation model of 2002 (Jacob, Park and Logan, 2005). The 2002 GEOS-CHEM output was mapped to the species and vertical layer structure of CMAQ and interpolated to the lateral boundaries of the 36 km grid shown in Figure 1-2 (Byun, 2004).

Table 1-6 summarizes the surface air quality monitoring networks and the number of sites available in the CENRAP region that were used in the model performance evaluation. Data from these monitoring networks were also used to evaluate the CMAQ and CAMx models outside of the CENRAP region.

Table 1-6. Ground-level ambient data monitoring networks and stations available in the CENRAP states for calendar year 2002 used in the model performance evaluation.

Monitoring Network	Chemical Species Measured	Sampling Frequency; Duration	Approximate Number of Monitors
IMPROVE	Speciated PM _{2.5} and PM ₁₀	1 in 3 days; 24 hr	11
CASTNET	Speciated PM _{2.5} , Ozone	Hourly, Weekly; 1 hr, 1 Week	3
NADP	WSO ₄ , WNO ₃ , WNH ₄	Weekly	23
EPA-STN	Speciated PM _{2.5}	Varies; Varies	12
AIRS/AQS	CO, NO, NO ₂ , NO _x , O ₃	Hourly; Hourly	25

1.3.12 2002 Base Case Modeling and Model Performance Evaluation

The CMAQ and CAMx models were evaluated against ambient measurements of PM species, gas-phase species and wet deposition. Table 1-6 summarizes the networks used in the model evaluation, the species measured and the averaging times and frequency of the measurements. Numerous iterations of CMAQ and CAMx 2002 base case simulations and model performance evaluations were conducted during the course of the CENRAP modeling study, most of which have been posted on the CENRAP modeling website (<http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml>) and presented in previous reports and presentations for CENRAP (e.g., Morris et al., 2005; 2006a,b). Details on the final 2002 Base F 36 km CMAQ base case modeling performance evaluation are provided in Chapter 3 and Appendix C (because of the similarity between 2002 Base F and 2002 Base G and resource constraints the model evaluation was not re-conducted for Base G). In general, the model performance of the CMAQ and CAMx models for sulfate (SO₄) and elemental carbon (EC) was good. Model performance for nitrate (NO₃) was variable, with a summer underestimation and winter overestimation bias. Performance for organic mass carbon (OMC) was also variable, with the inclusion of the SOAmods enhancement in CMAQ Version 4.5 greatly improving the CMAQ summer OMC model performance (Morris et al., 2006c). Model performance for Soil and coarse mass (CM) was generally poor. Part of the poor performance for Soil and CM is believed to be due to measurement-model incommensurability. The IMPROVE measured values are due, in part, to local fugitive dust sources that are not captured in the model's emission inputs and the 36 km grid resolution is not conducive to modeling localized events.

1.3.13 2018 Modeling and Visibility Projections

Emissions for the 2018 base case were generated following the procedures discussed in Section 1.3.8 and Chapter 2. 2018 emissions for Electrical Generating Units (EGUs) were based on simulations of the Integrated Planning Model (IPM) that took into the account the effects of the Clean Air Interstate Rule (CAIR) on emissions from EGUs in CAIR states using an IPM realization of a CAIR cap-and-trade program. Emissions for on-road and non-road mobile sources were based on activity growth and emissions factors from the EPA MOBILE6 and NONROAD models, respectively. Area sources and non-EGU point sources were grown to 2018 levels (Pechan, 2005d). The Canadian year 2000 emissions inventory was replaced by a Canadian 2020 emissions inventory for the 2018 CMAQ/CAMx simulations. The following sources were assumed to remain constant between the 2002 and 2018 base case simulations:

- Biogenic VOC and NO_x emissions from the BEIS3 biogenic emissions model;
- Wind blown dust associated with non-agricultural sources (i.e., natural wind blown fugitive dust);
- Off-shore emissions associated with off-shore marine and oil and gas production activities;
- Emissions from wildfires;
- Emissions from Mexico; and
- Global transport (i.e., emissions due to BCs from the 2002 GEOS-CHEM global chemistry model.

The results from the 2002 and 2018 CMAQ and CAMx simulations were used to project 2018 PM levels from which 2018 visibility estimates were obtained. The 2002 and 2018 modeling results were used in a relative sense to scale the observed PM concentrations from the 2000-2004 Baseline and the IMPROVE monitoring network to obtain the 2018 PM projections. The 2018/2002 modeled scaling factors are called Relative Response Factors (RRFs) and are constructed as the ratio of modeling results for the 2018 model simulation to the 2002 model simulation. Two important regional haze metrics are the average visibility for the worst 20 percent and best 20 percent days from the 2000-2004 five-year Baseline. For the 2018 visibility projections, EPA guidance recommends developing Class I area and PM species specific RRFs using the average modeling results for the worst 20 percent days during the 2002 modeling period and the 2002 and 2018 emission scenarios. The results of the CENRAP 2018 visibility projections following EPA guidance procedures (EPA, 2007a) are provided in Chapter 4 and Appendix D. CENRAP has also developed alternative procedures for visibility projections that are discussed in Chapter 5 and Appendix D. For example, much of the coarse mass (CM) impacts at Class I area IMPROVE monitors is believed to be natural and primarily from local sources that are subgrid-scale to the modeled 36 km grid so are not represented in the modeling. So, one alternative visibility projection approach is to set the RRF for CM to 1.0. That is, the CM impacts in 2018 are assumed to be the same as in the observed 2000-2004 Baseline. Similarly, the Soil impacts at IMPROVE monitors are likely mainly due to local dust sources so another alternative approach is to set the RRFs for both CM and Soil to 1.0.

The 2018 visibility projections for the worst 20 percent days are compared against a 2018 point on the Uniform Rate of Progress (URP) glidepath or the “2018 URP point”. The 2018 URP point is obtained by constructing a linear visibility glidepath in deciviews from the observed 2000-2004 Baseline (EPA, 2003a) for the worst 20 percent days to the 2064 Natural Conditions (EPA, 2003b; Pitchford, 2006). Where the linear glidepath crosses the year 2018 is the 2018 URP point. States may use the modeled 2018 visibility to help define their 2018 RPG in their RHR SIPs. The 2018 URP point is used as a benchmark to help judge the 2018 modeled visibility projections and the state’s RPG. However, as noted in EPA’s RPG guidance “The glidepath is not a presumptive target, and States may establish a RPG that provides for greater, lesser, or equivalent visibility improvement as that described by the glidepath” (EPA, 2007b). Chapter 4 and Appendix D present the 2018 visibility projections for the CENRAP Class I areas and their comparisons with the 2018 URP point using EPA default visibility projection procedures (EPA, 2007a) and EPA default URP glidepaths (EPA, 2003a,b; 2007b).

Various techniques have been developed to display the 2018 visibility modeling results including “DotPlots” that display the 2018 visibility projections as a percentage of meeting the 2018 point on the URP glidepath. A value of 100% on the DotPlot indicates that the Class I area is predicted to meet the 2018 point on the URP glidepath. Over 100% means the 2018 visibility projection obtains more visibility improvements (reductions) than required to meet the 2018 point on the URP glidepath (i.e., projected value is below the glidepath). And less than 100% indicates that fewer visibility improvements are projected than are needed to meet the 2018 point URP on the glidepath (i.e., above the glidepath). Figure 1-4 displays a DotPlot that compares the 2018 visibility projections from the CENRAP 2018 Base G CMAQ simulation with the 2018 URP point using the EPA default RRFs and alternative RRFs that set the CM and Soil RRFs to unity (i.e., assume CM and Soil are natural so remain unchanged from the 2000-2004 Baseline). For these results, the 2018 visibility projections at the Hercules Glade (HEGL1) Class I area meets the 2018 point on the URP glidepath (100%), whereas the 2018 visibility projections at Caney

Creek (CACR), Mingo (MING) and Upper Buffalo (UPBU) achieve more visibility improvements than needed to meet the 2018 URP point so are below the 2018 URP glidepath. However, the 2018 visibility projections at Breton Island comes up slightly short (~5%) of meeting the 2018 point on the URP glidepath and Wichita Mountains (WIMO) comes up approximately 40% short of meeting the 2018 point on the URP glidepath. Class I areas at the northern (e.g., VOYA, BOWA and ISLE) and southern (e.g., BIBE and GUMO) boundaries of the U.S. also fall short of achieving the 2018 URP point. High contributions of international transport and/or natural sources (e.g., wind blown dust) affect the ability of these Class I areas to be on the URP glidepath. These issues are discussed in more detail in Chapters 4 and 5.

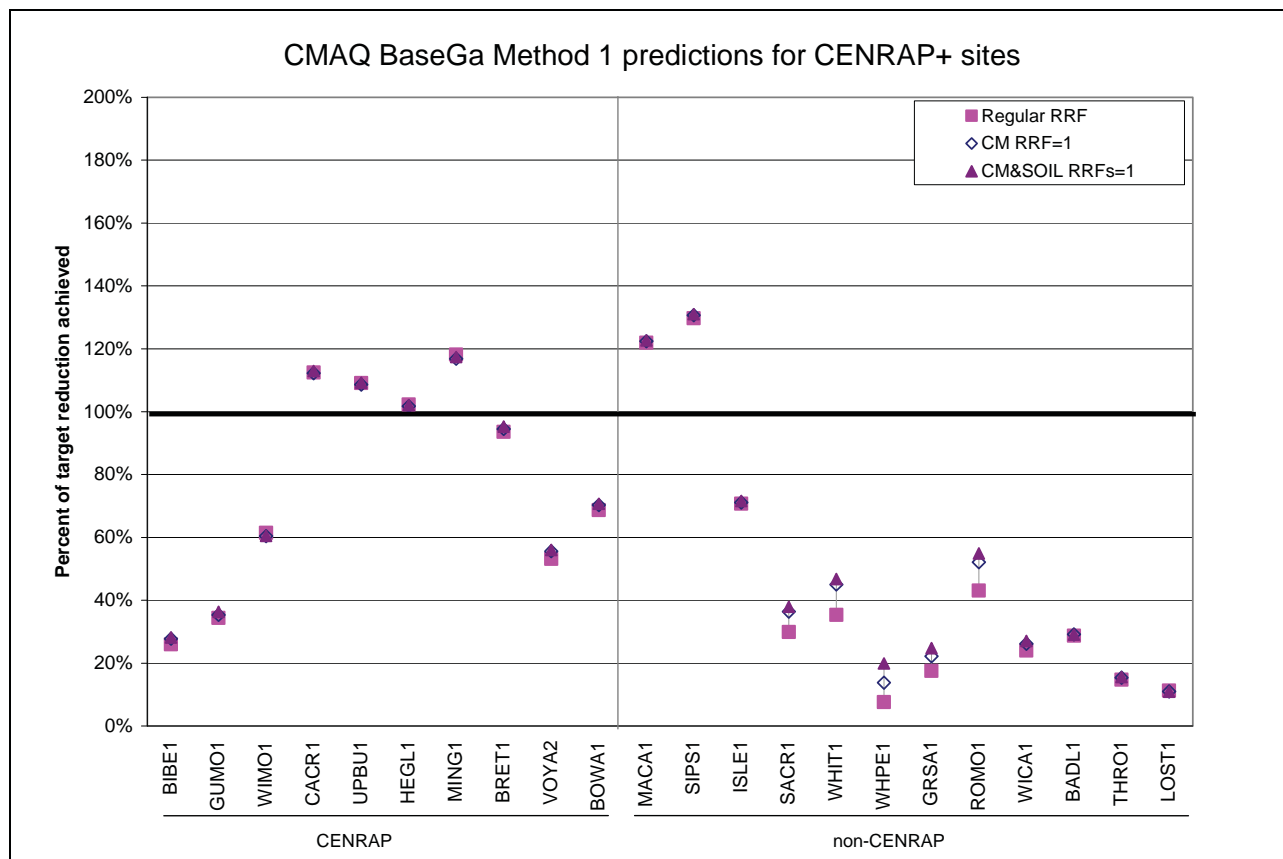


Figure 1-4. 2018 visibility projections expressed as a percent of meeting the 2018 URP point for the 2018 BaseG CMAQ base case simulation using the EPA default (EPA, 2007) Regular RRF and alternative projections procedures that set the RRFs for CM=1.0 and CM&SOIL=1.0.

1.3.14 Additional Supporting Analysis

CENRAP performed numerous supporting analyses of its modeling results including analyzing alternative glidepaths and 2018 projection Approaches and performing confirmatory analysis of the 2018 visibility projections. Details on the additional supporting analysis are contained discussed in Chapter 5, which include:

- The CENRAP 2018 visibility projections were compared with those generated by VISTAS and MRPO. There was close agreement between the CENRAP and VISTAS 2018 visibility projections at almost all common Class I areas. With the only exception being Breton Island where the CENRAP's projections were slightly more optimistic than VISTAS'. The MRPO 2018 visibility projections were less optimistic than CENRAP's at the four Arkansas-Missouri Class I area that may have been due to CENRAP's BART emission controls in CENRAP states not included in the 2018 MRPO inventory.
- Extinction based glidepaths were developed and the CENRAP 2018 visibility projections were shown to produce nearly identical estimates of achieving the 2018 URP point when using total extinction glidepaths as when the linear deciview glidepaths were used. With the extinction based glidepaths the analysis of 2018 URP could be made on a PM species-by-species basis where it was shown that 2018 extinctions due to SO₄ and, to a lesser extent, NO₃ and EC, achieve the URP, but the other species do not and in fact extinction due to Soil and CM is projected to get worse.
- 2018 visibility projections were made using EPA's new Modeled Attainment Test Software (MATS) program and the CENRAP Typ02G and Base18G modeling results. The CENRAP 2018 visibility projections exactly agreed with those generated by MATS with three exceptions: Breton Island, Boundary Waters and Mingo Class I areas, At these three Class I areas MATS did not produce any 2018 visibility projections due to insufficient data in the raw IMPROVE database to produce a valid observed 2000-2004 Baseline. CENRAP used filled data for these three Class I areas.
- PM Source Apportionment Technology (PSAT) modeling was conducted to estimate the contributions to visibility impairment at Class I areas by source region (e.g., states) and major source category. Source contributions were obtained for a 2002 and 2018 base case and the PSAT modeling results were implemented in a PSAT Visualization Tool that was provided to CENRAP states and others. Major findings from the PSAT source apportionment modeling include the following:
 - Sulfate from elevated point sources was the highest source category contribution to visibility impairment at CENRAP Class I areas for the worst 20 percent days.
 - International transport contributed significantly to visibility impairment at CENRAP Class I areas on the southern (BIBE and GUMO) and northern (BOWA and VOYA) borders of the U.S. and to a lesser extent at WIMO as well.
- Alternative visibility projections were made assuming that coarse mass (CM) alone and CM and Soil were natural in origin that confirmed the original 2018 visibility projections.
- Visibility projections were made using an alternative model (CAMx) that verified the projections made by CMAQ.
- The effects of International Transport were examined several ways and found that the inability of the 2018 visibility projections to achieve the 2018 URP point at the northern and southern border Class I areas was due to high contributions due to International Transport.

- Visibility trends for the worst 20 percent days, best 20 percent days and all monitored days were analyzed at CENRAP Class I areas using the period of record IMPROVE observations. At most Class I areas there was insufficient years of data to produce a discernable trend. In addition, there was significant year-to-year variability in visibility impairment with episodic events (e.g., wildfires and wind blown dust) confounding the analysis.

1.4 Organization of the Report

Chapter 1 of this TSD presents background, an overview of the approach and summary of the results of the CENRAP meteorological, emissions and air quality modeling. Appendix A contains more details on the meteorological model evaluation discussed in Chapter 1. Details on the emissions modeling are provided in Chapter 2 and Appendix B. The model performance evaluation is given in Chapter 3 and Appendix C. The 2018 visibility projections and comparisons with the 2018 URP point are provided in Chapter 4 with more details given in Appendix D. Chapter 5 contains additional supporting analysis with details on the PM source apportionment modeling and alternative projections provided in Appendices E and F, respectively. Chapter 6 lists the references cited in the report.

2.0 EMISSIONS MODELING

2.1 Emissions Modeling Overview

For the emissions modeling work conducted in support of CENRAP air quality modeling, we used updated 2002 emissions data for the U.S., 1999 emissions data for Mexico, and 2000 emissions data for Canada to generate a final base 2002 Base G Typical (Typ02G) annual emissions database. Numerous iterations of the emissions modeling were conducted using interim databases before arriving at the final Base G emission inventories. The 2002 and 2018 emissions inventories and ancillary modeling data were provided by CENRAP emissions inventory contractors (Pechan and CEP, 2005c,e; Reid et al., 2004a,b; Coe and Reid, 2003), other Regional Planning Organizations (RPOs) and EPA. Building from the CENRAP preliminary 2002 database (Pechan and CEP, 2005e) and 2018 projections (Pechan, 2005d), we integrated several updates to the inventories and ancillary data to create final emissions input files; the final simulations are referred to as 2002 Typical and 2018 Base G, or Typ02G and Base18G. We used the Sparse Matrix Operator Kernel Emissions (SMOKE) version 2.1 processing system (CEP, 2004) to prepare the inventories for input to the air quality modeling systems. The SMOKE simulations documented in this report include emissions generated for annual CMAQ and CAMx simulations at a 36-km model grid resolution, and a short-term CMAQ test simulation at a 12-km model grid resolution. We performed the modeling and quality assurance (QA) work based on the CENRAP modeling Quality Assurance Project Plan (QAPP; Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a).

The Typ02G and Base18G emission inventories represent significant improvements to the preliminary emissions modeling performed by CENRAP (Morris et al., 2005). While the preliminary 2002 modeling served its purpose to develop the infrastructure for modeling large emissions data sets and producing annual emissions simulations, much of the input data (both as inventories and ancillary data) were placeholders for actual 2002 data that were being prepared through calendar year 2005. As these actual 2002 data sets became available, they were integrated into the SMOKE modeling and QA system that was developed during the preliminary modeling, to produce a high-quality emissions data set for use in the final CMAQ and CAMx modeling. The addition of entirely new inventory categories, like marine shipping, added complexity to the modeling. By the end of the emissions data collection phase, there were 23 separate emissions processing streams covering a variety of sources categories necessary to general model-ready emission inputs for the 2002 calendar year.

2.1.1 SMOKE Emissions Modeling System Background

The purpose of SMOKE (or any emissions processor) is to process the raw emissions reported by states and EPA into gridded hourly speciated emissions required by the air quality model. Emission inventories are typically available as an annual total emissions value for each emissions source, or perhaps with an average-day emissions value. The air quality models, however, typically require emissions data on an hourly basis, for each model grid cell (and perhaps model layer), and for each model species. Consequently, emissions processing involves (at a minimum) transformation of emission inventory data by temporal allocation, chemical speciation, spatial allocation, and perhaps layer assignment, to achieve the input requirements of the air quality model. For the CENRAP modeling effort, all of these steps were needed. In

addition, CENRAP processing requires special MOBILE6 processing and growth and control of emissions for the future-year inventories. Finally, the biogenic emission processing using BEIS2 includes additional processing steps. SMOKE formulates emissions modeling in terms of sparse matrix operations. Figure 2-1 shows an example of how the matrix approach organizes the emissions processing steps for anthropogenic emissions, with the final step that creates the model-ready emissions being the merging of all the different processing streams of emissions into a total emissions input file for the air quality model. Figure 2-1 does not include all the potential processing steps, which can be different for each source category in SMOKE, but does include the major processing steps listed in the previous paragraph, except the layer assignment. Specifically, the inventory emissions are arranged as a vector of emissions, with associated vectors that include characteristics about the sources such as its state and county or source classification code (SCC). SMOKE also creates matrices that will apply the gridding, speciation, and temporal factors to the vector of emissions. In many cases, these matrices are independent from one another, and can therefore be generated in parallel. The processing approach ends with the merge step, which combines the inventory emissions vector (now an hourly inventory file) with the control, speciation, and gridding matrices to create model-ready emissions.

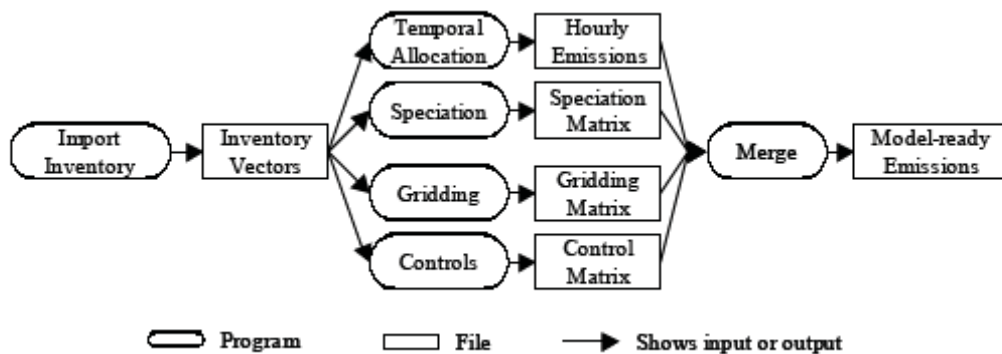


Figure 2-1. Flow diagram of major SMOKE processing steps needed by all source categories.

Temporal processing includes both seasonal or monthly adjustments and day-of-week adjustments. Emissions are known to be quite different for a typical weekday versus a typical Saturday or Sunday. For the day-of-week temporal processing step, emissions may be processed using representative Monday, weekday, Saturday, and Sunday for each month; we refer to this type of processing here as MWSS processing (note that because SMOKE operates in Greenwich Mean Time [GMT] then Monday would include some of local time Sunday so needs to be processed separately from the typical weekday). This approach significantly reduces the number of times the temporal processing step must be run. In the sections below, we have identified the cases in which we have used the MWSS processing approach. Figure 2-2 provides a schematic diagram of SMOKE/BEIS2 processing steps used in this project to generate biogenic emissions rates for Volatile Organic Compounds (VOCs) and oxides of nitrogen (NO_x). Because biogenic emissions are temperature sensitive, they are generated for each day of 2002 using day-specific meteorological conditions from the MM5 meteorological model.

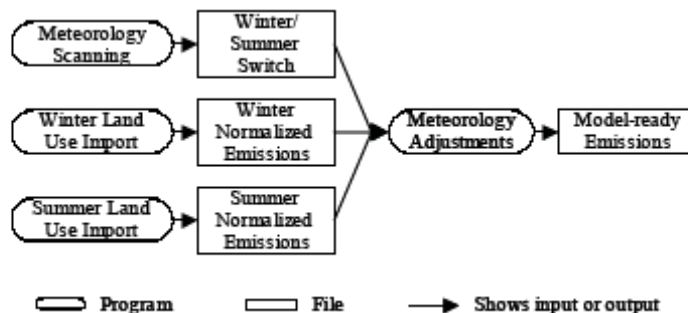


Figure 2-2. Flow diagram of SMOKE/BEIS2 processing steps.

2.1.2 SMOKE Scripts

The scripts are the interface that emissions modelers use to run SMOKE and define the set up and databases used in the emissions modeling so are important for anyone wishing to reproduce the CENRAP SMOKE emissions modeling. Many iterations of the CENRAP SMOKE emissions modeling were performed using updated and corrected emissions data and assumptions resulting in the creation of numerous SMOKE modeling scripts during the course of the study. For the CENRAP annual 2002 SMOKE emissions modeling, the default SMOKE script set up, which is based on source categories, was used to configure the scripts. We made several modifications to the default SMOKE scripts to modularize them, add error checking loops, and break up the report and logs directories by source category. The result is one script for each major source category being modeled that calls all of the SMOKE programs required for simulating that source category. 16 major source categories were modeled by SMOKE for CENRAP. An addition seven SMOKE scripts were also run to set up the emissions modeling. Table 2-1 lists all of the SMOKE scripts used for the 2002 base year modeling and the SMOKE programs called by each script. In addition to the source-specific scripts listed in Table 2-1, we also listed the SMOKE utility scripts that actually call executables, manage the log files, and manage the configuration of the SMOKE simulations.

Table 2-1. Summary of SMOKE scripts.

Source Category	Script Name	SMOKE Programs/Functions
Area	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_ar_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Area fire	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_arf_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Offshore Area	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_ofsar_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Non-road Mobile	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_nr_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Fugitive dust	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_fd_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Road dust	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_rd_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Ammonia*	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_nh3_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
On-road Mobile (non-VMT-based)	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_mb_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
On-road non-US Mobile (non-VMT-based)	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_nusm_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
On-road Mobile (VMT-based)	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_mbv_base02f.csh	smkinev, mbsetup, grdmat, spcmat, premobl, emisfac, temporal, smkmerge, smkreport
WRAP Oil and Gas	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_wog_base02f.csh	smkinev, grdmat, spcmat, temporal, smkmerge, smkreport
Point	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_pt_base02f.csh	smkinev, grdmat, spcmat, laypoint, temporal, smkmerge, smkreport
Offshore point	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_ofs_base02f.csh	smkinev, grdmat, spcmat, laypoint, temporal, smkmerge, smkreport
Canadian Point fires	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_bsf_base02f.csh	smkinev, grdmat, spcmat, laypoint, temporal, smkmerge, smkreport
All point fires	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_alf_base02f.csh	smkinev, grdmat, spcmat, laypoint, temporal, smkmerge, smkreport
Biogenec	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/sm_k_bg_base02f.csh	Normbies3, tmpbies3, smkmerge
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/make_invidir.csh	builds output file names and directories
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/sm_k_run.csh	Calls SMOKE executables for everything but projection, controls, and QA
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/qa_run.csh	Calls the SMOKE executables for running QA program & names the input/output directories for reports
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/scripts/run/36km/smoke_calls.csh	Calls smk_run.csh, qa_run.csh, configuration and management
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/Assignes/ASSIGNES.cenrap_base02f.cmaq.cb4p25	Sets up the environment variables for use of SMOKE
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/Assignes/sm_k_mkdir	Creates the input/output directories
n/a	/home/aqm2/edss2/cenrap02f/subsys/smoke/Assignes/setmerge_files.scr	Sets up the output environment variables for the smkmerge program

*The nr and nh3 where farther divided to nrm and nry and nh3m and nh3y for the monthly/seasonal and yearly inventories

2.1.3 SMOKE Directory Structures

The SMOKE directories can be divided into three broad categories:

1. Program Directories: These directories contain the model source code, assigns files, scripts and executables needed to run SMOKE.
2. Input Directories: These directories contain the raw emissions inventories, the meteorological data and the ancillary input files.
3. Output Directories: These directories contain all of the output from the model. Also, the output directories contain the MOBILE6 input files.

The directories are described in the Table 2-2. The final pre-merged emission file names and sources of the data re provided in Appendix B.

Table 2-2. Summary of SMOKE directories.

Category	Directory Location	Directory Contents
Program	/home/aqm2/edss2/ cenrap02f/subsys/smoke/src	SMOKE source code
	/home/aqm2/edss2/ cenrap02f/subsys/smoke/assigns	SMOKE assigns files
	/home/aqm2/edss2/ cenrap02f/subsys/smoke/scripts	SMOKE make and run scripts
	/home/aqm2/edss2/ cenrap02f/subsys/smoke/Linux2_x86pg	SMOKE executables
Input	/home/aqm2/edss2/ cenrap02f/data/met	MCIP out metrology files
	/home/aqm2/edss2/ cenrap02f/data/ge_dat	SMOKE ancillary input files
	/home/aqm2/edss2/ cenrap02f/data/inventory/cenrap2002	Raw emissions inventory files
Output	/home/aqm2/edss2/ cenrap02f/data/run_base02f/static	Non-time dependent SMOKE intermediate outputs and MOBILE6 inputs
	/home/aqm2/edss2/ cenrap02f/data/run_base02f/scenario	Time dependent SMOKE intermediate outputs
	/home/aqm2/edss2/ cenrap02f/data/run_base02f/outputs	Model-ready SMOKE outputs
	/home/aqm2/edss2/ cenrap02f/data/reports	SMOKE QA reports

2.1.4 SMOKE Configuration

SMOKE was configured to generate emissions for all months of 2002 on the 36-km unified RPO modeling domain (Figure 1-2). For the anthropogenic emissions sources that use hourly meteorology and daily or hourly data (i.e., on-road mobile sources, point sources with CEM data, point source fires and biogenic sources) we configured SMOKE to represent the daily emissions explicitly. For the non-meteorology dependent emissions, we used a representative Saturday, Sunday, Monday, and weekday for each month as surrogate days for the entire month’s emissions (we refer to this as the MWSS processing approach). For these non-meteorology dependent emissions sources we explicitly represented the holidays as Sundays. Table 2-3 lists the days that we modeled as representative days in the months that we simulated for the 2002 base year modeling. Table 2-4 lists the holidays in 2002 that were modeled as Sundays.

Table 2-3: Representative model days for 2002 base year simulation.

Saturday	Sunday	Monday	Weekday
January 5	January 6	January 7	January 4
February 2	February 3	February 4	February 5
March 2	March 3	March 4	March 5
April 6	April 7	April 8	April 2
May 4	May 5	May 6	May 7
June 8	June 9	June 3	June 4
July 6	July 7	July 8	July 3
August 3	August 4	August 5	August 6
September 7	September 8	September 9	September 10
October 5	October 6	October 7	October 8
November 2	November 3	November 4	November 5
December 7	December 8	December 9	December 10

Table 2-4: 2002 modeled holidays.

Holiday	Date
New Years	January 1, 2002 January 2, 2002
Good Friday	March 29, 2002 March 30, 2002
Memorial Day	May 27, 2002 May 28, 2002
Independence Day	July 4, 2002 July 5, 2002
Labor Day	September 2, 2002 September 3, 2002
Thanksgiving Holiday	November 28-30, 2002
Christmas Holiday	December 24-26, 2002

We used the designations in Table 2-5 to determine which months fell into each season when temporally allocating the seasonal emissions inventories. Some of the inventories for the Electrical Generating Units (EGUs) were received for Winter and Summer. Table 2-6 determines which months fell into each season

Table 2-5. Assignments of months to four seasons for use of seasonal inventory files in SMOKE.

Month	Season
January	Winter
February	Winter
March	Spring
April	Spring
May	Spring
June	Summer
July	Summer
August	Summer
September	Fall
October	Fall
November	Fall
December	Winter

Table 2-6. Assignments of months to two seasons for use of seasonal inventory files in SMOKE.

Month	Season
January	Winter
February	Winter
March	Winter
April	Winter
May	Summer
June	Summer
July	Summer
August	Summer
September	Summer
October	Winter
November	Winter
December	Winter

2.1.5 SMOKE Processing Categories

Emissions inventories are typically divided into area, on-road mobile, non-road mobile, point, and biogenic source categories. These divisions arise from differing methods for preparing the inventories, different characteristics and attributes of the categories, and how the emissions are processed through models. Generally, emissions inventories are divided into the following source categories, which we refer to later as “SMOKE processing categories.”

- **Stationary Area Sources:** Sources that are treated as being spread over a spatial extent (usually a county or air district) and that are not movable (as compared to non-road mobile and on-road mobile sources). Because it is not possible to collect the emissions at each point of emission, they are estimated over larger regions. Examples of stationary

area sources are residential heating and architectural coatings. Numerous sources, such as dry cleaning facilities, may be treated either as stationary area sources or as point sources.

- **On-Road Mobile Sources:** Vehicular sources that travel on roadways. These sources can be computed either as being spread over a spatial extent or as being assigned to a line location (called a link). Data in on-road inventories can be either emissions or activity data. Activity data consist of vehicle miles traveled (VMT) and, optionally, vehicle speed. Activity data are used when SMOKE will be computing emission factors via another model, such as MOBILE6 (U.S. EPA, 2005). Examples of on-road mobile sources include light-duty gasoline vehicles and heavy-duty diesel vehicles.
- **Non-Road Mobile Sources:** These sources are engines that do not always travel on roadways. They encompass a wide variety of source types from lawn and garden equipment to locomotives and airplanes. Emission estimates for most non-road sources come from EPA's NONROAD model (OFFROAD in California). The exceptions are emissions for locomotives, airplanes, pleasure craft and commercial marine vessels.
- **Point Sources:** These are sources that are identified by point locations, typically because they are regulated and their locations are available in regulatory reports. In addition, elevated point sources will have their emissions allocated vertically through the model layers, as opposed to being emitted into only the first model layer. Point sources are often further subdivided into electric generating unit (EGU) sources and non-EGU sources, particularly in criteria inventories in which EGUs are a primary source of NO_x and SO₂. Examples of non-EGU point sources include chemical manufacturers and furniture refinishers. Point sources are included in both criteria and toxics inventories.
- **Biogenic Land Use Data:** Biogenic land use data characterize the types of vegetation that exist in either county-total or grid cell values. The biogenic land use data in North America are available using two different sets of land use categories: the Biogenic Emissions Landcover Database (BELD) version 2 (BELD2), and the BELD version 3 (BELD3) (CEP, 2004b).

In addition to these standard SMOKE processing categories, we have added other categories either to represent specific emissions processes more accurately or to integrate emissions data that are not compatible with SMOKE. Examples of emissions sectors that fall outside of the SMOKE processing categories include emissions generated from process-based models for representing windblown dust and agricultural ammonia (NH₃) sources. An emissions category with data that are not compatible with SMOKE is one with gridded emissions data sets, such as commercial marine sources. Another nonstandard emissions category that we modeled was emissions from fires. All of the emissions categories that we used to build CENRAP simulations are described in detail in the following sections.

Continuing the enhancement of the emissions source categories that we initiated during the preliminary 2002 modeling, we further refined the categories from the standard definitions listed above to include more explicit emissions sectors. The advantage of using more detailed definitions of the source categories is that it leads to more flexibility in designing control strategies, substituting new inventory or profile data into the modeling, managing the input and output data from SMOKE and conducting QA of the SMOKE outputs. The major drawback to defining more emissions source categories is the increased level of complexity and computational requirements (run times and disk space) that results from having a larger number of input data sets. Another motivation behind separating the various emissions categories is related to the size and flexibility of the input data. Some data sets, like the CENRAP on-road

mobile inventory, were so large that we had to process them separately from the rest of the sources in the on-road sector due to computational constraints. We also separated the non-road mobile and ammonia sectors into yearly and monthly inventories to facilitate the application of uniform monthly temporal profiles to the monthly data. Additional details about how we prepared the emissions inventories and ancillary data for modeling are described in Sections 2.2 through 2.16. Table 2-7 summarizes the entire group of source sectors that composed simulation Typ02G. Each emissions sector listed in the table represents an explicit SMOKE simulation. As discussed in Section 2.1.2 below, after finishing all of the source-specific simulations, we used SMOKE to combine all of the data into a single file for each day for input to the air quality modeling systems. Each subsection on the emissions sectors describes each sector in terms of the SMOKE processing category, the year covered by the inventory, and the source(s) of the data.

Additional details about the inventories are also provided, including any modifications that we made to prepare them for input into SMOKE.

Table 2-7. CENRAP Typ02G emissions categories.

Emissions Sector	Abbreviation*
Fires as Point Sources (WRAP, CENRAP, VISTAS)	Alf
Area Sources (All domain)	ar
CENRAP area fires	arf
Area fires, Anthropogenic (All domain, excluding WRAP and CENRAP)	arfa
Area fires, Wild (All domain, excluding WRAP)	arfw
Biogenic	b3
Ontario, Canada, point-source fires	bsf
Fugitive dust	fd
WRAP on-road mobile	mb
CENRAP on-road mobile	mbv_CENRAP
Other US on-road mobile	mbv
Monthly CENRAP/MRPO anthropogenic NH ₃	nh3m
Ammonia from annual inventory (CENRAP)	nh3y
WRAP anthropogenic NH ₃	nh3
Seasonal/Monthly non-road mobile (WRAP, CENRAP, MW)	nrm
Annual non-road mobile	nry
On-road Mobile (Non-US)	nusm
Offshore shipping (Gulf, Atlantic)	ofs
Offshore area (Gulf)	ofsar
Stationary point (All domain, including offshore)	pt
Road dust	rd
Windblown dust (All domain)	wb_dust
WRAP oil and gas	wog

*These abbreviations are used in the file naming of the SMOKE output files for each sector.

Emissions models such as SMOKE are computer programs that convert annual or daily estimates of emissions at the state or county level to hourly emissions fluxes on a uniform spatial grid that are formatted for input to an air quality model. For the Typ02G and Base18G emission inventories we prepared emissions for CMAQ version 4.5 using SMOKE version 2.1 on the UCR Linux computing cluster. SMOKE integrates annual county-level emissions inventories with source-based temporal, spatial, and chemical allocation profiles to create hourly emissions fluxes on a predefined model grid. For elevated sources that require allocation of the emissions to the vertical model layers, SMOKE integrates meteorology data to derive dynamic vertical profiles. In addition to its capacity to represent the standard emissions processing categories, SMOKE is also instrumented with the Biogenic Emissions Inventory System, version 3 (BEIS3) model for estimating biogenic emissions fluxes (U.S. EPA, 2004) and the MOBILE6 model for estimating on-road mobile emissions fluxes from county-level vehicle activity data (U.S. EPA, 2005a).

SMOKE uses C-Shell scripts as user interfaces to set configuration options and call executables. SMOKE is designed with flexible QA capabilities to generate standard and custom reports for checking the emissions modeling process. After modeling all of the source categories individually, including those categories generated outside of SMOKE, we used SMOKE to merge all of the categories together to create a single CMAQ input file per simulation day. Also, for use in the CAMx modeling, we converted the CMAQ-ready emissions estimates to CAMx-ready files using the CMAQ2CAMx converter. Additional technical details about the version of SMOKE used for final simulations are available from CEP (2004b). All scripts, data, and executables used to generate the Typ02G and Base18G emissions for CMAQ and CAMx are archived on the CENRAP computing cluster.

2.1.6 2002 and 2018 Data Sources

This section describes the procedures that the CENRAP followed to collect and prepare all emissions data for Typ02G and Base18G simulations. We discuss the sources of all inventory and ancillary data used for simulations. CENRAP worked with emissions inventory contractors, other RPOs, and EPA to collect all of the data that constitute the simulation. Table 2-8 lists all of the contacts for the various U.S. anthropogenic emission inventories we used. For the CENRAP inventories, this table lists the contacts for the contractors who prepared the inventories; for the non-CENRAP inventories it lists the contacts at the RPOs who provided us inventory data. We obtained the emissions inventories for Canada and Mexico from the U.S. EPA Emissions Factors and Inventory Group (EFIG) via the Clearinghouse for Inventories and Emissions Factors (CHIEF) website (<http://www.epa.gov/ttn/chief/index.html>).

Table 2-8. CENRAP anthropogenic emissions inventory contacts.

Source Category	Emissions Data Contact
WRAP	
All	Tom Moore, Western Governors' Association Phone: (970) 491-8837 Email: mooret@cira.colostate.edu
CENRAP	
2002 Consolidated Inventory	Randy Strait, E.H. Pechan & Assoc., Inc. Phone: 919-493-3144 Email: rstrait@pechan.com
NH3 Inventory, Prescribed and Agricultural Fires, and On-road mobile emissions	Dana Sullivan, Sonoma Technology, Inc. Phone: 707-665-9900 Email: dana@sonomatech.com
Gulf Off-shore platform and support vessel emissions	Holly Ensz, Minerals Management Service Phone: (504) 736-2536 Email: holli.ensz@mms.gov
VISTAS	
All	Greg Stella, Alpine Geophysics, LLC, Phone: 828-675-9045 Email: gms@alpinegeophysics.com
MANE-VU	
All	Megan Schuster, MARAMA, Baltimore, MD USA Phone: 410-467-0170 Email: mschuster@marama.org
MRPO	
All	Mark Janssen, LADCO, Des Plaines, IL, USA Phone: 847-296-2181 Email: janssen@ladco.org

As mentioned above, the refinement of these inventories involved splitting some of the inventory files into more specific source sectors. As the stationary-area-source emissions sector has traditionally been a catch-all for many types of sources, this is the inventory sector that required the greatest amount of preparation. Upon receiving all stationary-area-source inventories we extracted fugitive dust, road dust, anthropogenic NH₃, and for the non-WRAP U.S. inventories, stage II refueling sources. We retained the dust sources as separate categories that we would further refine with the application of transport factors (see Section 2.8).

We collected the ancillary data used for SMOKE modeling from several sources. SMOKE ancillary modeling data include:

- Temporal and chemical allocation factors by state, county, and source classification code (SCC);
- Spatial surrogates and cross-reference files for allocating county-level emissions to the model grid;
- Hourly gridded meteorology data;
- Stack defaults for elevated point sources;
- MOBILE6 configuration files;
- A Federal Implementation Standards (FIPS) codes (i.e., country/state/county codes) definition file;

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- A Source Category Classification (SCC) codes definition file;
- A pollutant definition file; and
- Biogenic emission factors.

Except for the meteorology data and the MOBILE6 configuration files, we used default data sets provided by EPA as the basis for all of the ancillary data except for temporal profiles used for Electric Generating Units (EGUs). These profiles were developed based on CEM data from 2000 through 2003 (Pechan and CEP, 2005c). CENRAP provided the meteorology data for the simulations at 36-km and 12-km grid resolutions (Johnson, 2007). The inventory contractor who prepared the MOBILE6 inventories provided the MOBILE6 configuration files either directly or via an RPO representative; details about the sources of the MOBILE6 inputs are provided in Section 2.4. We made minor modifications to the chemical allocation, pollutant definition, and country/state/county codes files for new sources, pollutants, or counties contained in the inventories that we had not previously modeled. We made major modifications to the temporal and spatial allocation inputs, as described below.

2.1.7 Temporal Allocation

Temporally allocating annual, daily, or hourly emissions inventories in SMOKE involves combining a temporal cross-reference file and a temporal profiles file.

- Temporal cross-reference files associate monthly, weekly, and diurnal temporal profile codes with specific inventory sources, through a combination of a FIPS (country/state/county) code, an SCC, and sometimes for point sources, facility and unit identification codes.
- Temporal profiles files contain coded monthly, weekly, and diurnal profiles in terms of a percentage of emissions allocated to each temporal unit (e.g., percentage of emissions per month, weekday, or hour).

As a starting point for the temporal allocation data for simulations, we used the files generated by emission inventory contractors (Pechan and CEP, 2005c). Based on guidance from the developers of some of the inventory files, we enhanced the temporal profiles and assignments for some source categories (Pechan, 2005b).

We modified the temporal allocation data for the simulations to improve the representation of temporal emissions patterns for certain source categories. We implemented the adjusted profiles in SMOKE by modifying the temporal cross-reference file for the applicable FIPS and SCC combinations.

Updated temporal profiles for EGUs were made available for MRPO in the MRPO Base K inventory. Since the non-road emissions for IA and MN were monthly emissions developed by MRPO, new temporal profiles were created for all the SCCs in these emissions files for these two states only. The monthly profile was uniform and the weekly and diurnal profiles were kept the same as were modeled for the rest of the country.

An updated temporal profile, profile 485, based on NOAA 1971-2000 population weighted average heating degree days for home heating area source emissions was obtained from

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VISTAS. This profile provided state specific updates for home heating emissions and was applied to the full inventory in place of profile 17XX.

Other additions to the Base02G temporal allocation data included updates that made by other RPOs that are applicable to their inventories. These other updates to the temporal allocation files included

- VISTAS continuous emissions monitoring (CEM)-specific profiles for EGUs in the VISTAS states;
- VISTAS agricultural burning profiles;
- Wildfire and prescribed fire profiles developed by VISTAS for the entire U.S.;
- MANE-VU on-road mobile profiles;
- WRAP weekly and diurnal road dust profiles;
- WRAP diurnal wildfire, agricultural fire, and prescribed fire profiles; and
- WRAP on-road mobile weekly and diurnal profiles.

Finally, for all of the monthly and seasonal emissions inventories, we modified the temporal cross-reference files to apply uniform monthly profiles to the sources contained in these inventories. The monthly variability is inherent in monthly and seasonal inventories and does not need to be reapplied through the temporal allocation process in SMOKE. The inventories to which we applied uniform monthly temporal profiles included:

- WRAP, CENRAP, and MRPO non-road mobile sources;
- WRAP on-road mobile sources;
- WRAP road dust; and
- CENRAP anthropogenic ammonia.

2.1.8 Spatial Allocation

SMOKE uses spatial surrogates and SCC cross-reference files to allocate county-level emissions inventories to model grid cells. Geographic information system (GIS)-calculated fractional land use values define the percentage of a grid cell that is covered by standard sets of land use categories. For example, spatial surrogates can define a grid cell as being 50% urban, 10% forest, and 40% agricultural. In addition to land use categories, spatial surrogates can also be defined by demographic or industrial units, such as population or commercial area. Similar to the temporal allocation data, an accompanying spatial cross-reference file associates the spatial surrogates (indexed with a numeric code) to SCCs. Spatial allocation with surrogates is applicable only to area and mobile sources that are provided on a county level basis. Point sources are located in the model grid cells by SMOKE based on the latitude-longitude coordinates of each source. Biogenic emissions are estimated based on 1-km² gridded land use information that is mapped to the model grid using a processing program such as the Multimedia Integrated Modeling System (MIMS) Spatial Allocator (CEP, 2004).

We used various sources of spatial surrogate information for the U.S., Canada, and Mexico inventories in the simulations. For the U.S. and Canadian sources, we used the EPA unified

surrogates available through the EFIG web site (EPA, 2005c). For the 36-km grid, EPA provides these data already formatted for SMOKE on the RPO Unified 36-km domain that we used for the simulations. We modified the spatial surrogates for Canada on the RPO Unified 36-km domain by adopting several surrogate categories that were enhanced by the WRAP. Table 2-9 provides details about the new Canadian spatial surrogates that were developed by the WRAP and used for CENRAP simulations. For modeling Mexico, we used Shapefiles developed for the Big Bend Regional Aerosol and Visibility Observations Study (BRAVO) modeling to create surrogates for Mexico on the RPO Unified 36-km domain (EPA, 2005c).

Table 2-9. New Canadian spatial surrogates.

Attribute	Base02a Code	Shapefile	Reference
Land area	950	can_land93_land	Natural Resources Canada (1993) AVHRR land cover data
Water area	951	can_land93_water	Natural Resources Canada (1993) AVHRR land cover data
Forest land area	952	can_land93_forest	Natural Resources Canada (1993) AVHRR land cover data
Agricultural land area	953	can_land93_agri	Natural Resources Canada (1993) AVHRR land cover data
Urban land area	954	can_land93_urban	Natural Resources Canada (1993) AVHRR land cover data
Rural land area	955	can_land93_rural	Natural Resources Canada (1993) AVHRR land cover data
Airports	956	can_airport	U.S. DOT Bureau of Transportation Statistics (2005) NORTAD 1:1,000,000 scale data
Ports	957	can_port	U.S. DOT Bureau of Transportation Statistics (2005) NORTAD 1:1,000,000 scale data
Roads	958	can_road1m	Natural Resources Canada (2001) National Scale Frameworks data
Rail	959	can_rail1m	Natural Resources Canada (1999) National Scale Frameworks data

2.2 Stationary Point Source Emissions

Stationary-point-source emissions data for SMOKE consist of (1) Inventory Data Analyzer (IDA)-formatted inventory files; (2) ancillary data for allocating the inventories in space, time, and to the Carbon Bond-IV chemistry mechanism used in CMAQ and CAMx; and (3) meteorology data for calculating plume rise from the elevated point sources. This section describes where CENRAP obtained these data, how we modeled them, and the types of QA that we performed to ensure that SMOKE processed the data as expected.

2.2.1 Data Sources

For the stationary-point-source inventories in Typ02G and Base18G, we used actual 2002 data developed by the RPOs for the U.S., version 2 of the year 2000 Canadian inventory, and the BRAVO 1999 Mexican inventory. The BRAVO inventory was updated with entirely new inventories for the six northern states of Mexico for stationary area, as well as stationary point, on-road mobile, and off-road mobile sources. Emissions for the southern states of Mexico were included for the first time in CENRAP simulations Typ02G and Base18G. These data were provided by ERG, Inc., who completed an updated 1999 emissions inventory for northern Mexico (ERG, 2006b) and delivered these data to the WRAP. The CENRAP stationary-point inventory consisted of annual county-level and tribal data provided in August of 2005 (Pechan and CEP, 2005e). The WRAP (ERG, 2006a) and VISTAS Base G (MACTEC, 2006) stationary-point inventories consisted of an annual data set and monthly CEM data for selected EGUs. The WRAP and VISTAS provided these data directly to CENRAP. We downloaded the MANE-VU stationary-point inventories from the MANE-VU web sites. MRPO base K data was downloaded and processed for SMOKE modeling by Alpine Geophysics under contract from MARAMA. UCR entered into a nondisclosure agreement with Environment Canada to obtain version 2 of the 2000 Canadian point-source inventory. This inventory represented a major improvement over the version of the data that we had used in the preliminary 2002 modeling.

Reductions anticipated from BART controls for electric generating units (EGU) in Oklahoma, Arkansas, Kansas, and Nebraska were included in projections of 2018 emissions. These anticipated reductions were based on actual operating conditions and estimated control efficiencies from utilities.

Newly permitted coal-fired utilities were included in 2018 projections. Conservatively, no IPM projected new units were removed from the simulation with the addition of the permitted facilities.

Due to missing or clearly erroneous stack parameters, several facilities in CENRAP states were relegated to default stack profiles based on SCC in the NEI QA process. Prioritizing for the largest emissions sources, these default parameters were corrected by CENRAP States and updated files were provided to modeling contractors. Final IDA input files Typ02G and Base18G for point sources reflect State corrections.

For coal-fired point and area sources, The EPA Office of Air Quality and Planning Standards (OAQPS) determined that the organic carbon fraction in the speciation profile code "NCOAL" was not representative of most coal combustion occurring in the U.S. This profile has an organic carbon fraction of 20%, which includes an adjustment factor of 1.2 to account for other atoms (like oxygen) attached to the carbon. OAQPS has reverted back to the profile code "22001" for coal combustion, which has an organic carbon fraction of 1.07% (again including the 1.2 factor adjustment). This is the same profile that EPA used for previous rulemaking efforts including the Heavy Duty Diesel Rule and Non-Road Rule, which were proposed (and publicly reviewed) prior to the introduction of the NCOAL profile.

The consensus in OAQPS is that the NCOAL profile has a high organic carbon percentage because it is based on measurements of combustion of lignite coal. With the exception of Texas, lignite is not widely used in the U.S.. Thus, OAQPS staff stopped relying on this profile as a national default profile. A new coal speciation profile developed based on Eastern bituminous

coal combustion (since much of the coal burned in the U.S. is of this type) is being developed by EPA's Office of Research and Development but was not completed for this study.

The profile recently developed for MRPO by Carnegie Mellon was provided to CENRAP and is representative of combustion of eastern bituminous coal. This profile is a more appropriate profile for most facilities in the U.S. than the default NCOAL profile.

Additionally, the "22001" profile has been flagged as problematic because of the apparent inadvertent switching of the organic carbon and elemental carbon fractions, which are 1.07% and 1.83% respectively. The report discovering the discrepancy in the profile did not offer a clear alternative to correct the problem (MACTEC, 2003).

CENRAP has continued to use the NCOAL factor for facilities burning lignite in North Dakota and Texas. For the remainder of the U.S., the MRPO profile, CMU, was used. The NCOAL factor was modified reducing the organic carbon by half and assigning the remainder to PM_{2.5}. The modification was at the request of Texas and was reflective of the original study for the NCOAL factor conducted in Texas (Chow, 2005). Table 2-10 summarizes the PM_{2.5} speciation profiles for the NCOAL, 2201 and CMU speciation profiles for coal burning sources.

Table 2-10. PM 2.5 speciation profiles for coal-burning sources.

Profile	POC	PEC	PNO3	PSO4	PM2.5
NCOAL	0.1000	0.0100	0.0050	0.1600	0.7250
22001	0.0107	0.0183	0.0000	0.1190	0.8520
CMU	0.0263	0.0315	0.0036	0.0447	0.8938

Final simulations used improved temporal allocation and speciation information relative to the preliminary 2002 modeling; the rest of the ancillary data for modeling stationary point sources stayed the same (Mansell et al., 2005).

2.2.2 Emissions Processing

For Typ02G and Base18G simulations we configured SMOKE to process the annual inventories for the U.S., Canada, and Mexico and process hourly CEM data for the VISTAS. We configured SMOKE to allocate these emissions up to model layer 15 (approximately 2,500 m AGL), which roughly corresponds to the maximum planetary boundary layer (PBL) heights across the entire domain throughout the year. As coarse particulate matter (PMC) is not an inventory pollutant but is required by the air quality models as input species, we used SMOKE to calculate PMC during the processing as (PM₁₀ - PM_{2.5}). With the SMOKE option WKDAY_NORMALIZE set to "No," we treated the annual inventories based on the assumption that they represent average-day data based on a seven-day week, rather than average weekday data. We also assumed that all of the volatile organic compound (VOC) emissions in the inventories are reactive organic gas (ROG), and thus used SMOKE to convert the VOC to total organic gas (TOG) before converting the emissions into CB-IV speciation for the air quality models. To capture the differences in diurnal patterns that are contained in the CEM temporal profiles for VISTAS and CENRAP states (Base02F), we configured SMOKE to generate daily temporal matrices, as opposed to using a Monday-weekday-Saturday-Sunday (MWSS) temporal allocation approach.

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To QA the stationary-point emissions, we used the procedures in the CENRAP emissions modeling QA protocol (Morris and Tonnesen, 2004) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for all simulations. These QA graphics are available on the web site at: <http://pah.cert.ucr.edu/aqm/cenrap/emissions.shtml>

2.2.3 Uncertainties and Recommendations

There were issues with the stationary-point emissions that we left unresolved at the completion of the Typ02G and Base18G emissions modeling either because we did not feel they would have a major impact on the modeling results in CENRAP states or because we did not have alternative approaches and they represented the best available information. Canadian emissions for 2000 were found to have a significant number of missing stack parameters. These stacks when modeled with default parameters frequently resulted in lower plume heights. Stack parameters for 2000 were corrected based on cross referencing sources with the 2005 Canadian inventory for the largest emitting points. Stack parameters for many of the sources with lower emissions remain incorrect, but are assumed to have a less significant impact on CENRAP Class I areas. The 2020 projected emissions for Canada were obtained as air quality model-ready files from EPA. EPA has not confirmed that missing stack parameters were corrected for the projected inventory. It is assumed that they were not corrected and default parameters were used instead. Given confidentiality issues that surround Canadian inventories, EPA processed emissions represent the best available data.

2.3 Stationary Area Sources

Stationary-area-source emissions data for SMOKE consist of IDA-formatted inventory files and ancillary data for allocating the inventories in space, time, and to the Carbon Bond-IV chemistry mechanism used in CMAQ and CAMx. This section describes where we obtained these data, how we modeled them, and the types of QA that we performed to ensure that SMOKE processed the data as expected.

2.3.1 Data Sources

For the stationary area source inventories in the Typ02G and Base18G simulations, we used actual 2002 data developed by the RPOs for the U.S., version 2 of the year 2000 Canadian inventory, and the updated Mexican inventory, <http://www.epa.gov/ttn/chief/net/mexico.html>. The BRAVO inventory was updated with entirely new inventories for the six northern states of Mexico for stationary area, as well as stationary point, on-road mobile, and off-road mobile sources. Emissions for the southern states of Mexico were included for the first time in CENRAP simulations Typ02G and Base18G. The CENRAP stationary-area inventory consisted of annual county-level and tribal data provided by in August of 2005 (Pechan and CEP, 2005e). The WRAP (ERG, 2006a) and VISTAS Base G (MACTEC, 2006) stationary-area inventories consisted of an annual data set. We downloaded the MANE-VU stationary-area inventories from the MANE-VU web sites. MRPO base K data was downloaded and processed for SMOKE modeling by Alpine Geophysics under contract from MARAMA.

To prepare the stationary-area inventories for modeling, we made several modifications to the files by removing selected sources either to model them as separate source categories or to omit them from simulations completely. Using guidance provided by EPA (EPA, 2004b), we extracted fugitive and road dust sources from all stationary-area inventories for adjustment by transport factors and modeling as separate source categories (see Section 2.8). We also extracted and discarded the stage II refueling sources (Table 2-11) from the U.S. inventories; we modeled these sources with MOBILE6 as part of the on-road mobile-source emissions. We left the stage II refueling emissions in the WRAP stationary-area inventory because the on-road mobile inventory that we received for this region did not contain these emissions.

Table 2-11. Refueling SCCs removed from the non-WRAP U.S. stationary-area inventory.

SCC	Description
2501060100	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations Stage 2: Total
2501060101	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations Stage 2: Displacement Loss/Uncontrolled
2501060102	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations Stage 2: Displacement Loss/Controlled
2501060103	Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations Stage 2: Spillage
2501070100	Storage and Transport Petroleum and Petroleum Product Storage Diesel Service Stations Stage 2: Total
2501070101	Storage and Transport Petroleum and Petroleum Product Storage Diesel Service Stations Stage 2: Displacement Loss/Uncontrolled
2501070102	Storage and Transport Petroleum and Petroleum Product Storage Diesel Service Stations Stage 2: Displacement Loss/Controlled
2501070103	Storage and Transport Petroleum and Petroleum Product Storage Diesel Service Stations Stage 2: Spillage

Other steps that we took to prepare the stationary-area inventories included confirming that there is no overlap between the anthropogenic NH₃ inventory (Section 2.9) and stationary area sources, and moving area-source fires in each regional inventory to separate files. In addition to these inventory modifications we made a few changes to the ancillary data files for simulation Typ02G, as described next.

Simulation Typ02G used improved temporal and spatial allocation information relative to the preliminary 2002 modeling; the rest of the ancillary data for modeling stationary area sources stayed the same as in the preliminary 2002 modeling (Mansell et al., 2005). We adopted enhanced spatial allocation data with additional area-based surrogates for Canada (Table 2-9), and added surrogates for a missing county in Colorado (Broomfield) from WRAP modeling and QA work. The WRAP had noticed when looking at the Canadian data for the preliminary 2002 modeling that forest fire emissions from the Canadian area-source inventory, which are relatively large sources of CO, NO_x, and PM_{2.5}, were being allocated to a surrogate for logging activities. They found similar discrepancies for other area and non-road SCCs in Canada. To improve the representation of the Canadian emissions, we adopted several land-area-based surrogates developed by the WRAP, such as forested land area, urban land area, and rural land area, and made the accompanying additions to the spatial cross-reference file to associate inventory SCCs with these surrogates. We also added spatial surrogates for Broomfield County, CO; this county was included in the inventory but was not included in the base EPA surrogates (this county was recently created from portions of other counties).

Improvements to the temporal allocation data for simulation Typ02G included the addition of several FIPS-specific profiles provided by VISTAS and CENRAP contractors (Pechan 2005b). These temporal profiles listed in Table 2-12 targeted mainly fire and agricultural NH₃ sources, such as open burning and livestock operations, respectively.

Table 2-12. New Temporal Profile Assignments for CENRAP Area Source SCCs.

SCC	Description	Month	Week	Diurnal	Recommendation Based on Profile Data for SCC	Description of Similar SCC used to Recommend Profiles
2310001000	Industrial Processes; Oil and Gas Production: SIC 13;All Processes : On-shore; Total: All Processes	262	7	26	2310000000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes;Total: All Processes
2310002000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes : Off-shore;Total: All Processes	262	7	26	2310000000	Industrial Processes;Oil and Gas Production: SIC 13;All Processes;Total: All Processes
2461870999	Solvent Utilization;Miscellaneous Non-industrial: Commercial;Pesticide Application: Non-Agricultural;Not Elsewhere Classified	258	7	26	2461800000	Solvent Utilization;Miscellaneous Non-industrial: Commercial;Pesticide Application: All Processes;Total: All Solvent Types
2805009200	Miscellaneous Area Sources;Agriculture Production - Livestock;Poultry production - broilers;Manure handling and storage	1500	7	26	2805009300	Miscellaneous Area Sources;Agriculture Production - Livestock;Poultry production - broilers;Land application of manure
2805021100	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Confinement	1500	7	26	2805021300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Land application of manure
2805021200	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Manure handling and storage	1500	7	26	2805021300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - scrape dairy;Land application of manure
2805023100	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Confinement	1500	7	26	2805023300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Land application of manure
2805023200	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Manure handling and storage	1500	7	26	2805023300	Miscellaneous Area Sources;Agriculture Production - Livestock;Dairy cattle - drylot/pasture dairy;Land application of manure
2810020000	Miscellaneous Area Sources;Other Combustion;Prescribed Burning of Rangeland;Total	3	11	13	2810015000	Miscellaneous Area Sources;Other Combustion;Prescribed Burning for Forest Management;Total

2.3.2 Emissions Processing

For simulations Typ02G and Base18G we configured SMOKE to process the annual stationary-area-source inventories for the U.S., Canada, and Mexico. As PMC is not an inventory pollutant but is required by the air quality models as input species, we used SMOKE to calculate PMC during the processing as (PM₁₀ - PM_{2.5}). With the SMOKE option WKDAY_NORMALIZE set to “Yes,” we treated the annual stationary-area inventories based on the assumption that they represent average weekday data, causing SMOKE to renormalize the data to a seven-day estimate before applying any temporal adjustments. We also assumed that all of the VOC emissions in the inventories are ROG and thus used SMOKE to convert the VOC to TOG before converting the emissions into CB-IV speciation for the air quality models. We configured SMOKE to use a MWSS temporal allocation approach, as opposed to a daily temporal approach.

To QA the stationary-area emissions, we used the procedures in the CENRAP modeling QAPP and Modeling Protocol (Morris and Tonnesen, 2004; Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for all simulations. The graphical QA summaries include, for all emissions output species, daily spatial plots summed across all model layers, daily time-series plots, and annual time-series plots. These QA graphics are available on the UCR/CENRAP web site at <http://pah.cert.ucr.edu/aqm/cenrap/emissions.shtml>.

2.3.3 Uncertainties and Recommendations

Most of the issues that we encountered with the stationary area sources related to the removal of certain SCCs from the base inventories for inclusion as other source categories or complete omission from simulations. We spent considerable effort on ensuring that we did not have overlap between the area inventory and the other sectors that explicitly represent sources traditionally contained in the area inventory, such as NH₃ and dust.

Both the Canadian and Mexican inventories presented minor problems that we resolved for simulation Typ02G but that can be addressed more thoroughly in future simulations. The Canadian inventory we used contained data only at the province level, essentially equivalent to a statewide rather than county-level inventory. A higher resolution inventory would have allowed us to use higher-resolution and more accurate spatial allocation data. Future modeling that uses Canadian data should move to the newly released municipality-level year 2000 inventories for Canada.

There was a discrepancy between the state and county coding in the Mexican inventory and the SMOKE file that defines acceptable FIPS codes. Differences in the ordering of the Mexican state names between these two data sets led to some of the Mexican inventory sources being mislabeled in the SMOKE QA reports. The state codes in the inventory and spatial surrogate files for two Mexican states were changed to be consistent with the SMOKE country/state/county codes file.

2.4 On-Road Mobile Sources

On-road mobile-source emissions data for SMOKE consist of IDA-formatted emissions and vehicle activity inventory files, and ancillary data for allocating the inventories in space, time, and to the Carbon Bond-IV chemistry mechanism used in CMAQ and CAMx. This section describes where we obtained these data, how we modeled them, and the types of QA that we performed to ensure that SMOKE processed the data as expected.

2.4.1 Data Sources

The SMOKE processing for CENRAP included two approaches for processing on-road mobile sources depending on the source of the data provided. The first approach was to compute mobile emissions values prior to providing them to SMOKE; we call this the pre-computed emissions approach. The second approach was to provide SMOKE with VMT data, meteorology data, and MOBILE6 inputs, and let the SMOKE/MOBILE6 module compute the mobile emissions based on these data; we call this the VMT approach. These approaches are not mutually exclusive for a single SMOKE run; therefore, we performed single SMOKE runs in which both approaches were used as follows:

- Annual VMT for computing CO, NO_x, VOC, SO₂, NH₃ and PM using MOBILE6 for all CENRAP States.
- Pre-computed, seasonal MOBILE6-based emissions of all pollutants for the 13 WRAP states that included pre-specified PM_{2.5} data.
- Annual VMT for computing CO, NO_x, VOC, SO₂, NH₃ and PM using MOBILE6 for the rest of the United States (VISTAS, MRPO and MANE-VU).
- Pre-computed, annual 1999 emissions of all pollutants for Mexico.
- Pre-computed, annual 2000 emissions of all pollutants for Canada.

For the CENRAP states, STI provided VMT data and MOBILE6 input files for all counties in the CENRAP region (Reid et al., 2004a). MOBILE6 input files were provided only for the months of January and July for 2002. MOBILE6 input files for the remaining months of 2002 had to be generated. These data were then processed within SMOKE. Using one set of MOBILE6 input files for each county in the CENRAP states resulted in compute memory requirements that were too large to process all CENRAP states together. Therefore the on-road mobile processing for the CENRAP states was split into two groups for SMOKE processing. The resulting gridded emissions data files were then merged together to obtain an on-road mobile source emissions file for the entire CENRAP region.

For the WRAP states we used actual 2002 data split into California and non-California seasonal inventories that were provided by the WRAP (Pollack et al., 2006). In addition to the standard criteria pollutants, these files contained pre-specified PM_{2.5} emissions. For the rest of the U.S. we used annual county-level activity and speed inventories with monthly, county-level MOBILE6 inputs, and hourly meteorology to estimate the hourly emissions with the SMOKE/MOBILE6 module. For the non-U.S. inventories, we used version 2 of the year 2000 Canadian inventory and the updated 1999 Mexican inventory pre-computed mobile source emissions.

2.4.2 Emissions Processing

For the Typ02G emissions modeling we configured SMOKE to process the annual on-road mobile emissions inventory data for the WRAP, Canada, and Mexico as pre-computed inventories. For the non-WRAP states, we used the SMOKE/MOBILE6 integration to process the annual activity inventories and monthly, county-based roadway information. The WRAP inventories contained pre-computed speciated PM emissions (Pollack et al, 2006) so the SMOKE PM speciation module was not used. The WRAP on-road mobile inventories were developed to represent seven-day (weekly) average emissions (as compared to the area source inventory, which represented average weekday emissions). As actual weekly average emissions, we configured SMOKE to process the WRAP on-road mobile source emissions by setting WKDAY_NORMALIZE to “No” in which case the emissions are adjusted to represent weekday and Saturday and Sunday emissions (as in contrast to the area sources where the emissions are just adjusted for Saturday and Sunday). We also assumed that all of the VOC emissions in the inventories are ROG and used SMOKE to convert the VOC to TOG before converting the emissions into CB-IV speciation for the air quality models. We configured SMOKE to create day-of-week specific rather than MWSS, temporal profiles because the WRAP on-road mobile temporal profiles contain weekly profiles that vary across the weekdays.

As noted previously, the large number of county roadway inputs for MOBILE6 processed for the non-WRAP portion of the U.S. required us to split the states mobile-source processing into three subsets because of computer memory limitations. Separate MOBILE6 input files were used for each separate county for CENRAP states, where as one MOBILE6 input file was used for several counties outside of the CENRAP region. The three subsets consisted of two sets of SMOKE/MOBILE6 simulations for the CENRAP and a simulation that computed on-road mobile emissions for the MRPO, VISTAS, and MANE-VU states. We configured MOBILE6 to use weekly temperature averaging for computing these emissions within SMOKE.

To QA the on-road mobile emissions, we used the CENRAP emissions modeling QA protocol (Morris and Tonnesen, 2004; Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulations Typ02G and Base18G. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These graphics are available at http://pah.cert.ucr.edu/aqm/cenrap/qa_base02b36.shtml#mb

2.4.3 Uncertainties and Recommendations

We approached the on-road mobile emissions preparation for simulation Typ02G from three different directions, which were based on the form of the input inventories and ancillary emissions data for different regions of the modeling domain:

- The WRAP region used emissions estimates pre-computed with EMFAC for California and MOBILE6 for the rest of WRAP states and processed like area sources with SMOKE adjusted from weekly to day-of-week emissions.
- The CENRAP, VISTAS, MRPO, and MANE-VU states used county-level activity data to compute emissions with the SMOKE/MOBILE6 module.

- The non-U.S. parts of the domain also had pre-computer on-road mobile source emissions so used an area-source approach for processing with SMOKE.

Different approaches for modeling a single emissions sector adds complexity and additional sources of error and inconsistencies to the modeling because of the different assumptions that went into the preparation of the input data. For example, refueling emissions from the on-road mobile sector are represented in the WRAP area-source sector but are computed with MOBILE6 for the rest of the U.S. Not using MOBILE6-based emissions for the non-U.S. portion of the domain neglects the effects of the actual 2002 meteorology on these emissions. Applying MOBILE6 outside of the U.S. is currently not possible because MOBILE6 is instrumented only for calculating emissions for the U.S. automotive fleet. The result of using MOBILE6 to calculate U.S. emissions and not using it to calculate the non-U.S. on-road mobile emissions estimates is that the non-U.S. emissions are not specific to this modeling year and the 2002 meteorological conditions, whereas the U.S. emissions are 2002-specific.

While we used the best available information to compute the on-road mobile emissions for the various portions of the modeling domain, inconsistent approaches for representing these emissions may lead to unnatural emissions gradients along political boundaries. We recommend for future work a unified approach for at least the U.S. inventories, where either we use MOBILE6 in SMOKE for the entire domain (or alternative emissions model such as CONCEPT), or we calculate the emissions with MOBILE6 outside of SMOKE and then use the resulting county-based emissions inventories.

2.5 Non-Road Mobile Sources

Non-road mobile source emissions data for SMOKE consist of annual, seasonal, and monthly IDA-formatted emission inventory files and ancillary data for allocating the inventories in space, time, and to the Carbon Bond-IV chemistry mechanism used in CMAQ and CAMx. This section describes where we obtained these data, how we modeled them, and the types of QA that we performed to ensure that SMOKE processed the data as expected.

2.5.1 Data Sources

The non-road mobile-source inventories in the Typ02G and Base18G emissions modeling used actual 2002 data developed by the RPOs for the U.S., version 2 of the year 2000 Canadian inventory and the improved 1999 Mexican inventory. The U.S. inventories consisted of annual, seasonal, and monthly inventories; the non-U.S. inventories were annual data. Pechan provided the CENRAP inventories divided between annual data for aircraft, locomotive, and commercial marine and annual files for all other non-road sources (Pechan and CEP, 2005e). Minnesota substituted the monthly MRPO Base K non-road inventory for the CENRAP inventory in their state. Iowa substituted the monthly estimates for non-road agricultural sources from the MRPO base K inventory for the CENRAP inventory. Texas provided estimates for 2002 non-road emissions in lieu of the CENRAP prepared inventory. WRAP provided non-road inventories divided between California and non-California seasonal inventories, further subdivided into aircraft, locomotives, shipping, and all other non-road mobile sources (Pollack et al., 2006). Note that the California Air Resources Board uses their own OFFROAD model for California non-

road emissions, whereas the EPA NONROAD model is used for the rest of the states (with the exception of locomotives, aircraft and shipping). With these data WRAP also provided temporal adjustments to apply to the inventories to split them between weekday and weekend emissions. We used these weekday/weekend splits to derive new weekly temporal profiles for the WRAP sources. The MRPO base K monthly non-road inventories were obtained from MRPO in NIF format and were converted to SMOKE format by Wendy Vit of the Missouri DNR. The VISTAS Base G and MANE-VU non-road mobile inventories consisted of annual county-level data (Pechan and CEP, 2005c). We received these inventories directly from the respective RPO inventory representatives. We received the Canadian 2000 inventory version 2 from the U.S. EPA EFIG (EPA, 2005d). For Mexico we used the improved 1999 inventory available at <http://www.epa.gov/ttn/chief/net/mexico.html>.

Along with adding the WRAP weekday/weekend emissions splits to the temporal allocation files, we also created temporal input files that apply a flat, uniform monthly profile to the monthly and seasonal non-road inventories. With the monthly and seasonal variability inherent in these inventories, we avoided applying redundant monthly profiles by splitting the inventories into seasonal/monthly and annual data. We applied the uniform monthly temporal profiles to the seasonal/monthly inventories and non-uniform monthly temporal profiles to the annual inventories. How the non-road emissions inventory data were split into those with monthly/seasonal emission and those with annual emissions is provided in Table 2-13.

Table 2-13. Non-road mobile-source inventory temporal configuration.

Region	Source	Temporal Coverage
WRAP (non-CA)	Non-road mobile	Seasonal
WRAP (CA)	Non-road mobile	Seasonal
WRAP	Aircraft	Seasonal
WRAP	Locomotive	Annual
WRAP	In-port and near-shore shipping	Annual
CENRAP	All non-road	Annual
CENRAP, IA	Non road Ag.	Monthly
VISTAS	All non-road	Annual
MRPO and MN	All non-road	Monthly
MANE-VU	All non-road	Annual
Canada	All non-road	Annual
Mexico	All non-road	Annual

Iowa elected to use the CENRAP-sponsored inventory for all of the non-road categories except for the agricultural equipment categories provided in Table 2-14. For these agricultural equipment categories, Iowa elected to use the Midwest RPO Base K inventory because this inventory provided improvements to the temporal allocation of emissions for the agricultural sector. The Base K inventory includes monthly emissions. The monthly emissions are used in the SMOKE IDA files for modeling.

Table 2-14. Non-road agricultural emissions categories where the MRPO Base K inventory was used instead of the CENRAP inventory in Iowa.

SCC	SCC Description
22600050xx	Off-highway Vehicle Gasoline, 2-Stroke: Agricultural Equipment (2 SCCs);
22650050xx	Off-highway Vehicle Gasoline, 4-Stroke: Agricultural Equipment (11 SCCs);
22670050xx	LPG : Agricultural Equipment (3 SCCs);
22680050xx	CNG : Agricultural Equipment (3 SCCs); and
22700050xx	Off-highway Vehicle Diesel : Agricultural Equipment (11 SCCs).

Texas provided annual and daily emissions for CO, CO₂, NO_x, VOC, SO₂, PM10-FIL, and PM25-FIL for several oil and gas field equipment non-road categories (Table 2-15). Texas provided authorization to change the pollutant codes from PM10-FIL to PM10-PRI and PM25-FIL to PM25-PRI.

Table 2-15. Non-road oil and gas development equipment categories that Texas provided emissions to be used instead of the CENRAP inventory.

SCC	SCC Description
2265010010	Off-highway Vehicle Gasoline, 4-Stroke : Industrial Equipment: Other Oil Field Equipment;
2268010010	CNG : Industrial Equipment : Other Oil Field Equipment; and
2270010010	Off-highway Vehicle Diesel : Industrial Equipment : Other Oil Field Equipment

Lancaster County Nebraska provided its own non-road inventory for SCC 2260000000 (Off-highway Vehicle Gasoline, 2-Stroke : 2-Stroke Gasoline except Rail and Marine: All). The CENRAP-sponsored inventories for SCCs starting with 226 in Lancaster County were removed to correct double-counting of emissions. This adjustment was made by Pechan for Base02b modeling.

2.5.2 Emissions Processing

We configured SMOKE to process all of the non-road mobile emissions inventory data as area-like inventories using spatial surrogates to grid the county-level emissions. As the WRAP inventories contained pre-computed PM emissions, we did not have to use SMOKE to compute coarse mass PM (PMC). The WRAP non-road mobile inventories represented seven-day average emissions (different from the area inventory, which represented weekday average emissions). As actual weekly average emissions, we configured SMOKE to process them by setting WKDAY_NORMALIZE to “No.” For the rest of the non-road mobile inventories we processed the data as weekday average data by setting WKDAY_NORMALIZE to “Yes.” We also assumed that all of the VOC emissions in the inventories are ROG and used SMOKE to convert the VOC to TOG before converting the emissions into CB-IV speciation for the air quality models. We configured SMOKE to create MWSS temporal intermediates rather than daily temporal files because the non-road mobile sources do not use weekly temporal profiles that vary across the weekdays, but do have very different emissions on weekdays versus weekend days.

We divided the non-road mobile emissions modeling based on whether the data were annual or seasonal/monthly inventories. This split facilitated the application of uniform monthly temporal profiles to the seasonal/monthly inventories. After processing the non-road emissions as two separate categories, non-road yearly and non-road monthly, we combined them with the rest of the emissions sectors to create model-ready emissions for CMAQ and CAMx.

To QA the non-road mobile emissions we used the procedures in the CENRAP emissions modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulations. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at http://pah.cert.ucr.edu/aqm/cenrap/qa_base02f36.shtml#nr

2.5.3 Uncertainties and Recommendations

We prepared non-road mobile emissions using a combination of inventories having different temporal resolutions and various forms of ancillary data. These different combinations of information may lead to inconsistencies in how these emissions are represented across the modeling domain. In addition, the Canadian inventories contain only province-level information and thus have low-resolution spatial and temporal profiles applied to them. The Mexican non-road emissions are deficient in the number of different SCCs contained in the inventory and the availability of spatial surrogates that are applicable to non-road mobile sources. Improvements to the temporal profiles and spatial surrogates could provide a more consistent approach to representing the non-road emissions across the entire modeling domain.

2.6 Biogenic Sources

Biogenic emissions data for SMOKE consist of input files to the BEIS3 model (EPA, 2004a). BEIS3 is a system integrated into SMOKE for deriving emissions estimates of biogenic gas-phase pollutants from land use information, emissions factors for different plant species, and hourly, gridded meteorology data. The results of BEIS3 modeling are hourly, gridded emissions fluxes formatted for input to CMAQ or CAMx. This section describes the sources of the BEIS3 input data that we used for the Typ02G and Base18G emissions, how we modeled these data and the types of QA that were performed to ensure that SMOKE processed the data as expected.

2.6.1 Data Sources

The BELD3 land use data and biogenic emissions factors that were developed during the WRAP preliminary 2002 modeling were used for the CENRAP biogenic emissions modeling (Tonnesen et al., 2005). These data included BELD3 1-km resolution land use estimates and version 0.98 of the BELD emissions factors. Since the WRAP and CENRAP use the same 36 km Inter-RPO continental U.S. modeling domain, CENRAP was able to leverage of the WRAP work performed previously.

2.6.2 Emissions Processing

We used BEIS3.12 integrated in SMOKE to prepare emissions for the simulations. Most of the preparation for the biogenic emissions processing was completed during the preliminary 2002 modeling (Morris et al., 2005). As the modeling domains did not change from the preliminary 2002 to the final modeling, we re-used the gridded land use data and vegetation emissions factors that we prepared for the preliminary simulations.

To QA the biogenic emissions, we used the CENRAP emissions modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulation Base02b. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at http://pah.cert.ucr.edu/aqm/cenrap/qa_base02b36.shtml#b3

2.6.3 Uncertainties and Recommendations

The use of newer versions of BEIS (BEIS3.13) and the new MEGAN biogenic emissions models should be considered in future modeling.

2.7 Fire Emissions

Fire emissions data for SMOKE have traditionally been represented as county-level area-source inventories that were placed in only the first vertical model layer. We advanced the representation of fire emissions for air quality modeling by preparing portions of the inventory data as point sources with specific latitude-longitude coordinates for each fire centroid and pre-computed plume rise parameters that were derived from individual fire characteristics. These new inventories were based on the fire data products prepared by a CENRAP emission contractor (Reid et al., 2004b) and modified by the project team to be properly modeled as point sources. These data consist of annual, daily, and hourly IDA-formatted emissions inventory files and ancillary data for allocating the inventories in space, time, and to the Carbon Bond-IV chemistry mechanism used in CMAQ and CAMx. This section describes where we obtained these data, how we modeled them, and the types of QA performed to ensure that SMOKE processed the fire emissions data as expected.

2.7.1 Data Sources

The fire inventories in the Typ02G emissions inventory were held constant through Base18G. We used actual 2002 fire data developed by the RPOs for the U.S., version 2 of the year 2000 Canadian inventory fire data, and actual 2002 fire data for Ontario, Canada. The inventories used consisted of both area and point source data for the U.S., Canada, and Mexico. Sonoma Technology, Inc. provided the fire emissions for the CENRAP states (Reid et al., 2004b). Air Sciences provided us with the WRAP inventories divided among six different fire categories: wildfires, agricultural fires, wildland fire use, natural prescribed, anthropogenic prescribed, and non-Federal rangeland fires (Air Sciences, 2007a). These inventories consisted of annual, daily, and hourly IDA-formatted files with information on daily emissions totals and hourly plume characteristics for each fire. We received similar fire emission inventories for the other RPOS (Air Sciences, 2007b). We modeled these sources with the rest of the stationary-area-source sector.

CENRAP received data for 54 fires that occurred in Ontario during the year 2002. Information on the data code abbreviations, data definitions, and data units used in the raw data files was obtained from Mr. Rob Luik (Data Management Specialist) at the Ontario Ministry of Natural Resources (Rob.Luik@MNR.gov.on.ca). Emissions for each fire were estimated using the Emission Production Model (EPM)/CONSUME within the BlueSky framework. A fire identification code is needed to track individual fires throughout the processing. The unique fire identification code was created for each fire by concatenating the FIRE_NUMBER and CUR_DIST fields of the original data. The fire identification code also contains the FIPS code of the fire; this information is not used by BlueSky but is needed by BlueSky2Inv, the utility program that converts the BlueSky output to the SMOKE inventory format. The FIPS code 135000 was used for all fires with longitudes east of -90° , and FIPS code 135059 was used for

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fires west of -90° . These FIPS codes were used to ensure that the fires would be assigned the correct time zones in later SMOKE processing. Some of the dates provided in the original data included hourly information. In all cases, the hourly information was not used leaving all data at a daily resolution.

2.7.2 Emissions Processing

SMOKE is instrumented to distribute point-source-formatted fire inventories to the vertical model layers either by using a pre-computed plume rise approach or by computing the plume rise dynamically using actual 2002 meteorology. We applied both approaches for modeling point-source fire emissions in simulation Typ02G. For the pre-computed plume rise approach, SMOKE reads an annual inventory file with information on fire locations, a daily inventory file with daily emission totals for each fire, and an hourly inventory file with hourly plume bottom, plume top, and layer 1 fractions for each fire. SMOKE uses this information to locate the fires on the horizontal model grid and to distribute the plume of each fire vertically to the model layers. Because some of these fires have plumes that reach the model top, we set the number of emissions layers for processing these inventories to the full 19 layers of the meteorology. We applied this approach to the point-source fires for the WRAP, CENRAP and VISTAS regions. The alternative plume rise approach uses information on fuel loading and the heat flux of the fires to distribute the fires vertically to the model layers. The data are provided to SMOKE in the form of an annual inventory with information on fire locations and a daily inventory with daily emission totals for each fire, daily heat flux, and daily fuel loading. We applied this approach to the point-source fires for Ontario, Canada.

All of the point-source fires used diurnal temporal profiles and speciation profiles for VOC and $PM_{2.5}$ developed by Air Sciences (2007a) during the preliminary 2002 modeling (Morris et al., 2005).

We modeled the area-source fires for U.S. and Canada as standard stationary area sources. We applied monthly temporal profiles provided by RPOs, flat weekly temporal profiles, and the diurnal profiles developed by Air Sciences for WRAP fires (Air Sciences, 2007a), and for the rest of the RPOs we used diurnal profiles that were provided by them (Air Sciences, 2007b). We used the forestland area surrogate to distribute these emissions from the county or province level in the inventories to the model grid cells.

To QA the fire emissions, we used the procedure in the CENRAP emissions modeling QA protocol (Environ, 2004) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulation Typ02G. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, annual time-series plots, and vertical profiles. These QA graphics are available at: http://pah.cert.ucr.edu/aqm/cenrap/qa_typ02g36.shtml.

2.7.3 Uncertainties and Recommendations

We used forestland spatial surrogates to distribute these county level (province level for Canada) data to the model grid. Using spatial surrogates to locate fires is a crude approach that results in the artificial smearing of the emissions over too large an area. This issue can be remedied by

moving to a point-source approach for representing these fires, similar to the approach used by Air Sciences for preparing the WRAP fire inventories.

2.8 Dust Emissions

Dust emissions data for SMOKE have traditionally taken the form of county-level stationary-area-source inventories. As these emissions are correlated to meteorology, land use, and vegetative cover, we made several changes to how dust emissions are simulated by SMOKE to take these parameters into consideration. This section describes where we obtained data for windblown, fugitive, and road dust sources, how we modeled them, and the types of QA performed to ensure that SMOKE processed the data as expected.

2.8.1 Data Sources

For the fugitive dust and road dust inventories in the Typ02G emission scenario, we used actual 2002 data developed by the RPOs for the U.S., version 2 of the year 2000 Canadian inventory, and the BRAVO 1999 Mexican inventory. We extracted the fugitive dust inventories from the stationary-area inventories for each of the RPOs, Mexico, and Canada. Before modeling these data we further divided them into construction/mining sources and agricultural sources. We defined the fugitive dust sources in the Base02f modeling based on guidance provided by EPA (2004b). WRAP provide road dust emission inventories (Pollack et al., 2006). For the rest of the RPOs and Canada, we extracted the road dust SCCs from the stationary-area-source inventories. The BRAVO 1999 Mexico inventory did not contain any road dust SCCs. Table 2-16 lists the SCCs for the various fugitive and road dust sources that we modeled in the Base02f and Typ02G inventories. We applied near-source capture transport factors that are based on county-level vegetative cover to the fugitive and road dust inventories to prepare them for input to the air quality models.

For windblown dust, we used gridded emissions prepared outside of SMOKE using a land use and meteorology-based model developed under funding from the WRAP by ENVIRON and UC-Riverside (Mansell, 2005; Mansell et al., 2005).

Table 2-16. Fugitive and road dust SCCs.

Dust Category	SCCs
Fugitive dust (construction and mining)	2275085000, 2311000000, 2311010000, 2311010070, 2311020000, 2311030000, 2325000000, 2305070000, 2530000020, 2530000100, 2530000120
Fugitive dust (agricultural)	2801000003, 2801000005, 2801000008, 2805001000
Road dust	2294000000, 2296000000

2.8.2 Emissions Processing

We modeled the fugitive and road dust inventories through SMOKE using an area-source approach. We modeled these data on the assumption that they represented weekday, rather than seven-day week, emissions and thus used the SMOKE setting WKDAY_NORMALIZE to convert the data to a seven-day average. We configured SMOKE to compute PMC during the

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processing as (PM₁₀ - PM_{2.5}). Usually the records with dust do not include any other pollutants such as VOC, and NO_x. For the few records that did include pollutants other than the PM we

split the records where the PMs processed with dust and the non PMs processed with the area. We configured SMOKE to create MWSS temporal intermediates rather than daily temporal files because the dust sources do not use weekly temporal profiles that vary across the weekdays.

As noted above, we used SMOKE to apply near-source transport factors to the raw fugitive and road dust inventories to prepare them for input to the air quality models. We used U.S. transport factors from work done by Pace (2005) and a 2001 land use/land cover database to develop a SMOKE input file of county and SCC-based transport factors for the U.S., Canada, and Mexico. We applied these factors to create a new set of inventories adjusted for these transport factors for all regions except VISTAS; the VISTAS dust sources that we received already had the transport factors applied to them.

We calculated the windblown dust emissions outside of SMOKE using an internally developed, process-based model. By “process-based” we refer to an emissions model that integrates information about the processes that lead to the emissions of interest, in this case windblown dust. The process-based windblown dust model developed by the WRAP considers wind speeds, precipitation history, and soil types to derive gridded dust fluxes resulting from wind disturbances for the modeling domain. More information on this model, its modes of operation, and the configuration used for simulation Base02a are available in Mansell et al. (2005).

To QA the fire emissions, we used the procedures in the CENRAP emissions modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for Base02f emissions. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at http://pah.cert.ucr.edu/aqm/cenrap/qa_base02f36.shtml#fd for fugitive dust, http://pah.cert.ucr.edu/aqm/cenrap/qa_base02f36.shtml#rd for road dust, and http://pah.cert.ucr.edu/aqm/cenrap/qa_base02b36.shtml#wbd for windblown dust.

2.8.3 Uncertainties and Recommendations

There are several improvements that should be made to the dust emissions modeling in future simulations. We will expand the list of fugitive dust SCCs that we extract from the stationary-area-source inventories for application of transport factors. This expanded list is based on recent work by EPA (2004b). We will also explore improvements to the assumptions that we used for generating emissions with the WRAP windblown dust model. Areas of improvement in the windblown dust model include refinements to the land use data and soil characteristics, additional information about agricultural activities in the WRAP and CENRAP regions, detailed model evaluation on targeted windblown dust case studies, and the application of snow-cover and vegetative transport factors to these emissions (Mansell et al., 2005).

2.9 Ammonia Emissions

Ammonia (NH₃) emissions from agricultural activities are a major source of ammonia and are dependent on many different environmental parameters, such as meteorology, crop and soil

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types, and land use. CENRAP developed NH₃ emissions for the CENRAP states (Pechan and CEP, 2005e). Ammonia emissions were estimated for 13 source categories using the Carnegie Mellon University (CMU) model and supplemental technical work; 80% of technical work was dedicated to improving emissions estimates for two source categories—livestock production and fertilizer use. For these two categories, as well as biogenic sources, improvements were made to the activity data and/or emission factors used by the CMU model. For four other source categories (industrial point sources, landfills, ammonia refrigeration, and non-road mobile sources), emissions estimates were prepared independently of the CMU model, and for the remaining six source categories (publicly owned treatment works, wildfires, domestic animals, wild animals, human respiration, and on-road mobile sources), emissions estimates were derived by running the CMU model with no alterations.

CENRAP NH₃ model emissions estimates were combined with data provided by the other RPOs to represent agricultural NH₃ emissions in simulations Typ02G and Base18G.

2.9.1 Data Sources

The WRAP provided NH₃ emissions using the WRAP NH₃ model (Mansell et al, 2005) that generated emissions for the following sectors: domestic sources, wild animals, fertilizers, soils, and livestock. MWRPO provided monthly IDA-formatted inventories reflective of base K to CENRAP that they produced from process-based models of their own, along with temporal profiles and spatial cross-reference information for these sources. Iowa elected to use the MWRPO estimates of NH₃ emissions for fertilizer application, livestock, and wastewater treatment or SCC 28017XXXXX, 28050XXXXX, and 2630020000 respectively. Minnesota reviewed the MWRPO inventory and chose to move forward with the CENRAP developed data set. The rest of the U.S., Canada, and Mexico had agricultural NH₃ emissions contained within their annual stationary-area-source inventories.

2.9.2 Emissions Processing

The WRAP NH₃ emissions were processed outside of SMOKE using the WRAP NH₃ model and provided to CENRAP as gridded, hourly emissions in network common data form (NetCDF) files. CENRAP and MWRPO provided monthly IDA-formatted, county-level NH₃ inventories that were developed separately with process-based models. We modeled these emissions like area sources with SMOKE, applying the temporal profiles and the spatial cross-referencing developed for CENRAP that we received from the MWRPO. The agricultural NH₃ emissions for the rest of the RPOs, Canada, and Mexico are contained within their stationary-area inventories. We applied the SMOKE default temporal profiles and spatial surrogates to all non-process-based NH₃ emissions.

To QA the NH₃ emissions, we used the procedures in the CENRAP modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulations Typ02G and Base18G. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at <http://pah.cert.ucr.edu/aqm/cenrap/index.shtml>

2.9.3 Uncertainties and Recommendations

Like the other emissions categories that have traditionally been represented as stationary area sources, the agricultural NH₃ emissions sector is affected by interregional inconsistencies in the way these emissions are represented.

During the QA of the Base02a emissions, the WRAP discovered a problem with their soil NH₃ estimates. The emission factor for soil NH₃ that were used in developing these data produced too high an emission estimate from this sector. For simulations Base02B through Typ02G, we therefore removed the soil NH₃ sector completely from the WRAP domain. In future simulations we will include these emissions with a revised emission factor for NH₃ emissions from soils.

2.10 Oil and Gas Emissions

Emissions from oil and gas development activities have been poorly characterized in the past. Simulations These emissions have been sporadically reported by some states in their stationary-area-source inventories, but for the most part were missing from our preliminary modeling. In the Typ02G and Base18G simulations, significant effort was made to better represent oil and gas production emissions explicitly as both area and point sources.

2.10.1 Data Sources

Emissions from oil and gas production activities for the CENRAP states were included with the other CENRAP state emission source categories (Pechan and CEP, 2005e). We received oil and gas production emissions inventories for the WRAP states and for tribal lands in the WRAP region as stationary-area-source and stationary-point-source IDA-formatted inventories. ERG, Inc. provided the point-source inventories with the rest of the stationary-point data (ERG, 2006a). ENVIRON provided the area-source oil and gas inventories for non-CA WRAP states and for tribal lands in the WRAP region, along with spatial surrogates for allocating these data to the model grid (Russell and Pollack. 2005). Oil and gas production emissions data for outside of the WRAP region are contained in the stationary-area inventories.

2.10.2 Emissions Processing

We modeled the WRAP point-source oil and gas production emissions in combination with the rest of the stationary-point-source emissions. We modeled the WRAP area-source oil and gas production emissions explicitly as a separate category that included WRAP and tribal inventories. These data represent weekly average emissions and did not require any renormalization within SMOKE. We used spatial surrogates generated by ENVIRON to allocate these annual county-level emissions to the model grid. For all oil and gas emissions, we applied flat temporal profiles to create hourly inputs to CMAQ and CAMx.

2.10.3 Uncertainties and Recommendations

In future 2002 modeling California oil and gas production emissions should be replaced with revised data provided by the California Air Resources Board (CARB). In addition, WRAP has

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updated their oil and gas production inventory for the base and future years in a Phase II work effort that substantially improved the emissions inventory estimates (Bar-Ilan et al., 2007).

2.11 MMS Off-shore Gulf of Mexico Emissions

Offshore area point source emissions include emissions in the Gulf of Mexico and off the coast of California that are associated with oil and gas drilling platforms.

2.11.1 Data Sources

We obtained year 2000 IDA-formatted point-source inventories for oil and gas platforms in the Gulf of Mexico from the Minerals Management Service (MMS) web site:

http://www.gomr.mms.gov/homepg/regulate/environ/airquality/gulfwide_emission_inventory/2000GulfwideEmissionInventory.html

We combined these with point-source data for coastal California provided to us by CARB during the preliminary 2002 modeling. We also obtained gridded area source emissions for platforms in the Gulf of Mexico from the MMS that we converted to the CENRAP 36-km model grid.

The 2000 MMS Gulf wide Emission Inventory was updated as of June 2006 to account for a change in vessel emissions in the non-point source (non-platform) database file. The point source (platform) emission inventory database file has not changed from the original version. Area source emissions from offshore activities in the Gulf of Mexico were developed from the latest estimates provided by the Minerals Management Service (MMS). The MMS inventory includes both platform and non-platform sources. The non-platform area source emissions estimates are spatially allocated to lease blocks and protraction units throughout the Gulf of Mexico. Temporal and spatial allocation cross-reference data were developed from the MMS inventory data and formatted for input to the SMOKE emissions model by Carolina Environmental Programs. These data were provided to the CENRAP emissions modeling team for implementation within SMOKE. The spatial allocation surrogates were provided for 4-km grid cells. The UCR team used these surrogates and developed surrogates for 36-km grid cells. Because these data are references to lease blocks/protraction units, rather than counties, this source category was processed separately from all other emissions using a customized reference data and SMOKE run scripts.

We modeled the offshore point and area sources as separate categories in the simulations. We used SMOKE to locate the offshore point sources on the model grid and to vertically allocate them into 15 model layers.

To QA the offshore platform emissions, we used the procedures in the CENRAP modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 20042) and a suite of graphical summaries. We used tabulated summaries of the input data and SMOKE script settings to document the data and configuration of SMOKE for simulation Base02a. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at <http://pah.cert.ucr.edu/aqm/cenrap/index.shtml> for the point and area sources.

2.11.2 Uncertainties and Recommendations

While the MMS data that we used were an improvement over previously modeled Gulf of Mexico platform inventories, the data were developed for a different modeling application that covered only the extreme northwestern portion of the Gulf, so they are missing large areas of the region of the Gulf that contain drilling platforms. The California offshore inventory represents an initial attempt at compiling an emission inventory for this area and contains very few sources. Future simulations will focus on improving these emissions by expanding the coverage of the offshore platform inventories for both the Gulf of Mexico and the Pacific Coast.

2.12 Off-shore Shipping Emissions

Emission inventory development for regional- and continental-scale air quality modeling has historically neglected offshore emissions sources beyond 25 miles offshore. Concern over the environmental effects of commercial shipping emissions in the Pacific on the coastal states in the WRAP region led to the development of a commercial marine shipping inventory for the Pacific. This inventory of off-shore marine vessels emissions made a substantial difference in some of the coastal western PM estimates (e.g., SO₄). VISTAS developed an off-shore marine vessels inventory for the entire modeling domain that included the Pacific and Atlantic Oceans and the Gulf Of Mexico. For Typ02G and Base18G emission inventories CENRAP adopted the offshore shipping inventories developed by VISTAS.

2.12.1 Data Sources

Initially we obtained gridded annual commercial marine shipping emissions for the Pacific on the 36-km model grid from WRAP for inclusion in CENRAP simulations in the Base F modeling (Pollack et al., 2006). The commercial marine inventory contains all of the criteria pollutants contained in the non-road mobile-source inventory: CO, NO_x, VOC, NH₃, SO₂, PM₁₀, and PM_{2.5}. This inventory was subsequently updated in the Typ02G and Base18G modeling with the VISTAS off-shore commercial marine emissions inventory that covered the Gulf of Mexico and the Atlantic and Pacific Oceans and was based on the EPA/ARB SO_x Emissions Control Area (SECA) program. Dr. James Corbett (University of Delaware) analyzed off-shore marine vessel data and worked with ENVIRON/ICF to convert to gridded emissions for the SECA grid. ENVIRON then provided SO₂, NO_x, PM and VOC emissions for the RPO 36-km grid.

2.12.2 Emissions Processing

The commercial marine shipping inventory was not processed through SMOKE. VISTAS provided the data to the as gridded text files on the 36-km model grid. These data were reformatted to the NetCDF CMAQ input format with a utility developed by UCR. The VOC inventory was converted to CB-IV speciation and the NO_x and PM_{2.5} inventory pollutants to CMAQ input species with SMOKE chemical profiles for commercial shipping sources. No temporal adjustments were applied to these emissions; they use uniform monthly, daily, and diurnal profiles. An SCC for commercial marine vessels within the MMS inventory (SCC CM80002200) was accounted for in the commercial marine inventory developed for VISTAS. The duplicate emissions were removed from the MMS inventory prior to processing emissions

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for Base G simulations. The duplicated emissions amounted to 19,000 TPY of NO_x and 3,184 TPY of SO₂. For simulation Typ02G and Base18G we received binary netCDF file from ENVIRON for one day and that day was used for every day of the year.

To QA the commercial marine shipping emissions, we used the procedures in the CENRAP modeling QAPP (Morris and Tonnesen, 2004) and Modeling Protocol (Morris et al., 2004a) and a suite of graphical summaries. The graphical QA summaries include, for all emissions output species, daily spatial plots, daily time-series plots, and annual time-series plots. These QA graphics are available at <http://pah.cert.ucr.edu/aqm/cenrap/index.shtml>.

2.12.3 Uncertainties and Recommendations

As a first attempt at representing shipping emissions in the Pacific in international waters, the WRAP and VISTAS 2002 commercial shipping inventory is a breakthrough in a historically neglected emissions category. As the RPOs evaluate the effects of these emissions on the air quality modeling, we anticipate that there will be refinements to the temporal profiles and to the vertical allocation of the emissions. Many of the stacks of large commercial ships contained in this inventory extend vertically above the first model layer. Future versions of this inventory should use higher-resolution temporal adjustments and should allocate the emissions to the appropriate model layers. Off-shore marine shipping activity is projected to increase. However, there are also the potential for emission controls on this source category (e.g., SECA program). Given these two off setting activities, the 2002 off-shore marine shipping emissions were assumed to be unchanged going from 2002 to 2018. Better estimates of 2018 marine emissions are being developed that should be considered in future modeling activities.

2.13 2018 Growth and Control

Base18G was based on grown inventories assuming on-the-books control strategies. CENRAP contracted with Pechan to deliver growth and control data for CENRAP and to consolidate growth and control information for other RPOs where available (Pechan, 2005d). The data are applicable to all source categories and pollutants included in the CENRAP 2002 emission inventory. This includes the following pollutants: sulfur oxides (SO_x), oxides of nitrogen (NO_x), volatile organic compounds (VOC), carbon monoxide (CO), ammonia (NH₃), and primary PM₁₀ and PM_{2.5}. Some source categories were held constant between 2002 and 2018 because either stagnant growth was deemed appropriate or insufficient data was available to adequately project future growth or controls. These source categories include the following:

- Wind Blown Dust from non-agricultural land use categories.
- Emissions from wildfires.
- Emissions from Mexico.
- Global transport sources (i.e., the 2002 GEOS-CHEM boundary conditions).

2.13.1 Data Sources

CENRAP contracted with Pechan to provide growth and control factors to be applied with SMOKE for the CENRAP region (Pechan, 2005d). These growth and control parameters were based on growth estimates derived from EGAS 5.0 and control estimates assumed for

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implementation of federal regulations and on-the-books state and local control programs. Emissions projections for electric generating units were developed for the RPOs with the Integrated Planning Model (IPM). The RPO 2.1.9 IPM results were subsequently modified by VISTAS, MRPO and CENRAP to reflect planned new construction and controls. The WRAP provided 2018 EGU estimates developed in coordination with State and Industry stakeholders. VISTAS, MWRPO and the WRAP provided emissions for 2018, having applied growth and control factors outside of SMOKE processing. EPA provided SMOKE processed emissions, applying both growth and controls, for Canada for the year 2020. These emissions were provided on the RPO 36-km grid. However, emissions were inexplicably processed for an alternative vertical structure. Alpine Geophysics, under contract to VISTAS reallocated the emissions through the vertical layers to more accurately reflect the vertical structure applied uniformly by the RPOs. The modified data was obtained directly from Alpine Geophysics. Emissions from Mexico were held constant between the inventory year 1999 and modeled 2002 and 2018. Improvements to the Mexican inventory have been continuously made between generation of the original BRAVO inventory and the present improved 1999 inventory. However, given the continued uncertainties in the improved inventory, no future year projections were attempted by CENRAP.

2.13.2 Emissions Processing

Growth and control factors developed by Pechan (2005d) for Arkansas did not match the final delivered inventory for Arkansas. Arkansas underwent major revisions to point and facility IDs in mid-2005. These updates were not available by the delivery date of the growth and control parameters. In coordination with Arkansas, a cross-walk was developed to correct the point and facility IDs.

The assumptions that went into the development of controls for engines covered under the RICE MACT were not consistent with the final rule. Rule penetration values for CENRAP states were adjusted to more accurately reflect the impact of the final rule.

The impact of the refinery global settlements was not incorporated into CENRAP modeling until the base G simulations. Control assumptions provided by EPA and referenced in EPA CAIR modeling were applied to the 2018 inventory. These reductions primarily impacted SO₂ emissions; however, NO_x reductions were applied in Oklahoma, Louisiana, and Minnesota.

2.13.3 Uncertainties and Recommendations

The impact of control programs is an area of uncertainty that will need continued review as the programs are implemented. Development of growth and control assumptions for Mexico will be necessary for continued refinement of the impact of international transport. CENRAP obtained estimates of increased prescribed burn activity for the Forest Service after processing of the base G simulations was underway. These estimates of increased activity should be reviewed for inclusion in future simulations. EPA developed 2020 estimates of Canadian emissions are assumed to include erroneous stack parameters previously addressed in the 2000 emissions processing. Further review of this data set is recommended.

2.14 2018 Base G C1 Control Sensitivity

CENRAP conducted a control sensitivity evaluating the impact of point source reductions given a maximum dollar per ton control level. The intent of the control sensitivity was to generate information on the impact of possible control strategies in support of the consultation process. The strategies were grouped together under a common set of criteria and not specifically identified by the states. The results of the modeling were not intended to be prescriptive; instead, they were intended to be a starting point for control discussions that would require much greater refinement.

2.14.1 Data Sources

CENRAP contracted with Alpine Geophysics to provide an evaluation of possible additional controls for the 2018 CENRAP point source inventory. These controls were in addition to on-the-books and BART controls assumed in the development of Base18F and Base18G emission scenarios. Base18F IDA files were enhanced with additional information on base level controls. The enhanced dataset was then linked with the control data contained in the 2006 release of EPA's AirControlNet software. Alpine developed cost curves for NO_x and SO₂ in 2005 dollars for the Base18F CENRAP point source inventory. Staff from Iowa DNR and Kansas DHE worked in conjunction to add area of influence data (Alpine Geophysics, 2006) and distance calculations to each Class I area in CENRAP. A variety of dollar per ton control levels were evaluated. CENRAP elected to base the sensitivity on a maximum control cost of \$5,000 per ton. This selection was made with the understanding that the cost data under-represented the true cost of retrofit controls and did not take in to consideration more recent market fluctuations impacting costs of controls and construction. CENRAP refined the selection by applying controls to only those sources that met the criteria that the ratio of their emissions in tons per year to their distance to any Class I area in kilometers be less than 5. This distance weighting criteria allowed the sensitivity to focus on those sources with the greatest impact. Additional controls for other RPOs were not considered in this evaluation.

2.14.2 Emissions Processing

Sources considered for control were removed from the IDA files. Growth and control assumptions were applied outside of SMOKE and delivered to UCR as 2018 emissions. Stack parameter changes as a result of additional controls were not considered in this analysis.

2.14.3 Uncertainties and Recommendations

Given uncertainties in control costs more refined analyses should include an evaluation of retrofit control costs under present values.

2.15 Emissions Summaries

Appendix B provides details on the source of the emission files used in the CENRAP Typ02G and Base18G modeling. Also in Appendix B are sample emission summary plots, additional plots are available on the CENREAP modeling website:

<http://pah.cert.ucr.edu/aqm/cenrap/emissions.shtml>.

CENRAP has contracted with E.H. Pechan and Associates to provide emissions summaries used in the final Typ02G and Base18G modeling in Excel spreadsheets and in an Access database that are available on the CENRAP website (<http://www.cenrap.org/projects.asp#>). Figures 2-3 through 2-9 display the, respectively, SO₂, NO_x, VOC, PM_{2.5}, PM₁₀, NH₃ and CO anthropogenic emissions for the CENRAP states and the Typ02G and Base18G emission scenarios. Emissions are broken down by major source sector. For the state of Texas the emissions are broken by three groups, northeast Texas, southeast Texas and remainder of Texas (west Texas).

For most states, EGUs are the largest contributor to SO₂ emissions (Figure 2-3). As EGU SO₂ emissions are generally projected to be reduced in the future, most states show a reduction in total SO₂ emissions from 2002 to 2018. One exception to this is Louisiana for which non-EGU point source SO₂ emissions are greater than for EGU and are projected to increase from 2002 to 2018. The reasons for these increases are unclear, but the growth factors for non-EGU points should be examined more carefully.

NO_x emissions are fairly evenly distributed across non-EGU point, EGU point, non-road mobile, on-road mobile and area sources for the 2002 Typ02G emissions scenario (Figure 2-4). In 2018, the contributions of on-road mobile source NO_x emissions is reduced dramatically, with some states also showing reductions in EGU NO_x emissions as well, resulting in all states exhibiting lower NO_x emissions in 2018 than 2002.

VOC emissions are dominated by area, non-road mobile, on-road mobile and non-EGU point sources in both 2002 and 2018 (Figure 2-5). VOC emissions from on-road and non-road mobile source are projected to go down in the future, whereas VOC emissions from non-EGU point and, especially, area sources are projected to increase. Thus, whether a state's total VOC emissions increase or decrease depends on the relative contributions of mobile versus area sources and the level of increase in area source VOC emissions. Note that the VOC emissions listed in Figure 2-5 do not include biogenic VOC emissions that would be greater than the anthropogenic VOC emissions shown in Figure 2-5. Note that because biogenic VOC emissions are processed using the SMOKE/BEIS module on the 36 km grid, state-wide biogenic VOC emissions summaries are not readily available.

Primary PM_{2.5} emissions are primarily from road dust and fugitive dust, and for some states fires (Figure 2-6). Kansas, Oklahoma, Louisiana and Texas all have large contributions from fires not seen in the other states. Road dust and fugitive dust are the most dominate source categories for coarse particulate as well (Figure 2-7).

CENRAP developed a separate ammonia emissions for 13 categories using the CMU model including livestock and fertilizer that dominates the ammonia emissions across the CENRAP

states (Figure 2-8). Several states also have significant ammonia contributions from non-EGU point sources, whereas others do not.

CO emissions are dominated by the on-road and non-road mobile source sectors (Figure 2-9). However, states with fires also see large CO contributions from them as well. On-road mobile source CO emissions are projected to go down substantially from 2002 to 2018, whereas the other source categories are flat.

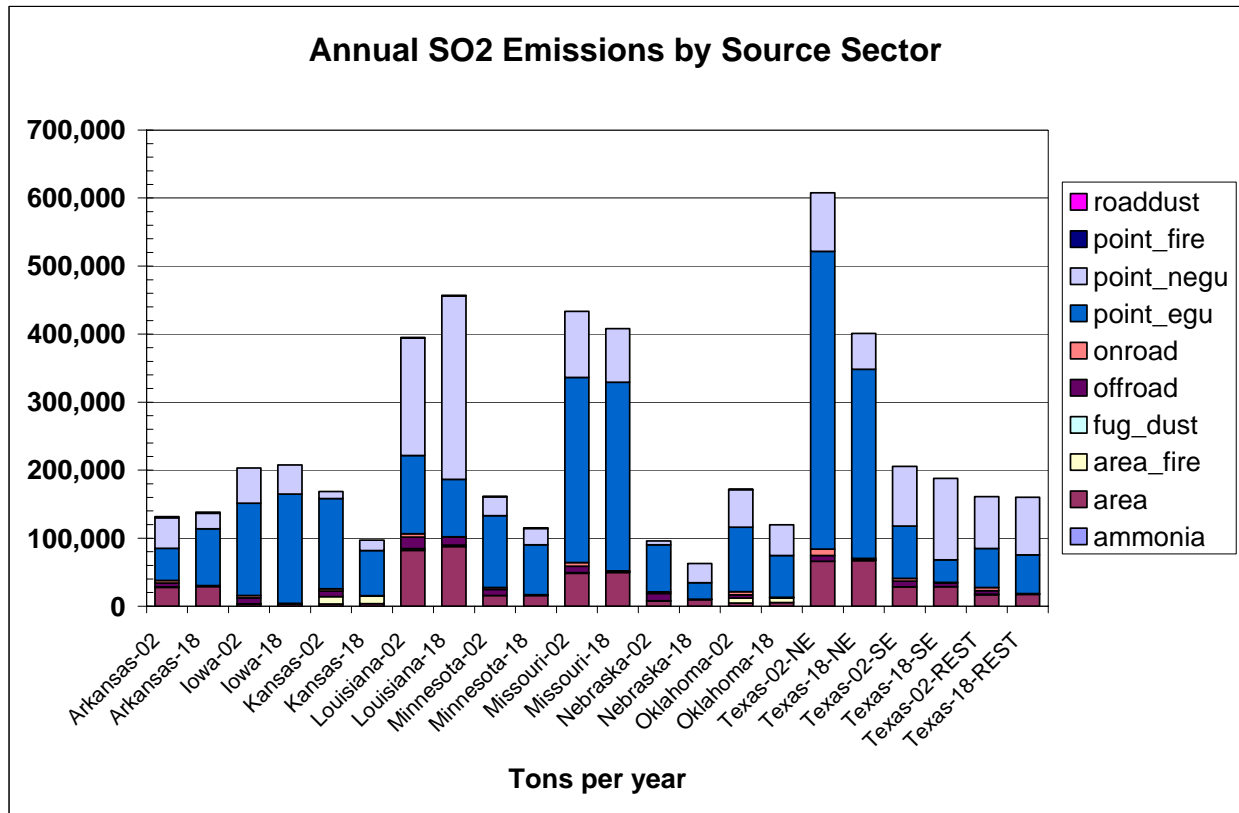


Figure 2-3. Summary of Typ02G and Base18G SO2 emissions by CENRAP state and major source sector (tons per year).

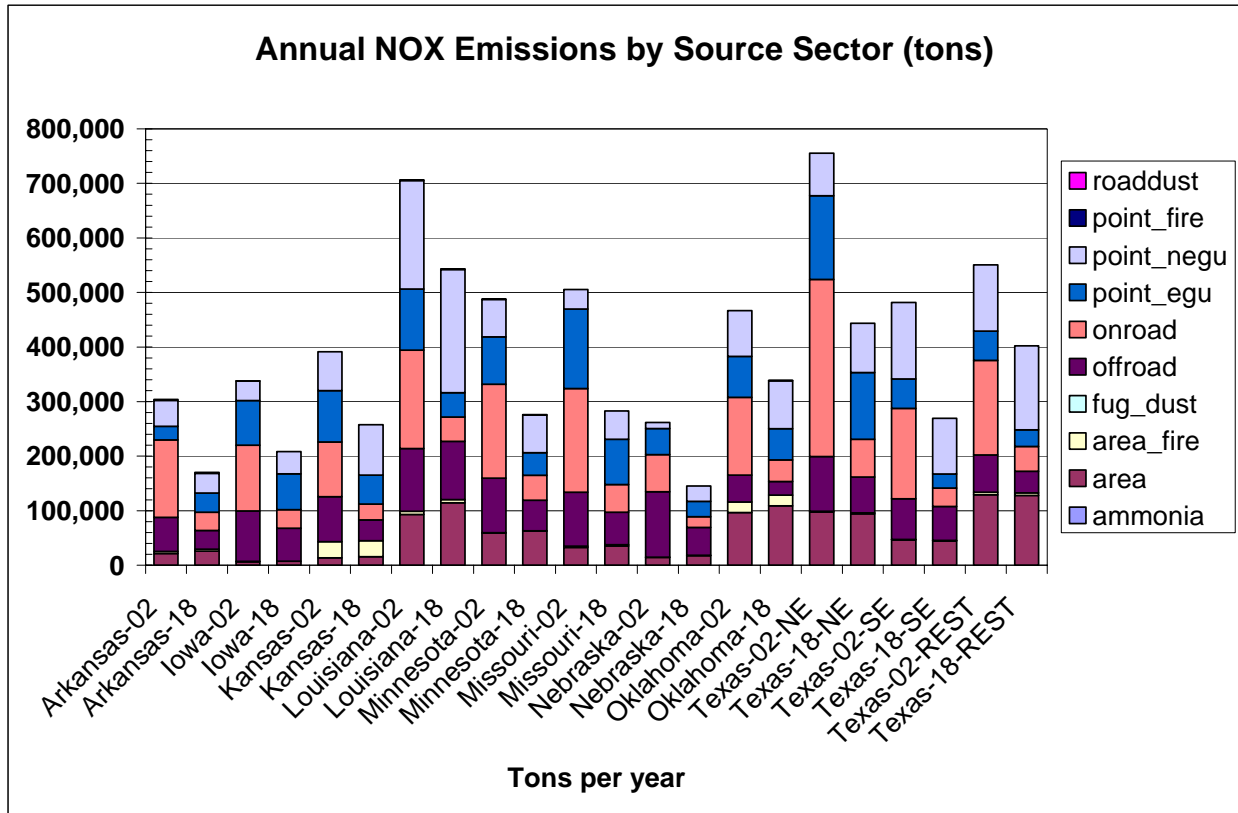


Figure 2-4. Summary of Typ02G and Base18G NOx emissions by CENRAP state and major source sector (tons per year).

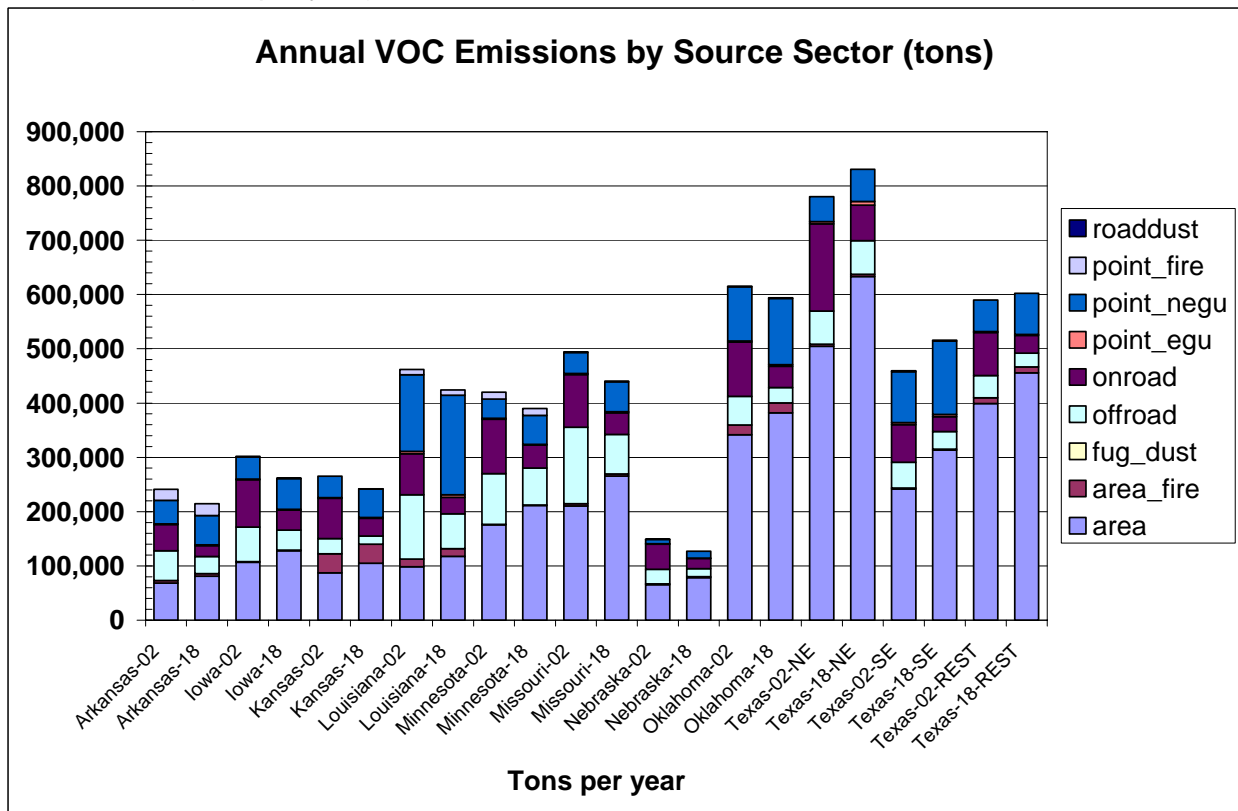


Figure 2-5. Summary of Typ02G and Base18G VOC emissions by CENRAP state and major source sector (tons per year).

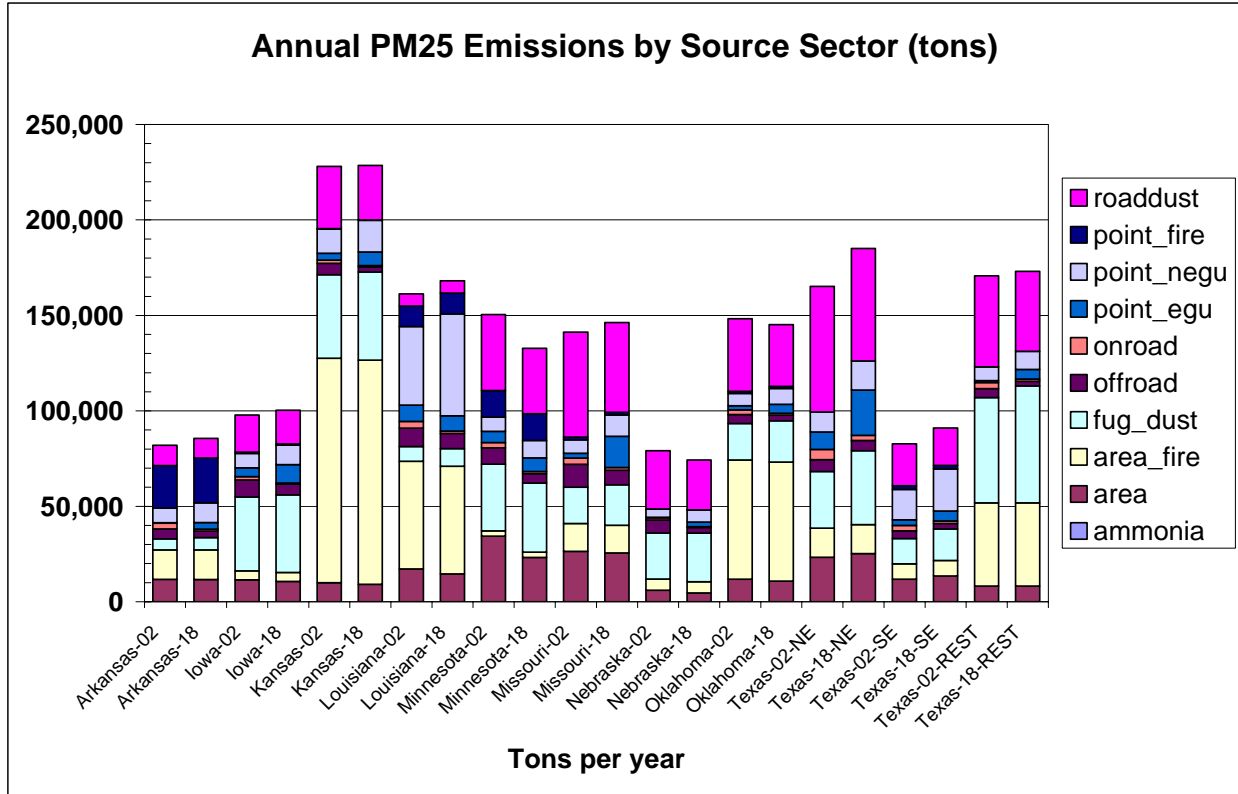


Figure 2-6. Summary of Typ02G and Base18G PM2.5 emissions by CENRAP state and major source sector (tons per year).

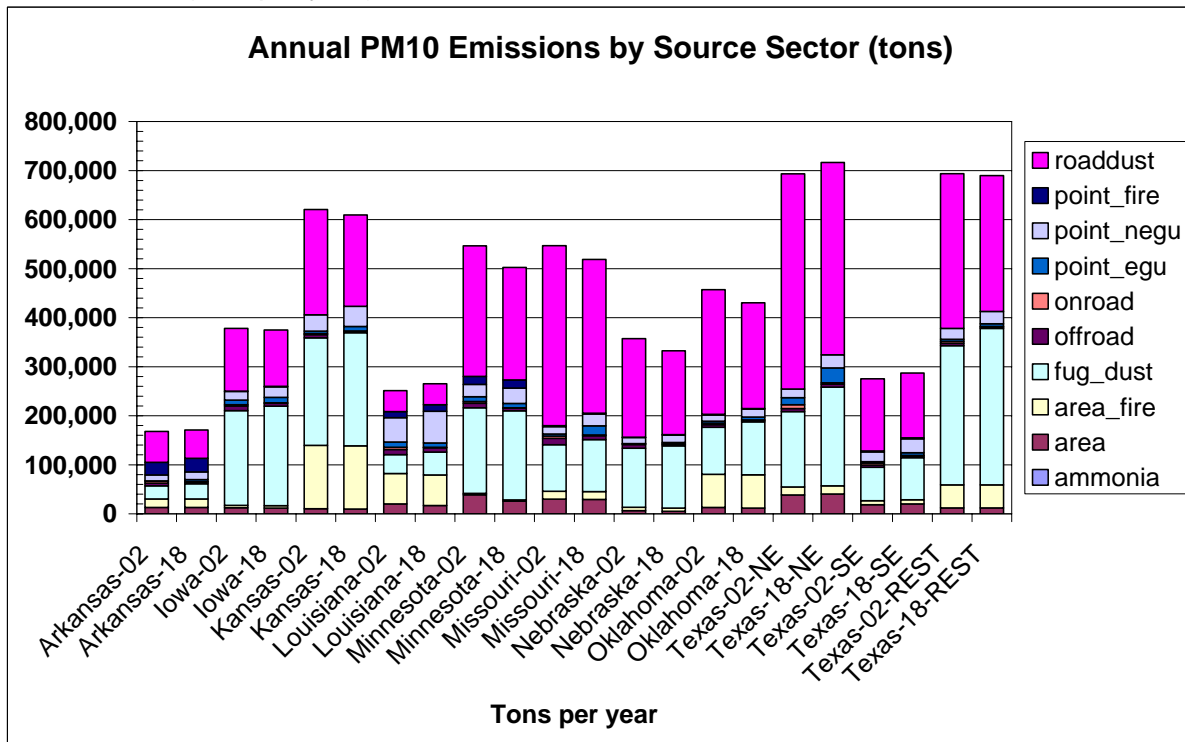


Figure 2-7. Summary of Typ02G and Base18G PM10 emissions by CENRAP state and major source sector (tons per year).

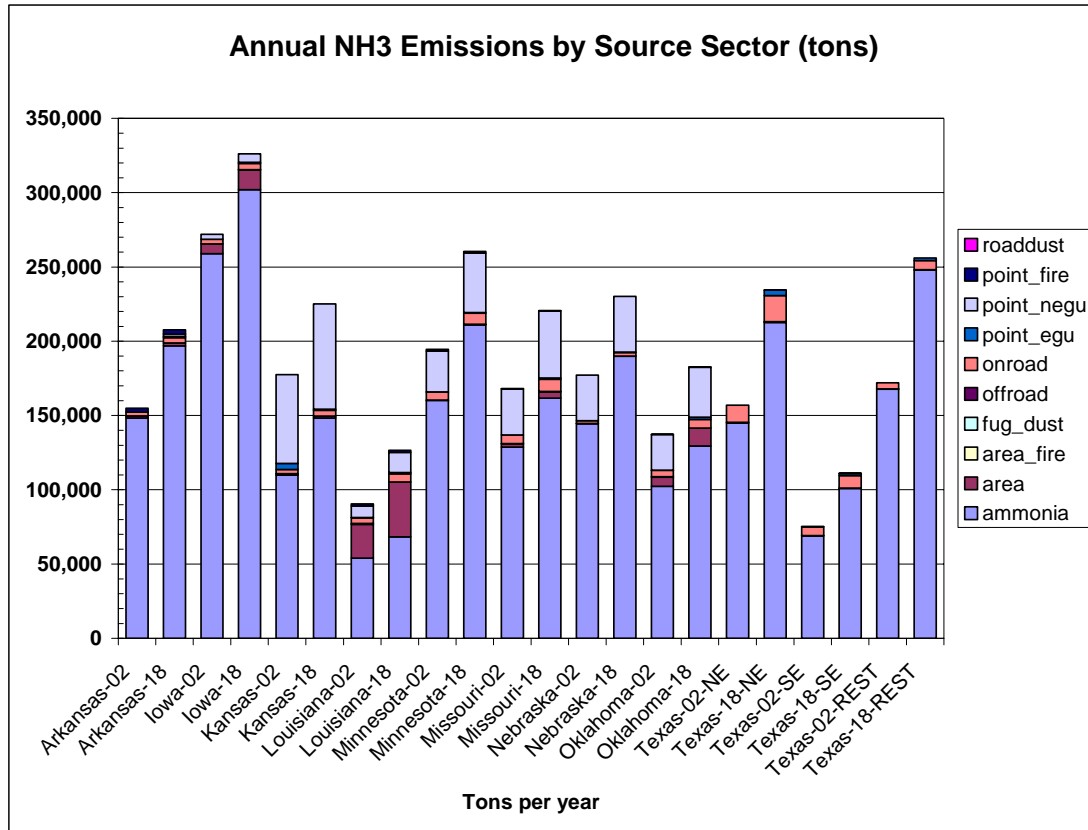


Figure 2-8. Summary of Typ02G and Base18G NH3 emissions by CENRAP state and major source sector (tons per year).

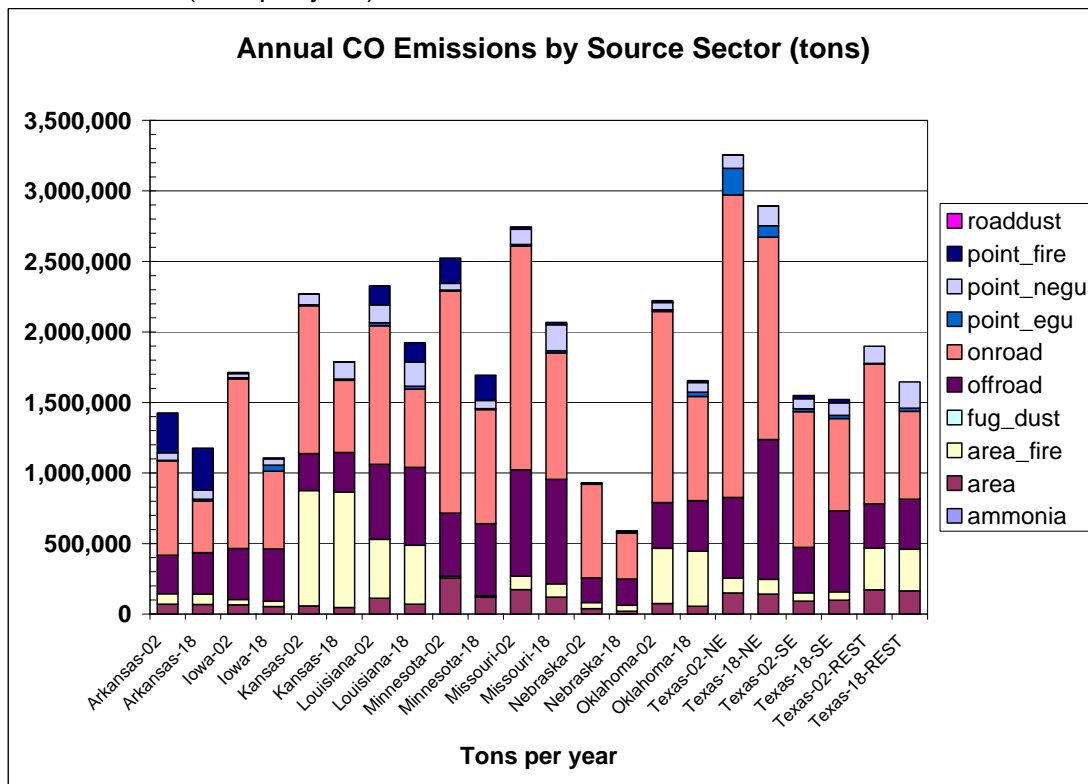


Figure 2-9. Summary of Typ02G and Base18G CO emissions by CENRAP state and major source sector (tons per year).

3.0 MODEL PERFORMANCE EVALUATION

In this Chapter we summarize the CMAQ model performance for the final 2002 36 km Base F base case simulation. Because the 2002 Base F CMAQ simulation produced nearly identical results in the U.S. as the final 2002 Base G simulation and limited resource availability, CENRAP elected not to redo the model evaluation for the 2002 Base G case. This model performance focuses on the ability of the model to predict PM species within the CENRAP region. Details on the model performance are provided in Appendix C. Previously we have documented model performance of interim versions of model base case simulations in reports (Morris et al., 2005) and presentations to the CENRAP Work Groups and POG (e.g., Morris et al., 2006a,b).

3.1 Evaluation Methodology

EPA's integrated ozone, PM_{2.5} and regional haze modeling guidance calls for a comprehensive, multi-layered approach to model performance testing, consisting of the four major components: operational, diagnostic, mechanistic (or scientific) and probabilistic (EPA, 2007). The CMAQ model performance evaluation effort focused on the first two components, namely:

- **Operational Evaluation:** Tests the ability of the model to estimate PM concentrations (both fine and coarse) and the components at PM₁₀ and PM_{2.5} including the quantities used to characterize visibility (i.e., sulfate, nitrate, ammonium, organic carbon, elemental carbon, other PM_{2.5}, and coarse matter (PM_{2.5-10})). This evaluation examines whether the measurements are properly represented by the model predictions but does not necessarily ensure that the model is getting “the right answer for the right reason”; and
- **Diagnostic Evaluation:** Tests the ability of the model to predict visibility and extinction, PM chemical composition including PM precursors (e.g., SO_x, NO_x, and NH₃) and associated oxidants (e.g., ozone and nitric acid); PM size distribution; temporal variation; spatial variation; mass fluxes; and components of light extinction (i.e., scattering and absorption).

In this final model performance evaluation for the 2002 Typical Base F CMAQ simulation, the operational evaluation has been given the greatest attention since this is the primary thrust of EPA's modeling guidance. However, we have also examined certain diagnostic features dealing with the model's ability to simulate sub-regional, monthly, diurnal, gas phase and aerosol concentration distributions. In the course of the CENRAP air quality modeling and other modeling processes, numerous diagnostic sensitivity tests were performed to investigate and improve model performance. Key diagnostic tests that were performed and the results are discussed on the CENRAP modeling website: <http://pah.cert.ucr.edu/aqm/cenrap/index.shtml>.

3.2 Ambient Air Quality Data used in the Evaluation

The ground-level model evaluation database for 2002 was compiled by the modeling team using several routine and research-grade databases. The first is the routine gas-phase concentration measurements for ozone, SO₂, NO₂ and CO archived in EPA's Aerometric Information Retrieval System (AIRS) Air Quality System (AQS) database. Other sources of observed information come from the various PM monitoring networks in the U.S. These include the Interagency Monitoring of Protected Visual Environments (IMPROVE); Clean Air Status and Trends Network (CASTNET); EPA Speciation Trends Network (STN) of PM_{2.5} species; and National Acid Deposition Program (NADP). During the course of the CENRAP modeling, the numerous base case simulations were evaluated across the continental U.S. (e.g., Morris et al., 2005). In this section and in Appendix C we focus our evaluation on model performance within the CENRAP region.

3.2 Operational Model Evaluation Approach

The CENRAP modeling databases will be used to develop the visibility State Implementation Plan (SIP) as required by the Regional Haze Rule (RHR). Accordingly, the primary focus of the operational evaluation in this report is on the six components of fine particulate (PM_{2.5}) and coarse mass (PM_{2.5-10}) within the CENRAP region that are used to characterize visibility at Class I areas:

- Sulfate (SO₄);
- Particulate Nitrate (NO₃);
- Elemental Carbon (EC);
- Organic Mass Carbon (OMC);
- Other inorganic fine particulate (IP or Soil); and
- Coarse Mass (CM).

The model performance for ozone, precursors, and product species (e.g., SO₄, NO₃, NH₄ and HNO₃) is also evaluated to build confidence that the modeling system is sufficiently reliable to project future-year visibility.

3.3 Model Performance Goals and Criteria

The issue of model performance goals for PM species is an area of ongoing research and debate. For ozone modeling, EPA has established performance goals for 1-hour ozone: normalized mean bias and gross error of #±15% and #35%, respectively (EPA, 1991). EPA's draft fine particulate modeling guidance notes that performance goals for ozone should be viewed as upper bounds of model performance that PM models may not be able to always achieve and that we should demand better model performance for PM components that make up a larger fraction of the PM mass than those that are minor contributors (EPA, 2001). EPA's final modeling guidance does not list any specific model performance goals for PM and visibility modeling and instead provides a summary of PM model performance across several historical applications that can be used for comparisons, if desired. Measuring PM species is not as precise as ozone monitoring. In fact, the uncertainty in measurement techniques for some PM species is likely to

exceed the more stringent model performance goals, such as those for ozone. For example, recent comparisons of the PM species measurements using the IMPROVE and STN measurement technologies found uncertainties of approximately $\nabla 20\%$ (SO₄) to $\nabla 50\%$ (EC) (Solomon et al., 2004).

For the CENRAP modeling we have adopted three levels of model performance goals and criteria for bias and gross error as listed in Table 3-1. Note that we are not suggesting that these performance goals be adopted as guidance. Rather, we are just using them to frame and put the PM model performance into context and to facilitate model performance intercomparison across episodes, species, models and sensitivity tests.

Table 3-1. Model performance goals and criteria used to assist in interpreting modeling results.

Fractional Bias	Fractional Gross Error	Comment
# $\nabla 15\%$	# 35%	Ozone model performance goal for which PM model performance would be considered “good” – note that for many PM species measurement uncertainties may exceed this goal.
# $\nabla 30\%$	# 50%	Proposed PM model performance goal that we would hope each PM species could meet
# $\nabla 60\%$	# 75%	Proposed PM criteria above which indicates potential fundamental problems with the modeling system.

As noted in EPA’s PM modeling guidance, less abundant PM species should have less stringent performance goals (EPA, 2001; 2007). Accordingly, we are also using performance goals that are a continuous function of average concentrations, as proposed by Dr. James Boylan at the Georgia Department of Natural Resources (GA DNR), that have the following features (Boylan, 2004):

- Asymptotically approaching proposed performance goals or criteria (i.e., the $\nabla 30\%/50\%$ and $\nabla 60\%/75\%$ bias/error levels listed in Table 3-1) when the mean of the observed concentrations are greater than 2.5 ug/m³.
- Approaching 200% error and $\nabla 200\%$ bias when the mean of the observed concentrations are extremely small.

Bias and error are plotted as a function of average concentrations. As the mean concentration approaches zero, the bias performance goal and criteria flare out to $\nabla 200\%$ creating a horn shape, hence the name “Bugle Plots”. Dr. Boylan has defined three Zones of model performance: Zone 1 meets the $\nabla 30\%/50\%$ bias/error performance goal and is considered “good” model performance; Zone 2 lies between the $\nabla 30\%/50\%$ performance goal and $\nabla 60\%/75\%$ performance criteria and is an area where concern for model performance is raised; and Zone 3 lies above the $\nabla 60\%/75\%$ performance criteria and is an area of questionable model performance.

3.4 Key Measures of Model Performance

Although we have generated numerous statistical performance measures (see Table C-2 in Appendix C) that are available on the CENRAP modeling website, when comparing model performance across months, subdomains, networks, grid resolution, models, studies, etc. it is useful to have a few key measurement statistics to be used to facilitate the comparisons. It is also useful to have a subset of months within the 2002 year that can represent the entire year so that a more focused evaluation can be conducted. We have found that the Mean Fractional Bias and Mean Fractional Gross Error appear to be the most consistent descriptive measure of model performance (Morris et al., 2004b; 2005). The Fractional Bias and Error are normalized by the average of the observed and predicted value (see Table C-2) because it provides descriptive power across different magnitudes of the model and observed concentrations and is bounded by -200% to +200%. This is in contrast to the normalized bias and error (as recommended for ozone performance goals, EPA, 1991) that is normalized by just the observed value so can “blow up” to infinity as the observed value approaches zero. In Appendix C we perform a focused evaluation of model performance for PM and gaseous species and four months of the 2002 year that are used to represent the seasonal variation in performance:

- January
- April
- July
- October

Scatter plots of model predictions and observations for each PM species are presented for each of the four months along with performance statistics and predicted and observed time series plots at each CENRAP Class I area. Summary plots of monthly fractional bias and error are also presented.

3.5 Operational Model Performance Evaluation

A summary of the operational evaluation is presented below. Just the monthly fractional bias performance metrics for each PM species using bar charts and Bugle Plots are presented in this section. The reader is referred to Appendix C for the complete model performance evaluation.

3.5.1 Sulfate (SO₄) Model Performance

Figure 3-1 compares the monthly SO₄ fractional bias across the CENRAP region for the IMPROVE, STN and CASTNet monitoring networks. An underprediction bias is clearly evident the first 8-10 months of the year. This underestimation bias is greatest across the CASTNet network which persists throughout the year. The SO₄ underprediction is not as severe for the STN network and it is minimal by August becoming a slight overprediction in September. For the IMPROVE network, the SO₄ fractional bias is $< \pm 20\%$ for the first 2 and last 3 months of the year and ranges from -30% to -50% for the late Spring and Summer months.

Figure 3-1 also includes a Bugle Plot of monthly SO₄ fractional bias statistics (for Bugle Plot of fractional gross error see Appendix C) and compares them against the proposed PM model

performance goal and criteria (see Table 3-1). For the STN network, SO₄ model performance meets the proposed performance goal for all months. For the IMPROVE network, approximately half of the months achieve the proposed PM performance goal with the other half outside of the goal, but within the performance criteria. Across the CASTNet network, most months are outside of the proposed goal but are within the criteria. The CASTNet fractional bias for some months is right at the performance criteria ($\leq \pm 60\%$). With the exception of two IMPROVE months, the monthly SO₄ fractional bias performance statistics achieve the proposed PM model performance goal.

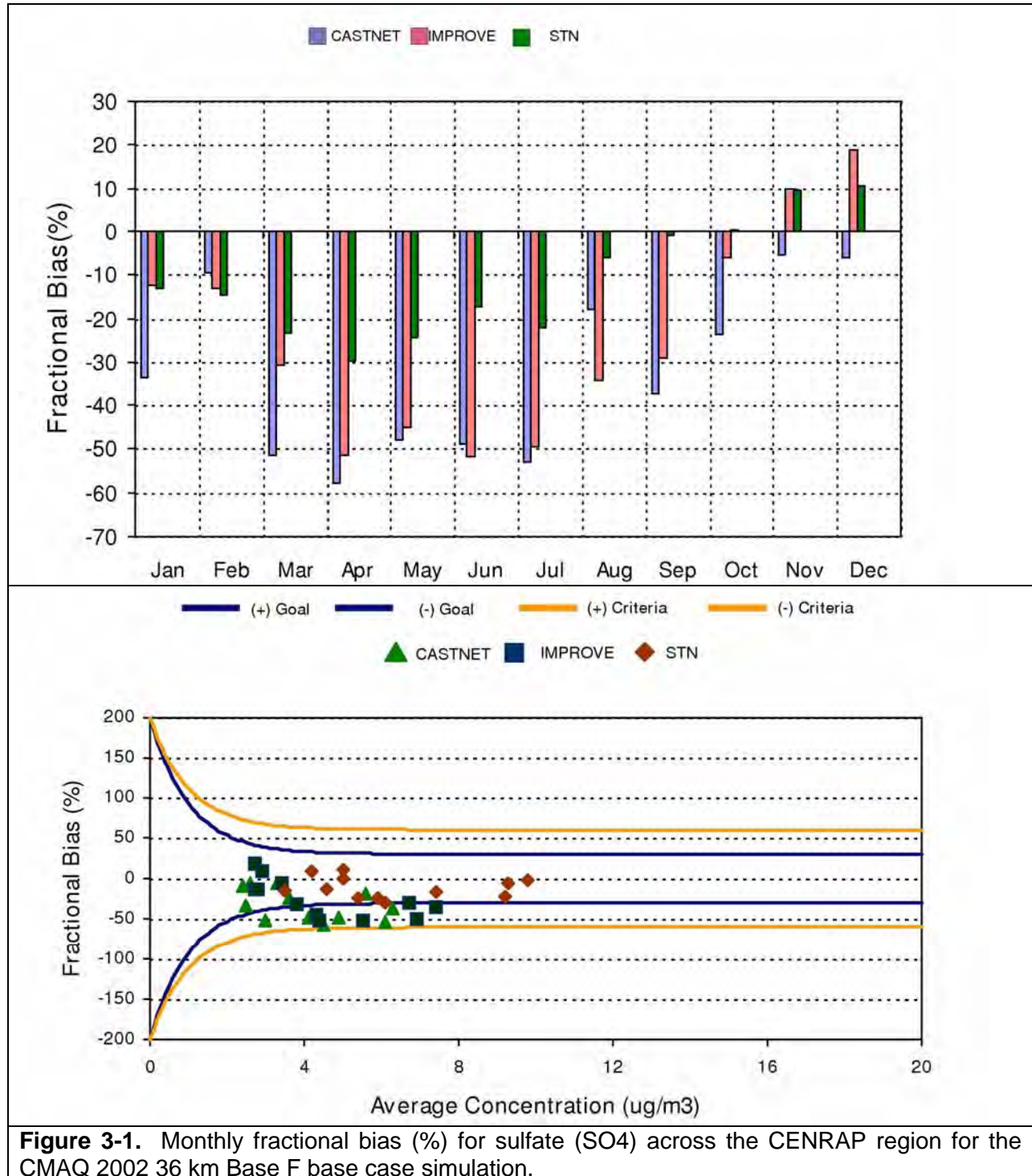
3.5.2 Nitrate (NO₃) Model Performance

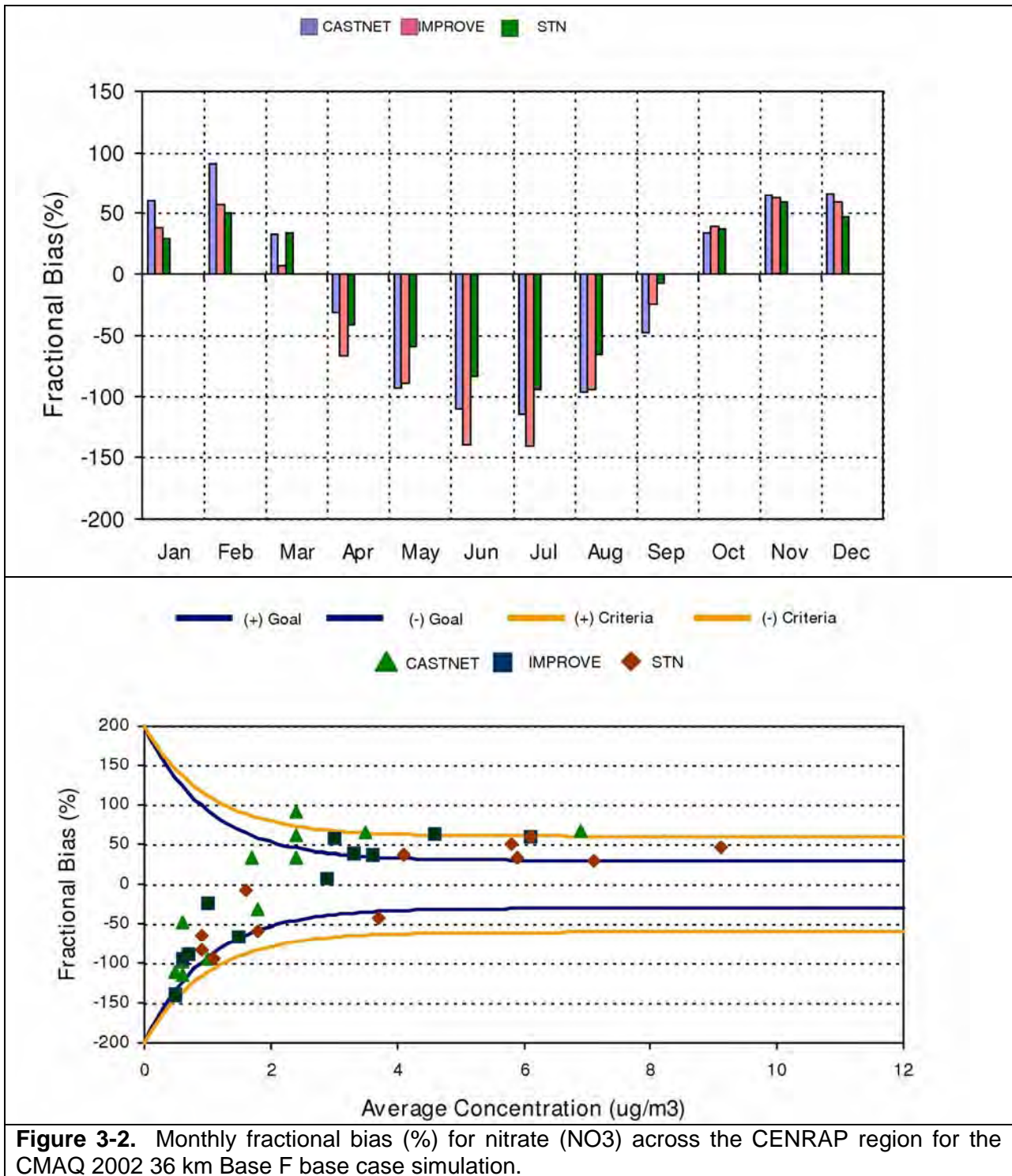
Monthly NO₃ model performance across the CENRAP region is characterized by a summer underestimation and winter overestimation bias (Figure 3-2). The summer underestimation bias is more severe, exceeding -100%. Whereas, the winter overestimation bias is approximately 50%. So based on statistics alone, it appears the summer underestimation bias is a bigger concern than the winter overestimation bias. However, the Bugle Plots in the bottom part of Figure 3-2 show that the summer underestimation bias occurs when NO₃ is very low and is not an important component of PM and visibility impairment. These summer values occur in the flared horn part of the Bugle Plot and the summer NO₃ performance, in most cases, achieves the model performance goal and always achieves the performance criteria. Whereas, the winter overstated NO₃ performance for the most part doesn't meet the performance goal and there are some months/networks that also don't meet the performance criteria.

3.5.3 Organic Matter Carbon (OMC) Model Performance

The OMC monthly fractional bias across IMPROVE and STN sites in the CENRAP region are shown in Figure 3-3. The fractional bias for OMC at the IMPROVE sites is quite good throughout the year with values generally within $\pm 20\%$, albeit with a slight winter overestimation and summer underestimation bias. At the urban STN sites, the model exhibits an underestimation bias throughout the year that ranges from -20% to -50%. The urban underestimation of OMC is a fairly common occurrence and suggests there may be missing sources of organic aerosol emissions in the modeling inventory.

The good performance of the model for OMC at the IMPROVE sites is also reflected in the Bugle Plot (Figure 3-3, bottom) with the bias achieving the proposed PM model performance goal for all months of the year. At the STN sites, however, the OMC bias falls between the proposed PM model performance goal and criteria, with error right at the goal for most months.





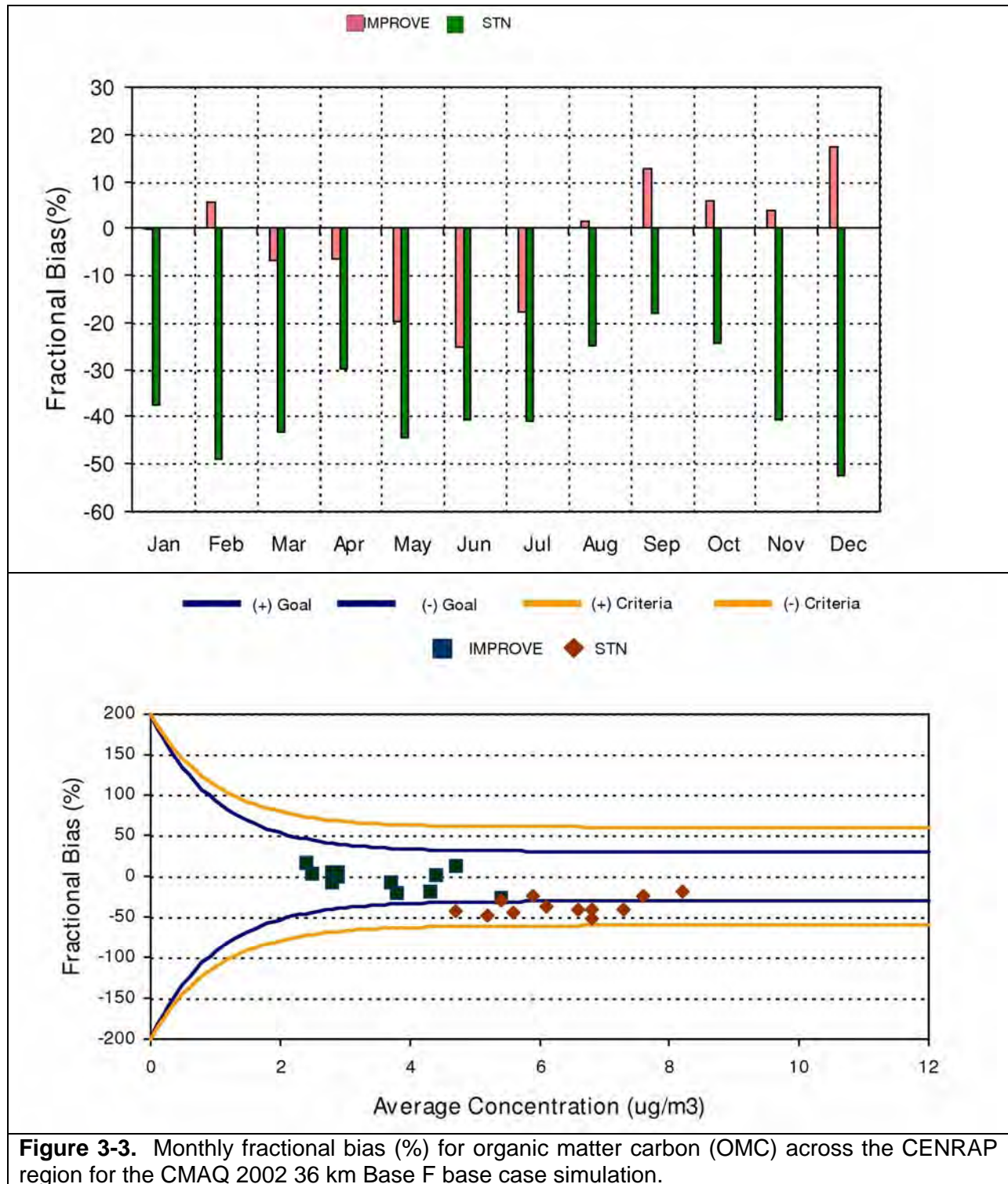


Figure 3-3. Monthly fractional bias (%) for organic matter carbon (OMC) across the CENRAP region for the CMAQ 2002 36 km Base F base case simulation.

3.5.4 Elemental Carbon (EC) Model Performance

The monthly average bias for EC across the IMPROVE and STN monitors in the CENRAP region are shown in Figure 3-4. The STN network exhibits small fractional bias year round, whereas the IMPROVE monitoring network exhibits a large underprediction bias in the summer months (-40% to -70%) and much smaller bias in the winter. The Bugle Plot puts the EC performance in context. The low EC concentrations at the IMPROVE sites results in bias values in the horn of the Bugle Plot. Thus, EC bias achieves the proposed PM performance goal for all months of the year.

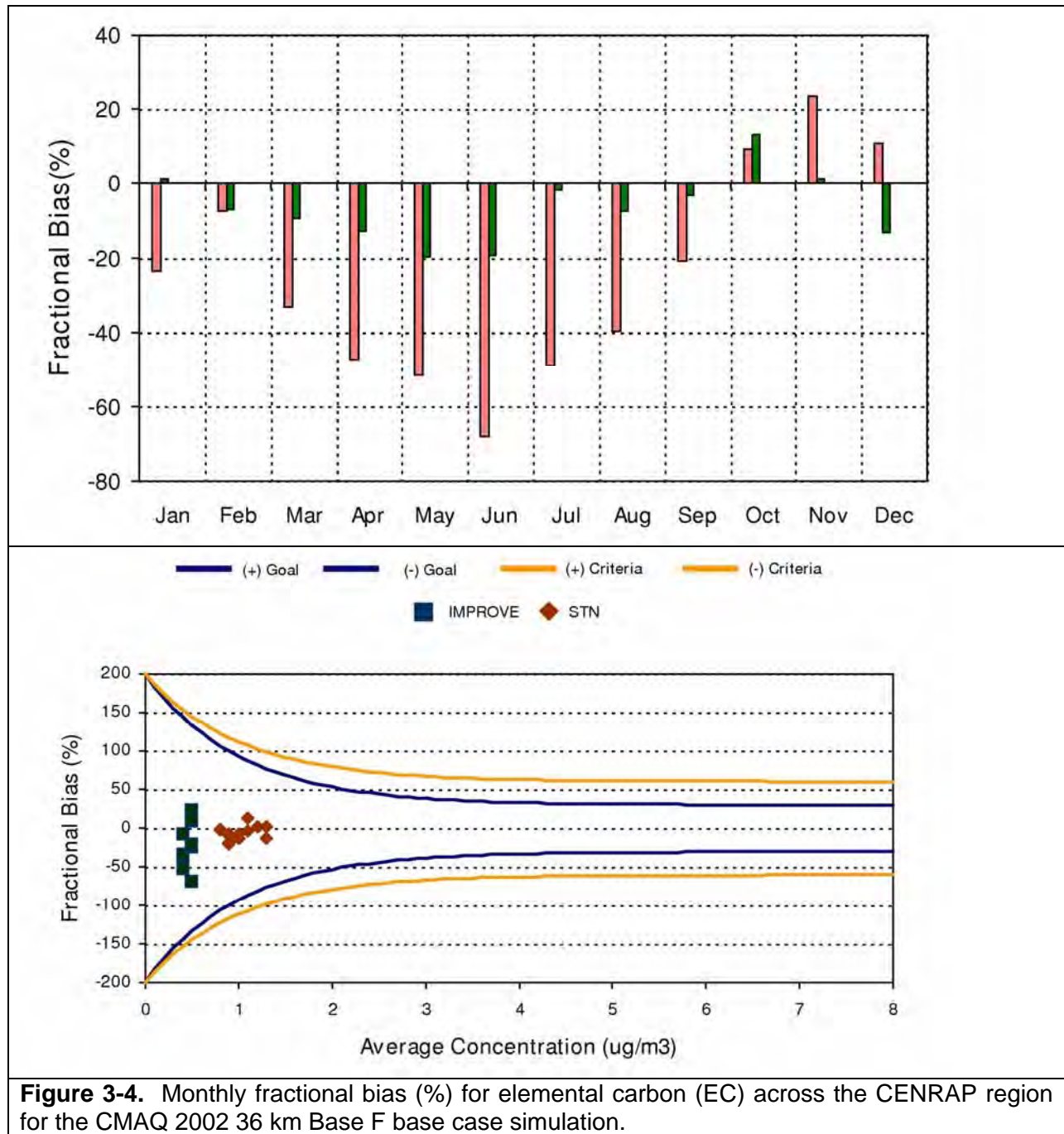
3.5.5 Other PM_{2.5} (Soil) Model Performance

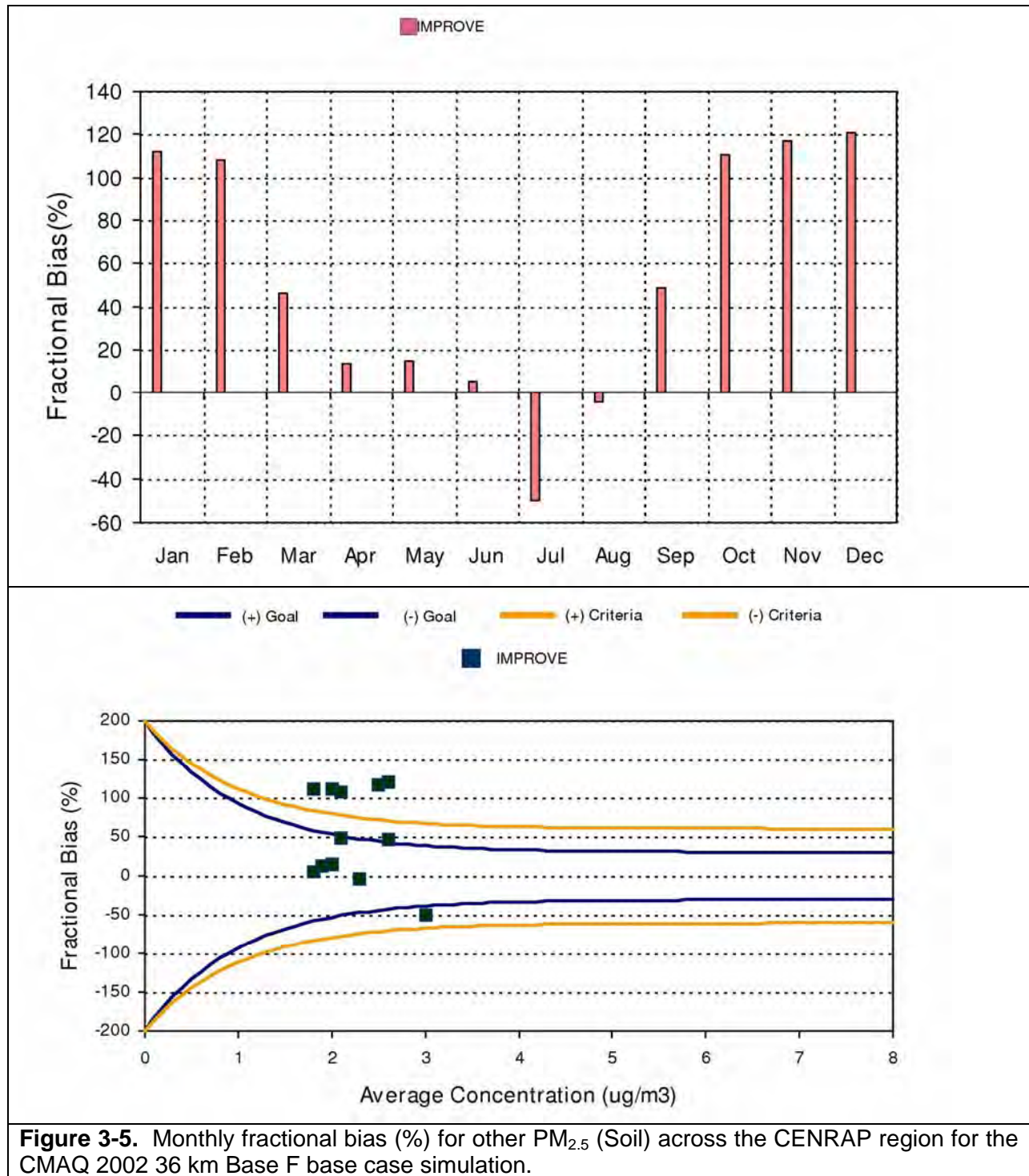
Figure 3-5 displays the monthly variation in the Soil fractional bias using IMPROVE measurements in the CENRAP region. During the winter months, the model exhibits a very large (> 100%) overestimation bias. With the exception of July, the summer monthly bias is toward a slight overprediction but generally less than 20%. The July underestimation bias appears to be driven by impacts of high Soil values from wind blown dust events (e.g., see July 2002 discussion in Appendix C). The Bugle Plot indicates that the summer Soil performance achieves the PM performance goal, a few months in the Spring/Fall period fall between the performance goal and criteria and the winter Soil performance exceeds the model performance criteria. Thus, the Soil performance is a cause for concern.

3.5.6 Coarse Mass (CM) Model Performance

The monthly average fractional bias values for CM are shown in Figure 3-6. In the winter the underprediction bias is typically in the -60% to -80% range. In the late Spring and Summer the underprediction bias ranges from -120% to -160%. As this underprediction bias is nearly systematic (i.e., an underprediction almost always occurs), then the fractional errors are the same magnitude as the bias.

The Bugle Plots clearly show that the CM model performance is a problem. The monthly bias exceeds both the performance goal and criteria for almost every month of the year.





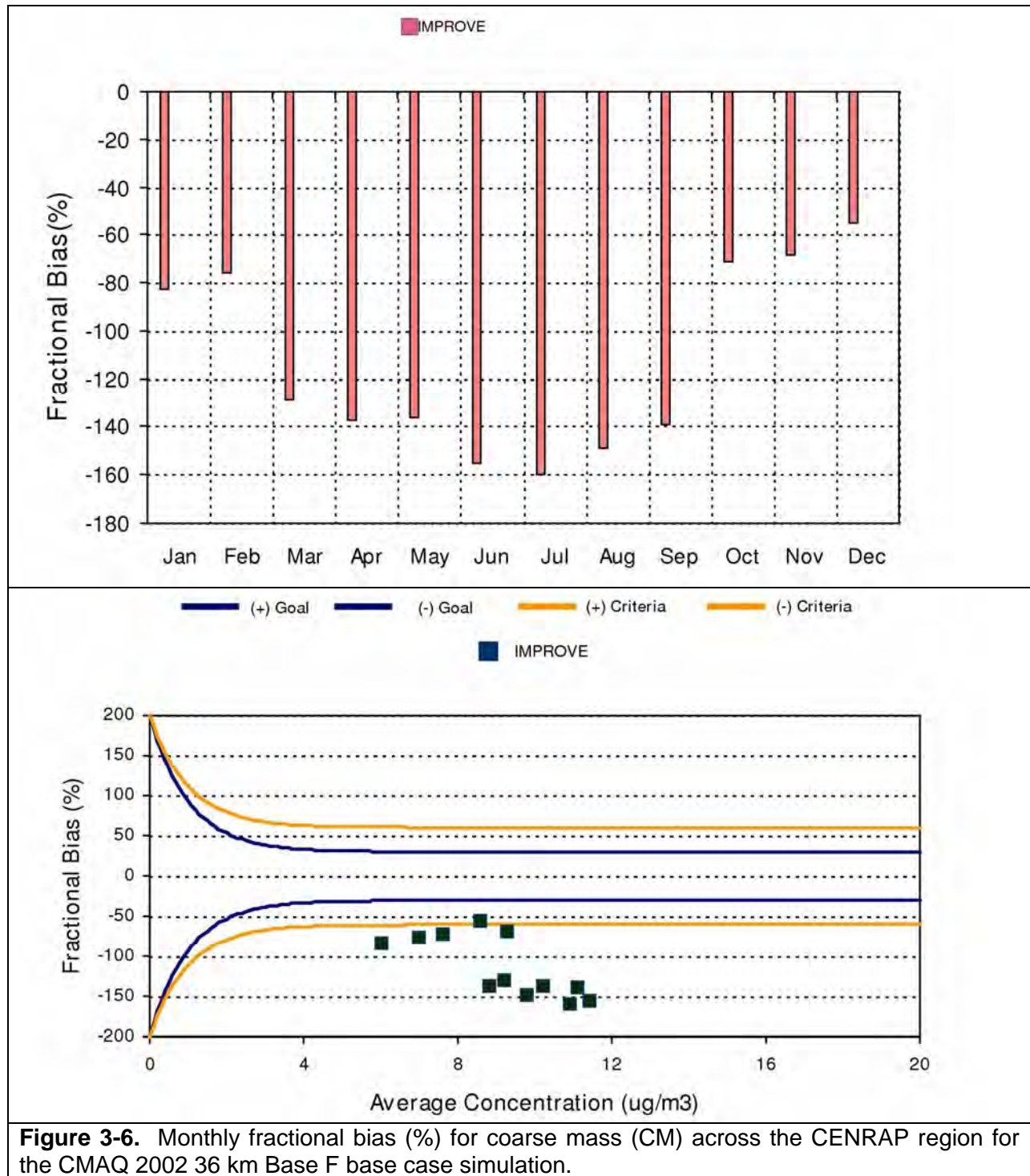


Figure 3-6. Monthly fractional bias (%) for coarse mass (CM) across the CENRAP region for the CMAQ 2002 36 km Base F base case simulation.

3.6 Diagnostic Model Performance Evaluation

The CASTNet and AQS networks also measure gas-phase species that are PM precursor or related species. The diagnostic evaluation of the 2002 36 km Base F CMAQ base case simulation for these compounds and the four seasonal months are presented in Appendix C. The displays for January are provided below as an example; the reader is referred to Appendix C for the rest of the monthly displays.

The CASTNet network measures weekly average samples of SO₂, SO₄, NO₂, HNO₃, NO₃ and NH₄. The AQS network collects hourly measurements of SO₂, NO₂, O₃ and CO. A comparison of the SO₂ and SO₄ performance provides insight into whether the SO₄ formation rate may be too slow or fast. For example, if SO₄ is underestimated and SO₂ is overestimated that may indicate chemical conversion rates that are too slow. Analyzing the performance for SO₄, HNO₃, NO₃, Total NO₃ and NH₄ provides insight into the equilibrium of these species. For example, if Total NO₃ performs well but HNO₃ and NO₃ do not, then there may be issues associated with the partitioning between the gaseous and particulate phases of nitrate. Causes for incorrect HNO₃/NO₃ partitioning could include inadequate ammonia emissions and/or poorly characterized meteorological conditions (e.g., temperature).

3.6.1 Diagnostic Model Performance in January 2002

In January, SO₂ is overstated across both the CASTNet and AQS sites with fractional bias values of 38% (Figure 3-7) and 31% (Figure 3-8), respectively. SO₄ is understated by -34% across the CASTNet monitors (Figure 3-7) and -12% and -13% for the IMPROVE and STN networks (Figure C-4a). Wet SO₄ deposition is also overstated in January (+40%, Figure C-4a). Given that SO₂ emissions are well characterized, these results suggest that the January SO₄ underestimation may be partly due to understated transformation rates of SO₂ to SO₄ and overstated wet SO₄ deposition.

Total NO₃ is overestimated by 35% on average across the CASTNet sites in the CENRAP region in January (Figure 3-7). HNO₃ is underestimated (-34%) and particle NO₃ is overestimated (+61%) suggesting there are gas/particle equilibrium issues. An analysis of the time series of the four CASTNet stations reveals that NO₃, HNO₃ and NH₄ performance is actually very reasonable at the west Texas site and the HNO₃ underestimation and NO₃ overestimation bias is coming from the east Kansas, central Arkansas and northern Minnesota CASTNet sites (see Figure C-3 for site locations). One potential contributor for this performance problem could be overstated NH₃ emissions. However, the Total NO₃ overestimation bias suggests that the model estimated NO_x oxidation rate may be too high in January.

The SO₂, NO₂, O₃ and CO performance across the AQS sites in January is shown in Figure 3-8. The AQS monitoring network is primarily an urban-oriented network. So, it is not surprising that the model is underestimating concentrations of primary emissions when a 36 km grid is used. NO₂ is underestimated by approximately 5%, and CO by approximately 67%. Ozone is also underestimated on average, especially the maximum values above 60 ppb.

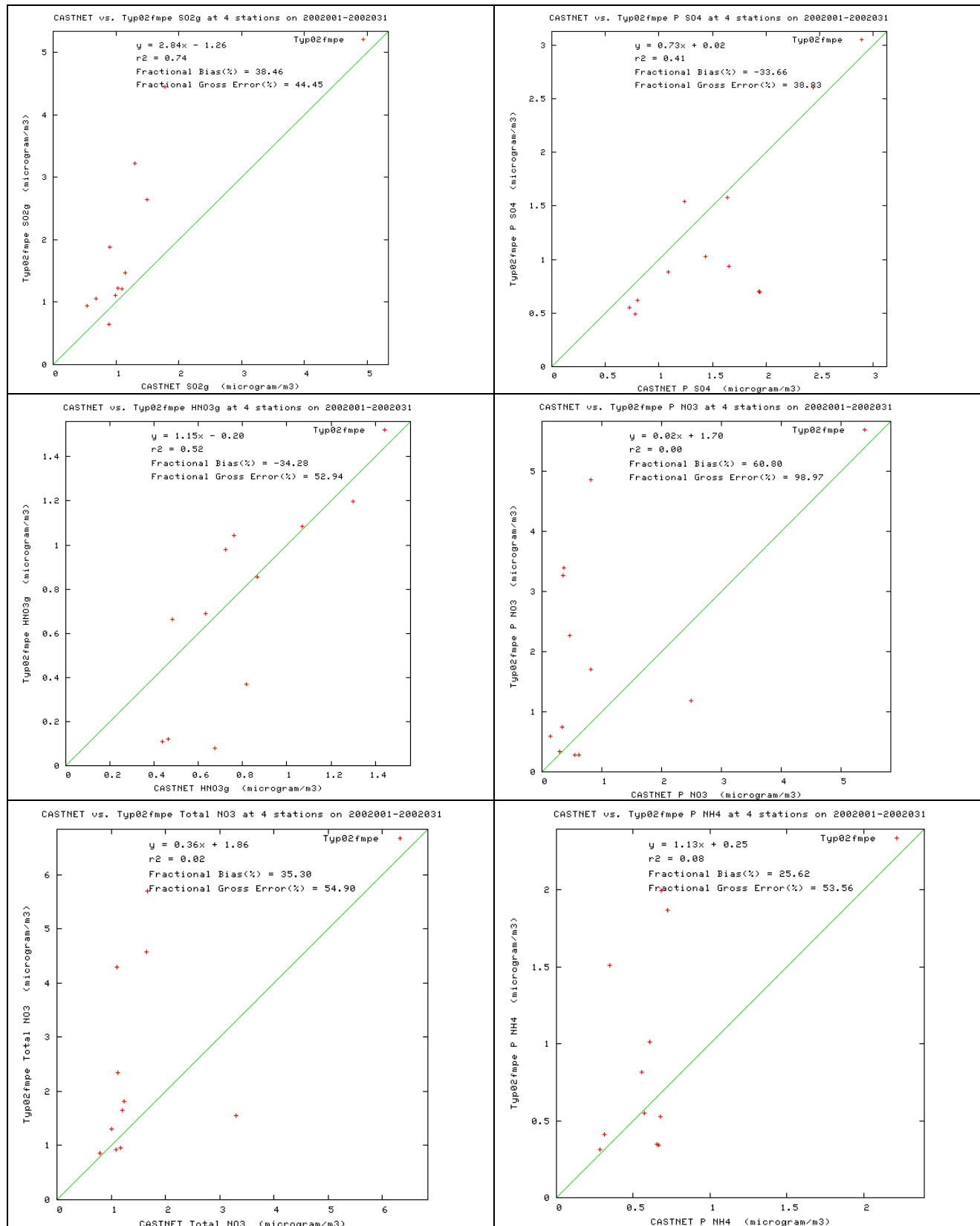
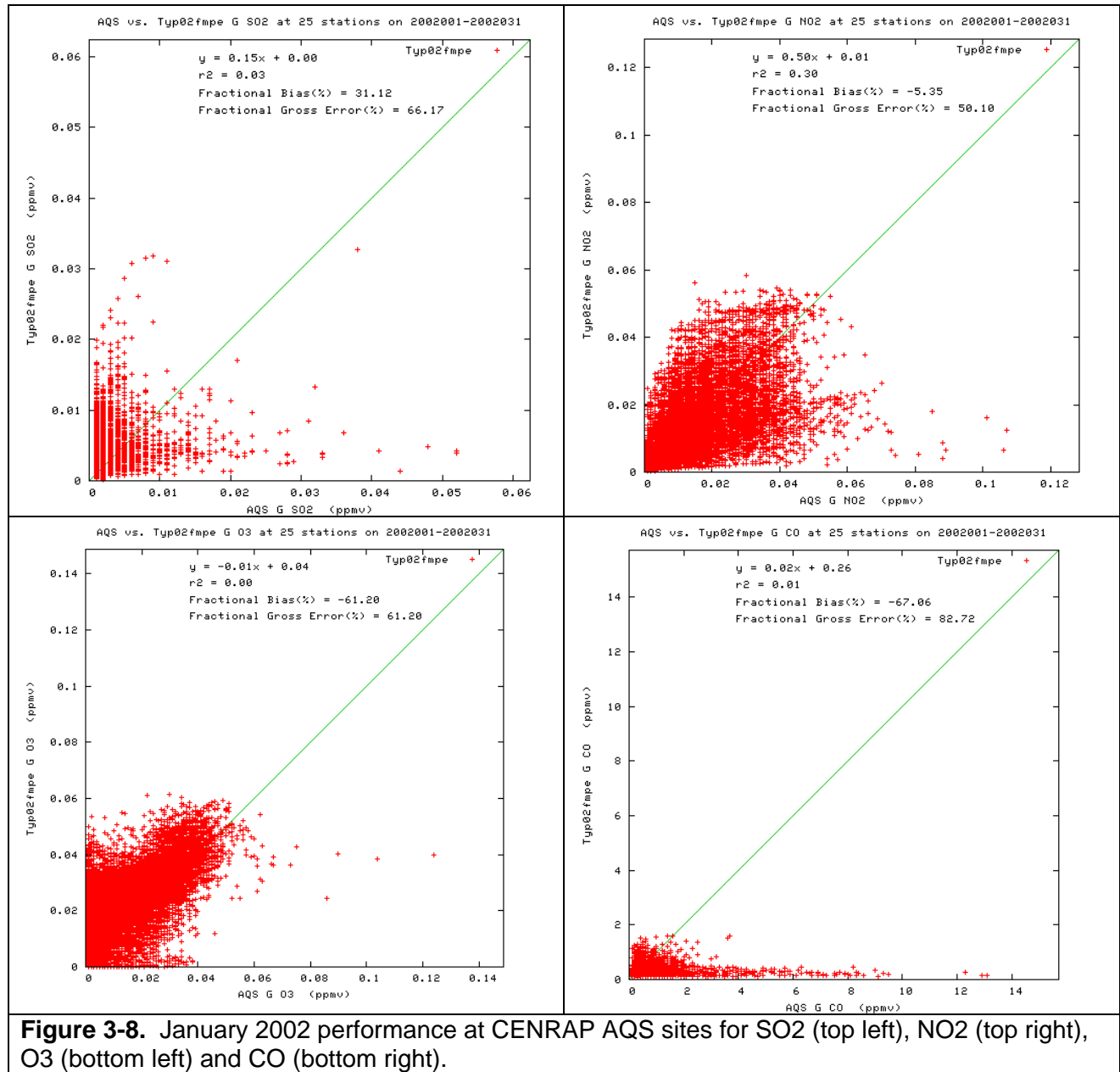


Figure 3-7. January 2002 performance at CENRAP CASTNet sites for SO2 (top left), SO4 (top right), HNO3 (middle left), NO3 (middle right), Total NO3 (bottom left) and NH4 (bottom right).



3.6.2 Diagnostic Model Performance In April

In April there is an average SO₂ overestimation bias across the CASTNet (+15%) and underestimation bias across the AQS (-10%) networks (Figures C-42 and C-43). SO₄ is underestimated across all networks by -30% to -58% (Figure C-5a). The wet SO₄ deposition bias is near zero. Both SO₂ and SO₄ are underestimated at the west Texas CASTNet monitor in April suggesting SO₂ emissions in Mexico are likely understated.

The HNO₃ performance in April is interesting with almost perfect agreement except for 5 modeled-observed comparisons that drives the average underprediction bias of -29% (Figure C-42). On Julian Day 102 there is high HNO₃ at the MN, KS and OK CASTNet sites that is not captured by the model. Given that HNO₃, NO₃ and Total NO₃ are all underestimated by about the same amount (-30%), then part of the underestimation bias is likely due to too slow oxidation of NO_x.

There is a lot of scatter in the NO₂ and O₃ performance that is more or less centered on the 1:1 line of perfect agreement with bias values of -8% and -21%, respectively (Figure C-43). CO is underestimated by -72% with the model unable to predict CO concentrations above 1 ppm due to the use of the coarse 36 km grid spacing. Mobile sources produce a vast majority of the CO emissions. So, AQS monitors for CO compliance are located near roadways, which are not simulated well using a 36 km grid.

3.6.3 Diagnostic Model Performance In July

In July SO₂ is slightly underestimated across the CASTNet (-5%) and AQS (-12%) networks (Figures C-44 and C-45). SO₄ is more significantly underestimated across all networks (-22% to -53%, as shown in Figure C-6a). Since wet deposition SO₄ is also underestimated, it is unclear why all sulfur species are underestimated.

The nitrate species are also all underestimated with the Total NO₃ bias (-56%) being between the HNO₃ bias (-35%) and NO₃ bias (-115%). The modeled NO₃ values are all near zero with little correlation with the observations, whereas the observed HNO₃ and Total NO₃ is tracked well with correlation coefficients of 0.74 and 0.76. These results suggest that the July NO₃ model performance problem is partly due to insufficient formation of Total NO₃, but mainly due to incorrect partitioning of the Total NO₃.

Again, there is abundant scatter in the AQS NO₂ scatter plot for July (Figure C-45) resulting in a low bias (0%) but high error (65%). Ozone performance also exhibits a low bias (-15%) and error (20%), but the model is incapable of simulating ozone above 100 ppb. Although CO performance in July is better than the previous months, it still has a large underestimation bias of 82%.

3.6.4 Diagnostic Model Performance In October

SO₂ is overstated in October across the CASTNet (+28%) and AQS (+33%) sites (Figures C-46 and C-47). Although SO₄ is understated across the CASTNet sites (-24%), the bias across the IMPROVE (-6%) and STN (0%) sites are near zero (Figure C-7a).

Performance for HNO₃ is fairly good with a low bias (+12%) and error (30%). But NO₃ is overstated (+34%) leading to an overstatement of Total NO₃ (+37%). The overstatement of NO₃ leads to an overstatement of NH₄ as well (Figure C-46)

As seen in the other months, NO₂ exhibits a lot of scatter resulting in a low correlation (0.22) and high error (61%) but low bias (12%). The model tends to underpredict the high and overpredict the low O₃ observations resulting in a -29% bias and low correlation coefficient. CO is also underpredicted (-76%) for the reasons discussed previously.

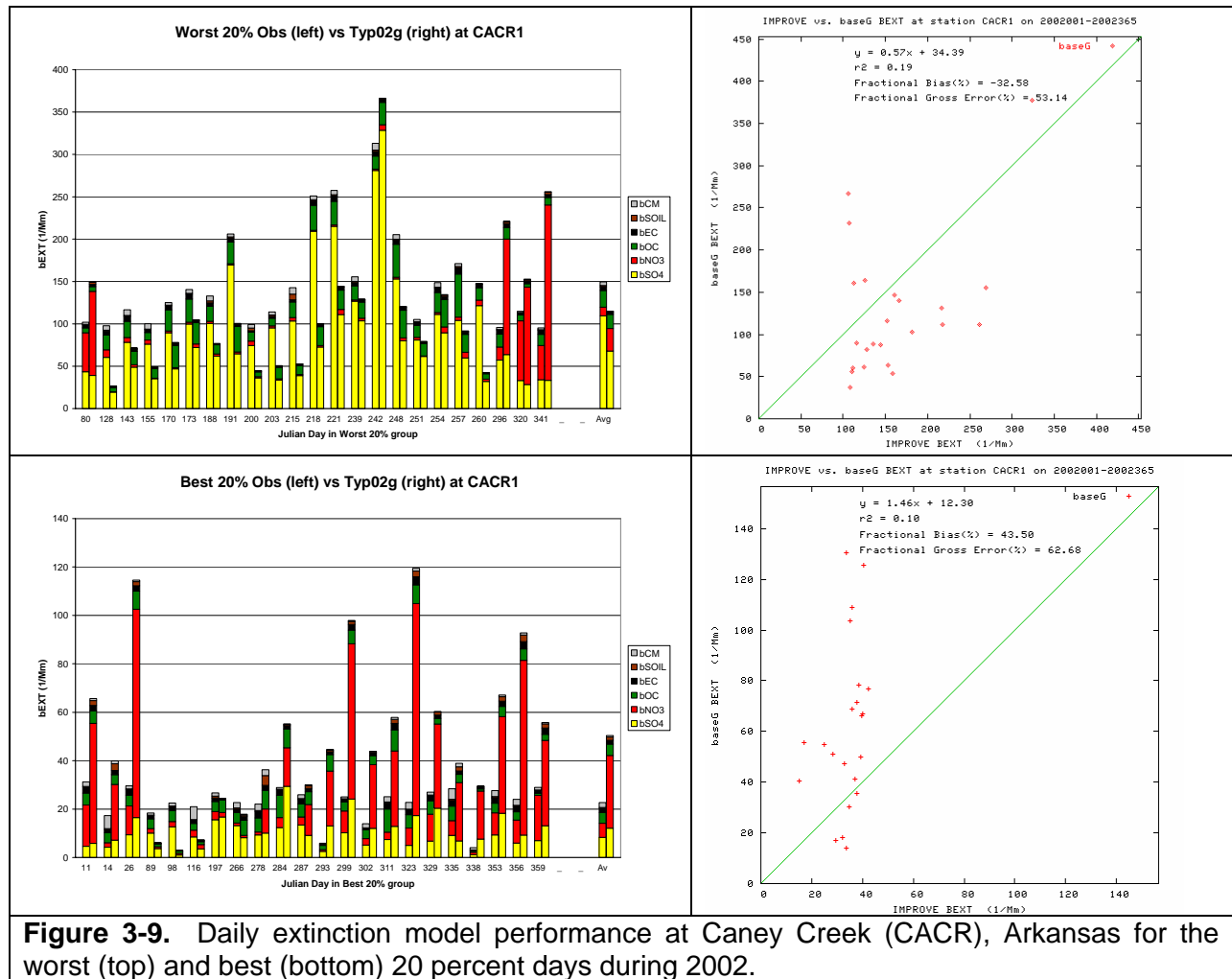
3.7 Performance at CENRAP Class I Areas for the Worst and Best 20 Percent Days

In this section, and in section C.5 of Appendix C, we present the results of the model performance evaluation at each of the CENRAP Class I areas for the worst and best 20 percent days. Performance on these days is critical since they are the days used in the 2018 visibility projections discussed in Chapter 4. For each Class I area we compared the predicted and observed extinction of the worst and best 20 percent days below. In Appendix C the PM species-specific extinction is also compared for the worst 20 percent days.

3.7.1 Caney Creek (CACR) Arkansas

The ability of the CMAQ model to estimate visibility extinction at the CACR Class I area on the 2002 worst and best 20 percent days is provide in Figures 3-9 and C-48. On most of the worst 20 percent days at CACR total extinction is dominated by SO₄ extinction with some extinction due to OMC. On four of the worst 20 percent days extinction is dominated by NO₃. The average extinction across the worst 20 percent days is underestimated by -33% (Figure 3-9), which is primarily due to a -51% underestimation of SO₄ extinction combined with a 6% overestimation of NO₃ extinction (Figure C-48). Performance for OMC extinction at CACR on the worst 20 percent days is pretty good with a -20% bias and 36% error. EC extinction is systematically underestimated. Soil extinction has low bias (-19%) but lots of scatter and high error (74%), while CM extinction is greatly underestimated (bias of -153%).

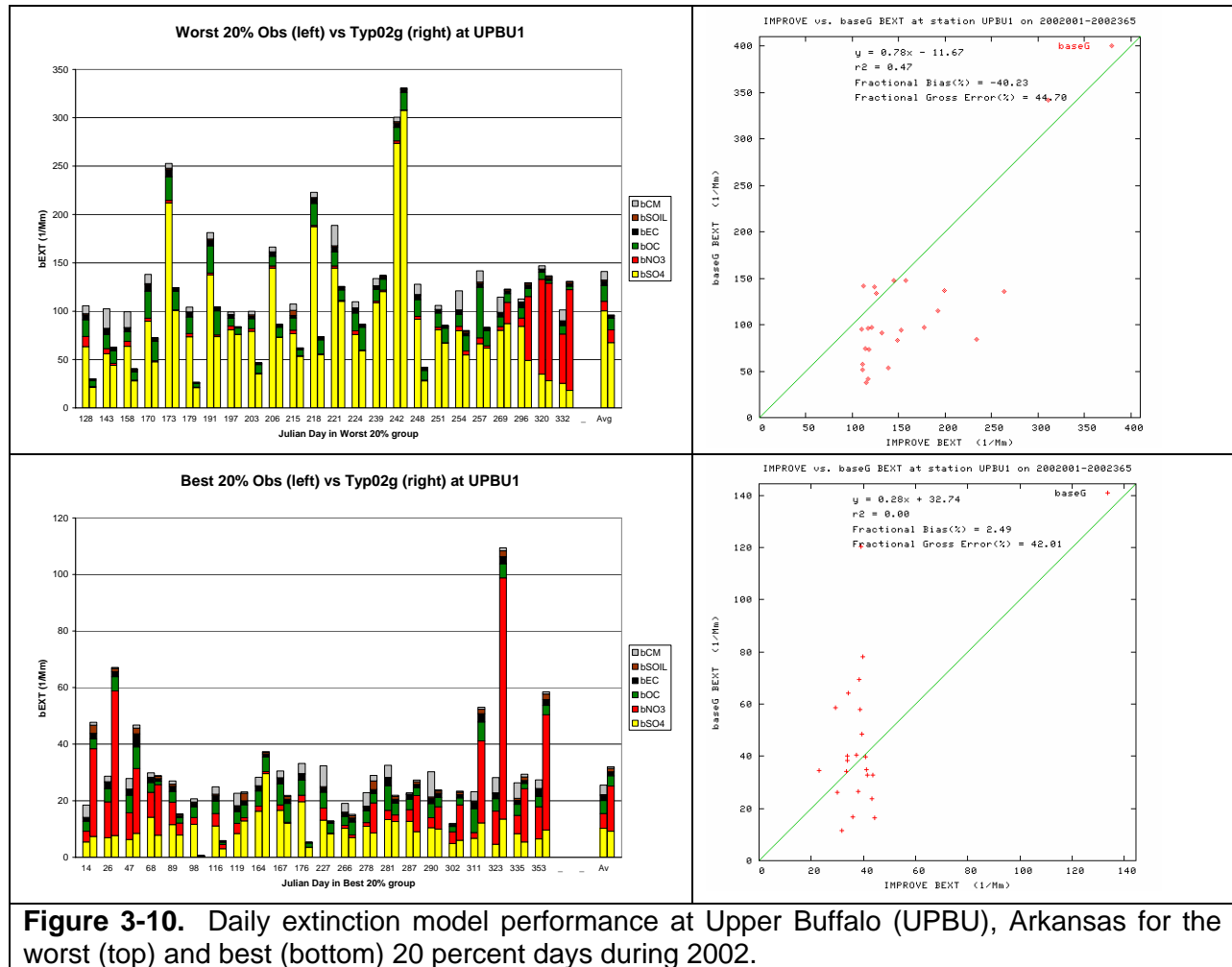
On the best 20 percent days at CACR the observed extinction ranges from 20 to 40 Mm⁻¹. Whereas, the modeled extinction has a much larger range from 15 to 120 Mm⁻¹. Much of the modeled overestimation of total extinction on the best 20% days (+44% bias) is due to NO₃ overestimation (+94% bias).



3.7.2 Upper Buffalo (UPBU) Arkansas

Model performance at the UPBU Class I area for the worst and best 20 percent days is shown in Figures 3-10 and C-49. On most of the worst 20 percent days at UPBU, visibility impairment is dominated by SO₄, although there are also two high NO₃ days. The model underestimates the average of the total extinction on the worst 20 percent days at UPBU by -40% (Figure 3-10), which is due to an underestimation of extinction due to SO₄, OMC and CM by -46%, -33% and -179%, respectively.

On the best 20 percent days at UPBU, the model performs reasonably well with a low bias (2%) and error (42%). But again, the model has a much wider range in extinction values across the best 20 percent days (15 to 120 Mm⁻¹) than observed (20 to 45 Mm⁻¹). There are five days in which the modeled NO₃ overprediction is quite severe and when those days are removed the range in the modeled and observed extinction on the best 20 percent days is quite similar to the observed, although the model gets much cleaner on the very cleanest modeled days.



3.7.3 Breton Island (BRET), Louisiana

The observed total extinction on the worst 20 percent days at Breton Island is underestimated by -71% (Figure 3-11), which is due to an underestimation of each component of extinction (Figure C-50) by from -50% to -70% (SO₄, OMC and Soil) to over -100% (EC and CM). The observed extinction on the worst 20 percent days ranges from 90 to 170 Mm⁻¹, whereas the modeled values drop down to as low as approximately 15 Mm⁻¹. On the best 20 percent days the range of the observed and modeled extinction is similar (roughly 10 to 50 Mm⁻¹) that results in a reasonably low bias (-22%), but there is little agreement on which days are higher or lower resulting in a lot of scatter and high error (54%).

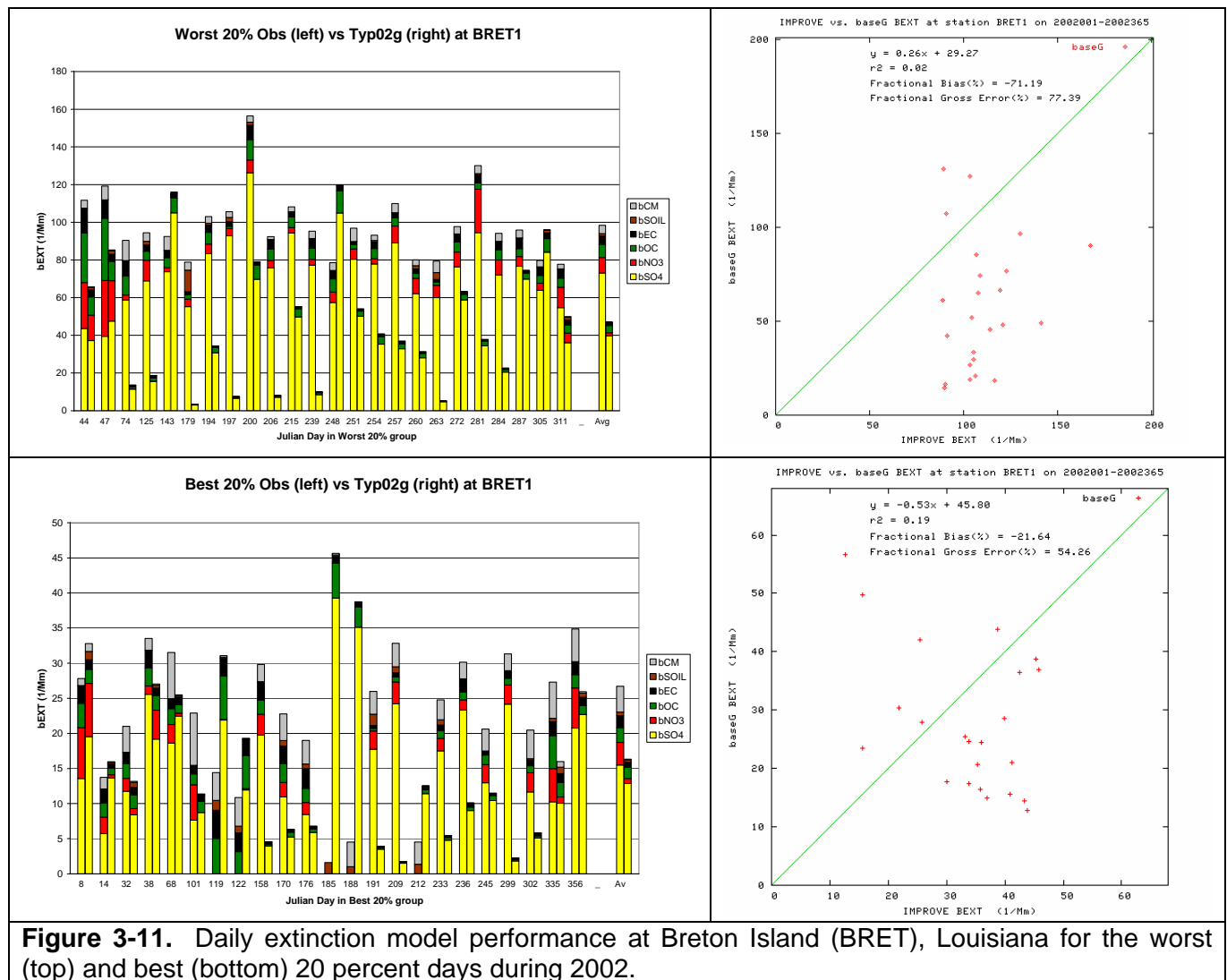


Figure 3-11. Daily extinction model performance at Breton Island (BRET), Louisiana for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.4 Boundary Waters (BOWA), Minnesota

There are three types of days during the worst 20 percent days at BOWA: SO4 days, OMC days and NO3 days (Figure 3-12). The two high OMC days are likely fire impact events that the model captures to some extent on one day and not on the other. On the five high (> 20 Mm⁻¹) NO3 extinction days the model predicts the observed extinction well on three days and overestimates by a factor of 3-4 on the other two high NO3 days. SO4 is underestimated by -43% on average across the worst 20 percent days at BOWA.

With the exception of two days, the model reproduces the total extinction for the best 20 percent days at BOWA quite well with a bias and error value of +14% and 22% (Figure 3-12). Without these two days, the modeled and observed extinction both range between 15 and 25 Mm⁻¹.

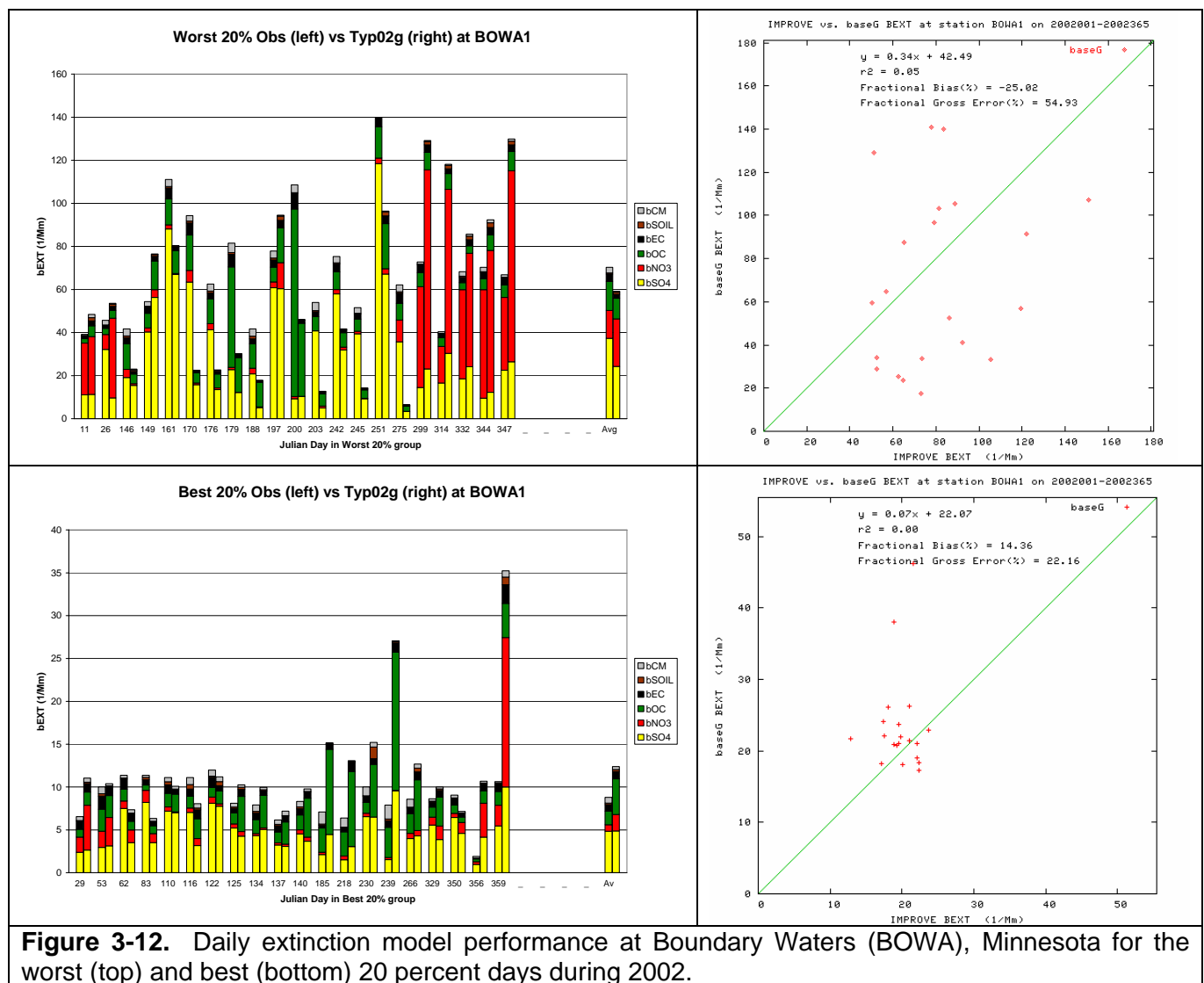


Figure 3-12. Daily extinction model performance at Boundary Waters (BOWA), Minnesota for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.5 Voyageurs (VOYA) Minnesota

VOYA is also characterized by SO₄, NO₃ and OMC days (Figure 3-13). Julian Days 179 and 200 are high OMC days that were also high OMC days at BOWA again indicating impacts from fires in the area that is not fully captured by the model. SO₄ and NO₃ performance is fairly good and, without the fire days, OMC performance looks good as well (Figure C-52). On the best 20 percent days there is one day the modeled extinction is much higher than observed and a few others that are somewhat higher, but for most of the best 20 percent days the modeled extinction is comparable to the observed values.

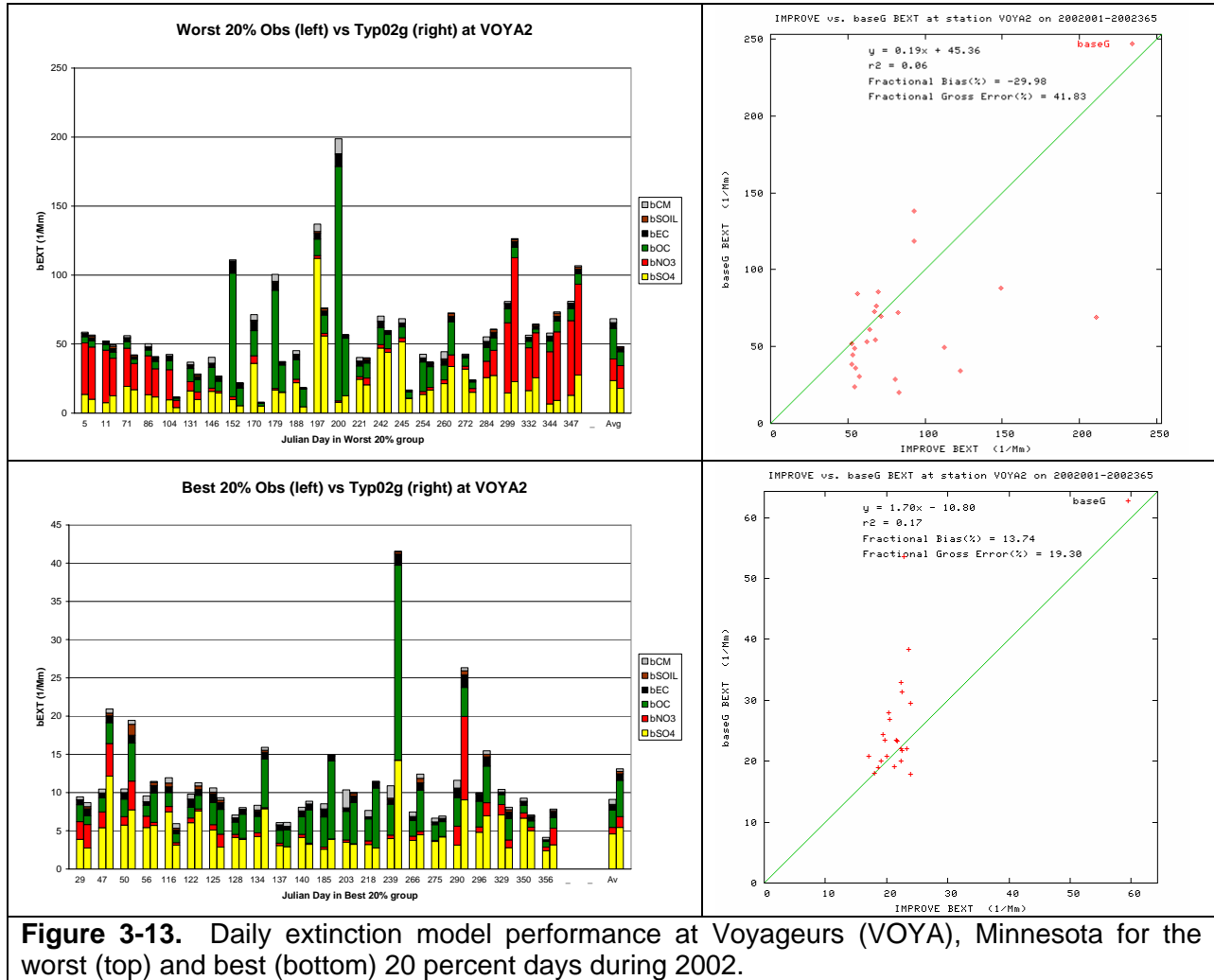


Figure 3-13. Daily extinction model performance at Voyageurs (VOYA), Minnesota for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.6 Hercules Glade (HEGL) Missouri

On most of the worst 20 percent days at HEGL the observed extinction ranges from 120 to 220 Mm^{-1} whereas model extinction ranges from 50 to 170 Mm^{-1} (Figure 3-14). However, there is one extreme day with extinction approaching 400 Mm^{-1} that the model does a very good job in replicating. Over all the days there is a modest underestimation bias in SO_4 (-39%) and OMC (-39%) extinction, larger underestimation bias in EC (-62%) and CM (-118%) extinction and overestimation bias in Soil (+30%) extinction (Figure C-53).

On the best 20 percent days there is one day where the model overstates the observed extinction by approximately a factor of four and a handful of other days that the model overstates the extinction by a factor of 2 or so, but most of the days both the model and observed extinction sites are around 40 $Mm^{-1} \pm 10 Mm^{-1}$. On the best 20 percent days, when the observed extinction is overstated, it is due to overstatement of the NO_3 .

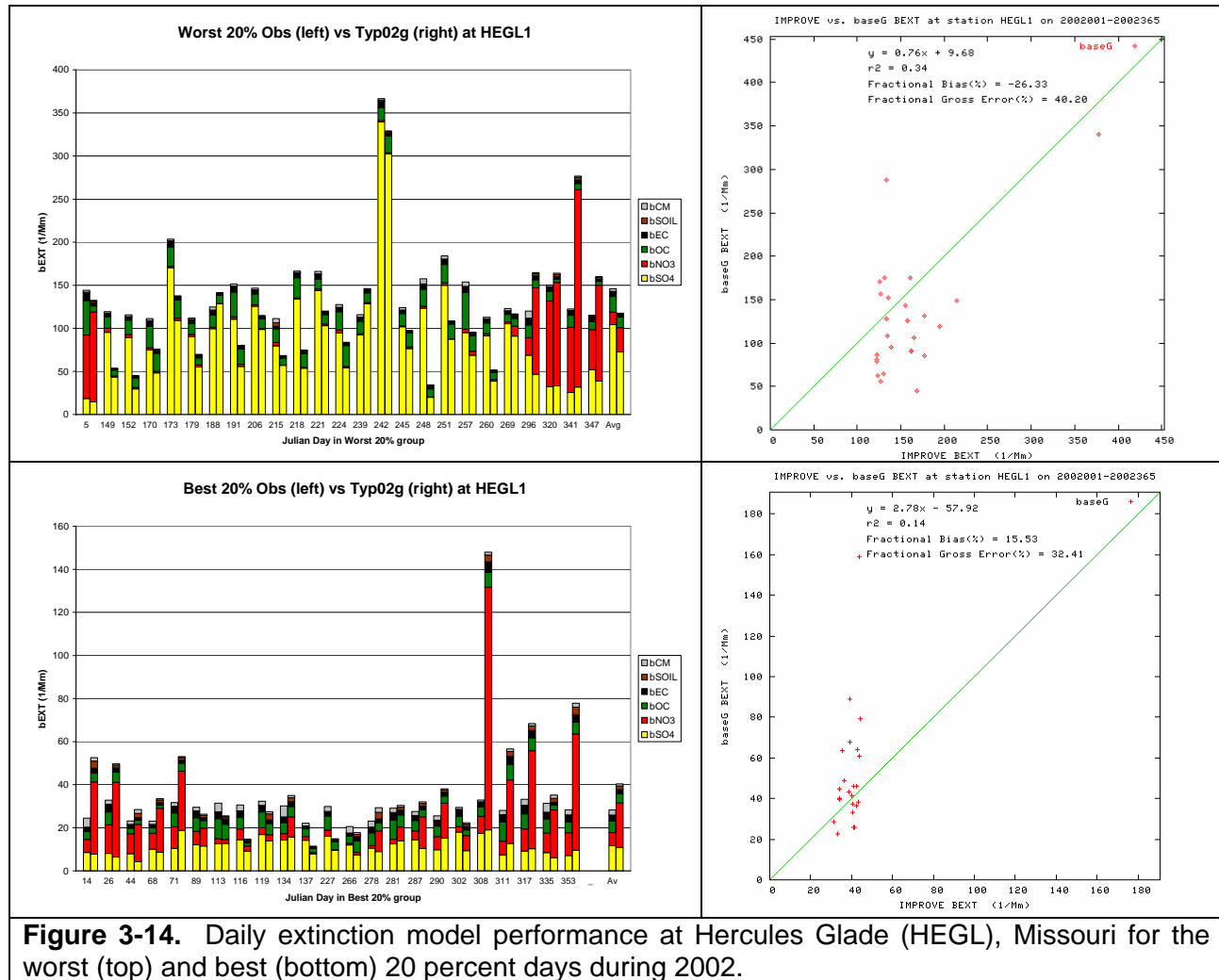


Figure 3-14. Daily extinction model performance at Hercules Glade (HEGL), Missouri for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.7 Mingo (MING) Missouri

The worst 20 percent days at MING are mainly high SO4 days with a few high NO3 days that the model reproduces reasonably well resulting in low bias (+10%) and error (38%) for total extinction (Figure 3-15). The PM species specific performance is fairly good with low bias for SO4 (+4%), good agreement with NO3 on high NO3 days except for one day, low OMC (+23%) and EC (+3%) bias and larger bias in EC (+37%) and CM (-105%) extinction (Figure C-54).

For the best 20 percent days, there is one day the model is way too high due to overstated NO3 extinction and a few other days the model overstates the observed extinction that is usually due to overpredicted NO3, but on most of the best 20 percent days the modeled extinction is comparable to the observed values. This results in low bias (+12%) and error (36%) for total extinction at MING for the best 20 percent days.

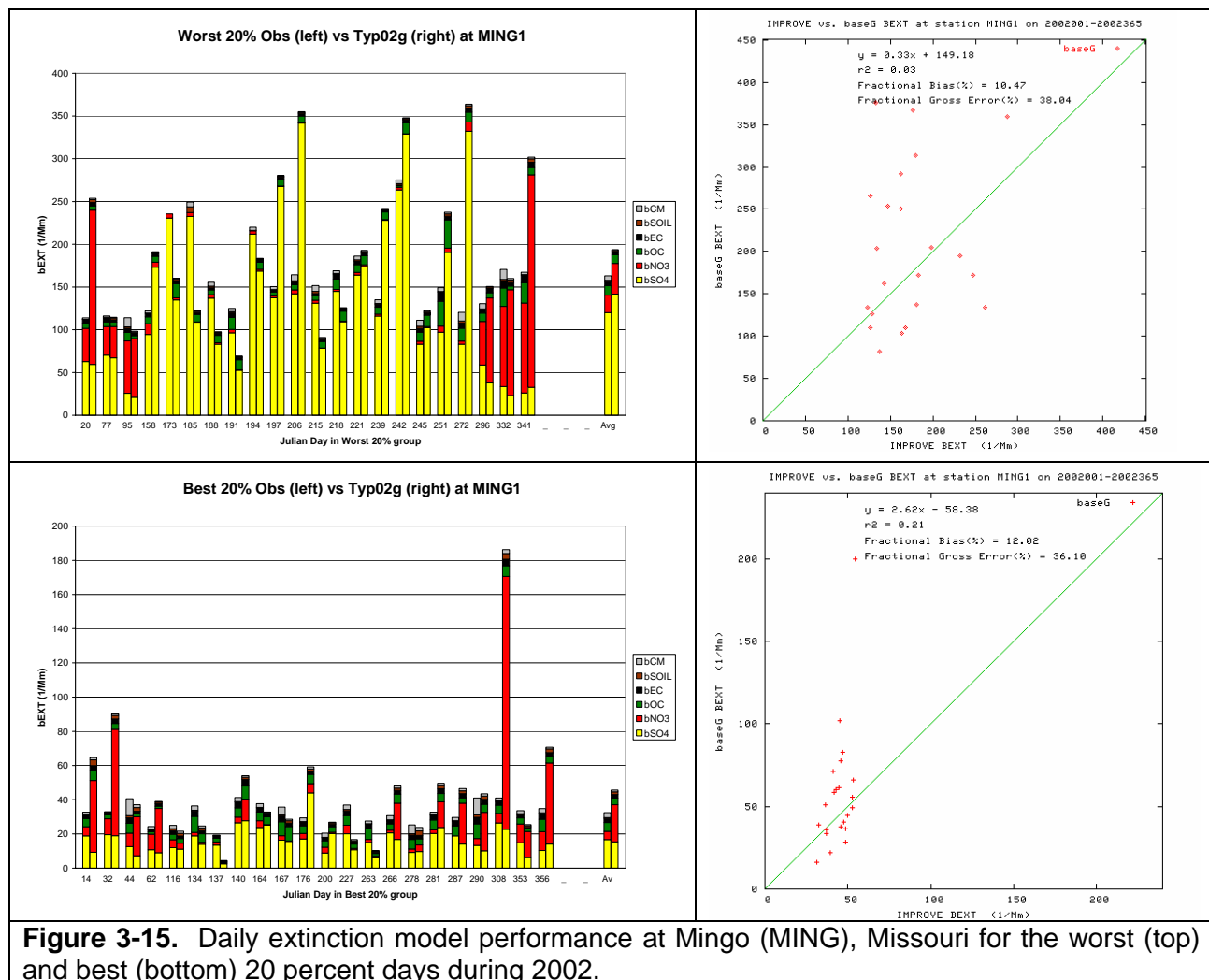


Figure 3-15. Daily extinction model performance at Mingo (MING), Missouri for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.8 Wichita Mountains (WIMO), Oklahoma

With the exception of an overprediction on day 344 due to NO₃, observed total extinction on the worst 20 percent days at WIMO is understated with a bias of -42% (Figure 3-16) that is primarily due to an underestimation of extinction due to SO₄ (-48%) and OMC (-69%) (Figure C-55).

CMAQ total extinction performance for the average of the best 20 percent days at WIMO is characterized by an overestimation bias (+21%) on most days that is primarily due to NO₃ overprediction on several days. Again the modeled range of extinction on the best 20 percent days (12-60 Mm⁻¹) is much greater than observed (20-35 Mm⁻¹).

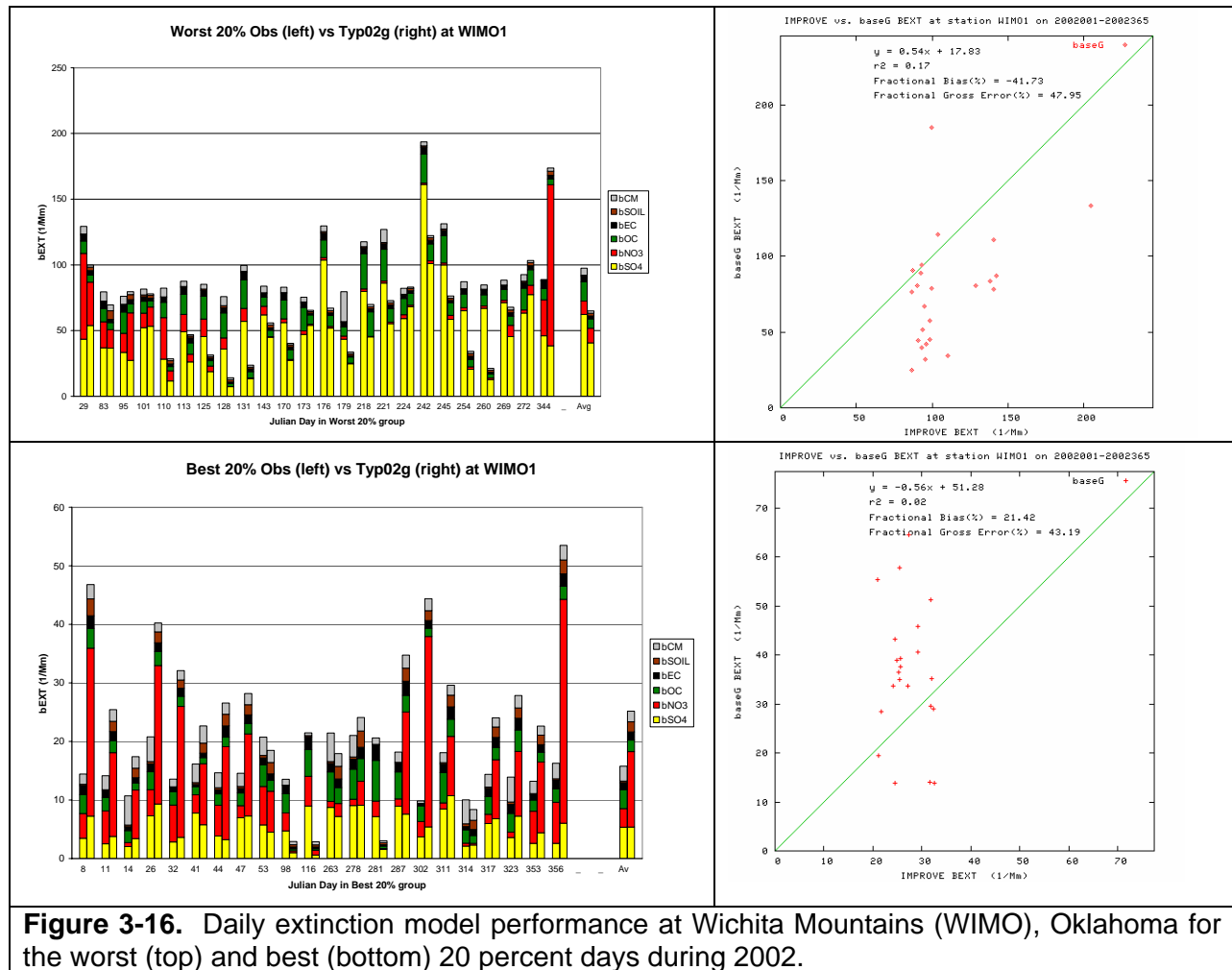


Figure 3-16. Daily extinction model performance at Wichita Mountains (WIMO), Oklahoma for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.9 Big Bend (BIBE) Texas

The observed extinction on the worst 20 percent days at BIBE is underpredicted on almost every day resulting in a fractional bias value of -72% (Figure 3-17). Every component of extinction is underestimated on average for the worst 20 percent days (Figure C-56) with the underestimation bias ranging from -24% (OMC) to -162% (CM). SO₄ extinction, that typically represents the largest component of the total extinction is understated by -94%.

The model does a better job in predicting the total extinction at BIBE for the best 20 percent days with average fractional bias and error values of +13% and 19% (Figure 3-17). With the exception of one day that the observed extinction is overestimated by approximately a factor of 2, the modeled and observed extinction on the best 20 percent days at BIBE are both within 12 to 25 Mm⁻¹. However, there are some mismatches with the components of extinction with the model estimating much lower contributions due to Soil and CM.

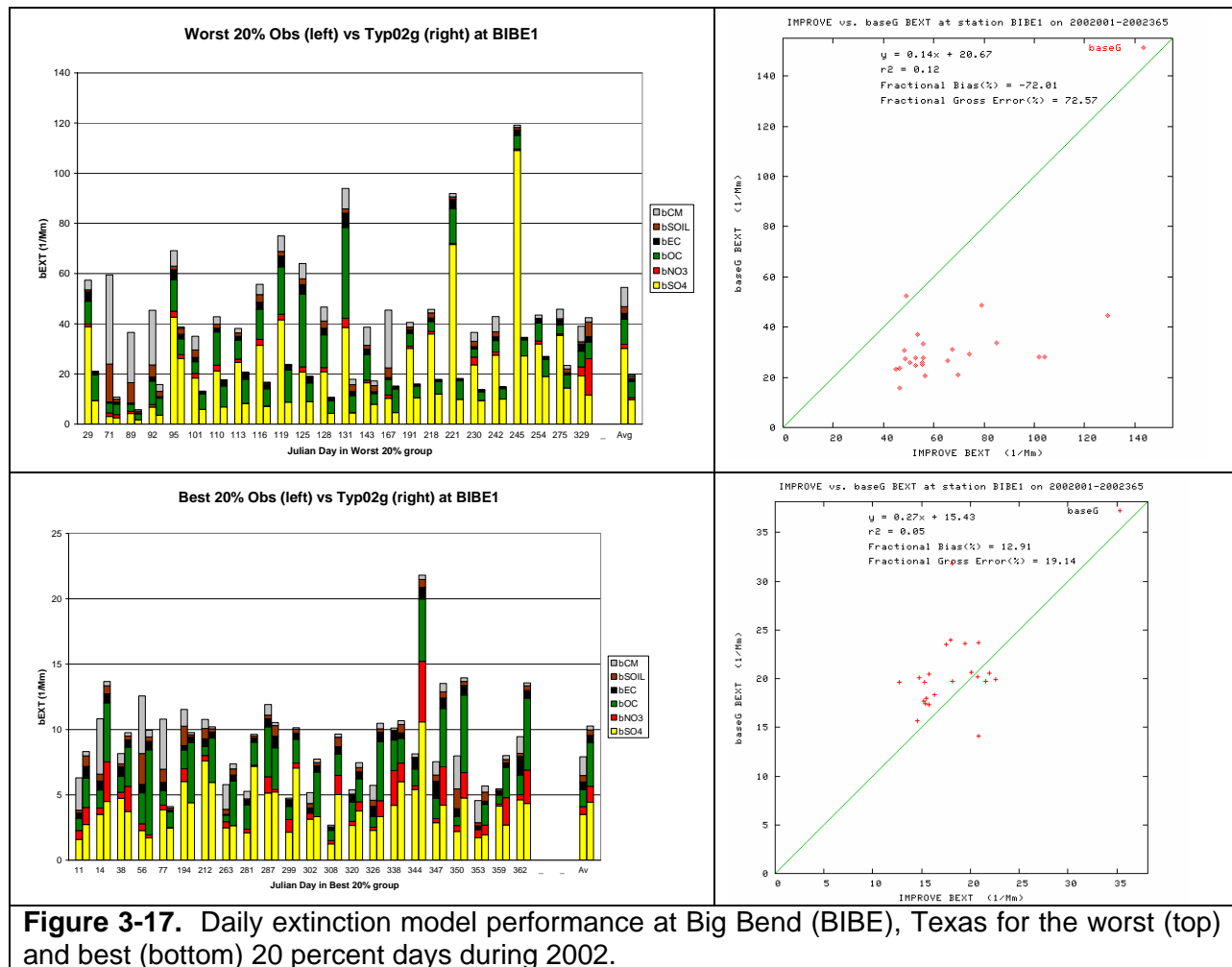
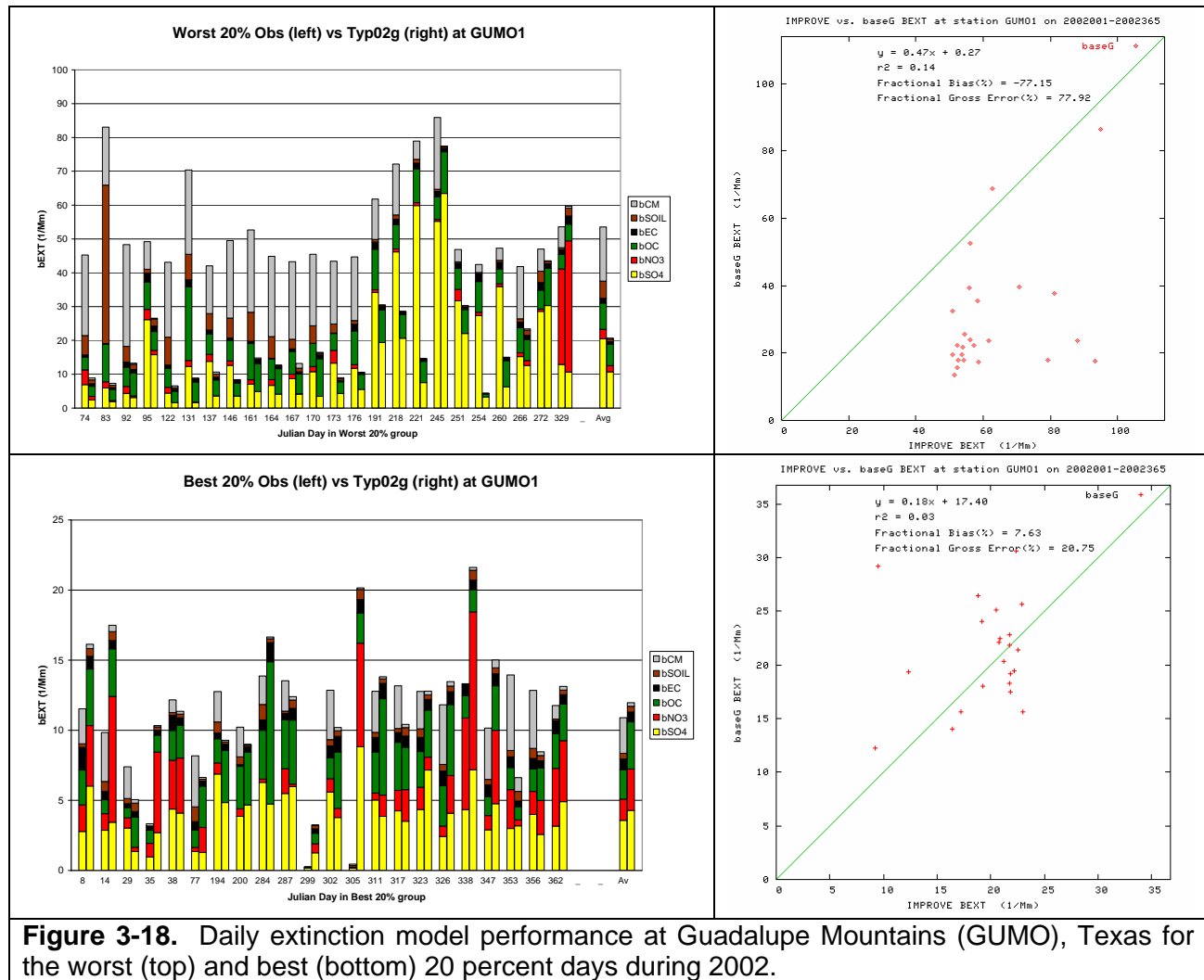


Figure 3-17. Daily extinction model performance at Big Bend (BIBE), Texas for the worst (top) and best (bottom) 20 percent days during 2002.

3.7.10 Guadalupe Mountains (GUMO) Texas

Most of the worst 20 percent days at GUMO are high dust days with high Soil and CM that is not captured by the model (Figure 3-18). Extinction due to Soil and CM on the worst 20 percent days is underestimated by -105% and -191%, respectively (Figure C-57). Better performance is seen on the best 20 percent days with bias and error for total extinction of 8% and 21%, but the model still understates Soil and CM.



3.8 Model Performance Evaluation Conclusions

The model performance evaluation reveals that the model is performing best for SO₄, OMC and EC. Soil performance is mixed with a winter overestimation bias with lower bias and higher error in the summer. CM performance is poor year round. The operational evaluation reveals that SO₄ performance usually achieves the PM model performance goal and always achieves the model performance criteria, although it does have an underestimation bias that is greatest in the summer. NO₃ performance is characterized by a winter overestimation bias with an even greater summer underestimation bias. However, the summer underestimation bias occurs when NO₃ is very low and when it is not an important component of the observed or predicted PM mass concentrations or component of visibility impairment. Performance for OMC meets the model performance goal year round at the IMPROVE sites, but is characterized by an underestimation bias at the more urban STN sites. EC exhibits very low bias at the STN sites and a summer underestimation bias at the IMPROVE sites, but meets the model performance goal throughout the year. Soil has a winter overestimation bias that is outside of the model performance goal and criteria raising questions whether the model should be used for this species. Finally, CM performance is extremely poor with an underprediction bias that is outside of the performance goal and criteria. We suspect that much of the CM concentrations measured at the IMPROVE sites is due to highly localized emissions from fugitive dust sources that are not included in the emissions inventory and would be difficult to simulate using 36 km regional modeling.

Performance for the worst 20 percent days at the CENRAP Class I areas is generally characterized by an underestimation bias. Performance at the BRET, BIBE and GUMO Class I areas for the worst 20 percent days is particularly suspect and care should be taken in the interpretation of the visibility projections at these three Class I areas.

The CMAQ 2002 36 km model appears to be working well enough to reliably make future-year projections for changes in SO₄, NO₃, EC and OMC at the rural Class I areas. Performance for Soil and especially CM is suspect enough that care should be taken in interpreting these modeling results. The model evaluation focused on the model's ability to predict the components of light extinction mainly at the Class I areas. Additional analysis would have to be undertaken to examine the model's ability to simulate ozone and fine particulate to address 8-hour ozone and PM_{2.5} attainment issues.

4.0 VISIBILITY PROJECTIONS

This section presents the future-year visibility projections for Class I areas within and near the CENRAP states and their comparison with the 2018 Uniform Rate of Progress (URP) point. As noted in Chapter 1, the Regional Haze Rule (RHR) requires states with Class I areas to develop State Implementation Plans (SIPs) that include reasonable progress goals (RPGs) for improving visibility in each Class I area and emission reduction measures to meet those goals. For the initial SIPs due in December 2007, states are required to adopt RPGs for improving visibility from Baseline Conditions. The 2000-2004 five-year period is used to define Baseline Conditions and the first future progress period is 2018. A state is required to set RPGs for each Class I area in the state for two visibility metrics:

- Provide for an improvement in visibility for the most impaired visibility days (i.e., the worst 20 percent days); and
- Ensure no degradation in visibility for the least impaired visibility days (i.e., the best 20 percent days).

The goal of the RPGs is to provide for a rate of improvement sufficient to be on a course to attain “Natural Conditions” by 2064. States are to define controls to meet RPGs every 10 years, starting in 2018, which defines progress periods ending in 2018, 2028, 2038, 2048, 2058 and finally 2064. States will determine whether they are meeting their goals by comparing visibility conditions from one five-year period to another (e.g., 2000-2004 to 2013-2017). As stated in 40 CFR 51.308 (d) (1), baseline visibility conditions, reasonable progress goals, and changes in visibility must be expressed in terms of deciview (dv) units. The haze index (HI) metric of visibility impairment, in deciviews, is derived from light extinction (b_{ext}) as follows:

$$HI = 10 \ln (b_{ext}/10),$$

Where light extinction (b_{ext}) is expressed in terms of inverse megameters ($Mm^{-1} = 10^{-6} m^{-1}$). Light extinction (b_{ext}) is calculated using the observed fine particulate concentrations from the IMPROVE monitors using either the original or the new IMPROVE aerosol extinction equation. Both equations are discussed below.

4.1 Guidance for Visibility Projections

EPA has published several guidance documents that relate to how modeling results should be used to project future-year visibility and how states should define RPGs:

“Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze” (EPA, 2007a).

“Guidance for Tracking Progress Under the Regional Haze Rule” (EPA, 2003a).

“Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Rule” (EPA, 2003b).

“Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program” (EPA, 2007b).

The first EPA modeling guidance document listed above (EPA, 2007) discusses the use of modeling results to project future-year visibility. The second EPA guidance document (EPA, 2003a) focuses on monitored visibility, how to define the visibility Baseline Conditions and how to track visibility goals. The third EPA guidance document discusses procedures for defining Natural Conditions for a Class I area. Natural Conditions are the visibility goal for 2064. Although states may propose alternative approaches for defining Natural Conditions, in this section we use the default Natural Conditions at Class I areas (EPA, 2003b; Pitchford, 2006). The final EPA guidance document discusses how states should define their RPGs and their relationship to the 2018 URP point.

The EPA documents discussed above are followed for the visibility projections presented in this section with one notable exception. Some of the EPA documents are based on the original IMPROVE equation (e.g., EPA, 2003a, b). The CENRAP visibility projections are based on the new IMPROVE equation, although projections based on the original IMPROVE equation are also presented as an alternative approach in Chapter 5. EPA guidance allows for using either the original or the new IMPROVE equation (EPA, 2007a; Timin, 2007). CENRAP, along with the other RPOs, have elected to use the new IMPROVE equation for their visibility projections.

4.2 Calculation of Visibility and 2018 URP Point from IMPROVE Measurements

EPA guidance recommends using the model in a relative sense to project future-year visibility conditions (EPA, 2007a). This projection is made using Relative Response Factors (RRFs) that are defined as the ratio of the future-year modeling results to the base-year modeling results. The RRFs are applied to the baseline visibility conditions to project future-year visibility. The major features of EPA’s recommended visibility projection approach are as follows (EPA, 2003a,b; 2007a):

- Monitored data are used to define current visibility Baseline Conditions using IMPROVE monitoring data from the 2000-2004 five-year base period.
- Monitored concentrations of PM₁₀ are divided into six major components, the first five of which are assumed to be PM_{2.5} and the sixth is coarse mass (CM or PM_{2.5-10}).
 - SO₄ (sulfate) that is assumed to be ammonium sulfate [(NH₄)₂SO₄];
 - NO₃ (particulate nitrate) that is assumed to be ammonium nitrate [NH₄NO₃];
 - OC (organic carbon) that is assumed to be total organic mass carbon (OMC)
 - EC (elemental carbon);
 - IP (other fine inorganic particulate or Soil); and
 - CM (coarse mass).
- Models are used in a relative sense to develop RRFs between baseline and future predicted concentrations of each component.

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- PM component-specific RRFs are multiplied by observed Baseline monitored values to estimate future-year PM component concentrations.
- Estimates of future-year component concentrations are consolidated to provide an estimate of future-year air quality and visibility using either the original or new IMPROVE equation.
- Future-year model projected visibility is compared with the 2018 point on the URP glidepath to assist in evaluating the visibility improvements.
- It is assumed that all measured sulfate is in the form of ammonium sulfate $[(\text{NH}_4)_2\text{SO}_4]$ and all particulate nitrate is in the form of ammonium nitrate $[\text{NH}_4\text{NO}_3]$.

In order to facilitate tracking visibility progress, three important visibility concepts are required for each Class I area:

Baseline Conditions: Baseline Conditions represent visibility for the 20 percent best (B20%) and 20 percent worst (W20%) visibility days for the initial five-year baseline period of the regional haze program. Baseline Conditions are calculated using IMPROVE monitor data collected during the 2000-2004 five-year period and are the starting point in 2004 for the URP glidepath and 2018 visibility projections.

Natural Conditions: Estimates of natural visibility conditions for the best 20 percent and worst 20 percent days at a Class I area (i.e., visibility conditions that would be experienced in the absence of human-caused impairment). EPA has defined a set of default Natural Conditions for the original IMPROVE equation (EPA, 2003b) that has been updated to the new IMPROVE equation by the Natural Haze Levels II Committee (Pitchford, 2006) that we have used in this Chapter.

2018 URP Point: The 2018 Uniform Rate of Progress (URP) point is defined by defining a linear glidepath in deciviews starting with the 2000-2004 Baseline Conditions in 2004 and ending at Natural Conditions in 2064. Where the linear glidepath passes through 2018 is the 2018 URP point in deciviews.

4.2.1 Calculation of Visibility from IMPROVE PM Measurements

Baseline Conditions for Class I areas are calculated using the procedures in EPA's guidance document (EPA, 2003a) and fine and coarse particulate matter concentrations measured at IMPROVE monitors (Malm et al, 2000; Debell et al., 2006). Currently, each Class I area in the CENRAP domain has an associated IMPROVE monitor. The IMPROVE monitors do not directly measure visibility, but instead measure speciated fine particulate ($\text{PM}_{2.5}$) and total $\text{PM}_{2.5}$ and PM_{10} mass concentrations from which visibility is obtained through the IMPROVE equation.

Visibility conditions are estimated starting with the IMPROVE 24-hour average mass measurements for six PM species:

- Sulfate [(NH₄)₂SO₄];
- Particulate Nitrate [(NH₄NO₃);
- Organic Matter Carbon or Organic Mass by Carbon [OMC];
- Elemental Carbon [EC] or Light Absorbing Carbon [LAC];
- Other fine particulate [Soil]; and
- Coarse Matter or Coarse Mass [CM].

The IMPROVE monitors do not directly measure some of these species so assumptions are made as to how the IMPROVE measurements can be adjusted and combined to obtain these six components of light extinction. For example, in the IMPROVE equation sulfate and particulate nitrate are assumed to be completely neutralized by ammonium. In addition, only the fine mode (PM_{2.5}) of PM is speciated by the IMPROVE monitor to obtain sulfate and nitrate measurements (that is, any coarse mode sulfate and nitrate in the real atmosphere may be present in the CM IMPROVE measurement). Concentrations for the above six components of light extinction in the IMPROVE equation are obtained from the IMPROVE measured species using the mappings shown in Table 4-1:

Table 4-1. Definition of IMPROVE PM Components from Measured IMPROVE Species.

IMPROVE Component	IMPROVE Measured Species
Sulfate	1.375 x (3 x S)
Nitrate	1.29 x NO ₃ ⁻
OMC	1.4*OC (original IMPROVE) and 1.8*OC (new IMPROVE)
LAC	EC
Soil	2.2*AL + 2.49*SI + 1.63*CA + 2.42*FE + 1.94*TI
CM	MT – MF

Where:

- S is elemental sulfur as determined from proton induced x-ray emissions (PIXE) analysis of the IMPROVE Module A¹. To estimate the mass of the sulfate ion (SO₄⁻), S is multiplied by 3 to account the presence of oxygen. If S is missing then the sulfate (SO₄) measured by ion chromatography analysis of the Module B is used to replace (3 x S). For the IMPROVE aerosol extinction calculation, Sulfate is assumed to be completely neutralized by ammonium (1.375 x SO₄).
- NO₃⁻ is the particulate nitrate measured by ion chromatography analysis of the Module B. For the IMPROVE aerosol extinction calculation, it is assumed to be completely neutralized by ammonium (1.29 x NO₃⁻).
- The IMPROVE Organic Carbon (OC) measurements are multiplied by 1.4 to obtain Organic Mass Carbon (OMC) using the original IMPROVE equation and multiplied by 1.8 for the new IMPROVE equation. This adjustment of the measured OC accounts for mass due to other elements in the OMC besides Carbon.
- Elemental Carbon (EC) is also referred to as Light Absorbing Carbon (LAC).

¹ The IMPROVE sampler consists of four independent modules (A, B, C and D). Each module incorporates a separate inlet, filter pack and pump assembly and are controlled by a common timing mechanism. Module A measures fine PM mass and elements. Module B measures sulfate and nitrate ions. Module C measures EC and OC. Module D measures PM₁₀ mass. (see <http://vista.cira.colostate.edu/improve/> for more details).

- Soil is determined as a sum of the masses of those elements (measured by PIXE) predominantly associated with soil (Al, Si, Ca, Fe, K and Ti), adjusted to account for oxygen associated with the common oxide forms. Since K and FE are products of the combustion of vegetation, they are both represented in the formula by 0.6 x Fe and K is not shown explicitly.
- MT and MF are total PM₁₀ and PM_{2.5} mass, respectively.

4.2.1.1 Original and New IMPROVE Equations

Associated with each PM species is an extinction efficiency that converts concentrations (in µg/m³) to light extinction (in inverse megameters, Mm⁻¹). Sulfate and nitrate are hygroscopic which means that they can absorb water from the atmosphere which changes their extinction efficiency. This is accounted for through relative humidity adjustment factors [f(RH)] that increase the particle’s extinction efficiency with increasing RH to account for the particles taking on water. Note that some OMC may also have hygroscopic properties, but the IMPROVE equations assume OMC is non-hygroscopic.

There are currently two IMPROVE equations that are used to convert the measured PM concentrations to light extinction, the original (or old) and the new IMPROVE equations.

4.2.1.1.1 Original IMPROVE Equation

The original IMPROVE equation that converts PM species concentrations to light extinction is given as follows:

$$\begin{aligned}
 b_{\text{Sulfate}} &= 3 \times f(\text{RH}) \times [\text{Sulfate}] \\
 b_{\text{Nitrate}} &= 3 \times f(\text{RH}) \times [\text{Nitrate}] \\
 b_{\text{EC}} &= 10 \times [\text{EC}] \\
 b_{\text{OMC}} &= 4 \times [\text{OMC}] \\
 b_{\text{Soil}} &= 1 \times [\text{Soil}] \\
 b_{\text{CM}} &= 0.6 \times [\text{CM}]
 \end{aligned}$$

Monthly average f(RH) factors are used as recommended in EPA’s guidance (EPA, 2003a). These values are available in the final EPA guidance document (EPA, 2003a) and at: ftp://ftp.saic.com/raleigh/RegionalHaze_2002FRHcurve/fRH_analysis/.

The total light extinction (b_{ext}) is assumed to be the sum of the light extinction due to the six PM species listed above plus Rayleigh (blue sky) background (b_{Ray}) that is assumed to be 10 Mm⁻¹.

$$b_{\text{ext}} = b_{\text{Ray}} + b_{\text{Sulfate}} + b_{\text{Nitrate}} + b_{\text{EC}} + b_{\text{OMC}} + b_{\text{Soil}} + b_{\text{CM}}$$

The total light extinction (b_{ext}) in Mm⁻¹ is related to visual range (VR) in km using the following relationship:

$$\text{VR} = 3912 / b_{\text{ext}},$$

for b_{ext} in Mm^{-1} .

The Regional Haze Rule requires that visibility be expressed in terms of a haze index (HI) in units of deciviews (dv), which is calculated as follows:

$$HI = 10 \ln(b_{ext}/10)$$

4.2.1.1.2 New IMPROVE Equation

The new IMPROVE equation is nonlinear in SO₄, NO₃ and OMC concentrations accounting for the different light scattering efficiency characteristics as a function of concentrations for these three species. It is expressed as follows:

$$\begin{aligned} b_{Sulfate} &= 2.2 \times f_S(RH) \times [Small\ Sulfate] + 4.8 \times f_S(RH) \times [Large\ Sulfate] \\ b_{Nitrate} &= 2.4 \times f_S(RH) \times [Small\ Nitrate] + 5.1 \times f_S(RH) \times [Large\ Nitrate] \\ b_{EC} &= 10 \times [Elemental\ Carbon] \\ b_{OMC} &= 2.8 \times [Small\ Organic\ Mass] + 6.1 \times [Large\ Organic\ Mass] \\ b_{Soil} &= 1 \times [Fine\ Soil] \\ b_{CM} &= 0.6 \times [Coarse\ Mass] \\ b_{NaCl} &= 1.7 \times f_{SS}(RH) \times [Sea\ Salt] \\ b_{NO2} &= 0.33 \times [NO_2\ (ppb)] \end{aligned}$$

The total Sulfate, Nitrate and OMC are each split into two fractions, representing small and large size distributions of those components. As noted in Table 4-1, the OMC is 1.8 times the IMPROVE OC measurement in the new IMPROVE algorithm, compared to 1.4 times the IMPROVE OC measurement in the original IMPROVE equation. New terms have been added for Sea Salt (important for coastal areas and possibly other areas) and for light absorption by NO₂ (only used where NO₂ observations are available). As none of the CENRAP Class I area IMPROVE sites measure NO₂ concentrations, then this component of the new IMPROVE equations was not used. Site-specific Rayleigh scattering for each IMPROVE monitoring site is used in the new IMPROVE equation, as compared to a constant 10 Mm^{-1} value assumed in the original IMPROVE equation.

The apportionment of the Small and Large components of Sulfate, Nitrate and Organic Mass is done as follows:

$$\begin{aligned} [Large\ Sulfate] &= [Total\ Sulfate] / 20 \times [Total\ Sulfate], \text{ for } [Total\ Sulfate] < 20 \mu\text{g}/\text{m}^3 \\ [Large\ Sulfate] &= [Total\ Sulfate], \text{ for } [Total\ Sulfate] \geq 20 \mu\text{g}/\text{m}^3 \\ [Small\ Sulfate] &= [Total\ Sulfate] - [Large\ Sulfate] \end{aligned}$$

The same equations are used to apportion Total Nitrate and Total OMC among their Large and Small components.

The total extinction (b_{ext}) in the new IMPROVE equations is the sum of all the extinction components associated with each PM species. The new IMPROVE equation adds Sea Salt and

NO₂ as noted above. In addition, site-specific Rayleigh background is used with the new IMPROVE equation:

$$b_{\text{ext}} = b_{\text{Ray}} + b_{\text{Sulfate}} + b_{\text{Nitrate}} + b_{\text{EC}} + b_{\text{OMC}} + b_{\text{Soil}} + b_{\text{CM}} + b_{\text{NaCl}} + b_{\text{NO}_2}$$

The Haze Index (HI) and Visual Range (VR) are calculated from the total extinction from the new IMPROVE equation using the same formulas as given above for the original IMPROVE equation.

4.2.1.1.3 Justification for Using the New IMPROVE Equation

The new IMPROVE equation was developed using the latest scientific information on PM species extinction properties combined with fitting reconstructed light extinction based on IMPROVE measured PM and NO₂ concentrations with actual co-located measured light extinction (e.g., nephelometer measurements). Figure 4-1 displays example comparisons of 24-hour light extinction using the original and new IMPROVE equations compared against 24-hour nephelometer measurements of light extinction at the Great Smoky Mountains Class I area IMPROVE monitor. The original IMPROVE equation has a bias toward understating light extinction at the high end and overstating it at the low end, whereas the new IMPROVE equation does a better job in estimating light extinction from measured PM at all extinction levels. Because the new IMPROVE equation is based on more recent science and fits the observed light extinction values better, the CENRAP states have elected to perform their primary visibility projections using the new IMPROVE equation. Results using the original IMPROVE equation are presented in Section 5 as an alternative approach.

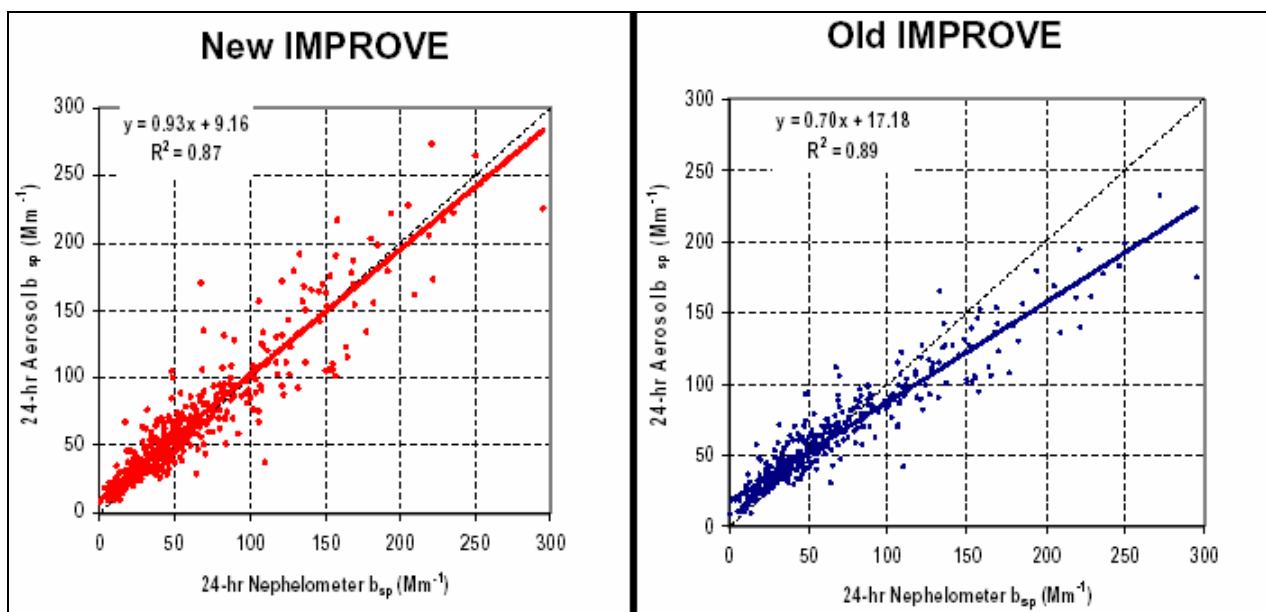


Figure 4-1. Comparisons of observed light extinction with reconstructed light extinction using the new (left) and original (right) IMPROVE equations at the Great Smoky Mountains National Park.

4.2.2 Calculation of the Baseline Conditions

The visibility Baseline Conditions for the worst 20 percent and best 20 percent days is calculated from the IMPROVE observations from the 2000-2004 period for each Class I area following EPA's guidance (EPA, 2003a). The basic procedures for calculating the Baseline Conditions are as follows:

1. Determine whether the observed IMPROVE data for each site and year satisfies EPA's minimal data capture criteria (EPA, 2003a). If there are less than three years with valid data capture for the 2000-2004 Baseline then the Baseline Conditions can not be calculated and data filling is needed.
2. For each year in the 2000-2004 period with sufficient valid data, rank the visibility in terms of extinction or deciview using either the original or new IMPROVE equation and monthly average $f(RH)$ factors (EPA, 2003a).
3. For the worst 20 percent days, extract the 20% most impaired visibility days for each year (similarly for best 20 percent days extract 20% cleanest days). With a complete yearly data capture of IMPROVE 1:3 day sampling frequency this would result in 24 worst 20 percent and 24 best 20 percent days in a year.
4. For each worst 20 percent (or best 20 percent) day in each year, calculate 24-hour average visibility extinction using the IMPROVE measurements and either the original and new IMPROVE equation, convert the daily extinction to daily deciview and then average across each year to get yearly average deciview extinction for the worst 20 percent (or best 20 percent) days for each valid year from the 2000-2004 period.
5. Average the annual average deciview worst 20 percent (or best 20 percent) days deciview across each valid year in the 2000-2004 period (minimum of 3 valid years required) to get the worst 20 percent (or best 20 percent) Baseline Conditions.

4.2.3 Data Filling for Sites with Insufficient Valid Data to Calculate Baseline Conditions

Three CENRAP Class I areas did not contain sufficient IMPROVE observations during the five-year 2000-2004 Baseline to have three valid years of data from which Baseline Conditions could be constructed: Breton Island (BRET), Louisiana; Boundary Waters (BOWA), Minnesota and Mingo (MING), Missouri. For these three Class I areas, data filling was used to obtain sufficient data so that at least three-years of valid data were available from which Baseline Conditions could be calculated. These data filled IMPROVE databases were prepared and made available on the VIEWS website. More information on the data filling procedures can be found at the VIEWS website: (<http://vista.cira.colostate.edu/views/>).

4.2.4 Natural Conditions

EPA has published default Natural Conditions for Annual Average and the worst 20 percent and best 20 percent days based on the original IMPROVE equation (EPA, 2003b). These default Natural Conditions have been updated to the new IMPROVE equation by the Natural Haze Levels II Committee (Pitchford, 2006). These default Natural Conditions are used as the anchor point for the glidepaths in 2064 and are provided in Appendix D for the CENRAP Class I areas.

4.2.5 2018 URP Point

The 2018 point on the Uniform Rate of Progress (URP) glidepath is constructed by generating a linear glidepath in deciviews from the Baseline Conditions in 2004 to Natural Conditions in 2064. Where the linear glidepath crosses 2018 is the 2018 URP point or the 2018 URP point. Figure 4-2 displays an example linear glidepath for the Caney Creek Class I area in Arkansas. There are three years of sufficient valid IMPROVE data during the 2000-2004 Baseline (2002, 2003 and 2004) with values of 27.21, 26.52 and 25.34 dv resulting in worst 20 percent Baseline Conditions of 26.36 dv that is placed as the starting point in 2004 for the glidepath. The ending point for the glidepath is 11.58 dv which is the default Natural Conditions for the worst 20 percent days (EPA, 2003b; Pitchford, 2006). The linear glidepath crosses 2018 at 22.91 dv which becomes the 2018 URP point.

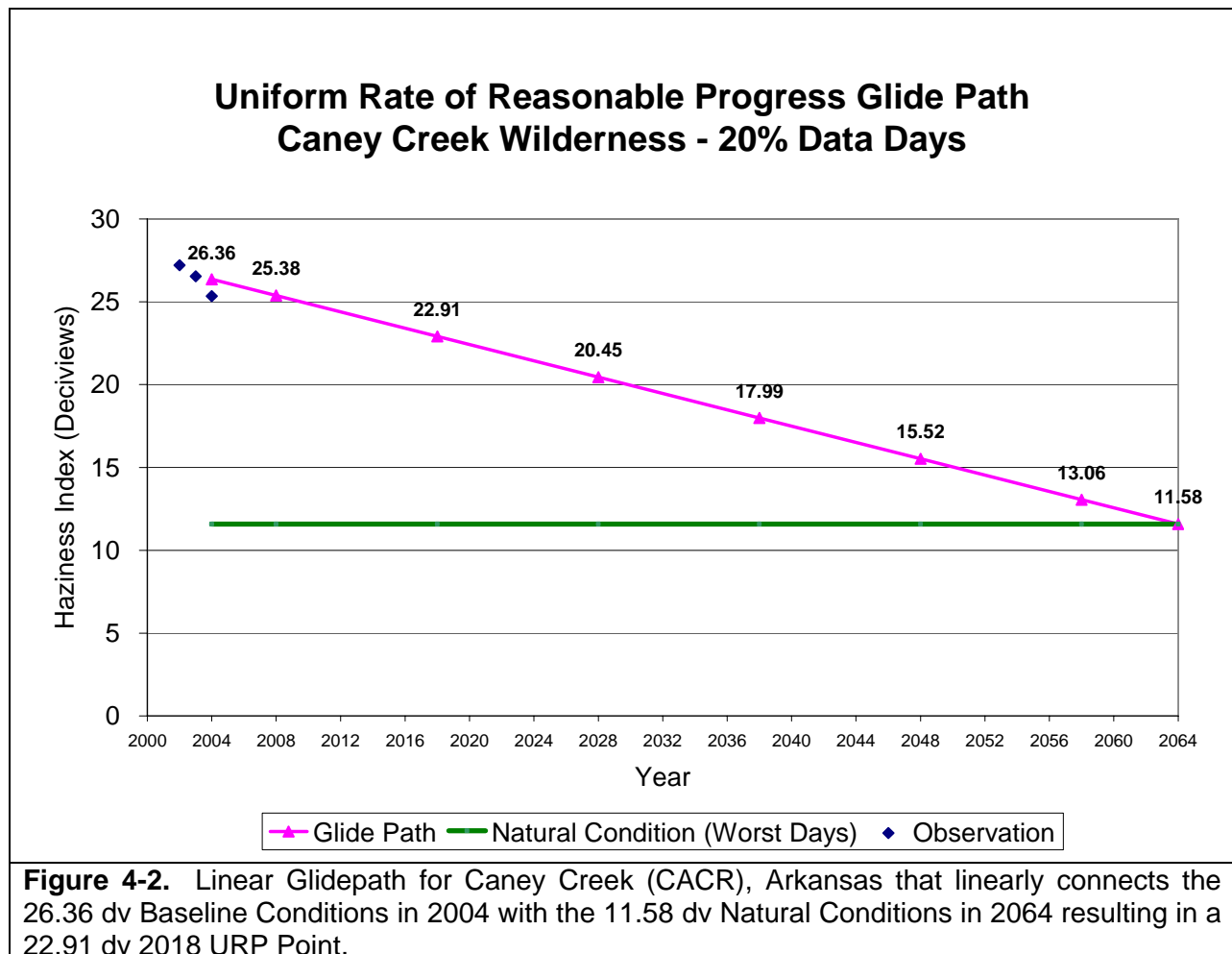


Figure 4-2. Linear Glidepath for Caney Creek (CACR), Arkansas that linearly connects the 26.36 dv Baseline Conditions in 2004 with the 11.58 dv Natural Conditions in 2064 resulting in a 22.91 dv 2018 URP Point.

4.3 EPA Default Approach to Visibility Projections

For CENRAP’s model application for a single year (2002), EPA’s regional haze modeling guidance recommends developing Class I area-specific and PM species-specific RRFs based on the average concentrations for the worst 20 percent days from 2002 (EPA, 2007). Thus, this is

the methodology used to project 2018 visibility estimates in this section. For example, if $SO_4(2002)_i$ and $SO_4(2018)_i$ are the model estimated sulfate concentrations for the 2002 worst 20 percent days ($i=1\dots N$) at a given Class I area for the 2002 and 2018 emission scenarios then the RRF for sulfate and this Class I area is given by:

$$RRF(SO_4)_i = \frac{\sum SO_4(2018)_i}{\sum SO_4(2002)_i}$$

4.3.1 Mapping of Modeling Results to the IMPROVE Measurements

As noted above, to project future-year visibility at Class I areas the modeling results are used in a relative sense to scale current observed visibility for the worst 20 percent and best 20 percent visibility days using RRFs that are the ratio of modeling results for the future-year to current-year. This scaling is done separately for each of the six components of light extinction in the IMPROVE equations. The CMAQ modeled species do not necessarily exactly match up with the IMPROVE PM species, thus assumptions must be made to map the modeled species to the IMPROVE PM species for the purpose of projecting visibility improvements. For example, CMAQ explicitly simulates ammonium and sulfate may or may not be fully neutralized in the model by ammonium, whereas the IMPROVE equations assume sulfate is fully neutralized by ammonium. For the CMAQ Version 4.5 (September 15, 2005 release) model, the mapping of modeled species to IMPROVE equation PM species is listed in Table 4-2.

Table 4-2. Mapping of CMAQ V4.5 modeled species concentrations to IMPROVE PM components.

IMPROVE Component	CMAQ V4.3 Species
Sulfate	1.375 x (ASO4J + ASO4I)
Nitrate	1.29 x (ANO3J + ANO3I)
LAC	AECJ + AECI
OMC	AORGAJ + AORGAI + AORGP AJ + AORGP AI + AORGBJ + AORGBI
Soil	A25J + A25I
CM	ACORS + ASEAS + ASOIL

For the CENRAP visibility projections using the 2002 Typical and 2018 base case Base G emission scenarios, the secondary organic aerosol (SOA) module in CMAQ V4.5 was modified (SOAmods) to include additional processes related to the generation of SOA from biogenic emissions. In particular, three new species have been added that represent SOA products from biogenic emission compounds that is not included in the standard version of CMAQ V4.5 (Morris et al., 2006c):

- ASOC1 – SOA from biogenic sources (e.g., terpenes and isoprene) that has become polymerized so is no longer volatile.
- ASOC2 – SOA from biogenic sesquiterpene and higher reactivity and higher yield monoterpene emissions.
- ASOC3 – SOA from biogenic isoprene emissions.

Thus, the species mapping for Organic Mass Carbon (OMC) and the CMAQ V4.5 SOAmods version of the model used in CENRAP 2018 visibility projections is as given in Table 4-2 only with the addition of the three new biogenic SOA species to OMC as follows:

$$\text{OMC} = \text{AORGAI} + \text{AORGAI} + \text{AORGPBJ} + \text{AORGPBI} + \text{AORGBJ} + \text{AORGBI} + \text{ASOC1} + \text{ASOC2} + \text{ASOC3}$$

4.3.2 Using Modeling Results to Project Changes in Visibility

Modeling results are used in a relative fashion to project future-year visibility using relative response factors (RRFs). RRFs are expressed as the ratio of the modeling results for the future-year to the results of the base year (2018/2002) and are Class I area and PM species specific. RRFs are applied to the Baseline Condition observed PM species to project future-year PM levels from which visibility can be assessed using the IMPROVE equations listed above. The following six steps are used to project future-year visibility for the worst 20 percent and best 20 percent visibility days (discussion is for worst 20 percent days but also applies to best 20 percent days):

1. For each Class I area and each monitored day, daily visibility is ranked using IMPROVE data and IMPROVE equation (either original or new IMPROVE equation) for each year from the five-year baseline period (2000-2004) to identify the worst 20 percent visibility days for each year from the five-year baseline (see Baseline Conditions discussion above).
2. Use an air quality model to simulate a base year period (ideally the five-year Baseline period of 2000-2004, but for CENRAP just the 2002 annual period was simulated) and a future-year (e.g., 2018) and use the resulting information to develop Class I area-specific RRFs for each of the six components of light extinction in the IMPROVE equation (SO₄, NO₃, EC, OMC, Soil and CM).
3. Multiply the RRF times the measured 24-hour PM concentration data for each day from the worst 20 percent days in each year from the five-year Baseline period to obtain projected future-year 24-hour PM concentrations for the worst 20 percent days and the five-year Baseline.
4. Compute the future-year daily extinction using the IMPROVE equation and the projected PM concentrations for each of the worst 20 percent days in the five-year baseline from Step 3.
5. For each of the worst 20 percent days within each year of the five-year baseline, convert the future-year daily extinction to deciview and average the daily deciview values within each of the five years separately to obtain five-years (or as many years with valid data in the 2000-2004 Baseline) of average deciview visibility for the worst 20 percent days.
6. Average the five-years of average deciview visibility to obtain the future-year visibility Haze Index estimate that is the future-year estimated visibility.

In calculating the RRFs, EPA draft guidance recommends selecting estimated PM species concentrations “near” the monitor by taking a spatial average of PM concentrations across a grid cell resolution dependent NX by NY array of cells centered on the grid containing the monitor. The NX x NY array of cells is grid resolution specific with EPA recommending that NX=NY=1 for 36 km grids, NX=NY=3 for 12 km grids and NX=NY=7 for 4 km grids (EPA, 2007). For the CENRAP 2002 36 km modeling, just the model estimates for the grid cell containing the monitor was used (i.e., NX=NY=1).

4.4 EPA Default 2018 Visibility at CENRAP and Nearby Class I areas and Comparisons to 2018 URP Goals

Using the EPA default visibility projection procedure described in Section 4.3 and the CENRAP 2002 Typical Base G and 2018 Base Case Base G CMAQ modeling results, 2018 visibility projections were made for CENRAP and nearby Class I areas. Appendix D details the 2018 Base G visibility projections for each Class I area in the CENRAP region using the new IMPROVE equation. Results for the Caney Creek (CACR), Arkansas Class I area are discussed in Section 4.4.1 below. Displays for other CENRAP Class I areas are provided in Appendix D and summarized in Section 4.4.2

4.4.1 Example 2018 Base G Visibility Projections for Caney Creek, Arkansas

The 2018 visibility projections for the Caney Creek (CACR), Arkansas Class I area given in Figure D-1 in Appendix D are reproduced in Figure 4-3 and described below.

4.4.1.1 EPA Default 2018 Visibility Projections

The 2018 Base G visibility projection using the EPA default method (EPA, 2007a) and comparison with the 2018 URP point for the worst 20 percent days and the CACR Class I area is shown in Figure 4-3a. The 2000-2004 Baseline Conditions for CACR is 26.36 dv and the 2018 URP point is 22.91 dv so that a 3.45 dv reduction in visibility for the worst 20 percent days is needed to meet the 2018 URP point. The 2018 Base G CMAQ projected visibility is 22.48 dv so that the modeling predicts more visibility improvements (3.88 dv reduction) than required to meet the 2018 URP point (3.45 dv reduction). When looking at visibility projections across several Class I areas, it has been useful to present the 2018 visibility projections as a percentage of meeting the 2018 URP point; where 100% is meeting the point, greater than 100% surpassing the point (i.e., below the glidepath) and less than 100% means that less visibility improvement is achieved than needed to meet the 2018 URP point. For 2018 Base G CMAQ modeling at CACR, we achieve 112% of the visibility reduction needed to meet the 2018 URP point. Note that meeting the 2018 URP point is not a requirement of the RHR SIPs, rather it just serves as a benchmark to compare progress toward Natural Conditions in 2064 and is designed to help states in selecting their 2018 RPGs. As clearly stated in EPA guidance “The glidepath is not a presumptive target, and States may establish a RPG that provides for greater, lesser, or equivalent improvement as that described by the glidepath” (EPA, 2007b).

The 2018 Base G CMAQ visibility projections for the best 20 percent days and CACR is shown in Figure 4-3b. Recall the RHR goal for this visibility metric is no worsening of the visibility for the best 20 percent days. The Baseline Conditions for the best 20 percent days at CACR is 11.24 dv. The 2018 Base G projected visibility for the best 20 percent days is 10.35 dv, which represents a 0.89 dv visibility improvement for the best 20 percent days at CACR and demonstrating no worsening in visibility for the best 20 percent days.

Figure 4-3c displays “StackedBar Chart” plots of observed and model estimated extinction for each of the worst 20 percent days in 2002 and the 2002 Typical Base G CMAQ simulation and the average across the worst 20 percent days. This figure allows a comparison of how well the model is reproducing the observed extinction at CACR for the worst 20 percent days in 2002 and the breakdown of the PM components that are contributing to visibility impairment (more details on model performance were presented in Chapter 3). The 2002 worst 20 percent days at CACR are dominated by SO₄ days (yellow), although during the winter there are also three days dominated by NO₃ (Julian Days 80, 320 and 341). For most of the worst 20 percent days at CACR, the model reproduces the observed extinction reasonably well, although it does tend to understate SO₄ on a few days and overstate NO₃ on the four winter days. The observed average extinction across the 2002 worst 20 percent days at CACR is 150 Mm⁻¹, compared to a modeled value that is 23% lower (115 Mm⁻¹).

Figure 4-3d displays “Boxplots” of differences in modeled extinction for the 2002 worst 20 percent days between the 2018 Base G and 2002 Typical Base G CMAQ simulations. On most days SO₄ is the largest component of the extinction that is estimated to be reduced at CACR on the worst 20 percent days. The exception to this is for the winter NO₃ days where NO₃ is the largest component of extinction that is reduced. The modeling results are not used directly in the visibility projections, rather they are used to develop the PM-species specific RRFs. That is, an important attribute in Figures 4-3c and 4-3d is the relative changes in the modeled PM species averaged across the worst 20 percent days that are represented by the last bar in each figure and provide insight into the RRFs used in the visibility projections. These results are summarized in Table 4-3 below. Table 4-3 compares the average extinction across the 2002 worst 20 percent days at CACR from the measured IMPROVE data, the modeled values and the modeled change in extinction between the 2018 and 2002 emissions scenarios. Although the results in Table 4-3 are not RRFs (RRFs are based on ratios of concentrations not extinction) they do show how the RRFs may magnify or deflate the importance of a modeled PM species. For example, the model estimates that approximately 23% (26.66 Mm⁻¹) of the visibility extinction average across the worst 20 percent days is due to NO₃, whereas it is only 7% in the observed values (10.22 Mm⁻¹). So the modeled ~40% reduction in NO₃ between the 2018 and 2002 scenarios is applied to the smaller observed NO₃ value to obtain the 2018 projected NO₃ value making NO₃ a smaller portion of the 2018 projected visibility than the 2018 modeled visibility. On the other hand, the modeled SO₄ extinction is less than observed so that its importance in the 2018 projections is much greater than in the modeled 2018 SO₄ values.

Table 4-3. Observed and Modeled Extinction by Species Averaged Across the Worst 20 Percent Days in 2002 at CACR.

	2002 Average Observed W20% (Mm ⁻¹)	2002 Average Modeled W20% (Mm ⁻¹)	2018-2002 Reduction (Mm ⁻¹)	2018-2002 Reduction (%)
bSO4	109.50	67.90	-24.47	-36%
bNO3	10.22	26.66	-10.90	-41%
bOMC	19.65	16.68	-2.12	-13%
bEC	4.38	2.32	-0.67	-29%
bSOIL	1.43	1.04	+0.21	+20%
bCM	4.30	0.37	-0.01	-3%

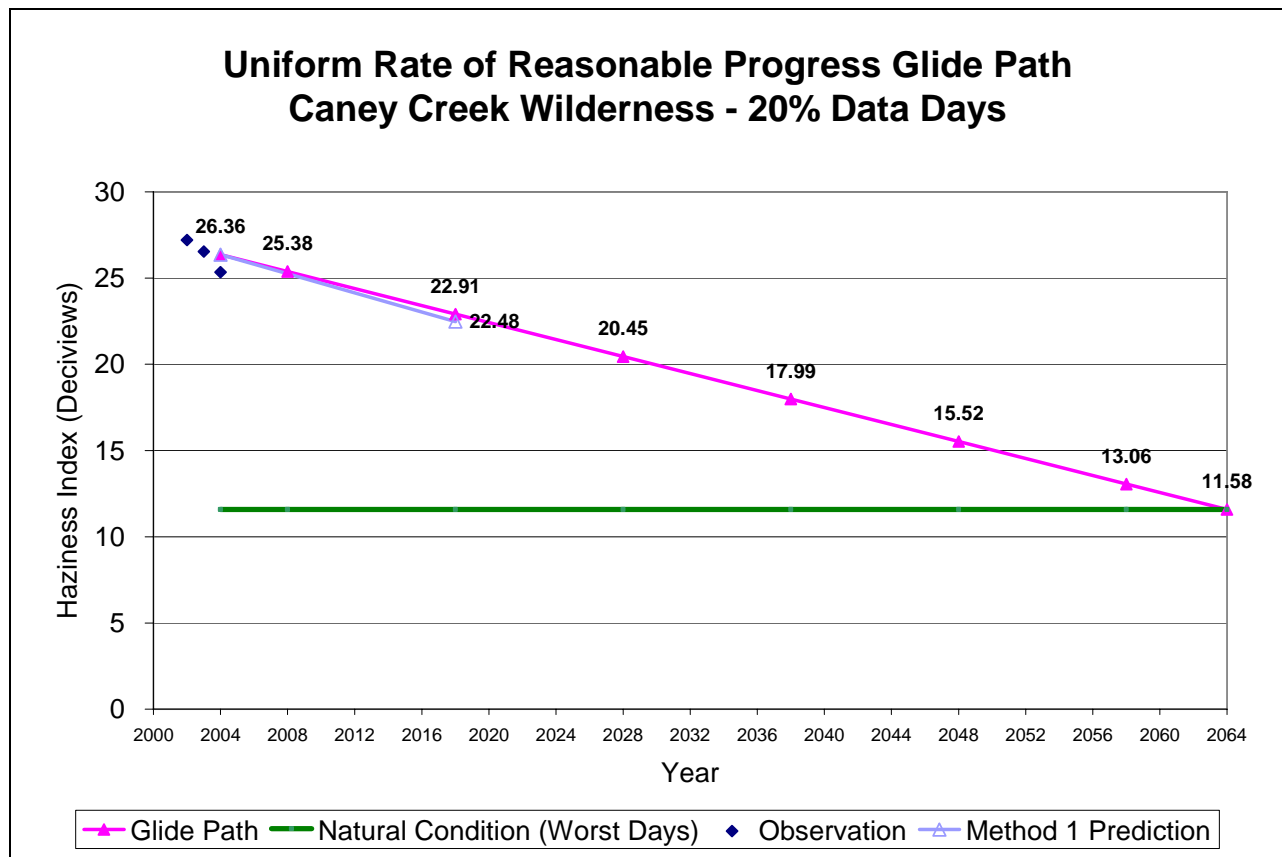


Figure 4-3a. 2018 Visibility Projections and 2018 URP Glidepaths in Deciview for Caney Creek (CACR), Arkansas and Worst 20 Percent (W20%) days Using 2002/2018 Base G CMAQ 36 km Modeling Results.

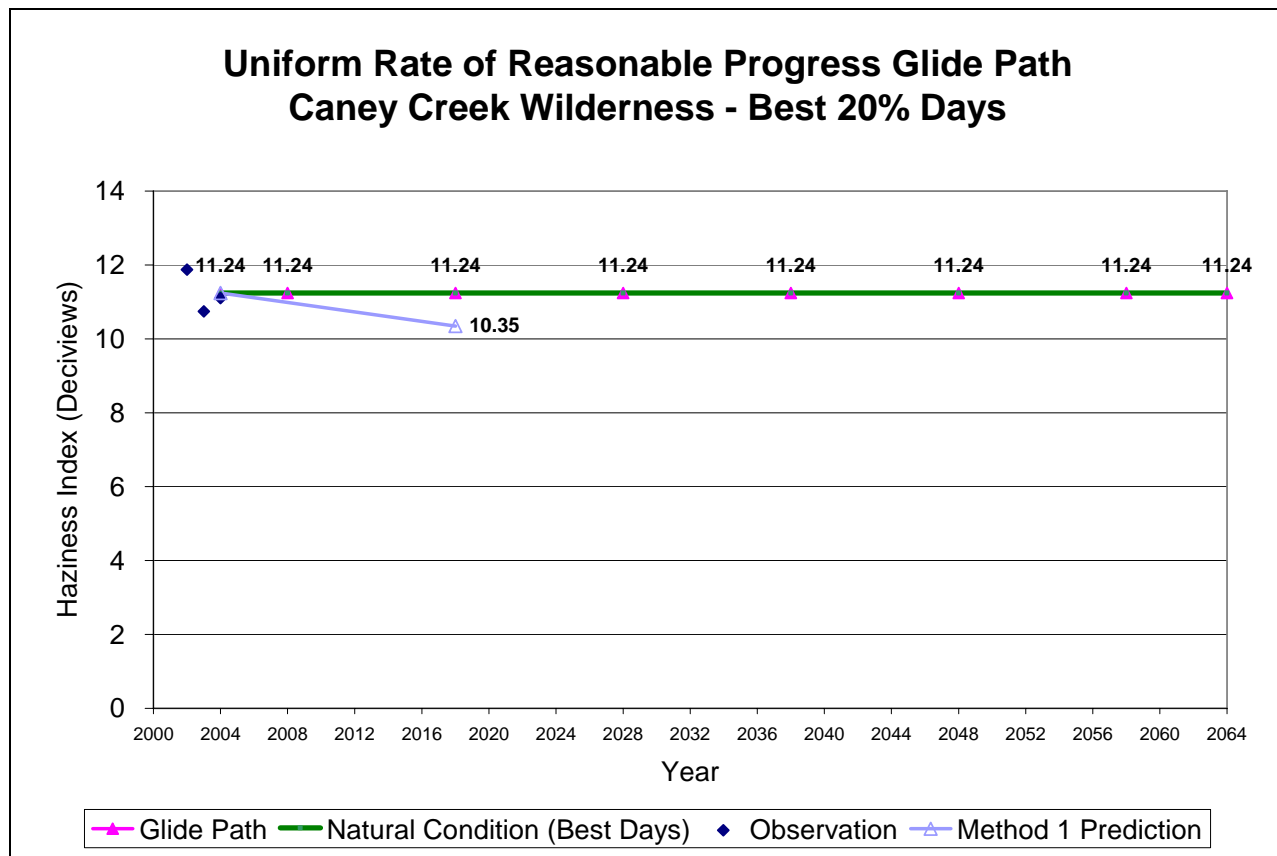


Figure 4-3b. 2018 Visibility Projections and 2018 URP Glidepaths in Deciview for CACR, Arkansas and Best 20 Percent (B20%) days Using 2002/2018 Base G CMAQ 36 m Modeling Results.

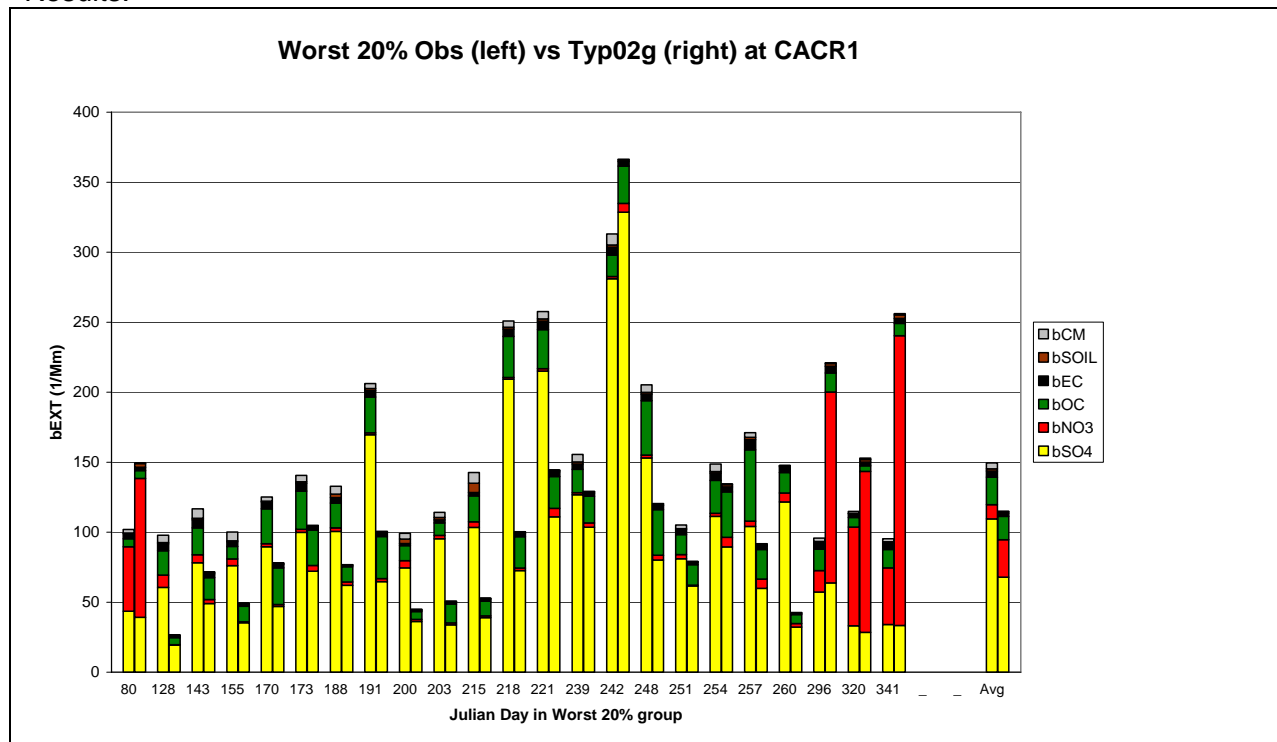


Figure 4-3c. Comparison of Observed (left) and 2002 Base G Modeled (right) Daily Extinction for Caney Creek (CACR), Arkansas and Worst 20 Percent (W20%) days in 2002.

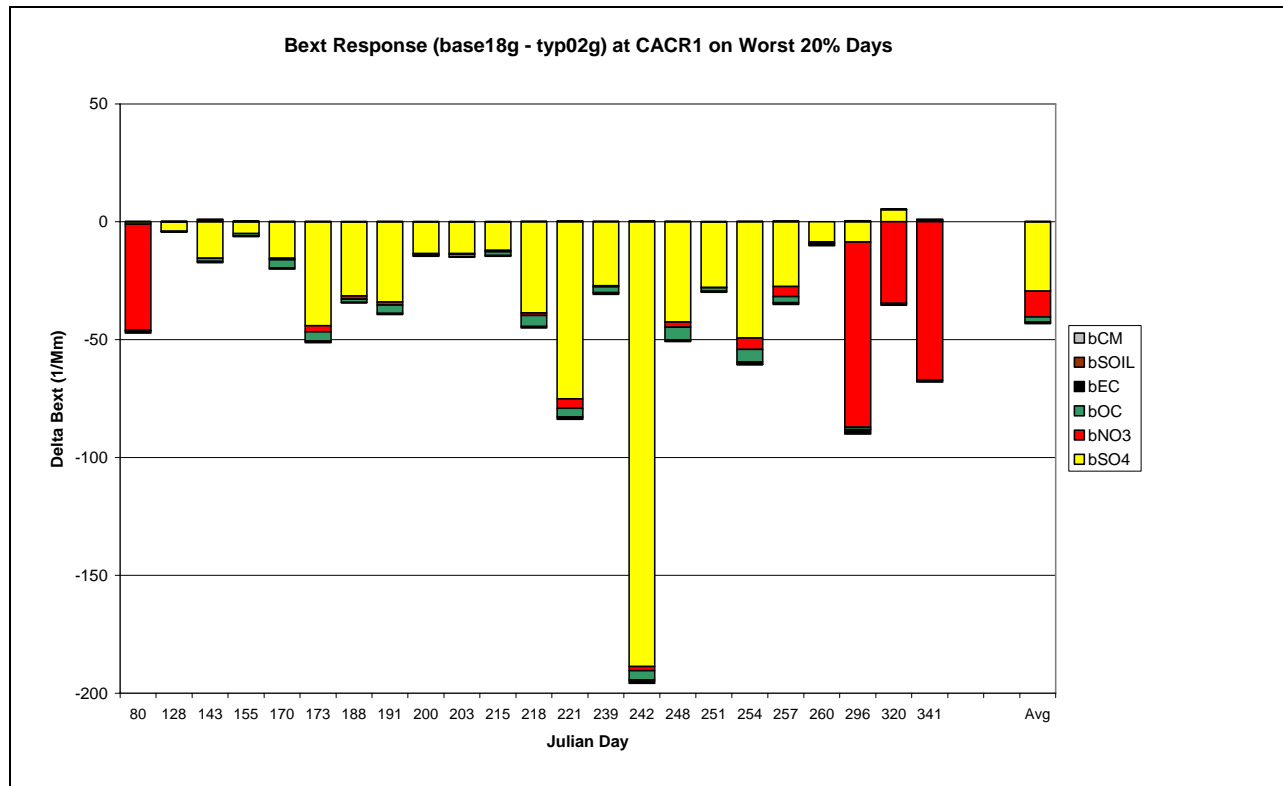


Figure 4-3d. Differences in Modeled 2002 and 2018 Base G CMAQ Results (2018-2002) Daily Extinction for Caney Creek (CACR), Arkansas and Worst 20 Percent (W20%) Days in 2002.

4.4.2 Summary 2018 Visibility Projections Across Class I Areas

Figure 4-4 displays a “DotPlot” of 2018 visibility projections using the 2002 Typical and 2018 base case Base G CMAQ 36 km modeling results. DotPlots present the 2018 visibility projections as a percentage of meeting the 2018 URP point. For example, at CACR the 2018 Base G modeling achieved 112% of the visibility reduction needed to meet the 2018 URP point so the dot under CACR is plotted at 112%. Class I areas’ with dots above 100% surpass the 2018 URP point (i.e., are below the glidepath), whereas Class I areas’ with dots that are under 100% fail to meet the 2018 URP point. Figure 4-4 summarizes the 2018 visibility projections using the EPA default “Regular RRF” and the two alternatives where CM is assumed to be natural (CM RRF=1) and both CM and Soil are assumed to be natural (CM&SOIL RRF=1). When CM or CM&SOIL are assumed to be natural that means that we assume the same CM or CM&SOIL occurs in the 2018 future-year as in the 2000-2004 Baseline Conditions. For the CENRAP sites, the EPA default and alternative projection, assuming CM alone or CM and Soil are natural, techniques produced similar results.

At the four eastern CENRAP Class I area sites close to the Mississippi River (CACR, UPBU, HEGL and MING), the 2018 visibility projections meet (HEGL) or surpass the 2018 URP point. Breton Island Class I area (BRET) comes up 6% short of meeting the 2018 URP point (i.e., 94% of the URP point). Wichita Mountains Class I area (WIMO) comes up approximately 40% short of the 2018 URP point. The two northern Class I areas (BOWA and VOYA) also come up about 40% short of meeting the 2018 URP point (i.e., achieve 69% and 53% of the visibility improvement needed to meet the 2018 URP point). The two Texas Class I areas only achieve

26% (BIBE) and 34% (GUMO) of the visibility improvement needed to meet the 2018 URP point for the worst 20 percent days. As discussed in more detail in Chapter 5, much of the difficulty for the Texas and some of the other CENRAP Class I areas in meeting the 2018 URP point is due to large contributions due to international transport, much of which (e.g., Mexico and global transport) is assumed to remain unchanged from 2002 to 2018.

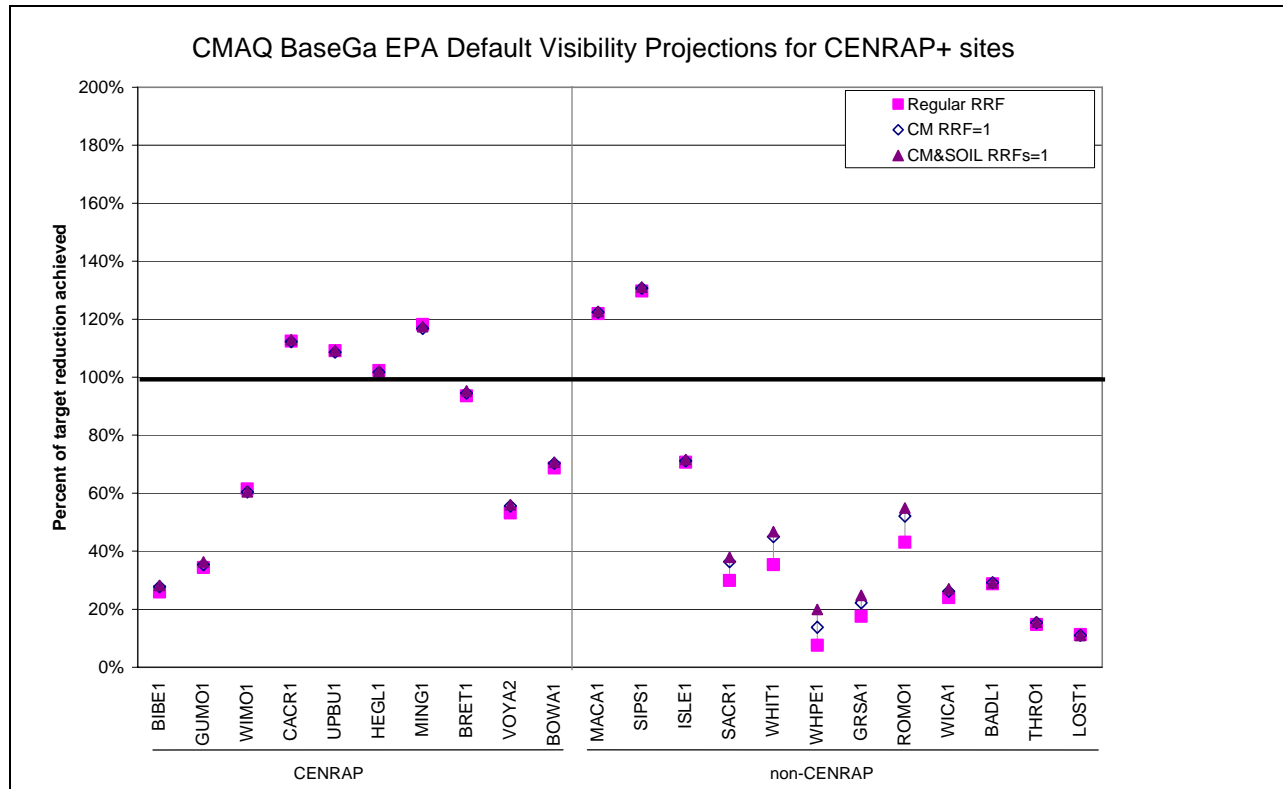


Figure 4-4. 2018 Base G CMAQ Visibility Projections for CENRAP and Nearby Class I areas Using DotPlots that Express 2018 Visibility as a Percentage of Meeting the 2018 URP Point On the Deciview Linear Glidepath.

Figure 4-5 displays the model estimated absolute change in extinction (Mm^{-1}) averaged across the 2002 worst 20 percent days at Class I areas in and near the CENRAP region. The largest modeled reductions are in SO_4 extinction. Figure 4-6 displays the percent change in the projected PM extinction by PM species for each CENRAP and nearby Class I area average across the worst 20 percent days (i.e., the relative modeled change). The four CENRAP Class I areas that meet the 2018 URP point (CACR, UPBU, HEGL and MING) are characterized by large SO_4 , NO_3 and EC extinction reductions (30-40%) with small Soil increases. At the other CENRAP Class I areas, however, there are lower levels of SO_4 , NO_3 and EC extinction reductions and even some NO_3 increases (BIBE). At the non-CENRAP Class I areas, the two VISTAS Class I areas (MACA and SIPS) have large reductions in SO_4 extinction (~50%), whereas the WRAP Class I areas SO_4 extinction reductions are much smaller.

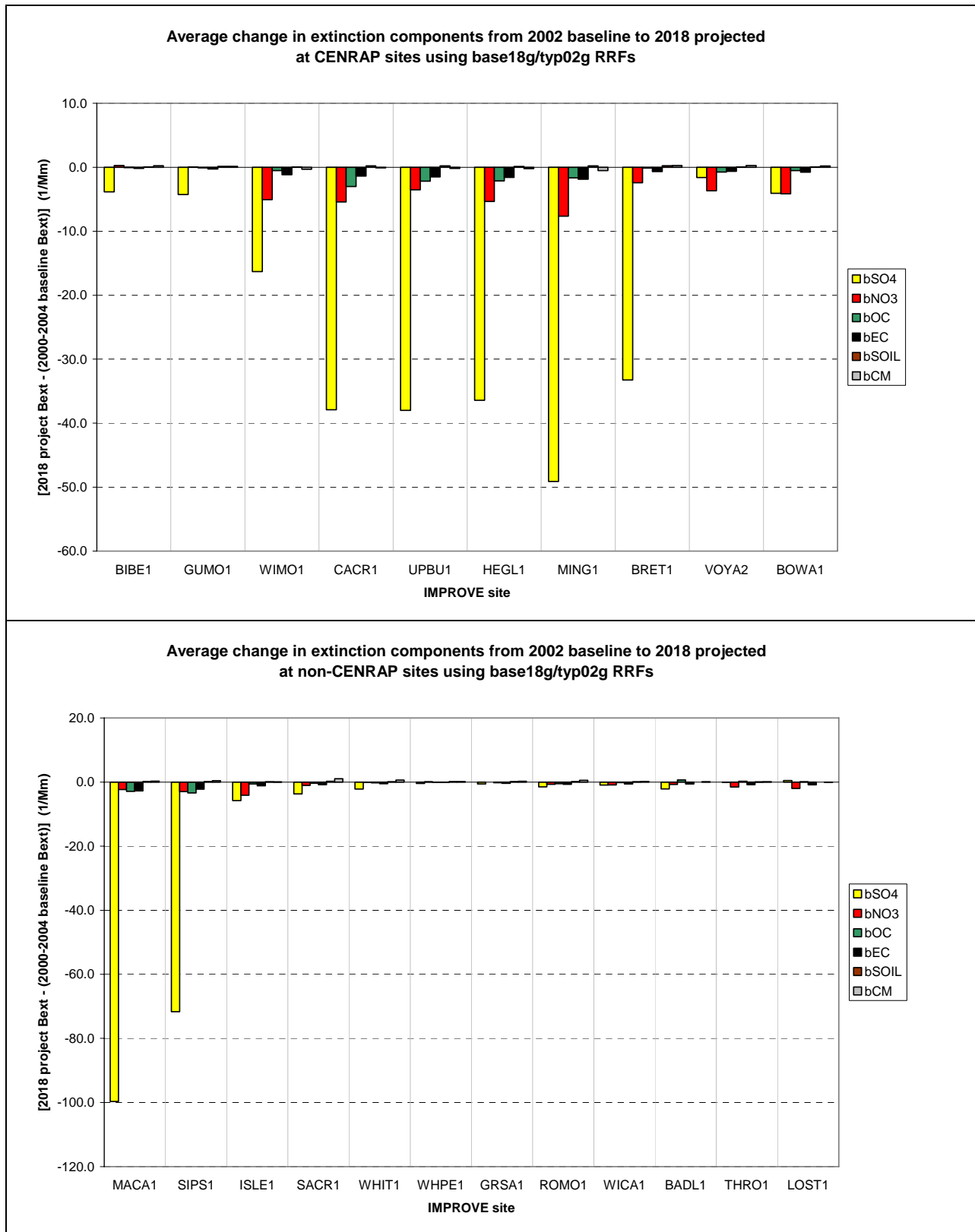


Figure 4-5. Absolute Model Estimated Changes in Extinction (Mm^{-1}) by PM Species for Class I Areas in the CENRAP region (top) and Near the CENRAP region (bottom).

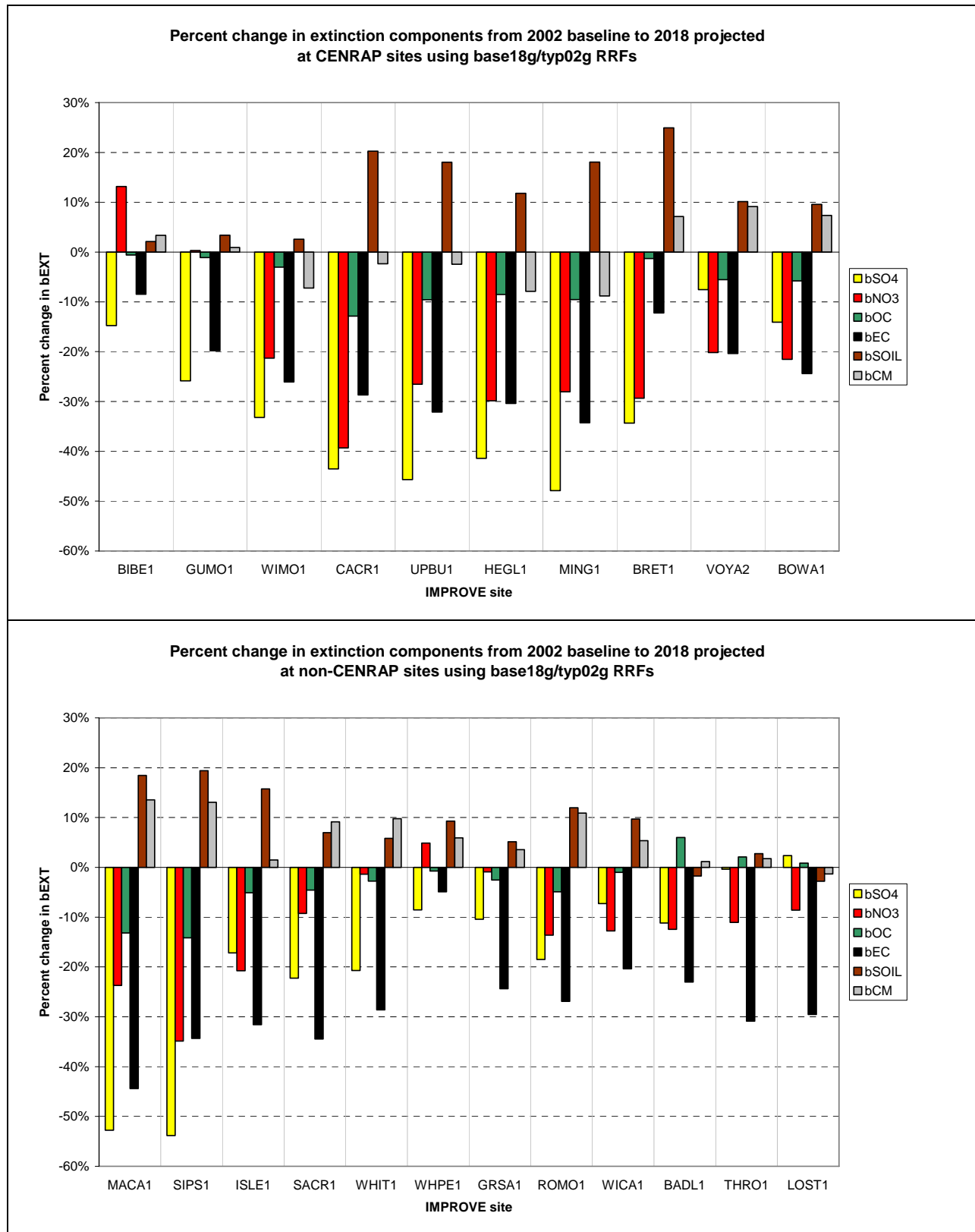


Figure 4-6. Percent Change In Modeled Extinction by PM Species Averaged Across the 2002 Worst 20 Percent Days for Class I areas in the CENRAP region (top) and Near the CENRAP region (bottom).

4.5 2018 Visibility Projections for Base G C1 Control Scenario

The 2018 visibility projections based on the CMAQ simulations for the 2018 Base G C1 Control Strategy simulations are presented in this section. The C1 Control Strategy results in reductions mainly in SO₂ and NO_x emissions from point sources in the CENRAP states. Consequently, PM improvements are limited to mainly SO₄ and NO₃ concentration reductions in the CENRAP states. Figure 4-7 displays the differences in CMAQ-estimated annual average SO₄ and NO₃ concentrations between the 2018 Base G base case and the 2018 Base G C1 Control Strategy case; the differences in all other PM species (with the exception of NH₄) were negligible (see: <http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml#base18gc1vsbase18g>). Annual average SO₄ concentration reductions of over a quarter of a µg/m³ are estimated to occur in northeast Texas, east Oklahoma, Missouri, northeast Arkansas and up into Iowa and Illinois. There are much lower reductions in NO₃ that cover a similar area.

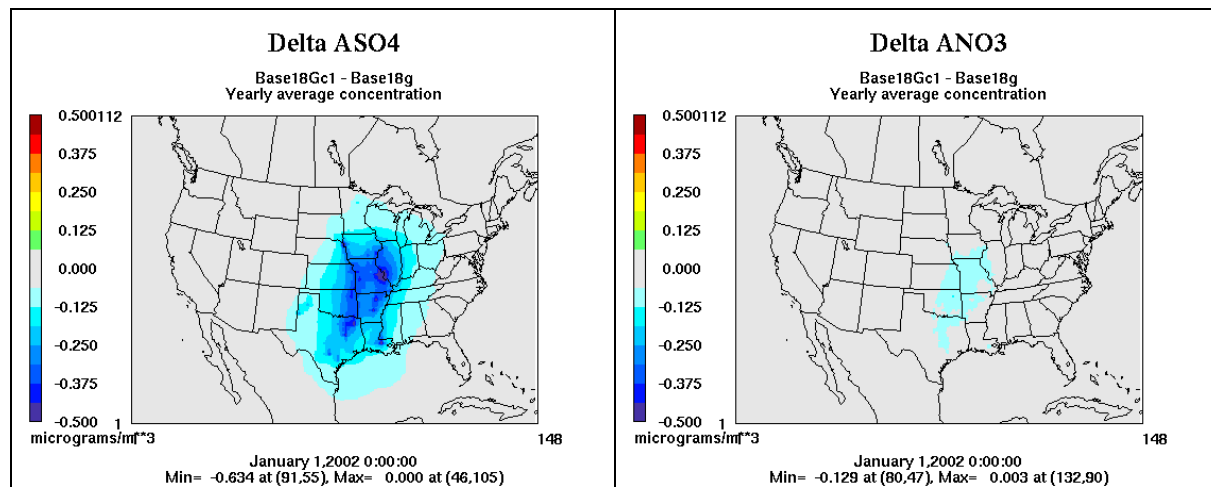


Figure 4-7. CMAQ-Estimated Reductions in Annual Average SO₄ (left) and NO₃ (right) Fine Particle Concentrations Between the 2018 Base G Base Case and 2018 Base G C1 Control Strategy Case.

Figure 4-8 displays the DotPlot comparisons of the 2018 visibility projections for 2018 Base G and 2018 Base G C1 Control Strategy emission scenarios. The additional controls in the C1 Control Strategy are projected to result in visibility improvements for the worst 20 percent days at Class I areas throughout and near the CENRAP region. Sites are closer to being on the glide path by 10 to 30 percent. For Breton Island this makes a difference of not meeting the 2018 URP point in 2018 Base G (94%) to surpassing the URP point in the C1 Control Strategy (106%).

Table 4-4 presents a tabular summary of the information presented in Figure 4-8, including the Baseline, 2018 URP point, and 2018 projected visibility for the Base G and C1 Control Strategy simulations.

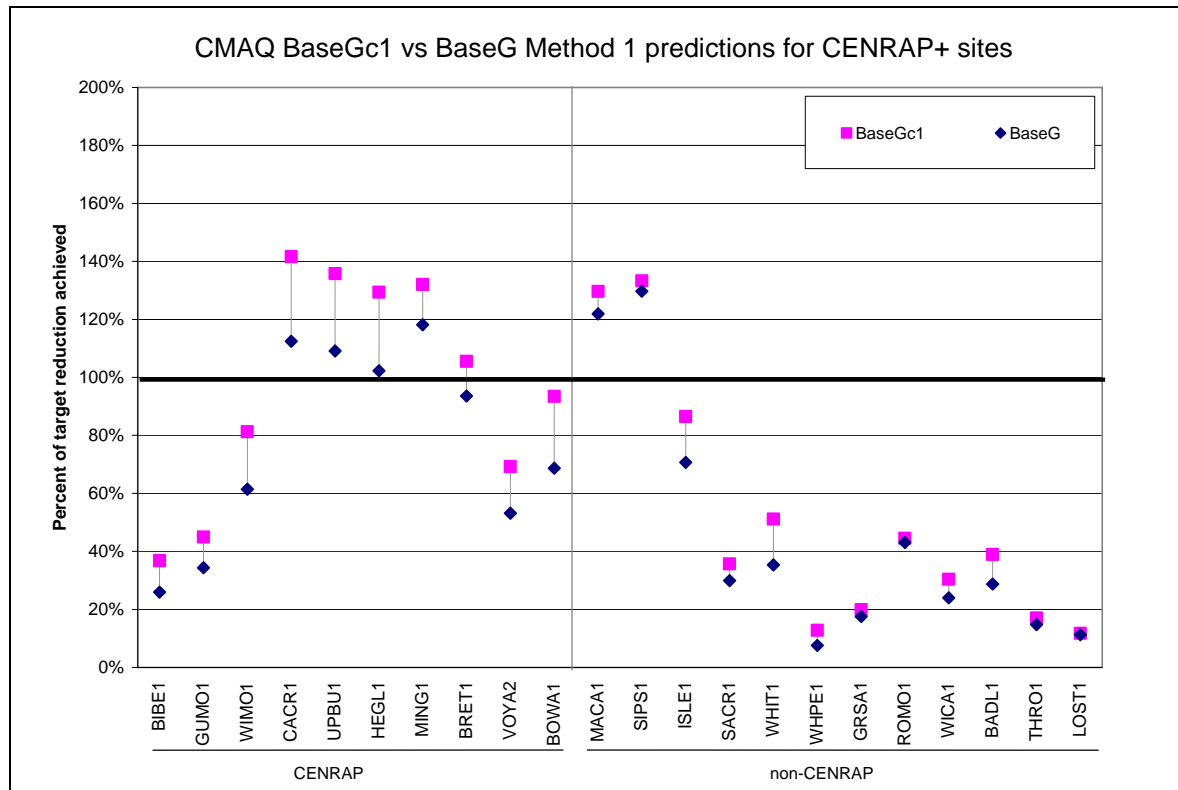


Figure 4-8. 2018 Visibility Projections as a Percentage of Meeting the 2018 URP Point (i.e., DotPlot) for the 2018 Base G and 2018 Base G C1 Control Strategy Emission Scenarios.

Table 4-4. 2000-2004 Baseline, 2018 URP Point, and Projected 2018 Visibility and Percent of Meeting the 2018 URP Point for the 2018 Base G and 2018 C1 Control Strategy CMAQ Simulations.

Class I Area Name	State	ID	Lat.	Lon.	00/04 Baseline Condit.	2018 URP Point	2018 Base G Base Case		2018 Base G C1 Control Strategy	
							(dv)	(%)	(dv)	(%)
			(deg)	(deg)	(dv)	(dv)	(dv)	(%)	(dv)	(%)
Badlands NP	SD	BADL1	43.81	-102.36	17.14	15.02	16.53	29%	16.31	39%
Big Bend NP	TX	BIBE1	29.33	-103.31	17.30	14.93	16.69	26%	16.43	37%
Boundary Waters Canoe Area	MN	BOWA1	48.06	-91.43	19.58	17.72	18.30	69%	17.84	93%
Breton	LA	BRET1	29.87	-88.82	25.73	22.51	22.72	94%	22.34	106%
Caney Creek Wilderness	AR	CACR1	34.41	-94.08	26.36	22.91	22.48	112%	21.48	142%
Great Sand Dunes NM	CO	GRSA1	37.77	-105.57	12.78	11.35	12.53	18%	12.49	20%
Guadalupe Mountains NP	TX	GUMO1	31.91	-104.85	17.19	14.74	16.35	34%	16.09	45%
Hercules-Glades Wilderness	MO	HEGL1	36.68	-92.9	26.75	23.14	23.06	102%	22.09	129%
Isle Royale NP	MI	ISLE1	48.01	-88.83	20.74	18.78	19.36	71%	19.05	87%
Lostwood	ND	LOST1	48.59	-102.46	19.57	16.87	19.27	11%	19.26	12%
Mammoth Cave NP	KY	MACA1	37.20	-86.15	31.37	26.64	25.60	122%	25.23	130%
Mingo	MO	MING1	37.00	-90.19	28.02	24.37	23.71	118%	23.21	132%
Rocky Mountain NP	CO	ROMO1	40.35	-105.7	13.83	12.29	13.17	43%	13.14	45%
Salt Creek	NM	SACR1	33.6	-104.41	18.03	15.41	17.25	30%	17.10	36%
Sipsey Wilderness	AL	SIPS1	34.32	-87.44	29.03	24.82	23.57	130%	23.42	133%
Theodore Roosevelt NP	ND	THRO1	46.96	-103.46	17.74	15.42	17.40	15%	17.34	17%
Upper Buffalo Wilderness	AR	UPBU1	36.17	-92.41	26.27	22.84	22.52	109%	21.61	136%
Voyageurs NP	MN	VOYA2	48.47	-92.8	19.27	17.58	18.37	53%	18.10	69%
White Mountain Wilderness	NM	WHIT1	33.48	-105.85	13.70	12.11	13.14	35%	12.89	51%
Wheeler Peak Wilderness	NM	WHPE1	36.57	-105.4	10.41	9.49	10.34	8%	10.30	13%
Wind Cave NP	SD	WICA1	43.58	-103.47	15.84	13.94	15.39	24%	15.26	30%
Wichita Mountains	OK	WIMO1	34.75	-98.65	23.81	20.01	21.47	61%	20.72	81%

5.0 ADDITIONAL SUPPORTING ANALYSIS

This Chapter presents additional supporting analysis to the modeled 2018 visibility projections provided in Chapter 4. This supporting analysis may be used by the states in their RHR SIPs, along with their factor analysis, to assist in setting their 2018 RPGs for the worst 20 percent days and best 20 percent days.

5.1 Comparison of CENRAP 2018 Visibility Projections with Other Groups

2018 visibility projections for CENRAP and nearby Class I area have also been performed by the other RPOs. Thus, it is useful to compare the CENRAP 2018 visibility projections with those from the other RPOs as a quality assurance (QA) check and to foster confidence in the CENRAP modeling results.

5.1.1 Comparison of CENRAP, VISTAS, MRPO and WRAP Visibility Projections

The CENRAP 2018 Base G visibility projections were compared to the following other RPO visibility projections:

- VISTAS 2018 visibility projections based on their CMAQ 12 km 2002 annual modeling results for the 2002 Base G and 2018 Base G2a emissions scenarios.
- MRPO 2018 visibility projections based on their CAMx 36 km 2002 annual modeling for the Run 4 Scenario 1a (R4S1a) emissions scenario.
- WRAP 2018 visibility results based on their Plan02b and Base18b CMAQ 36 km modeling of the 2002 calendar year.

Figure 5-1 displays a DotPlot comparison of the four RPO visibility projections expressed as a percentage of achieving the 2018 URP point at CENRAP and nearby Class I areas. For the four CENRAP Class I areas just west of the Mississippi River in Arkansas and Missouri (CACR, UPBU, HEGL and MING), 2018 visibility projections are available from the CENRAP, VISTAS and MRPO RPOs. At HEGL, the three RPOs 2018 visibility projections are in close agreement with each other (estimated to achieve 99%, 101% and 95% of the 2018 URP point). The CENRAP and VISTAS 2018 visibility projections are also very close at the other three Arkansas-Missouri CENRAP Class I areas: CACR (112% and 116%), UPBU (109% and 112%) and MING (118% and 114%). But the MRPO 2018 visibility projections are approximately 12 to 25 percentage points lower than the CENRAP and VISTAS projections at these three Class I areas, with values of 97% to 100%. The reasons why the MRPO 2018 visibility projections are less optimistic than CENRAP and VISTAS are unclear. However, the MRPO focused on visibility projections at their northern Class I areas and likely did not use the latest CENRAP emission estimates. In addition, the CENRAP 2018 visibility projections included BART controls on several sources in CENRAP states not included in the MRPO projections. Such BART controls are even more important in those states not covered by CAIR.

For the Breton Island (BRET) Class I area, 2018 visibility projections are available from CENRAP and VISTAS. CENRAP estimates that BRET will achieve 94% of the URP point and

VISTAS is slightly less optimistic with an 84% value. One potential contributor to this is that emissions from off-shore marine vessel emissions in the oil and gas production areas of the Gulf of Mexico are double counted in the VISTAS Base G modeling. As these emissions were assumed to remain unchanged between 2002 and 2018, the double counting of their emissions will result in stiffer RRFs than there should be and consequently less visibility benefits in 2018. This double counting also occurred in the CENRAP Base F modeling but was corrected in Base G. The double counting occurred because off-shore marine vessels were present in both the MMS off-shore oil/gas development inventory for the Gulf of Mexico and the VISTAS off-shore marine vessel inventory for the Pacific and Atlantic Oceans and the Gulf of Mexico. VISTAS intends to correct this double counting in their next round of modeling.

At the two northern Minnesota Class I areas (BOWA and VOYA), the MRPO 2018 visibility projections (93% and 92%) exhibit more visibility improvements than CENRAP's (69% and 53%). This is believed to be due to higher contributions to visibility impairment from Canada in the CENRAP modeling. Figure 5-2 displays the CENRAP 2002 Base F total SO₂ emissions and their differences with the 2018 Base F SO₂ emissions. The SO₂ emissions in Alberta Canada appear to be much higher and more wide spread when compared to the other provinces in Canada and emissions in the U.S. states. Also, there is a very large SO₂ source in northern Manitoba (> 10⁵ tons/year). The Alberta SO₂ emissions may be overstated in the CENRAP modeling, which would overstate the Canadian contribution to visibility impairment. The western boundary of the MRPO modeling domain was east of the Rocky Mountains so did not include Alberta. CENRAP confirmed that the Alberta emissions and the source in Manitoba were present in the emissions provided by Canada. Air parcels from Canada are generally associated with clean visibility conditions at the northern Minnesota Class I areas with the worst 20 percent days generally occurring under conditions with a southerly wind component. However, in 2002 some of the worst 20 percent days did occur with transport out of Canada. For example, Figure 5-3 displays back trajectories off of the VIEWS website for two of the worst 20 percent days at Voyageurs National Park (Julian Days 347 and 332). These back trajectories suggest that the potentially overstated emissions in Alberta would have an impact at VOYA during the worst 20 percent days in 2002.

At the VISTAS Mammoth Cave (MACA), Kentucky Class I area, VISTAS, CENRAP and the MRPO estimated that 2018 visibility for the worst 20 percent days will achieve, respectively, 122%, 123% and 102% of the 2018 URP point. The close agreement between the VISTAS (122%) and CENRAP (123%) 2018 visibility projections for MACA is encouraging. Why MRPO is 20 percentage points lower is unclear, but may be due to using earlier versions of the VISTAS and CENRAP emissions. The 2018 visibility projections at Sipsey (SIPS), Alabama estimated by VISTAS (127%) and CENRAP (130%) are also extremely close.

Both the CENRAP and WRAP 2018 visibility projections agree that the WRAP Class I areas fail to achieve the 2018 URP point by a wide margin, with values achieving only ~40% or less of the 2018 URP point. The CENRAP 2018 visibility projections agrees well with the WRAP values at Great Sands (GRSA), Colorado (18% vs. 15%), Badlands (BADL), South Dakota (24% vs. 31%), Theodore Roosevelt, North Dakota (15% vs. 11%) and Lostwood (LOST), Montana (11% vs. 14%). There is also reasonable agreement between CENRAP and WRAP 2018 visibility projections at Salt Creek (SACR), New Mexico (30% vs. 12%), Rocky Mountain (ROMO), Colorado (43% vs. 30%), and Wind Cave (WICA), South Dakota (24% vs. 6%). There are two WRAP Class I areas, White Mountains (WHIT) and Wheeler Peak (WEPE), where the WRAP

2018 visibility projections estimate that visibility will degrade for the worst 20 percent days (i.e., negative percent of achieving the 2018 URP point), whereas CENRAP estimates visibility improvements. The reasons for these differences are unclear.

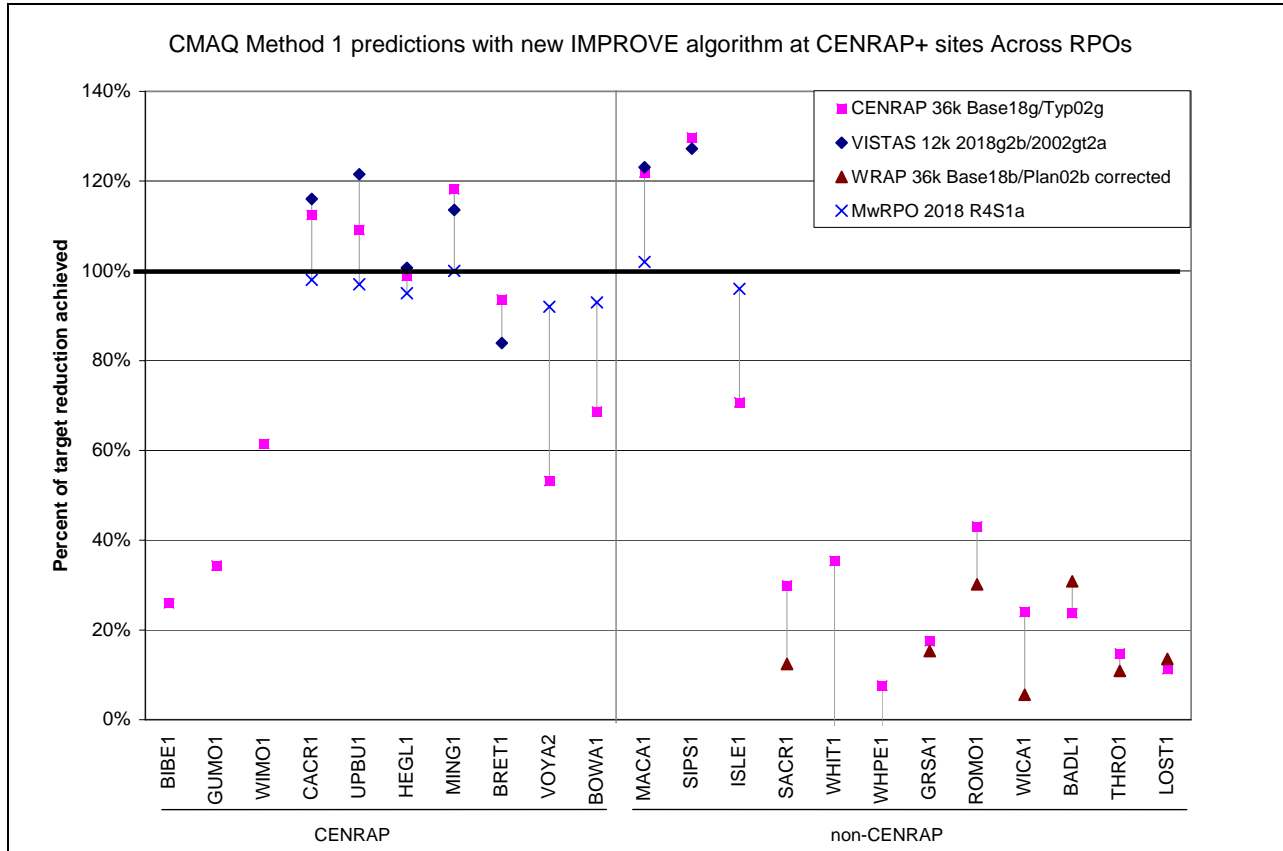


Figure 5-1. DotPlot comparing the CENRAP, VISTAS, MRPO and WRAP 2018 visibility projections expressed as a percentage of achieving the 2018 URP goal.

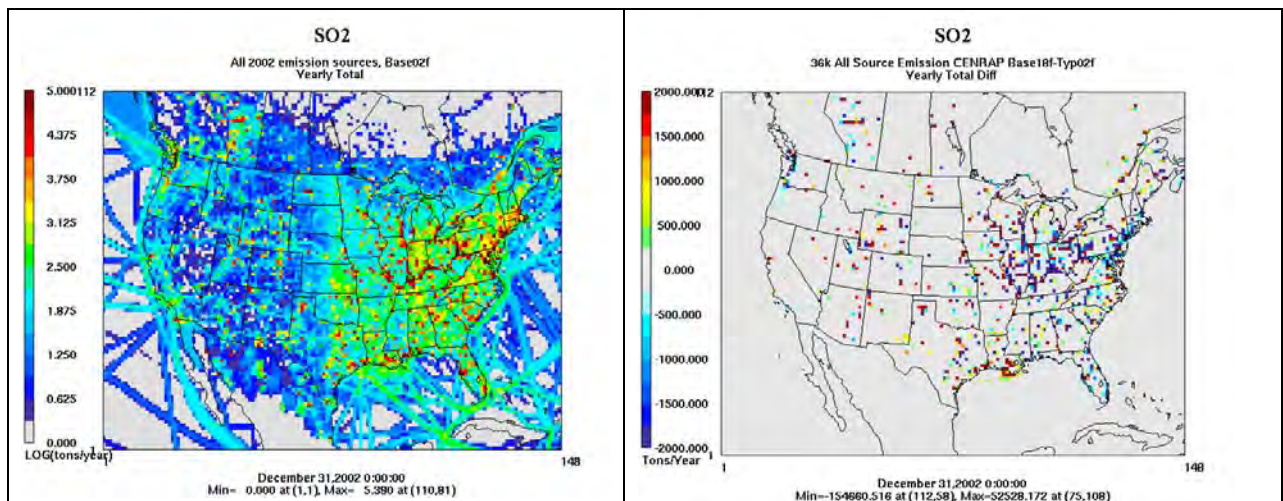


Figure 5-2. 2002 Base F SO2 emissions (left) as LOG10(tons/year) and differences in 2018 and 2002 Base F SO2 emissions (tons/year).

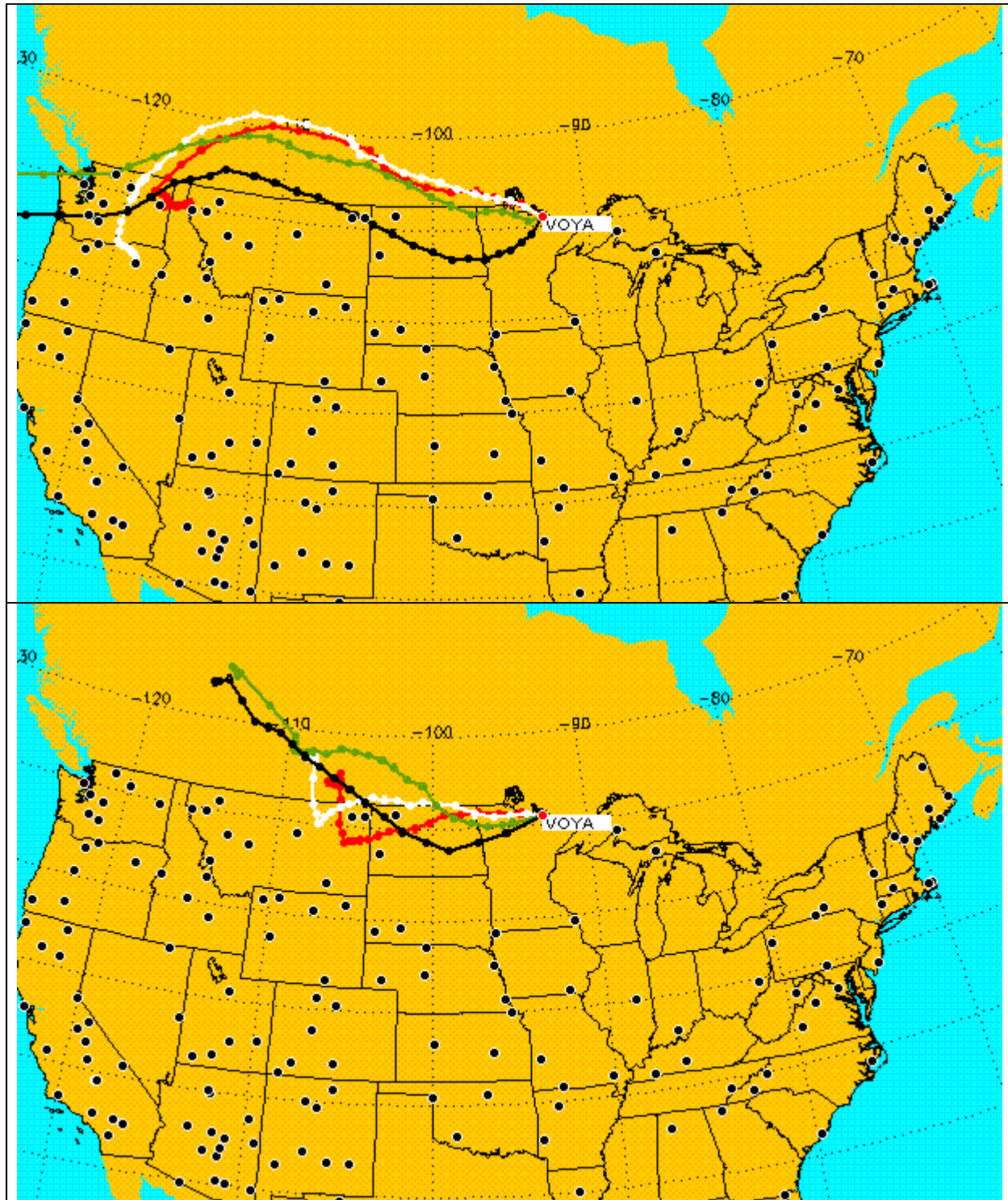


Figure 5-3. Exemplified back trajectories to Voyageurs National Park for two of the worst 20 percent days from 2002: December 13, 2002 (Julian Day 347) and November 28, 2002 (Julian Day 332).

5.2 Extinction and PM Species Specific Visibility Projections and Comparisons to 2018 URP Point

It is useful to examine 2018 visibility projections by PM species to determine how each PM component of visibility is changing as both a diagnostic analysis of the visibility projections as well as whether species that are associated more with anthropogenic emissions (e.g., SO₄ and NO₃) are being reduced substantially compared to those that are less influenced by anthropogenic emissions (e.g., Soil and CM). However, because deciview is the natural logarithm of total extinction, such comparisons can not be made using the deciview scale and must be made using extinction. The linear glidepath from which the 2018 URP points are derived are based on deciview, thus to examine corresponding glidepath using extinction the curvature associated with the logarithmic transformation of the linear deciview glidepath to extinction must be accounted for in the extinction glidepath.

5.2.1 Total Extinction Glidepaths

Figure 5-4 displays a total extinction based glidepath for Caney Creek that is based on the EPA default deciview linear glidepath counterpart shown in Figure 4-3a. That is, the deciview linear glidepath defined by the line connecting the 26.36 dv Baseline Conditions at 2004 to the 11.58 dv Natural Conditions in 2064. The glidepath points in 2008, 2018, 2028, etc. from the linear deciview glidepath (Figure 4-3a) are turned into extinction (Bext) [$Bext = 10 \exp(dv/10)$] to create the curved extinction glidepath that exactly match the linear deciview glidepath points. Note that the 2000-2004 Baseline using the curved extinction glidepath is slightly different than if you just converted the deciview baseline to extinction because the logarithm relationship is performed before the averaging, but they are extremely close. Using the extinction curved glidepath, the 2018 URP point is a reduction of the Baseline 145.10 Mm⁻¹ to 98.88 Mm⁻¹ (a 46.22 Mm⁻¹ reduction). The modeled 2018 visibility projection in extinction is 97.54 Mm⁻¹, a 47.56 Mm⁻¹ reduction, which achieves 103% of the reduction needed to achieve the 2018 URP point. Note that this compares with achieving 112% of the 2018 URP reduction point when using the deciview linear glidepath. The percent of achieving the 2018 URP point using the linear deciview and curved extinction glidepaths will rarely be the same due to the logarithmic relationship between the two visibility metrics and the fact that averaging within and across years in the deciview calculations occur after the logarithms have been applied. The greater the difference in extinction across the worst 20 percent days in a year and averaged across the years in the 2000-2004 Baseline and the greater number of years available from the 2000-2004 Baseline may result in greater differences in the 2018 URP points using the linear deciview and the curved extinction glidepaths.

Appendix F contains total extinction curved glidepaths for all the CENRAP Class I areas and Figure 5-5 contains a DotPlot that compares the percent of achieving the 2018 URP point at each CENRAP Class I area using the 2018 Base G modeling results and the linear deciview and curved extinction glidepaths. At most CENRAP Class I areas the ability of the 2018 modeling results to achieve the 2018 URP point is the same using either the deciview or extinction glidepaths. There are some differences at GUMO, BOWA and VOYA Class I areas which are due to these Class I areas having more complete data during the 2000-2004 Baseline period and therefore more years in the Baseline than other Class I areas as well as having variations in extinction across the worst 20 percent days and years (Appendix F). In any event, the closeness of the ability of the model to achieve the 2018 URP point using either the extinction or deciview

glidepath verifies the validity of the extinction based glidepaths and allows for the construction of PM species specific glidepaths in extinction to gain insight into how each component of extinction is being reduced to achieve a uniform rate of progress toward natural conditions in 2064.

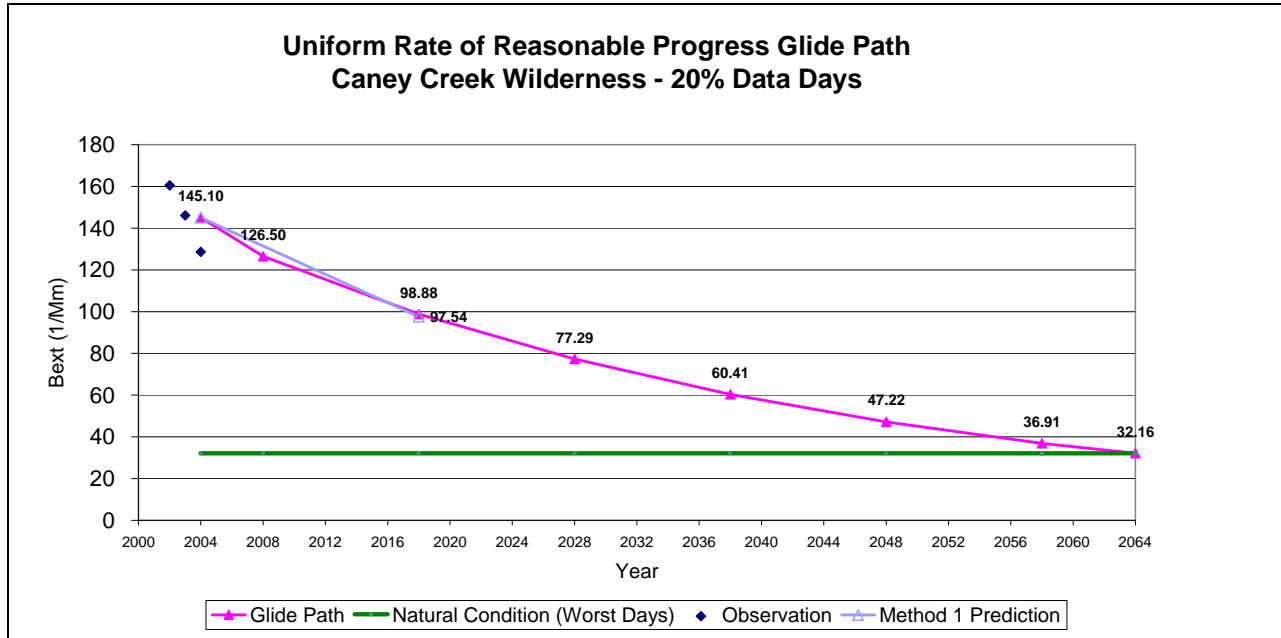


Figure 5-4. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

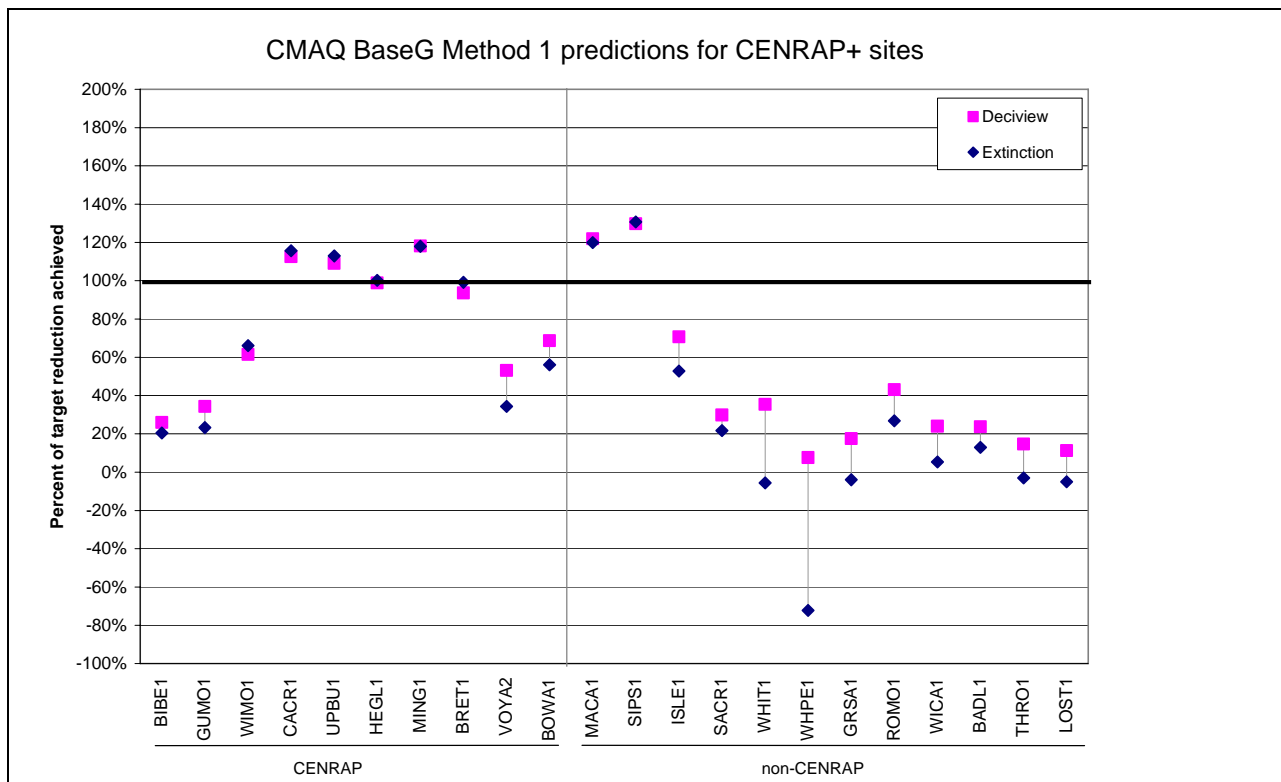


Figure 5-5. CMAQ 2018 Base G visibility projections and comparison of ability to achieve the 2018 URP point using the EPA default deciview and alternative total extinction Glidepaths.

5.2.2 PM Species specific Glidepaths

The VIEWS website (<http://vista.cira.colostate.edu/views/>) has posted PM species specific Natural Conditions based on the new IMPROVE equation. Using these PM species specific Natural Conditions and the curved extinction glidepaths we can evaluate how well visibility extinction achieves the 2018 URP point on a species-by-species basis. The PM species specific glidepaths are constructing starting with a Baseline at 2004 averaging the extinction for each PM species measured using the 2000-2004 IMPROVE observations and ending with the Natural Conditions in 2064 from the VIEWS website. Points in the glidepath for the years in between 2004 and 2064 are constructed based on the relative differences in the 2004 Baseline and 2064 Natural Conditions PM species extinction such that the total extinction due to all PM species at each interim year adds up to the same as the total extinction on the extinction-based glidepath (e.g., Figure 5-3). For example, for the CACR SO4 extinction glidepath the 2018 URP point is generated from the 2004 and 2064 SO4 extinction (BSO4) and the 2004, 2018 and 2064 total extinction (BTOT) as follows:

$$\begin{aligned}
 \text{BSO4}_{2018} &= \text{BSO4}_{2004} - [(\text{BSO4}_{2004} - \text{BSO4}_{2064}) / \\
 &\quad (\text{BTOT}_{2004} - \text{BTOT}_{2064})] \times (\text{BTOT}_{2004} - \text{BTOT}_{2018}) \\
 &= 87.05 - [(87.05 - 3.20) / (145.10 - 32.16)] \times (145.10 - 98.88) \\
 &= 52.73 \text{ Mm}^{-1}
 \end{aligned}$$

Note that the SO4 2018 URP point in Figure 5-5 and F-1b (52.77 Mm-1) does not exactly match the 52.73 Mm⁻¹ calculated due to round off error in the above calculation that only used numbers with precision to the nearest hundredth.

As there are larger differences between the Baseline and Natural PM species extinction for some species, then the rate of improvement to achieve a species specific 2018 URP point will vary across PM species. For example, current Baseline extinction values for Soil and CM tend to be closer to Natural Conditions than extinction due to SO4 and NO3. Consequently the rate of progress to achieve the 2018 URP point for Soil and CM will be less than for SO4 and NO3.

Appendix F contains the PM species specific glidepaths compares them to the modeled 2018 projections for all CENRAP Class I areas. The species specific results for the CACR Class I area in Figure F-1 are reproduced in Figure 5-6. The modeled rate of SO4 and NO3 extinction reduction is greater than the PM species specific glidepaths and both achieve the species specific 2018 URP point by achieving 111% and 104% of the reduction needed to achieve the 2018 URP point. The modeled rate of extinction improvement at CACR for EC and OC is less than the species specific glidepath achieving only 65% and 75% of the reduction needed to achieve the species specific 2018 URP point. The PM species specific glidepath for Soil is flat because the Baseline and Natural Conditions (1.12 Mm⁻¹) are the same. This does not mean that anthropogenic emissions of Soil do not contribute on worst 20 percent days at CACR. It just points to a mismatch between the current set of worst 20 percent days and those in 2064 under Natural Conditions. The worst 20 percent days in 2064 under Natural Conditions will be dominated by wind blown dust days when Soil and CM may be higher than during the current set of worst 20 percent days that are dominated by SO4, NO3 and OMC. Thus, the Soil and CM glidepaths tend to be flatter and in some cases may even have an upward trend for some Class I areas (see Appendix F). Soil is projected to increase at CACR in 2018 so does not achieve its species specific URP point. Little reduction in CM is also seen by 2018. As discussed

previously, this is due in part to incompatibilities between the measured Soil and CM values at the IMPROVE monitor and the modeled Soil and CM species. In the model, a large component of the Soil and CM in the inventory is due to paved and unpaved road dust. These emissions are directly related to Vehicles Miles Traveled (VMT). VMT is projected to increase in future-years resulting in increases in road dust emissions. At the IMPROVE monitor, much of the measured Soil and CM is likely due to local dust events that are not simulated by the model using a 36 km grid resolution. Thus, the 2018 projections for Soil and CM are likely applying modeled changes due to road dust to local Soil and CM concentrations that in reality are likely natural and should remain unchanged in the future year. This is why alternative 2018 modeled projection approaches have been developed that assume that CM and CM and Soil are natural so remain unchanged in the future-year (see Section 5.5).

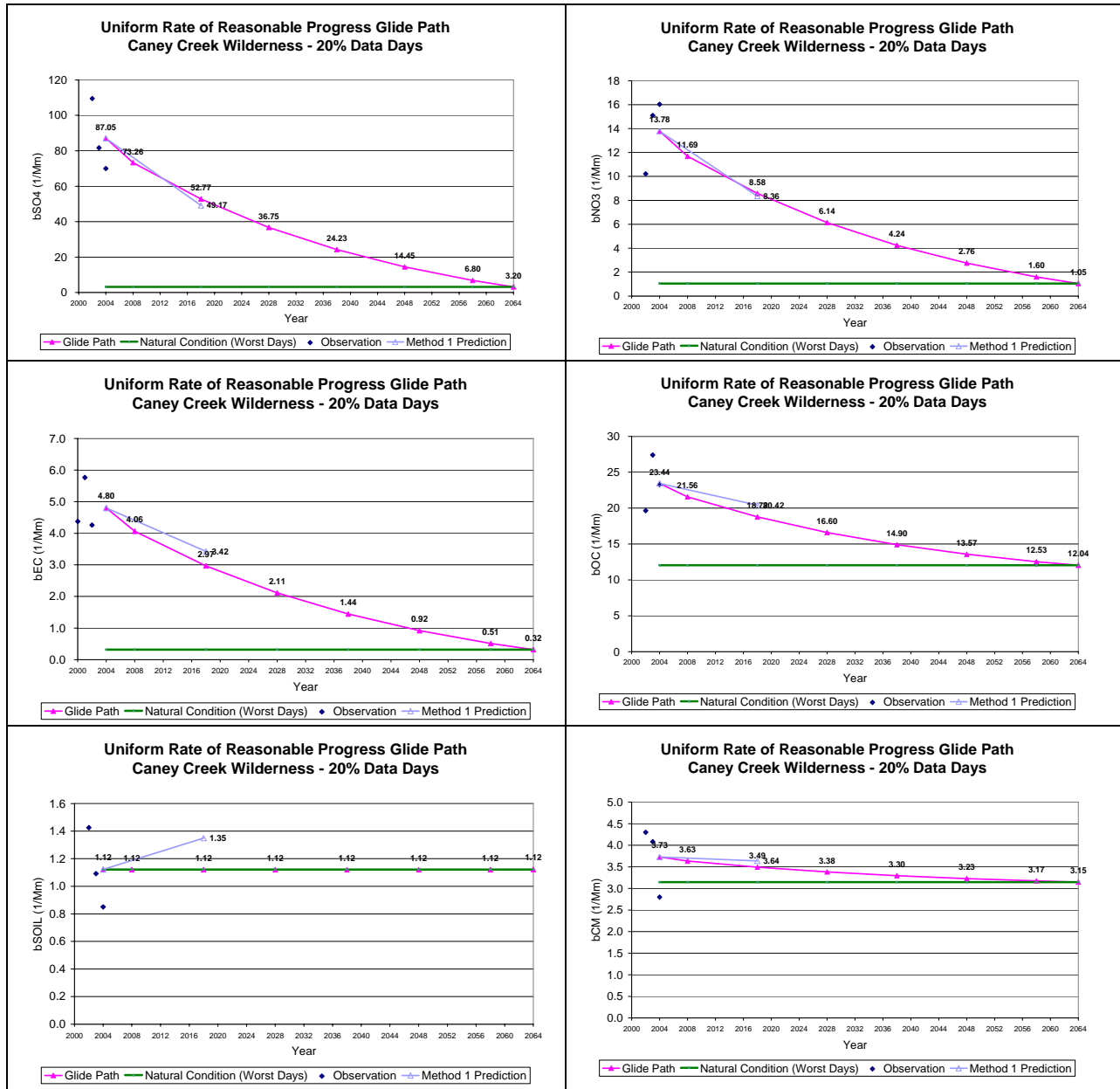


Figure 5-6. 2018 Visibility Projections and 2018 URP Glidepaths for SO4 (top left), NO3 (top right), EC (middle left), OMC (middle right), Soil (bottom left) and CM (bottom right) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20 Percent Days using 2002/2018 Base G CMAQ 36 km modeling results.

Figure 5-7 displays a DotPlot that compares the 2018 projected total and PM species specific extinction with the 2018 URP points. These results show that SO4 is most frequently achieving its 2018 URP point at those Class I areas that achieve the deciview URP point. Reductions in NO3 and EC also sometimes achieve their species specific URP point.

There are some anomalies in the species specific projections and glidepaths that bear mention and point to areas where better estimates of emissions growth and Natural Conditions are needed. The increase in 2018 Soil projections is not an isolated incident at CACR and occurs at other CENRAP Class I areas. There are three CENRAP Class I areas that “achieve” the Soil specific 2018 URP point (HEGL, BOWA and VOYA). An examination of these glidepaths and visibility projections (Figures F-4f, F-5f and F-6f) reveals that the current Baseline Conditions Soil at these three Class I areas is actually less than the 2064 Natural Conditions so that the glidepath is an accent rather than reduction (Figures F-4g, F-5g and F-6g). In these three cases to “achieve” the 2018 URP point the modeling results must increase the projected Soil extinction, which is why these three Class I areas “achieve” their 2018 URP point for Soil. Clearly, the 2018 URP point for Soil is not very meaningful under these conditions. The current Baseline Conditions for OMC at BRET and BOWA is also less than the Natural Conditions resulting in anomalous glidepaths (Figure F-3e and F-4e).

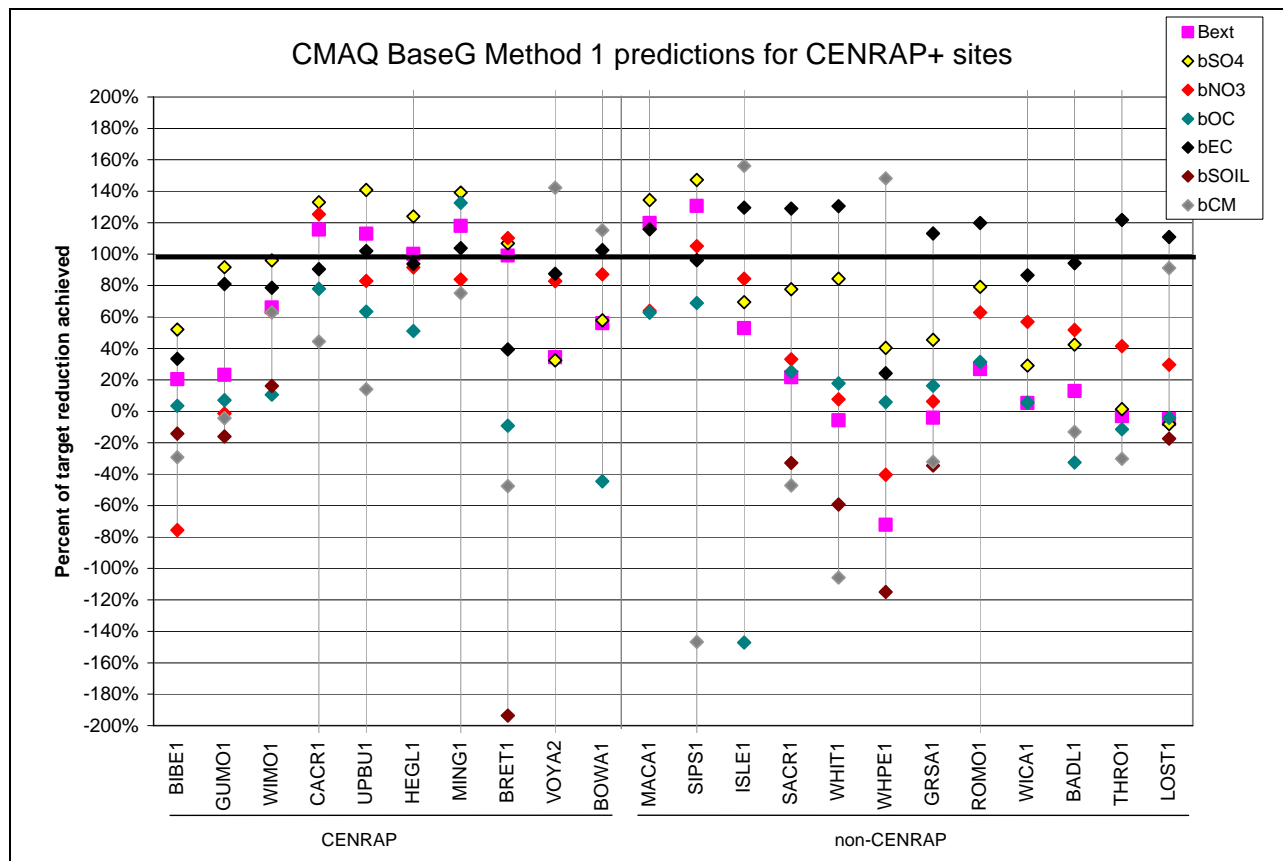


Figure 5-7. Ability of total and species specific 2018 visibility projections to achieve 2018 URP points.

5.3 Alternative 2018 Visibility Projection Software

The CENRAP 2018 visibility projections were made using software developed by the CENRAP modeling team. PM concentrations in the 36 km grid cells containing each of the Class I area IMPROVE monitoring sites were extracted using the UCR Analysis Tool. These modeling data were then ported into Excel spreadsheets that also include the filled RHR IMPROVE database available from the VIEWS website along with the EPA default Natural Conditions (EPA, 2003b). Excel macros are then used to perform the visibility projections using the EPA default procedures described in Chapter 4 and alternative procedures described in this Chapter.

EPA is developing a Modeled Attainment Test Software (MATS) program that codifies the 8-hour ozone, PM_{2.5} and visibility projection procedures given in EPA's latest air quality modeling guidance (EPA, 2007a). The June 2007 release of the beta version of MATS is capable of performing 8-hour ozone and visibility projections; MATS is still under development for making PM_{2.5} projections. The June 2007 beta versions of MATS was applied to the CENRAP 2002 and 2018 Base G 36 km CMAQ results and the resultant 2018 visibility projections were compared with the CENRAP values using the EPA default projection approach (see Chapter 4) at CENRAP and nearby Class I areas. The projected 2018 visibility estimates using the CENRAP and EPA MATS software are shown in Table 5-1. The biggest differences in the two 2018 visibility projections are for the Boundary Waters (BOWA), Breton Island (BRET), and Mingo (MING) Class I areas where MATS produces no 2018 visibility projections. This is because there is insufficient capture of valid IMPROVE PM measurements within the 2000-2004 five-year baseline to generate three years of annual visibility estimates that is the minimum needed to develop the Baseline Conditions following EPA's guidance (EPA, 2003a). For the CENRAP projections, data filling was used to fill out the IMPROVE measurements with sufficient data so that Baseline Conditions could be calculated at these three Class I areas. At 14 of the remaining 17 Class I areas, the CENRAP and MATS 2018 visibility projections agree exactly to within a hundredth of a deciview. At the three sites that are different (BIBE, GUMO and ISLE) the difference is 0.01 dv, which is 0.06 percent or less. These differences are likely due to round off errors in the calculations and are not significant. These results verify the consistency with the CENRAP spreadsheet based and EPA MATS software for projecting future-year visibility estimates.

Table 5-1. Comparison of CENRAP and EPA MATS 2018 visibility projections at CENRAP and nearby Class I areas.

Site	2018 Visibility Projections		2000-2004 Baseline Conditions	
	MATS (dv)	CENRAP (dv)	MATS (dv)	CENRAP (dv)
BADL	16.53	16.53	17.14	17.14
BIBE	16.70	16.69	17.30	17.30
BOWA	NA	18.30	NA	19.58
BRET	NA	22.72	NA	25.73
CACR	22.48	22.48	26.36	26.36
GRSA	12.53	12.53	12.78	12.78
GUMO	16.36	16.35	17.19	17.19
HEGL	23.06	23.06	26.75	26.75
ISLE	19.35	19.36	20.74	20.74
LOST	19.27	19.27	19.57	19.57
MACA	25.60	25.60	31.37	31.37
MING	NA	23.71	NA	28.02
ROMO	13.17	13.17	13.83	13.83
SACR	17.25	17.25	18.03	18.03
SIPS	23.57	23.57	29.03	29.03
THRO	17.40	17.40	17.74	17.74
UPBU	22.52	22.52	26.27	26.27
VOYA	18.37	18.37	19.27	19.27
WHIT	13.14	13.14	13.70	13.70
WHPE	10.34	10.34	10.41	10.41
WICA	15.39	15.39	15.84	15.84
WIMO	21.47	21.47	23.81	23.81

NA = Not Available

5.4 PM Source Apportionment Modeling

The PM Source Apportionment Technology (PSAT) was used to obtain PM source apportionment by geographic regions and major source category for the CENRAP 2002 and 2018 Base E base case conditions. PSAT uses reactive tracers that operated in parallel to the CAMx host model using the same emissions, transport, chemical transformation and deposition rates as the host model to account for the contributions of user specified source regions and categories to PM concentrations throughout the modeling domain. Details on the formulation of the CAMx PSAT source apportionment can be found in the CAMx user’s guidance (ENVIRON, 2006; www.camx.com).

5.4.1 Definition of CENRAP 2002 and 2018 PM Source Apportionment Modeling

PSAT calculated PM source apportionment for user defined source groups. Source groups are usually defined by specifying a source region map of geographic regions where source contributions are desired and providing source categories as input so that source group would

consist of a geographic region plus source category (e.g., on-road mobile source emissions from Oklahoma). Although other source group configurations and even individual sources may be specified. For the CENRAP PSAT application, a source region map was used that divided up the modeling domain into 30 geographic source regions as shown in Figure 5-8. The 2002 and 2018 emissions inventories were divided into six source categories. The 30 geographic source regions consisted of CENRAP and nearby states, with Texas divided into 3 regions, remainder of the western and eastern States, Gulf of Mexico, Canada and Mexico. The original intent of the CENRAP PSAT analysis was to obtain separate contributions due to on-road mobile, non-road mobile, area, natural, EGU point and non-EGU point sources. However, the CAMx emissions for the PSAT runs were based on the CMAQ pre-merged 3-D emission files. Since all point sources were contained in a single CMAQ pre-merged emissions file, then the separate source apportionment modeling of EGU and non-EGU point sources was not possible. The six source categories that were separately tracked in the PSAT PM source apportionment modeling were:

- Elevated point sources;
- Low-level point sources (i.e., point source emissions emitted into layer 1 of the model);
- On-Road Mobile Sources;
- Non-Road Mobile Sources;
- Area Sources; and
- Natural Sources.

Natural Sources included biogenic VOC and NO_x emissions from the BEIS3 biogenic emissions model, emissions from wildfires and emissions from wind blown dust due to non-agriculture land use types.

PM source apportionment in PSAT is available for five families of PM tracers: (1) Sulfate; (2) Nitrate and Ammonium; (3) Secondary Organic Aerosols (SOA); (4) Primary PM; and (5) mercury. The CENRAP PSAT 2002 and 2018 applications used three of the PSAT families of tracers and did not use the SOA and mercury families. For SOA, the standard CAMx model output was used that partitions SOA into an anthropogenic (SOAA) and biogenic (SOAB) components.

The PSAT results were extracted at the CENRAP and nearby Class I areas and the contributions for the average of the worst 20 percent and best 20 percent days were processed. A PSAT Visualization Tool was developed that can be used by States, Tribes and others to generate displays of the contributions of source regions and categories to visibility impairment for the average of the worst 20 percent and best 20 percent days at each CENRAP and nearby Class I areas.

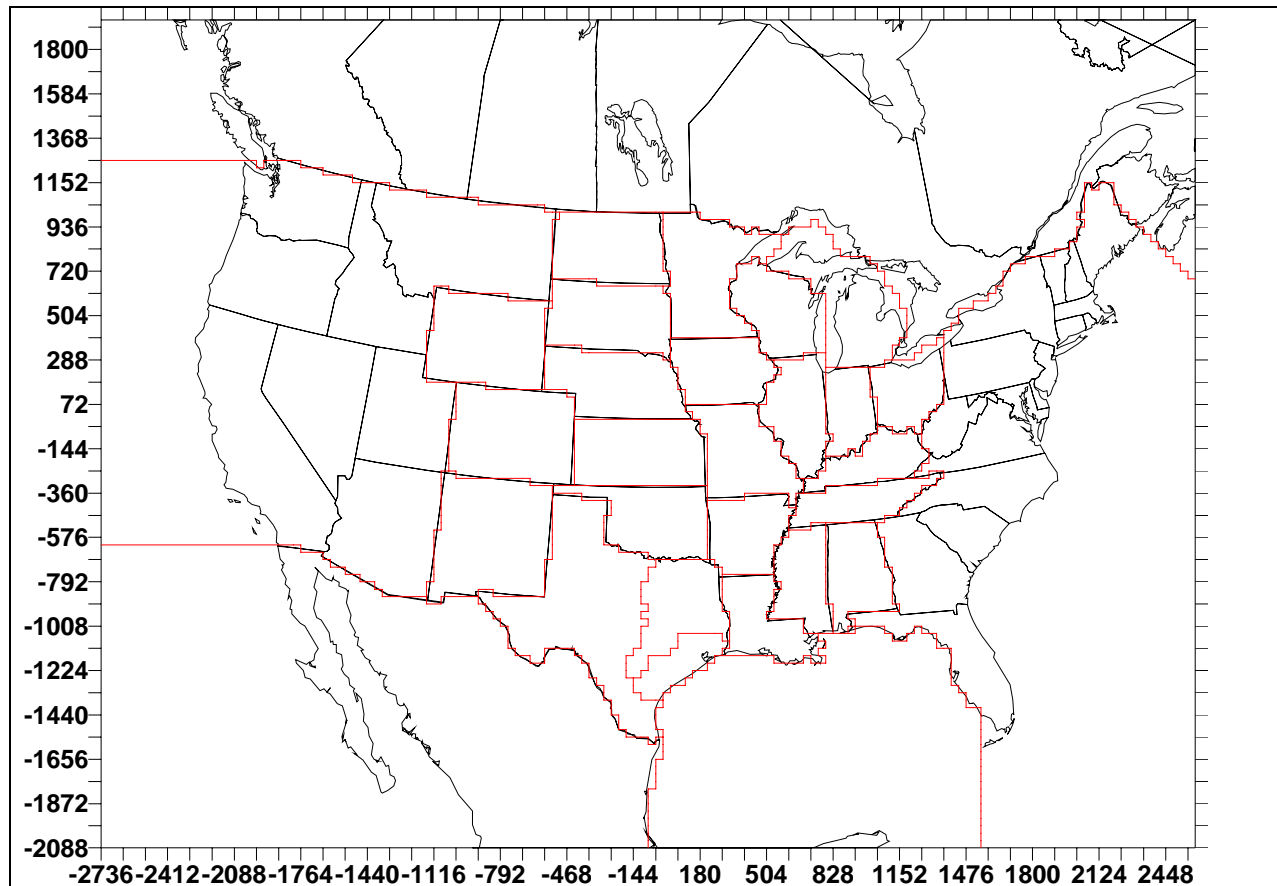


Figure 5-8. 30 source regions used in the CENRAP 2002 and 2018 CAMx PSAT PM source apportionment modeling.

5.4.2 CENRAP PSAT Visualization Tool

The PSAT Visualization Tool allows CENRAP States, Tribes and others to visualize the CENRAP 2002 and 2018 PSAT modeling results and identify which source regions, categories and PM species are contributing to visibility impairment at Class I areas for the average of the worst 20 percent and best 20 percent visibility days. The Visualization Tool is currently available on the CENRAP website (<http://www.cenrap.org>) under Projects. The Tool can generate bar charts of source contributions at Class I areas. It can be run in a receptor oriented mode where it identifies the contributions of PM species and source regions and categories to visibility impairment on the worst and best 20 percent days. It can also be run in a source oriented mode to examine an individual source region’s (State’s) contribution to visibility impairment at downwind Class I areas on the worst and best 20% days. The original IMPROVE equation is used to convert the PM species concentrations to extinction.

There are 14 air quality analysis metrics in the Tool:

W20% Modeled Bext: The source region, source category and PM species contributions to the extinction (Bext) at a Class I area estimated by the model averaged across the worst 20 percent days in 2002.

W20% Projected Bext: The source region, source category and PM species contributions to the extinction (Bext) at a Class I area projected by the model averaged across the worst 20 percent days in the 2000-2004 Baseline.

W20% Modeled USAnthro: The source region, source category and PM species contributions to the extinction (Bext) at a Class I area for just U.S. anthropogenic emission source categories estimated by the model averaged across the worst 20 percent days in 2002.

W20% Projected USAnthro: The source region, source category and PM species contributions to the extinction (Bext) at a Class I area for just U.S. anthropogenic emission source categories projected by the model averaged across the worst 20 percent days in the 2000-2004 Baseline.

Emissions: Emissions by source region, source category and PM precursor. Precursors include SO_x, NO_x, primary organic aerosol (POA), primary elemental carbon (PEC) other primary fine particulate (FCRS+FPRM) and coarse mass (CCRS+CPRM). Emissions for four days have been extracted and implemented in the Tool.

Control Effectiveness: Control effectiveness is defined as the PM contribution divided by the emissions of the primary precursor. For example the SO₄ contribution divided by the SO₂ emissions.

Visualization Tool results are available for visibility contributions on both an absolute (Mm^{-1}) and percentage basis. When looking at contributions at a given Class I area, contributions can be examined in terms of PM species, source regions and/or source categories. Results are available for both the current year (2002 modeled or 2000-2004 projected) and future year (2018). The “2002 W20% Project Bext” metric applies the 2002 PSAT modeled source apportionment to the observed 2000-2004 Baseline extinction keeping the relative contributions of source groups to each PM species (e.g., SO₄, NO₃, etc.) the same averaged across the 2002 worst 20 percent days but scaling their magnitudes up or down based on the ratio of the 2000-2004 Baseline to the 2002 modeling results. Similarly, the “2018 W20% Projected” metric uses the relative contributions of the 2018 PSAT results from each source group and scales them according to the differences in the 2018 projected PM species to the 2018 modeled PM species for the average of the worst 20 percent days. The US Anthropogenic metrics just include source groups associated with U.S. man-made emissions (i.e., non-Natural source categories from states and Gulf of Mexico source regions) so excludes contributions from Canada and Mexico, Boundary Conditions, SOA from biogenic sources and the natural source category (biogenic NO_x, wildfires and wind blown dust).

5.4.3 Source Contributions to Visibility Impairment at Class I Areas

Appendix E displays example contributions of PM species, source regions and source categories to visibility impairment for the worst and best 20 percent days at the CENRAP Class I areas. Some of the results from Figure E-1 for the CACR Class I area are reproduced in Figures 5-9, 5-10 and 5-11 below.

5.4.3.1 Caney Creek (CACR) Arkansas

2002 visibility impairment for the worst 20 percent days at CACR is primarily due to SO₄ from elevated point sources that contributes over half (66.3 Mm⁻¹) of the total extinction of 118.8 Mm⁻¹ (Figure E-1a and 5-8 left). By 2018, the total extinction at CACR for the worst 20 percent days is reduced by approximately one third (38.5 Mm⁻¹) which is primarily due to reductions in SO₄ extinction from elevated point sources (from 66.3 to 37.3 Mm⁻¹) as well as reductions in visibility impairment from on-road and non-road mobile sources. Even with such large reductions in SO₄ from point sources in 2018, extinction due to elevated point sources is still the highest contributor to visibility impairment on the worst 20 percent days contributing over half (41.8 Mm⁻¹) of the total extinction in 2018 of 80.3 Mm⁻¹, with area sources the next most important source category contributing 16.0 Mm⁻¹ (~20%).

The geographic source apportionment for the worst 20 percent says at CACR is shown in Figures 5-10, E-1c and E-1d. Elevated point sources from the eastern source region is the largest contributor in 2002 contributing almost 18 Mm⁻¹ that is reduced by over a factor of three in 2018 to approximately 5 Mm⁻¹. By 2018, Arkansas is the largest contributor to extinction at CACR for the 20 percent worst days followed by East Texas, the large Eastern U.S. region and then SOA due to biogenic sources. Figures E-1e ranks the source group contributions to extinction on the worst 20 percent days at CACR with Elevated Point Sources from East Texas being the highest contributor to total extinction, similar results are seen when examining extinction at CACR for the worst 20 percent days due to just SO₄ and NO₃ (Figure E-1f).

For the best 20 percent days at CACR (Figures 5-11, E-1g-j), SO₄ is still a major contributor but no where near as dominate as seen for the worst 20 percent days, but elevated point is still the largest contributing source category Local contributions from within Arkansas contribute the most to the average of extinction across the best 20 percent days at CACR.

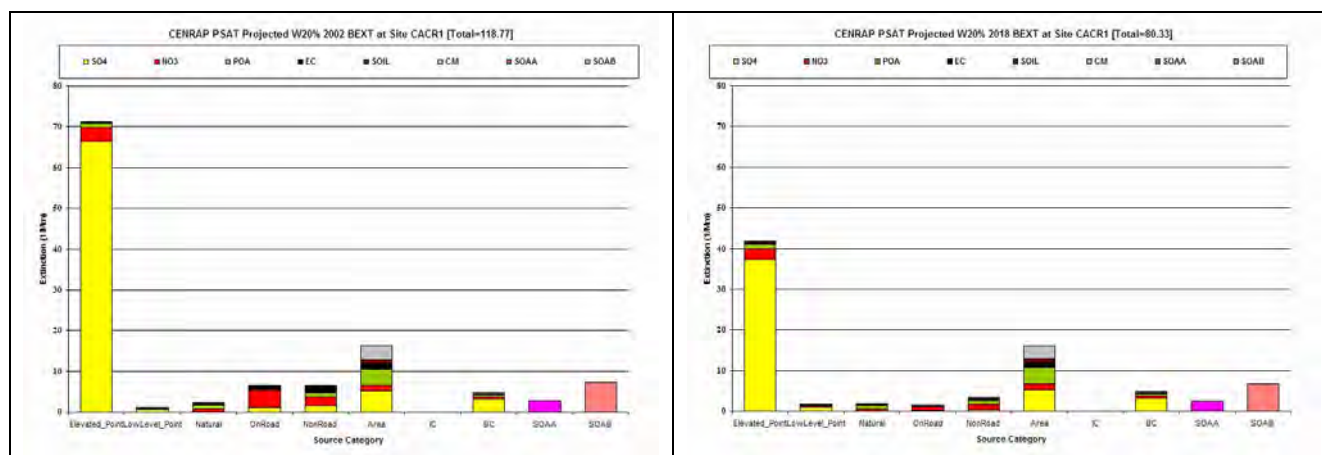


Figure 5-9. PSAT source category by PM species contributions to the average 2000-2004 Baseline and 2018 projected extinction (Mm⁻¹) for the worst 20 percent visibility days at Caney Creek (CACR), Arkansas.

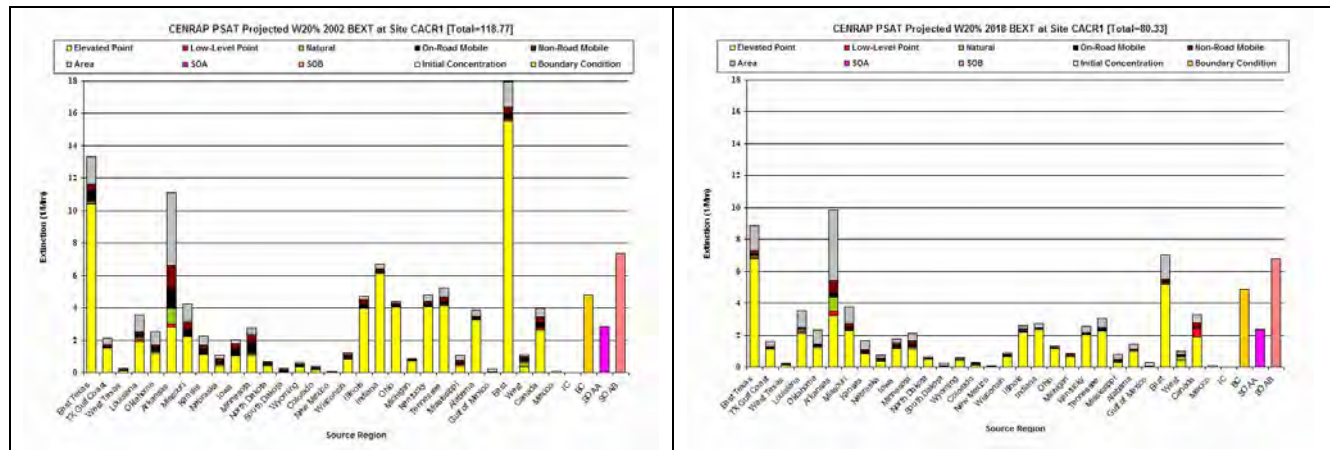


Figure 5-10. PSAT source region by source category contributions to the average 2000-2004 Baseline and 2018 projected extinction (Mm^{-1}) for the worst 20 percent visibility days at Caney Creek (CACR), Arkansas.

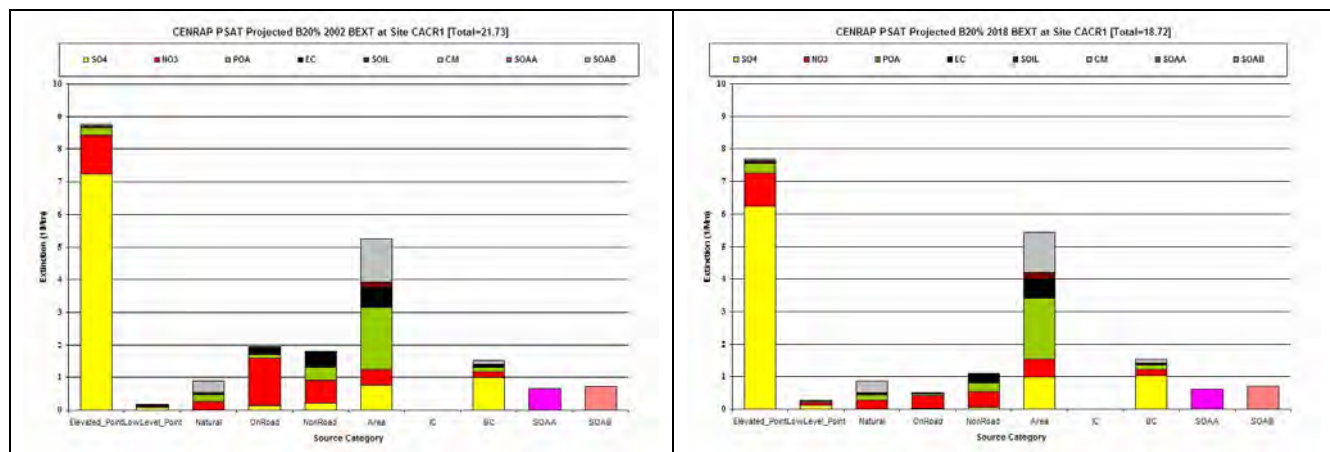


Figure 5-11. PSAT source category by PM species contributions to the average 2000-2004 Baseline and 2018 projected extinction (Mm^{-1}) for the best 20 percent visibility days at Caney Creek (CACR), Arkansas.

5.4.3.2 Upper Buffalo (UPBU) Arkansas

The contributions to extinction on the worst 20 percent days at UPBU (Figure E-2) is similar to CACR only with less contributions from East Texas and more from Missouri, Illinois and Indiana. By 2018, the top five highest contributing source groups to the average extinction on the worst 20 percent days are as follows: Arkansas Elevated Point; SOA from biogenics; Boundary Conditions, East Elevated Points, and Illinois Elevated Points (Figure E-2e). On the best 20 percent days at UPBU visibility impairment is primarily due to Arkansas and adjacent states Oklahoma, Missouri, and Kansas).

5.4.3.3 Breton Island (BRET) Missouri

Visibility impairment for the worst 20 percent days at Breton Island is primarily (69%) due to elevated point sources that contribute 77.7 Mm^{-1} out of a total of 122.2 Mm^{-1} (Figure E-3a). Although the contribution of elevated point sources is reduced substantially by 2018, they still contribute over half of the total extinction (101.1 Mm^{-1}) on the worst 20 percent days at BRET (Figure E-3b). The top five contributing source groups to 2018 visibility impairment at BRET for the worst 20 percent days are: Louisiana Elevated Point Sources; Boundary Conditions; East Elevated Point Sources; Gulf of Mexico Area Sources and Louisiana Area Sources. Gulf of Mexico Area sources includes off shore shipping and oil and gas development emissions; note that for the PSAT simulation the off-shore marine shipping emissions were double counted which was corrected in the Base G emission scenarios used in the 2018 visibility projections discussed in Chapter 4.

5.4.3.4 Boundary Waters (BOWA) Minnesota

As seen for the other Class I areas, elevated point sources contribute the largest amount (47%) to visibility impairment at BOWA for the worst 20 percent days in 2002 (Figure E-4a). However, unlike many of the other Class I areas, there is little reductions (~10%) in the elevated point source contributions going from 2002 (29.0 Mm^{-1}) to 2018 (26.2 Mm^{-1}) (Figures E-4a and E-4b). This is because there is a slight increase in the contributions of elevated point sources in Minnesota from 2002 to 2018 (Figures E-4c and E-4d) that is the highest contributing source group (Figure E-4e). Note that the 2018 emission scenario includes growth and CAIR controls but no BART controls. For the best 20 percent days, the largest contributing source group by far is Boundary Conditions (i.e., global transport) followed by Minnesota and Canada (Figures E-4g-j).

5.4.3.5 Voyageurs (VOYA) Minnesota

Results for VOYA are similar to BOWA with Minnesota, Canada and Boundary Conditions contributing the most to visibility impairment on the worst and best 20 percent days (Figure E-5).

5.4.3.6 Hercules Glade (HEGL) Missouri

Elevated point sources contribute over half to the total extinction for the worst 20 percent days at HEGL in 2002 (Figures E-6a and E-6b). Going from 2002 to 2018 the contributions due to elevated point sources, on-road mobile and non-road mobile are reduced substantially, but the contributions due to the other sources remain unchanged. The largest source group contributing to visibility impairment on the worst 20 percent days is area sources from Missouri in both 2002 and 2018 (Figures E-6c and E-6d). Since area emissions are not reduced much between 2002 and 2018 and Missouri elevated point sources are mostly unchanged because the IPM model assumed Missouri CAIR sources would buy credits, then the Missouri contributions is only reduced a little going from 2002 to 2018 (from $\sim 18 \text{ Mm}^{-1}$ to $\sim 16 \text{ Mm}^{-1}$). However, the contributions due to the Eastern U.S., Illinois and Indiana are reduced substantially. Missouri is by far the largest contribution to visibility impairment at UPBU on the best 20 percent days as

well with area sources from Missouri being the largest source category (Figures E-6h through E-6j).

5.4.3.7 Mingo (MING) Missouri

The substantial improvements in visibility impairment at MING for the worst 20 percent days from 2002 (141 Mm^{-1}) to 2018 (96 Mm^{-1}) is primarily due to reductions in SO_4 from non-Missouri elevated point sources (Figures E-7a through E-7d). Even so, with the exception of the top contributing Missouri area sources the largest contributing source groups to 2018 visibility impairment for the worst 20 percent days are still elevated point sources from several CAIR states (Illinois, Indiana, Missouri, East; Figure E-7e). Missouri is the largest contributor to visibility on the best 20 percent days followed by Boundary Conditions and Illinois (Figure E-7i-j).

5.4.3.8 Wichita Mountains (WIMO) Oklahoma

Elevated point sources are the largest contributors to visibility impairment on the worst 20 percent days at WIMO in both 2002 and 2018 (Figures E-8a and E-8b). East Texas followed closely by Oklahoma are the largest contributing source regions in 2002, but by 2018 the reverse is true (Figures E-8c and E-8d). By 2018 the largest contributing source group to visibility impairment on the worst 20 percent days at WIMO is global transport (i.e., boundary conditions) followed by Oklahoma Area Sources and East Texas Elevated Point sources (Figure E-8e). Oklahoma Area Sources is the largest contributor to visibility impairment on the best 20 percent days at WIMO (Figures E-8g-j).

5.4.3.9 Big Bend (BIBE) Texas

Elevated point sources ($\sim 17 \text{ Mm}^{-1}$) followed by Boundary Conditions ($\sim 12 \text{ Mm}^{-1}$) are the largest contributions to total extinction (46 Mm^{-1}) on the worst 20 percent days at BIBE in 2002 (Figure E-9a). In 2018 there is very little ($\sim 2 \text{ Mm}^{-1}$) reduction in the contributions of elevated point sources and no reductions in global transport resulting in little reductions ($\sim 7\%$) in visibility impairment on the worst 20 percent days from 2002 (46 Mm^{-1}) to 2018 (43 Mm^{-1}). This is due to the extremely large contributions of emissions from Mexico in both 2002 (Figure E-9c) and 2018 (Figure E-9d). In fact, the four highest contributing source groups to visibility impairment at BIBE for the worst 20 percent days are assumed to be unchanged from 2002 to 2018: Boundary Conditions, Mexico Elevated Points, West Texas Natural and Mexico Natural (Figure E-9e). For the best 20 percent days at BIBE, West Texas, Mexico and Boundary Conditions are the highest three contributors to visibility impairment (Figures E-9g-j).

5.4.3.10 Guadalupe Mountains (GUMO) Texas

The large contribution of CM to visibility impairment at GUMO is clearly evident in the source apportionment modeling results (Figures E-10a-b). These sources are about evenly divided in the modeling between natural sources and area sources. Since these source categories are not reduced in the future year then there is little reduction in extinction from 2002 to 2018 (50 to 45

Mm^{-1}) and what reductions there are come from Elevated Point Sources. Sources in West Texas, Mexico, Boundary Conditions and New Mexico are the largest contributing source regions for both the worst 20 percent days (Figure E-10c-e) and best 20 percent days (Figures E-10g-j).

5.5 Alternative Visibility Projection Procedures

In this section we analyze several alternative visibility projection procedures from the EPA's default approach (EPA, 2007a) used in Chapter 4.

5.5.1 Treatment of Coarse Mass and Soil

As noted previously, much of the coarse mass (CM) and, to a lesser extent, Soil measured at the IMPROVE monitor is likely due to local wind blown dust that is natural in origin and not captured by the model. Consequently, even using the modeling results in a relative sense with the RRFs may not be appropriate for projecting CM and Soil. If CM and Soil are in fact local impacts due to wind blown dust from natural lands, then it would be appropriate to assume they are natural and remain unchanged from the 2000-2004 Baseline to 2018. This is probably certainly appropriate for CM because CM is primarily due to fugitive dust and it has a very short transport distance that is subgrid-scale to the model. In fact the model evaluation discussed in Chapter 3 and Appendix C clearly shows a large underprediction bias for CM that is likely due to local fugitive dust impacts at the IMPROVE monitor. For Soil this is less clear as fine particles can be transported over longer distances and is produced by anthropogenic sources, such as combustion and road dust, as well as natural sources. We initially performed two CM and Soil sensitivity tests, the first assumed CM was all natural so remains unchanged from the 2000-2004 Baseline to 2018 (i.e., set the RRF for CM equal to 1.0). The second sensitivity test assumed both CM and Soil were natural so set RRFs for both of them to 1.0. A comment from an FLM noted that we know some of the Soil is likely anthropogenic in origin. So it was suggested to subtract the 2002 base case modeled Soil from the observed values for the 2002 worst 20 percent days and assume that the remainder (if any) was natural so hold the rest of the Soil constant in 2018 and add to the 2018 modeled Soil values.

The results of the CM and Soil visibility projection sensitivity analysis are shown in the DotPlot in Figure 5-12. The CM and Soil visibility projection sensitivity analysis has little effect on the 2018 visibility projections at the CENRAP Class I areas. Even GUMO, which has a large CM and Soil component, shows very little sensitivity. This is probably because the CM at GUMO is likely dominated by wind blown dust that was assumed constant from 2002 to 2018 so the RRF calculated using the default EPA method is near 1.0 anyway. Some larger sensitivity is seen at several WRAP Class I areas. It is encouraging that CENRAP 2018 visibility projections are not sensitive to the CM and Soil components of the modeling which are highly uncertain.

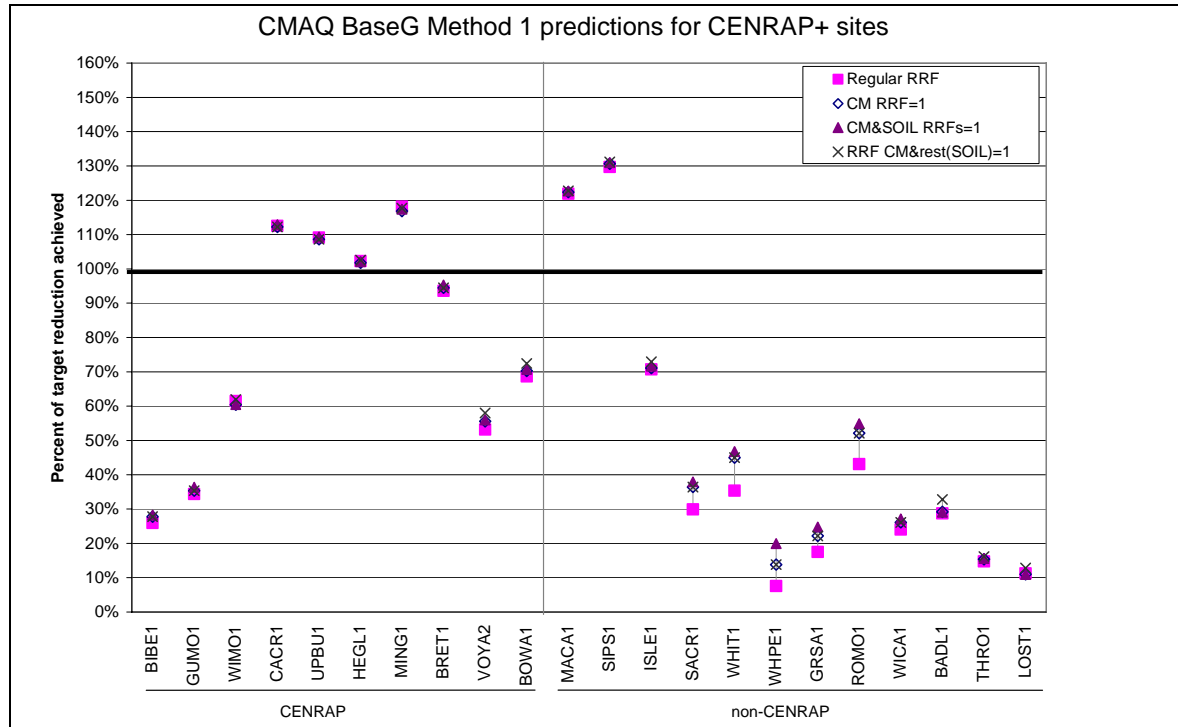


Figure 5-12. Sensitivity of 2018 visibility projections to various methods that assume all CM, all CM and Soil and all CM and part of the Soil is natural.

5.6 Alternative Model

The CAMx model was also run for a 2002 and 2018 base case scenarios with earlier versions of the CENRAP emissions (Base E modified to eliminate double counting of some area fire emissions) than the final CMAQ 2002 Base G modeling. The CAMx 2002 and 2018 output was processed the same way that the CMAQ results were to generate 2018 visibility projections at the CENRAP and nearby Class I areas that were compared with the 2018 URP point. Figure 5-13 summarizes the CAMx 2018 visibility projections using the new IMPROVE algorithm (NIA) in a DotPlot and compares them with the CMAQ 2018 Base G results (from Figure 5-12). The CMAQ and CAMx 2018 visibility projections are remarkably similar. The four Arkansas and Missouri Class I areas are projected to achieve the 2018 URP point by almost the exact same amount by the two models. The two Texas Class I areas are projected to come up short of achieving the 2018 URP point by the same amount by the two models. The largest differences are seen at BRET, and to a lesser extent BOWA and VOYA. At BRET the CAMx 2018 visibility projections are much less optimistic (< 80%) in achieving the 2018 URP point than CMAQ (> 90%). And CMAQ is slightly less optimistic than CAMx in achieving the 2018 URP point for the two northern Minnesota Class I areas. The reasons for these differences are unclear but could be partially due to the emissions updates in the final CMAQ Base G run that included eliminating the double counting of off-shore marine emissions in the Gulf of Mexico that was present in the CAMx simulation, which makes it more difficult to get visibility improvements at BRET since it is influenced by sources in the Gulf. Corrections to stack parameters for Canadian point sources were also made for the final Base G. The general close agreement of the CAMx 2018 visibility projections to the final CMAQ values is encouraging and good QA check.

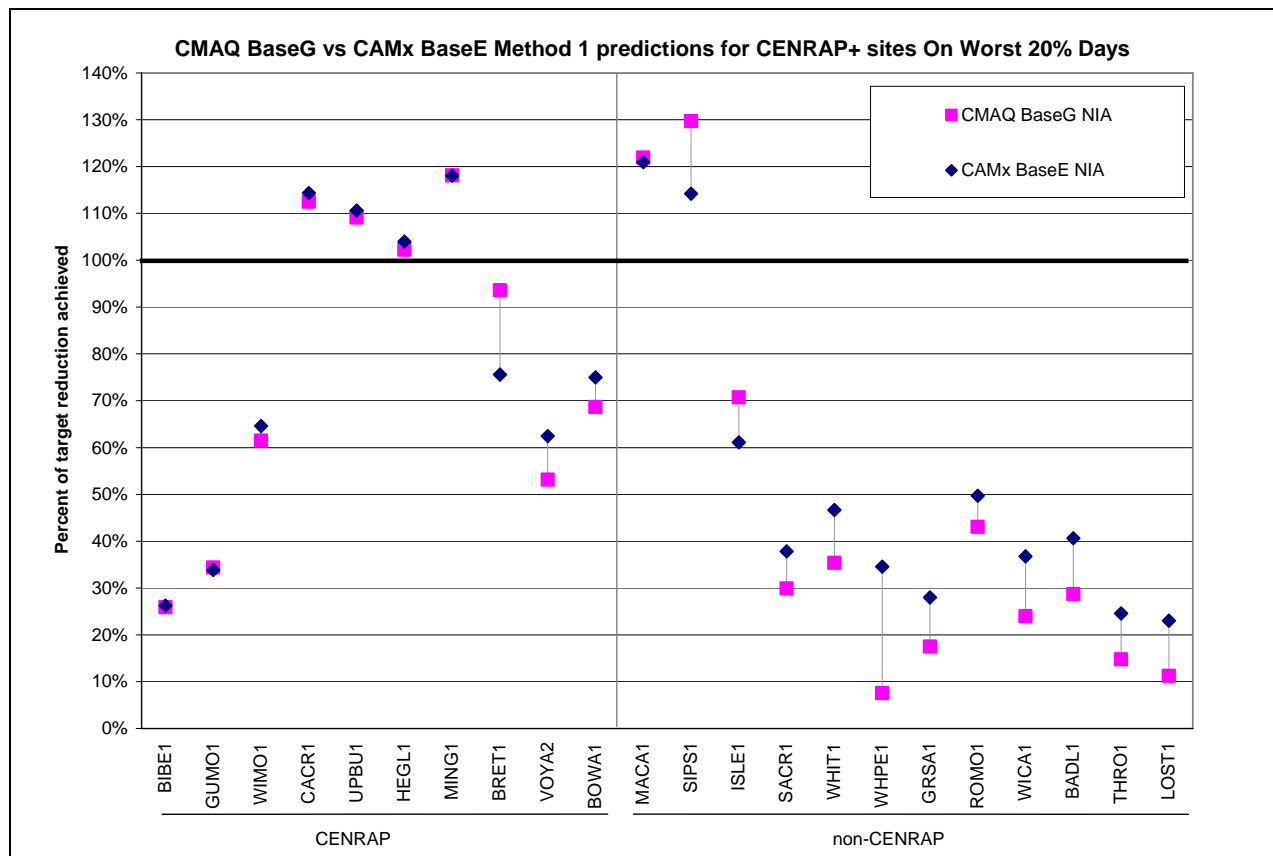


Figure 5-13. Comparison of CAMx 2018 visibility projections with 2018 URP points for CENRAP and nearby Class I areas.

5.7 Effects of International Transport on 2018 Visibility Projections

As seen in the PM source apportionment modeling discussed in Section 5.4, there is significant contributions of international sources to visibility impairment at many CENRAP Class I areas for the worst 20 percent days. With the exception of Canada, where we used a year 2000 inventory for the 2002 base case modeling and a 2020 inventory for the 2018 inventory, international sources were assumed to be constant between 2002 and 2018. Thus, Class I areas that are heavily impacted by contributions of international transport will have a difficult time achieving the 2018 URP point since international sources are assumed to remain constant. The CAMx PSAT runs discussed previously provide a framework for quantitatively assessing the contributions of international transport to the visibility projections and whether reasonable progress toward natural conditions is being achieved in the 2018 modeling.

There are several source regions (Figure 5-8) and source categories in the PSAT modeling that include international sources:

- Mexico Anthropogenic Sources (assumed all international);
- Canada Anthropogenic Sources (assumed all international);
- Gulf of Mexico (assumed all U.S. sources);
- Pacific and Atlanta Ocean (assumed all U.S. sources); and
- Boundary Conditions (assumed half international and half natural sources).

Although it can be argued that Mexico and Canada are not truly international due to the presence of numerous U.S. corporations in Mexico along with free trade among the two countries, states and federal government have no jurisdiction to regulate industry in these two countries so they are considered international in these calculations. The Gulf of Mexico includes off-shore oil and gas production facilities, support vessels and aircraft and off-shore marine shipping. Given that emissions from the oil and gas production can be regulated by the U.S., then the Gulf of Mexico is not considered an international source. Emissions from off-shore shipping in the Pacific and Atlantic Oceans are also currently not regulated by the U.S. government. However, there are current efforts to apply some regulations to these emissions so for these calculations they were not assumed to be international sources. Finally, the Boundary Conditions (BCs) for the CENRAP modeling were generated from a 2002 simulation of the GEOS-CHEM global chemistry model and held constant in 2018. These BCs would include contributions from international sources as well as natural sources, so need to be split. For the sensitivity calculations discussed below we assumed that the BCs were half due to natural and half due to international sources. This results in international sources being defined as follows:

$$\text{International Contribution} = \text{Mexico Anthro} + \text{Canada Anthro} + \frac{1}{2} \text{BCs}$$

Two methods were examined to see what the effects of international sources on 2018 visibility projections and a Class I areas ability to achieve the 2018 URP point:

Elimination of International Contributions to 2018 Visibility Projections: In this method the contribution of international emissions is taken out of the 2018 visibility projections and examined to see whether the new visibility projection achieves the URP point. If so, then international sources are hindering a Class I area in achieving the 2018 URP point, which suggests that the 2018 URP point is not a reasonable value for an RPG.

Visibility Projections and Glidepaths Based on Controllable Visibility Impairment: The second method would look at the visibility projections for just the U.S. controllable portion of the visibility impairment. The glidepath end point in 2064 would be to eliminate the U.S. man-made contributions to visibility impairment on the worst 20 percent days.

Note that this analysis is performed solely for providing states and others additional information on which Class I areas the modeling suggest are unduly influenced by International Transport.

5.7.1 Elimination of International Contributions to 2018 Visibility Projections

This method was also discussed in a recent technical brief prepared by the Electric Power Research Institute (EPRI), only in EPRI's analysis they used results from a global chemistry model and VISTAS CMAQ runs with no global anthropogenic emissions (EPRI, 2007). Thus, before discussing our results of this analysis using PSAT, we discuss EPRI's analysis.

5.7.1.1 EPRI's Analysis of Effects of International Contributions

EPRI funded Harvard University to perform annual simulations of the GEOS-Chem global chemistry model (<http://www-as.harvard.edu/chemistry/trop/geos/>) for annual simulations with and without non-U.S. anthropogenic emissions to determine the contributions of international transport to PM and visibility. The EPRI Harvard GEOS-Chem simulations were performed for 2001. Figure 5-14 and 5-15 compare the annual average ammonium sulfate, ammonium nitrate organic mass carbon (OMC, also called OCM) and elemental carbon (EC) due to the GEOS-Chem global modeling and the CAMx PSAT source apportionment modeling. The similarity of the results for ammonium sulfate is remarkable (Figure 5-14). Both methods estimate that the annual average ammonium sulfate contribution due to international sources ranges from 0.4 to 1.0 $\mu\text{g}/\text{m}^3$ across the Class I areas. There is less agreement between the two methods for ammonium nitrate due in part to a CAMx overestimation issue that is likely due in part to how ammonia emissions were classified as being anthropogenic or not in the no U.S. anthropogenic emissions simulations (Figure 5-15). Better agreement is seen between the two methods international contributions of OMC and EC, although CAMx estimates higher contributions than GEOS-Chem.

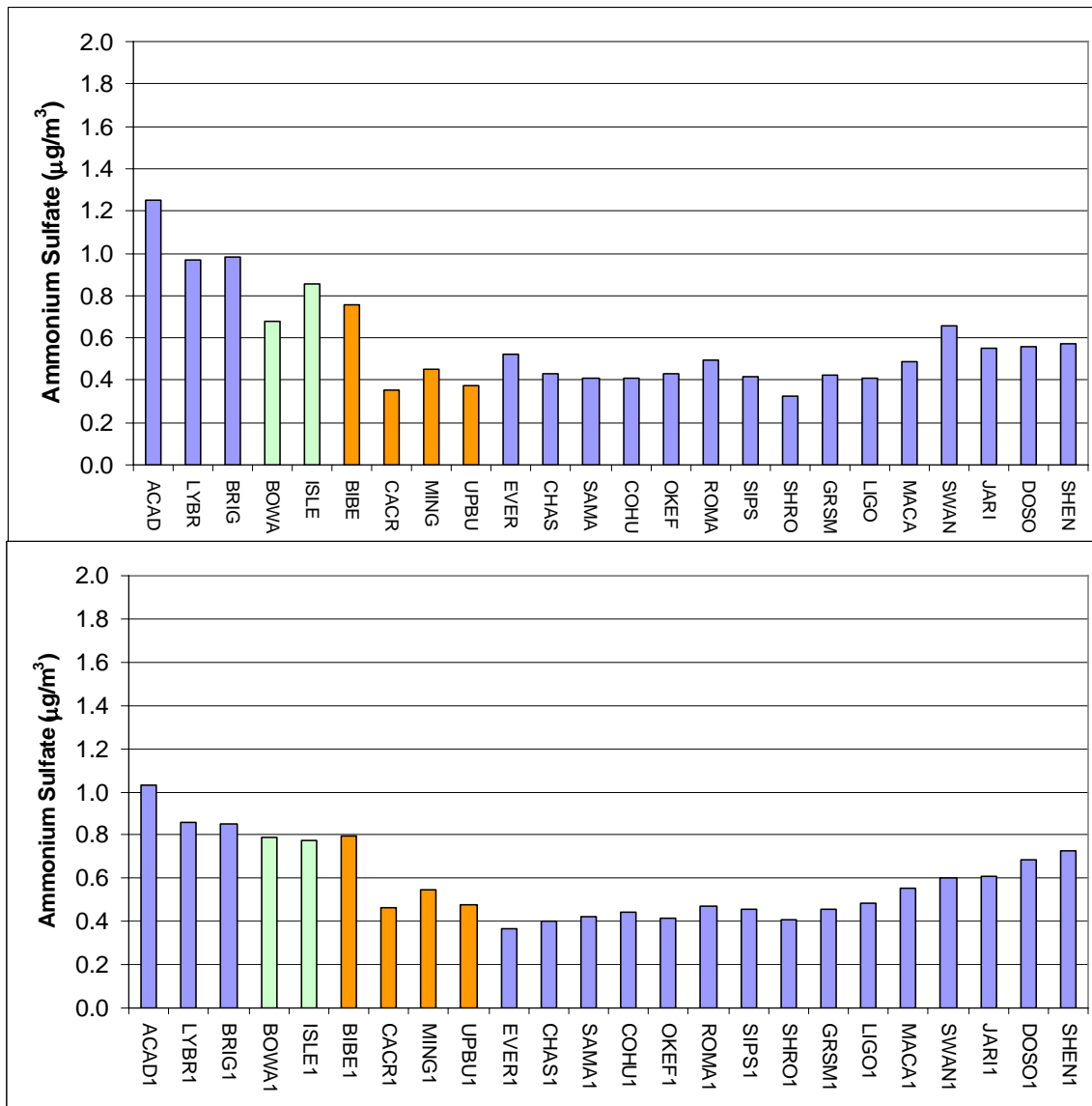


Figure 5-14. Comparison of EPRI Harvard GEOS-Chem global chemistry (top) and CENRAP PSAT (bottom) international source contributions to ammonium sulfate at Class I areas.

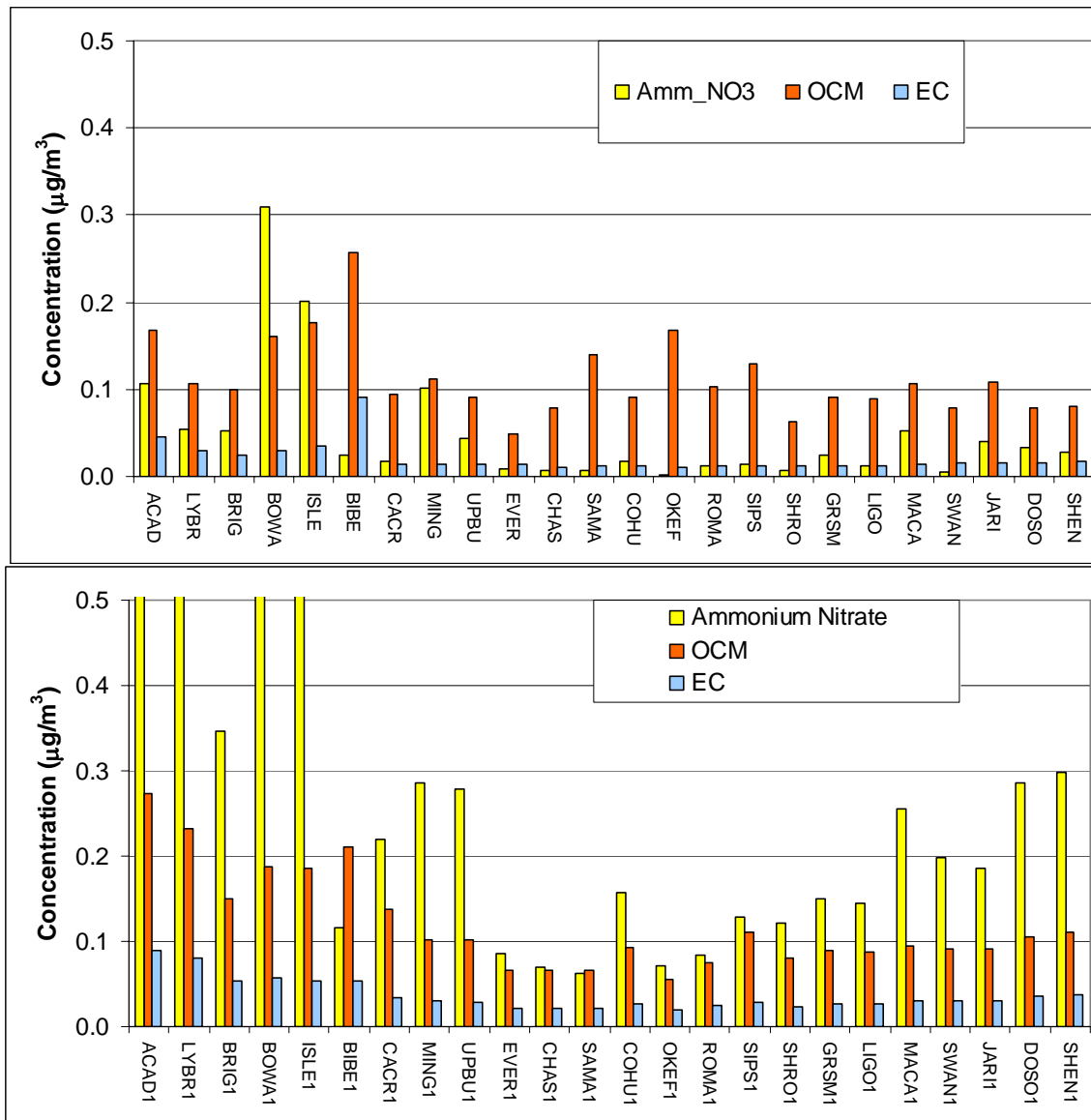


Figure 5-15. Comparison of EPRI Harvard GEOS-Chem global chemistry (top) and CENRAP PSAT (bottom) international source contributions to ammonium nitrate, organic carbon mass (OCM or OMC) and elemental carbon (EC) at Class I areas.

The EPRI technical brief used the VISTAS CMAQ runs to adjust the modeled 2018 visibility projections to eliminate the effect of international transport and compared them to the 2018 URP point. For the Boundary Waters, Voyageurs, Isle Royal and Seney Class I areas the standard 2018 visibility projections did not achieve the 2018 URP point. However, when the effect of transboundary pollutions was removed the 2018 URP point was essentially achieved or more than achieved at all four Class I areas.

5.7.1.2 CENRAP Results From Elimination International Transport

Because the elimination of the international sources from the 2018 visibility projections results in a portion of the total light extinction, then these comparisons with the 2018 URP points were done using extinction glidepaths and projections rather than deciview. In Section 5.2.1 we demonstrated that the level of achieving the 2018 URP point was almost identical at CENRAP Class I areas whether the linear deciview or curved extinction glidepaths were used. The PSAT source apportionment was used to determine the contribution to the projected extinction in 2018 due to international sources. As noted above, international sources were assumed to be due to anthropogenic emissions in Mexico and Canada and half of the Boundary Conditions.

Figure 5-16 shows the standard CAMx extinction glidepaths and 2018 visibility projections and the 2018 visibility projections when the contributions of international sources is eliminated. CACR, which achieved the 2018 URP point by 104%, achieves it by even more when international sources are eliminated (117%). UPBU that barely achieved the 2018 URP point by 102% achieves it by 116% without international emissions.

BRET comes up short of achieving the 2018 URP point when international emission are included (76%) as well as when they are eliminated (92%), although it is much closer (recall contributions of Gulf of Mexico to visibility impairment at BRET that is assumed in this analysis to be of U.S. origin). Eliminating international transport emissions makes of difference of meeting the 2018 URP point without them (120%) to not meeting it with them (64%) at BOWA. Similarly at VOYA the standard 2018 visibility projections do not achieve the 2018 URP point (54%), whereas it is achieved by a far margin when international sources are eliminated (132%).

HEGL comes up short achieving the 2018 URP point when international sources are included (95%), but achieves it when they are eliminated (107%). Recall the standard CAMx deciview visibility projections barely achieved the URP point even when international emissions are included (Figure 5-13). MING achieves the 2018 URP point with (106%) and without (116%) international sources. WIMO does not achieve the 2018 URP point when international contributions are eliminated.

International sources have by far the largest effect at BIBE. Whereas the standard 2018 visibility projections only achieved 27% of the reductions needed to achieve the 2018 URP point, elimination of the international source contributions achieves 172% of the reduction needed. GUMO comes up short in achieving the 2018 URP point when international sources are included (31%), but achieves it when they are not (107%).



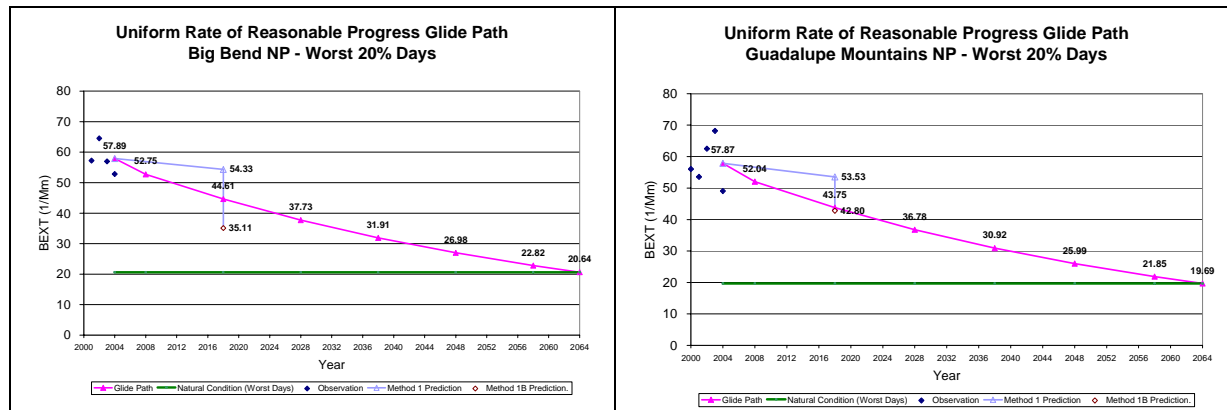


Figure 5-16. Elimination of international sources from 2018 visibility projections and comparison with 2018 URP point at CENRAP Class I areas.

5.7.2 Glidepaths Based on Controllable Extinction

Another alternative glidepath that was examined using the CAMx PSAT source apportionment results was based on the U.S. anthropogenic emissions contributions to visibility impairment on the worst 20 percent days at the CENRAP Class I areas. The RHR strives to achieve “natural visibility conditions” by 2064 and defines natural conditions as conditions that would exist “in the absence of human caused impairment”. As shown above, anthropogenic emissions from international sources contribute significantly to visibility impairment at many of the CENRAP Class I areas making the RHR objective not practical if contributions from such sources are not reduced. Given that states and EPA have no jurisdiction over international sources, then we can not assume they will be controlled and have therefore held most of them constant at 2002 levels. For such Class I areas with high contributions from international sources, the comparison with the 2018 URP point is not very meaningful since the 2018 URP assumes such sources will be reduced. A more meaningful comparison would be to focus on the U.S. man-made contributions to visibility impairment at the Class I areas and develop a URP glidepath and 2018 URP point that is aimed at eliminating the U.S. anthropogenic emissions contributions to visibility impairment at Class I areas for the worst 20 percent days in 2064.

The CAMx 2002 base case PSAT PM source apportionment results were processed to identify the portion of the 2000-2004 Baseline extinction that was due to U.S. anthropogenic emissions (i.e., man-made sources). The contributions of source groups that included on-road mobile, non-road mobile, elevated point sources, low-level point sources and area sources from the PSAT source regions covering the U.S. states and Gulf of Mexico (Figure 5-8) were assumed to make up the U.S. anthropogenic contributions (i.e., excluding the Natural source category, all sources from the Mexico and Canada source regions and boundary conditions). Note that off-shore marine emissions in the Pacific and Atlantic Oceans and Gulf of Mexico were included in the U.S. anthropogenic emissions definition because they were in source regions associated with states or the Gulf of Mexico. As off-shore marine emissions may not be controllable by U.S. agencies and they were assumed to remain unchanged going from 2002 to 2018, then the 2018 visibility projections for the U.S. anthropogenic component are overstated.

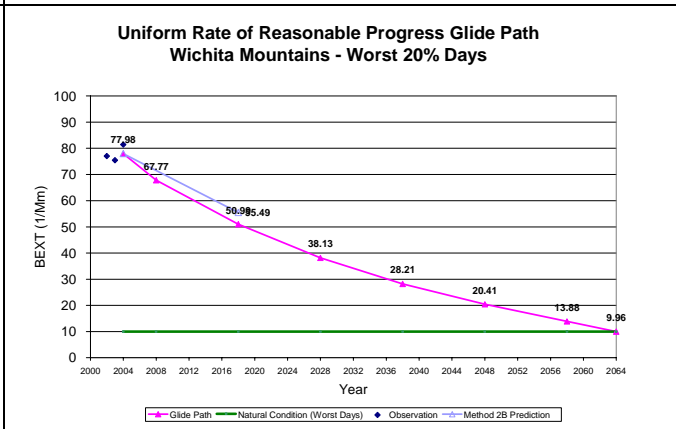
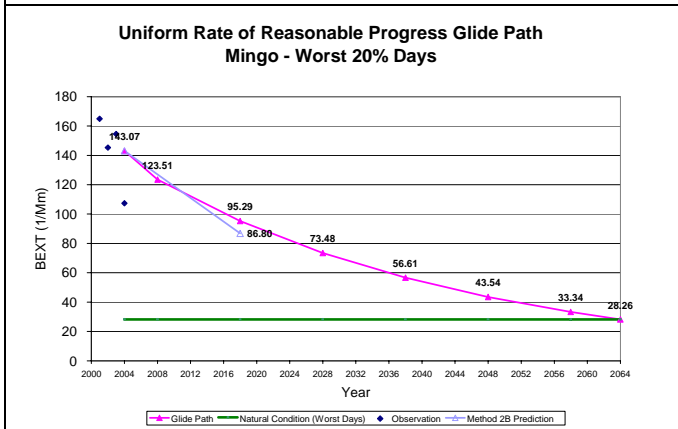
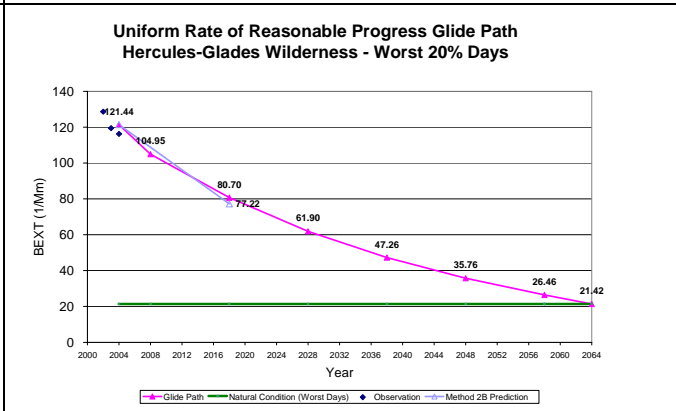
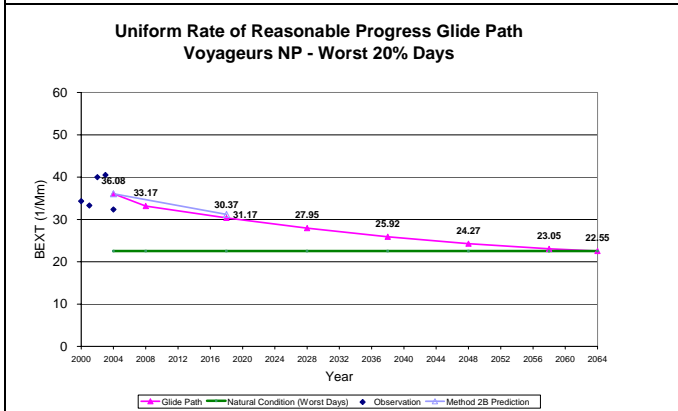
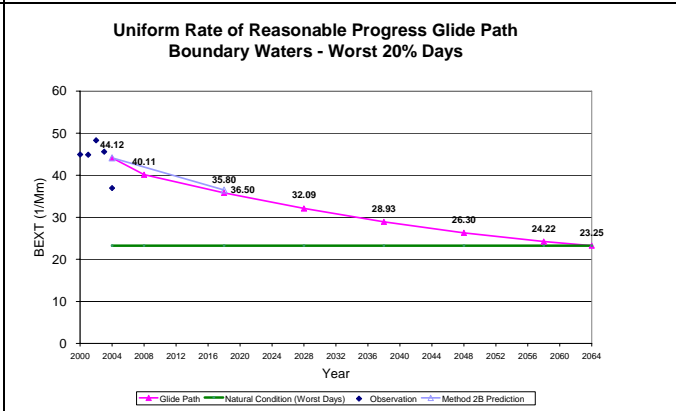
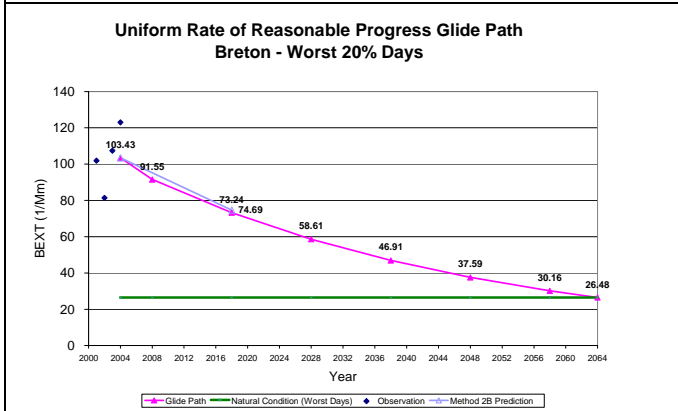
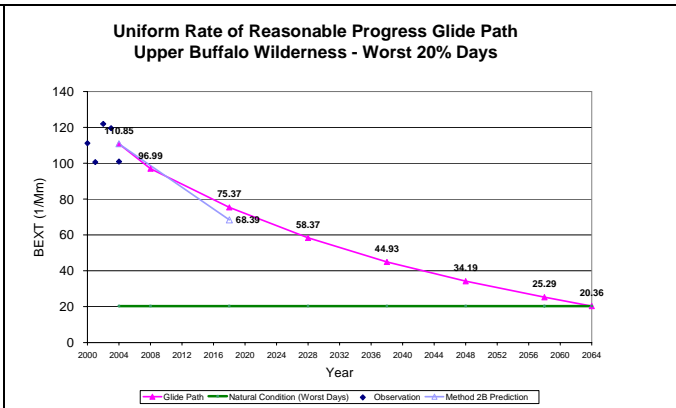
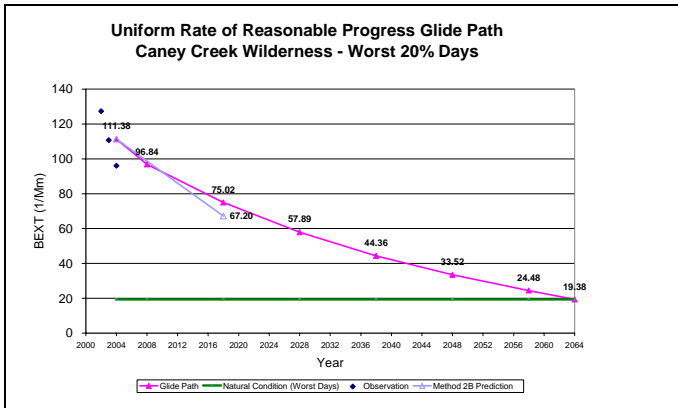
The 2064 objective for the U.S. anthropogenic emissions glidepath would be no contributions on the worst 20 percent days. This does not mean the 2064 U.S. anthropogenic extinction objective

is zero, rather the U.S. anthropogenic plus natural background is less than the Natural Conditions for the worst 20 percent days. The PSAT results were used to define the natural background contributions on the current worst 20 percent days which was subtracted from the EPA default Natural Conditions to obtain the 2064 objective for the U.S. anthropogenic emissions contributions. Here the PSAT derived natural background was defined as the sum of the contributions from the Natural source category, secondary organic aerosol from biogenic sources (SOAB) and half of the boundary conditions. For example, Figure 5-17 top left displays the US anthropogenic emissions glidepath for CACR. The PSAT natural sources contribution (=Natural Source Category + SOAB + $\frac{1}{2}$ BC) is approximately 13 Mm^{-1} so that is subtracted from the 2064 Natural Background ($\sim 32 \text{ Mm}^{-1}$, see figure 5-16) to obtain a 2064 end point of $\sim 19 \text{ Mm}^{-1}$ for the glidepath. The 2002 PSAT results applied to the 2000-2004 Baseline extinction estimates that 111 Mm^{-1} of the extinction is due to U.S. anthropogenic emissions which form the starting point for the glidepath. The curvature in the US anthropogenic glidepath is introduced the same way as for the extinction based glidepath to account for the logarithmic relationship between extinction and deciview.

Figure 5-17 displays the U.S. anthropogenic emissions extinction glidepaths and comparison with the 2018 visibility projections for extinction due to U.S. anthropogenic emissions on the worst 20 percent days. As seen by the standard linear deciview glidepaths discussed in Chapter 4, the U.S. anthropogenic emissions 2018 URP point is achieved by a wide margin at the four Class I areas in Arkansas and Missouri (CACR, UPBU, HRGL and MING). BRET that achieved 94% of the 2018 URP point obtains similar results using the U.S. anthropogenic emissions glidepath achieving 96% of the 2018 URP point. As discussed above, the inclusion of the off-shore marine emissions in the U.S. anthropogenic emissions will greatly affect the BRET Class I area so that actual reduction in U.S. anthropogenic emissions extinction would be greater and may even achieve the 2018 URP point if off-shore marine vessels were classified as not being part of the U.S..

The BOWA and VOYA northern Minnesota Class I areas achieved, respectively, 69% and 53% of the 2018 URP point using the standard EPA default deciview glidepaths and projection techniques (Figure 4-4). Using the U.S. anthropogenic glidepaths BOWA and VOYA achieve 92% and 86% of the 2018 point, respectively (Figure 5-17). WIMO that came up approximately 40% short of achieving the 2018 URP point using the deciview glidepath comes up under 20% short using the U.S. anthropogenic emissions glidepath.

The two Texas Class I areas also come up short in achieving the 2018 URP point using the U.S. anthropogenic emissions glidepaths, but not as short as when the linear deciview glidepaths are used. BIBE increases from 26% to 67% and GUMO increases from 34% to 49%. One reason these two Class I areas fail to achieve the 2018 point for U.S. anthropogenic emissions is because of the high contributions of Soil and CM and little change in precursor emissions of these species between 2002 and 2018.



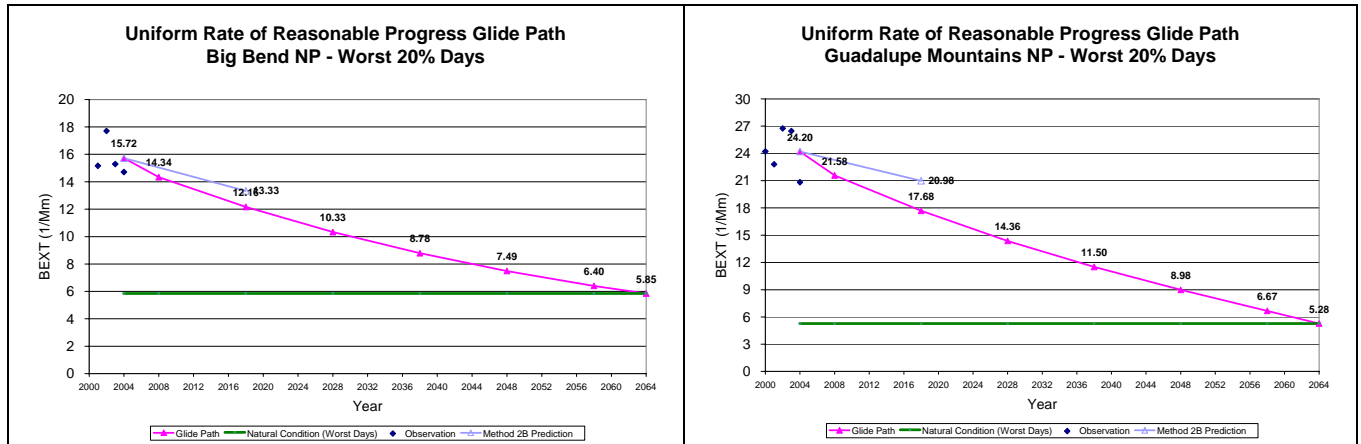
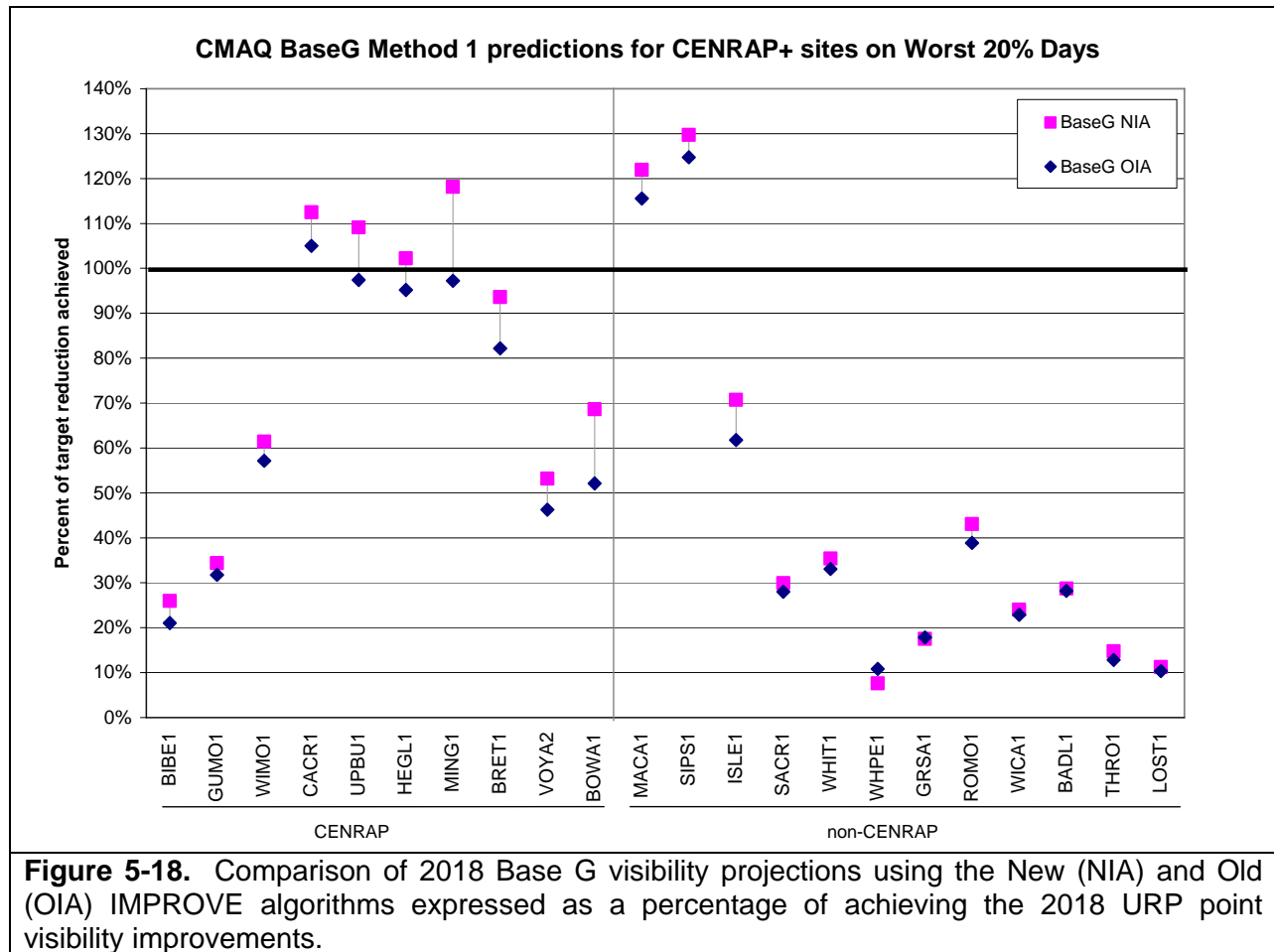


Figure 5-17. Glidepaths and 2018 visibility projections based on visibility due to U.S. anthropogenic emissions at CENRAP Class I areas.

5.8 Use of Original IMPROVE Equation

2018 visibility projections were also made using the CENRAP Typ02g and Base18g CMAQ modeling results and the original (old) IMPROVE equation. Figure 5-18 displays a DotPlot that compares the 2018 Base G visibility projections using the new IMPROVE algorithm (NIA) and the original IMPROVE algorithm (OIA). In general the new IMPROVE equation results in more optimistic 2018 visibility projections than the original IMPROVE equation. For the Texas and WRAP Class I areas, the 2018 visibility projections are nearly identical using the two IMPROVE equations. For the four Class I areas in Arkansas and Missouri the 2018 visibility projections using the new IMPROVE equation are from 7 to 21 percentage points more optimistic than the original IMPROVE equation. In the case of UPBU, HEGL and MING the 2018 visibility projections go from not achieving to achieving the 29018 URP point when switching from the old to new IMPROVE equation.



5.9 Visibility Trends

Figure 5-19 displays trends in visibility impairment at the CENRAP Class I areas using the period of record of measurements at the associated IMPROVE monitor and the new IMPROVE equation. These trends include trends for the worst 20 percent days, the best 20 percent days and all IMPROVE sampled days during a year. The EPA guidance procedures were used to construct the worst and best 20 percent days that includes a minimum data capture requirement (EPA, 2003a), whereas no such minimum data capture was applied when looking at the “annual average” of all IMPROVE sampled days trends. So care must be taken when analyzing trends for the all sampled IMPROVE days trends as there could be large missing periods with high or low extinction that are not being account for. The WRAP Technical Support System (TSS) website was used to calculate the visibility trends at the CENRAP Class I areas that includes IMPROVE data from start of recording through 2004 and includes no data filling (see: <http://vista.cira.colostate.edu/TSS/Default.aspx>).

Trends in visibility at CACR has three years of data (2002-2004) for the worst and best 20 percent days and five years for the IMPROVE sampled days trends. Although it is hard to come to any conclusions regarding trends with just three years of data, there does seem to be a general downward trend, that is also supported by the five year trend in the IMPROVE sampled days.

A much longer trend plot is available for UPBU that includes 12 years of data for the worst and best 20 percent days (Figure 5-19b). Although there is a lot of a year-to-year variation in the visibility trends with cleaner years occurring in 1997, 2001 and 2004, there does appear to be a slight trend toward improved visibility at UPBU.

There is insufficient data to calculate the worst or best 20 percent days visibility for any year at the BRET Class I area so only the IMPROVE sampled days trends are presented (Figure 5-19c). The trends at BRET are inconclusive and given the large amounts of missing data at this site it is difficult to interpret the results.

There is also a lot of missing years in the worst and best 20 percent days for the BOWA Class I area making it difficult to interpret (Figure 5-19d). But visibility appears to be more impaired in the early 1990s than in more current years so improvements have been seen. VOYA has five years of valid data and shows worsening visibility for 2000-2003, and then improved visibility in 2004. It is unclear whether the 2004 improved visibility is a trend or just due to variations in meteorology so no conclusions can be drawn.

Although a downward trend in visibility impairment appears to be occurring at the two Missouri Class I areas (Figure 5-19f-g), given that there are only three years available for HEGL and lots of missing data for MING these trends are inconclusive.

Three years (2002-2004) of visibility trends for the worst and best 20 percent days are available for WIMO (Figure 5-19h). The most impaired year from the three years for the worst 20 percent days is the most recent (2004). Again, the time period is too short to draw any conclusions on trends in visibility at WIMO.

The two Texas Class I areas have a relatively long period of record. There is a lot of year-to-year variability in the visibility measurements that make interpreting the trends difficult. 1998 appears to be an anomalously high visibility impairment year at BIBE and due to the much higher OMC extinction indicates that the year was likely impacted by smoke from fires. GUMO has lots of year to year variability in CM and Soil which are likely due to occurrences of impacts due to wind blown dust. Even taking Soil and CM out of the interpretation it is difficult to interpret any trend in visibility at the two Texas Class I areas. The higher visibility impairment in 1998 and 1999 suggests a downward trend but that may be just due to more adverse meteorological and natural emissions (e.g., wildfires) in these two years than any real long term trend.

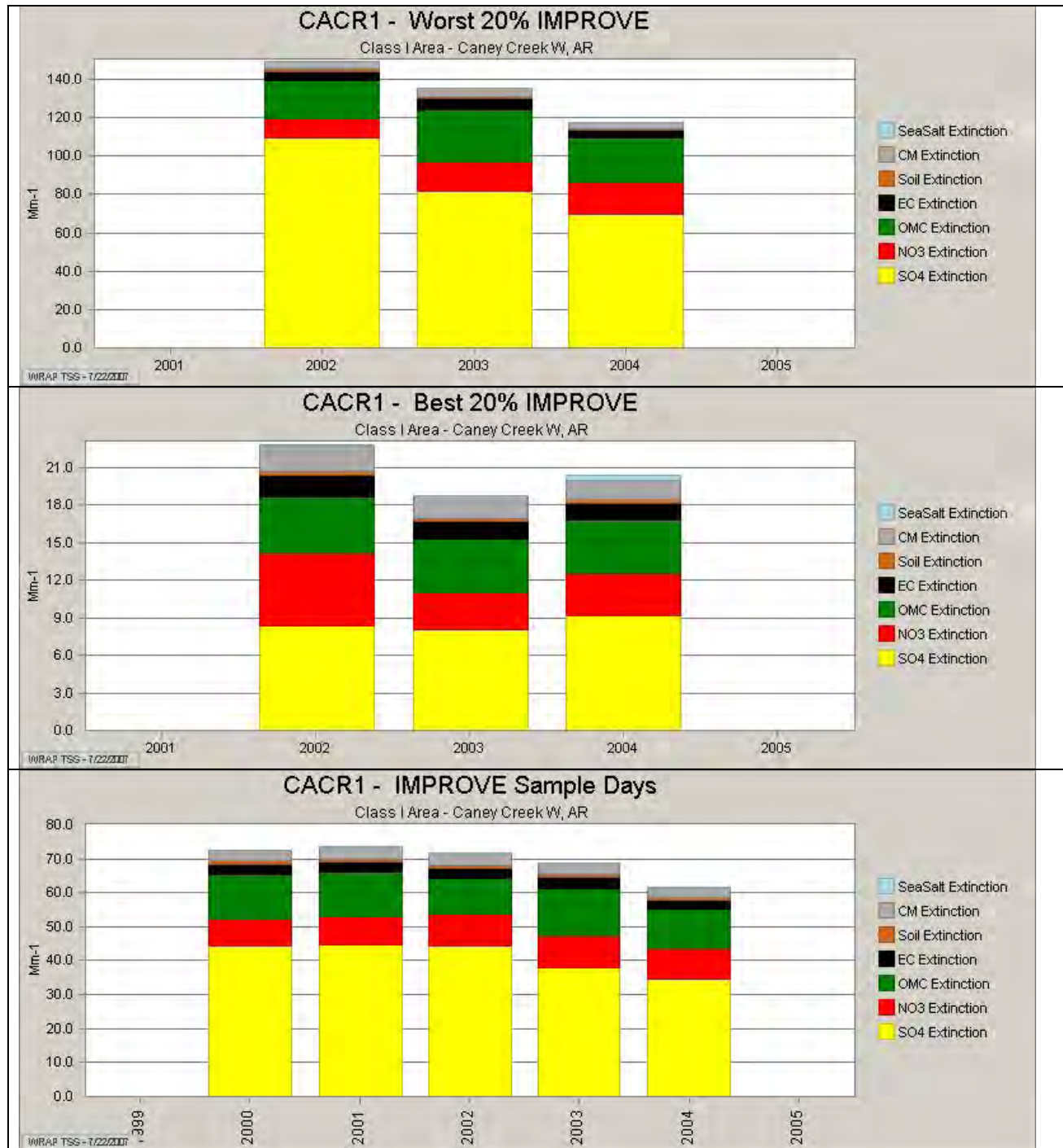


Figure 5-19a. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Caney Creek (CACR), Arkansas for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

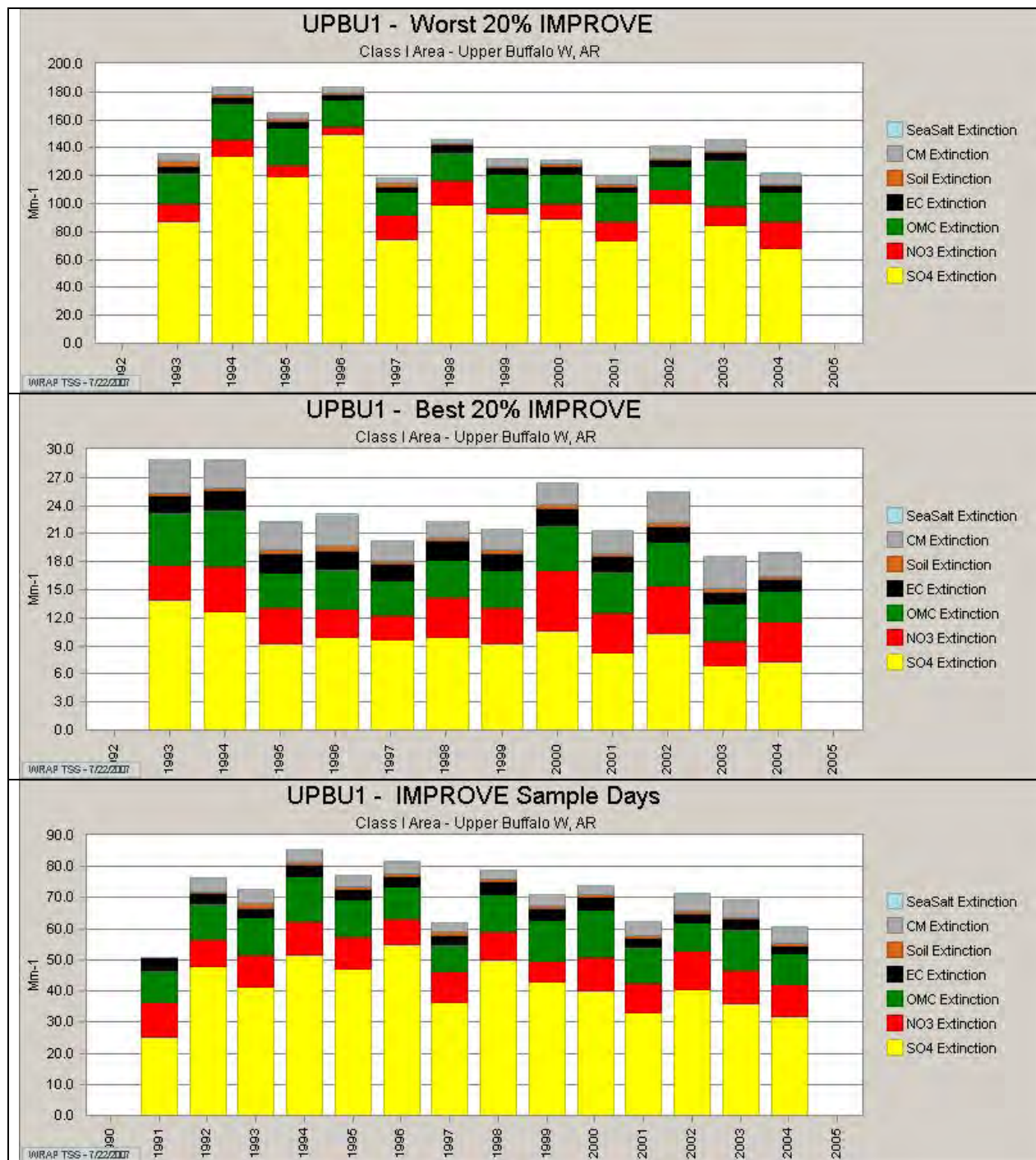


Figure 5-19b. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Upper Buffalo (UPBU), Arkansas for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

Insufficient Data to Calculate Best 20 Percent days at BRET

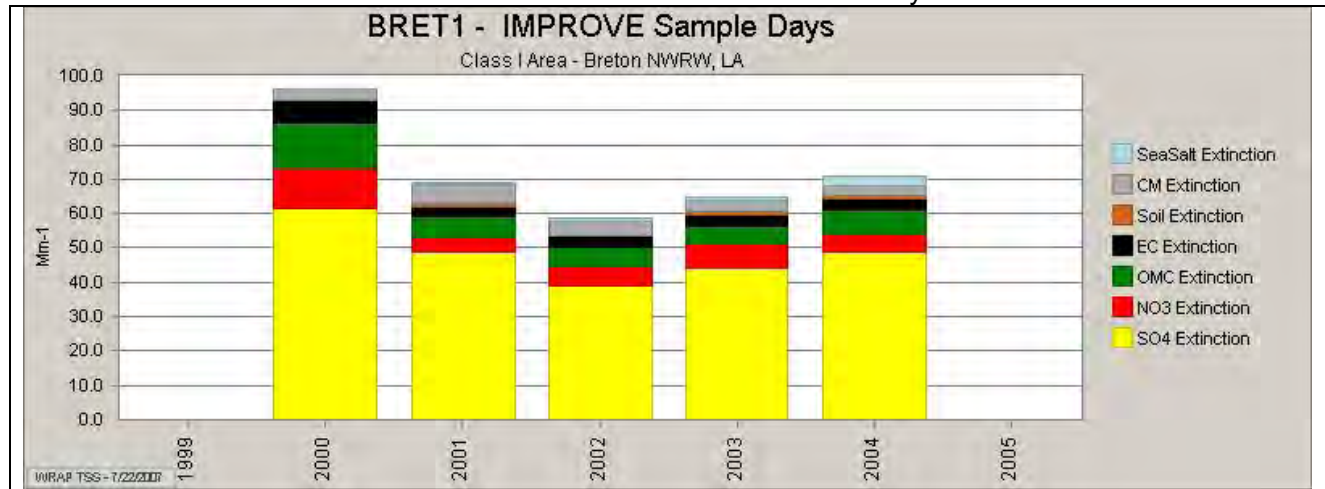


Figure 5-19c. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Breton Island (BRET), Louisiana for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

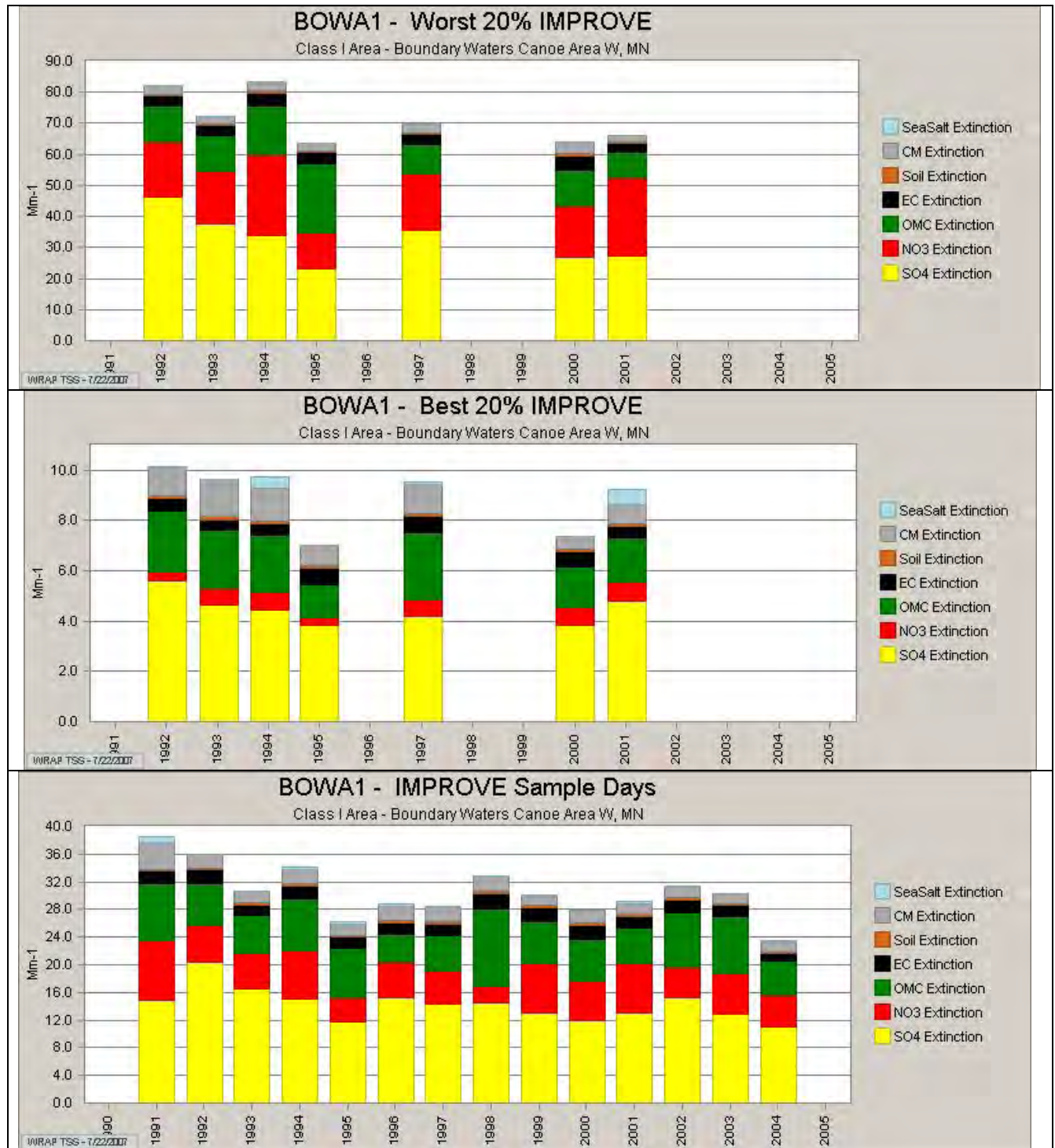


Figure 5-19d. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Boundary Waters (BOWA), Minnesota for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

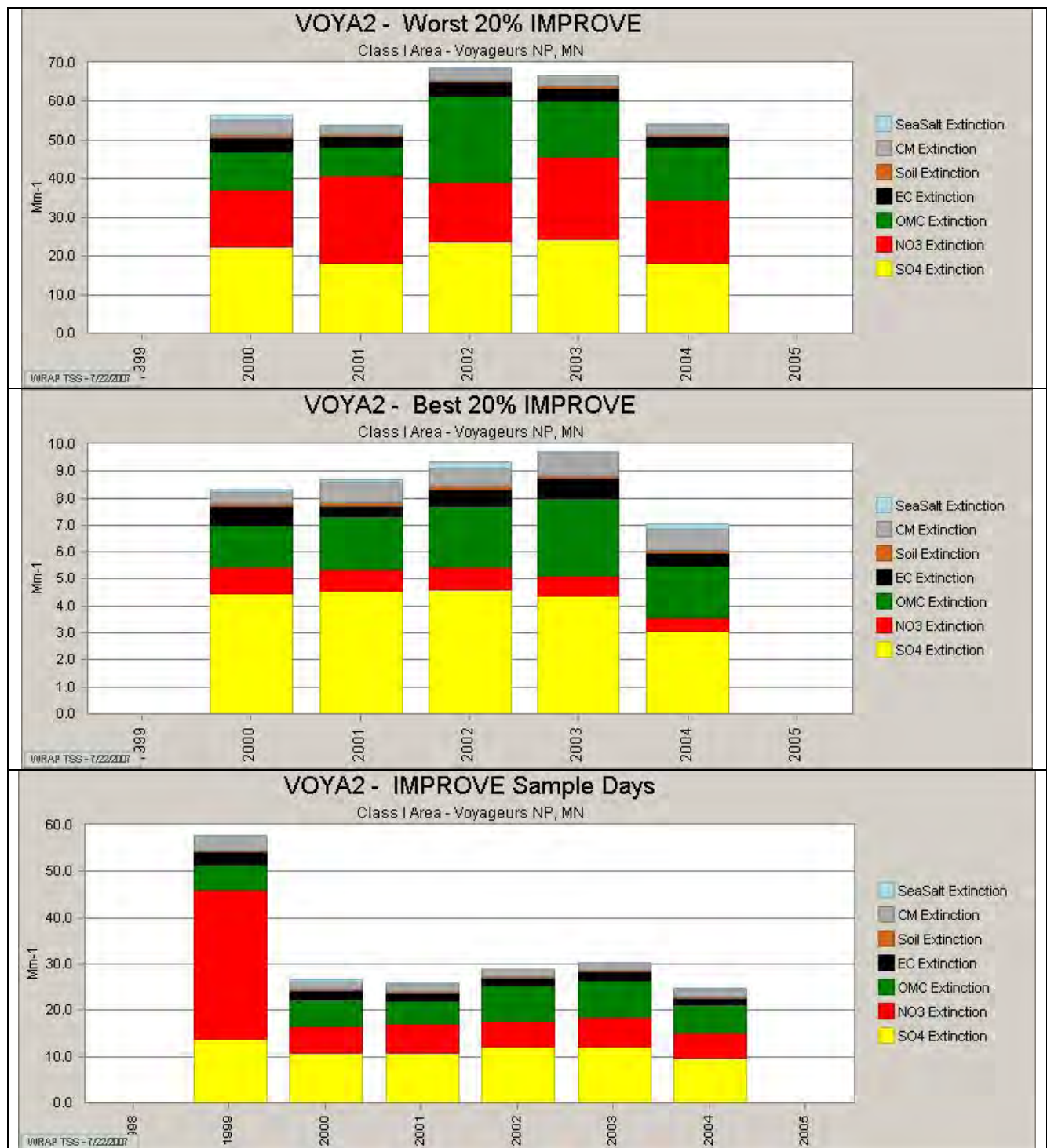


Figure 5-19e. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Voyageurs (VOYA), Minnesota for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

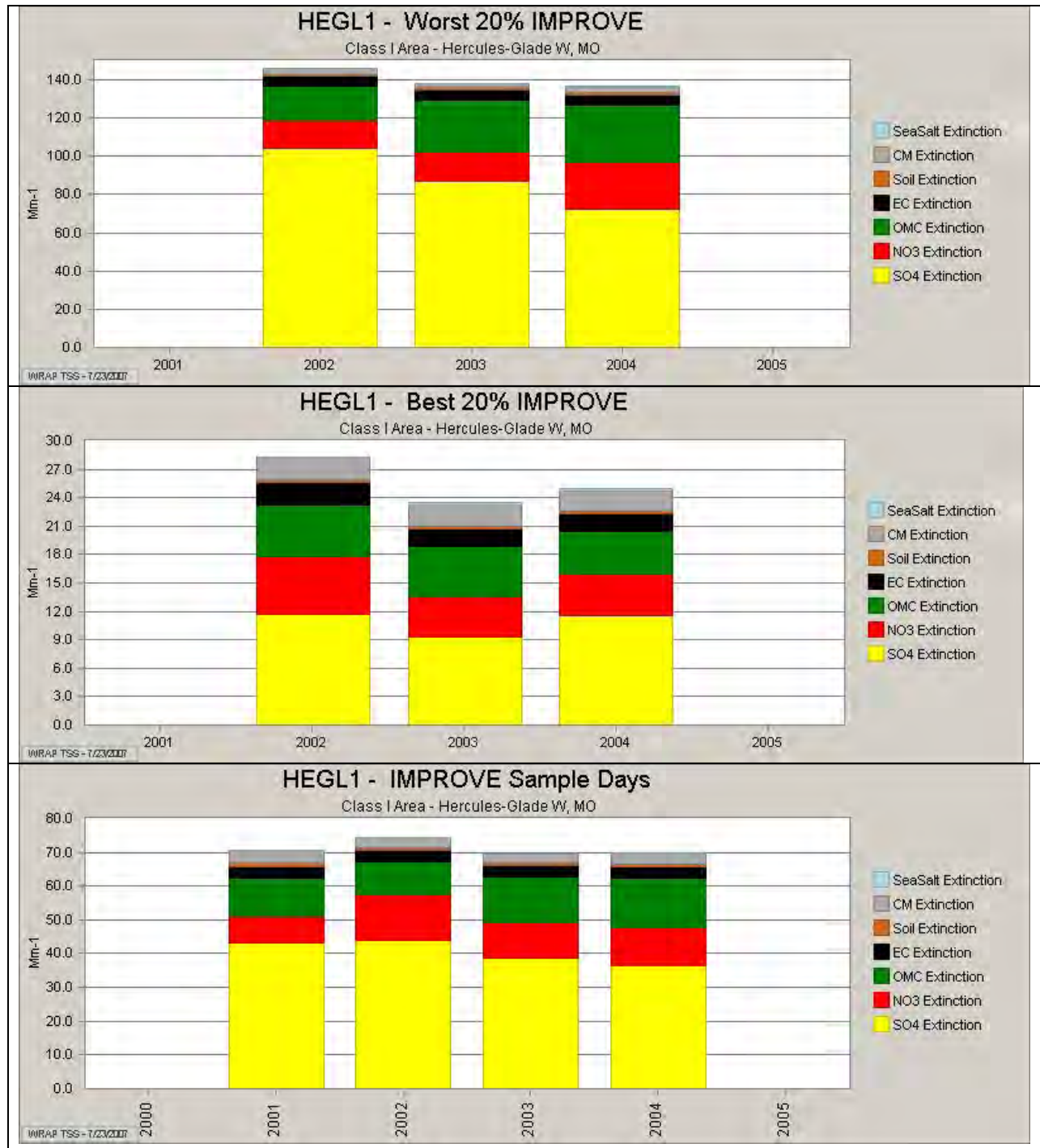


Figure 5-19f. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Hercules Glade (HEGL), Missouri for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

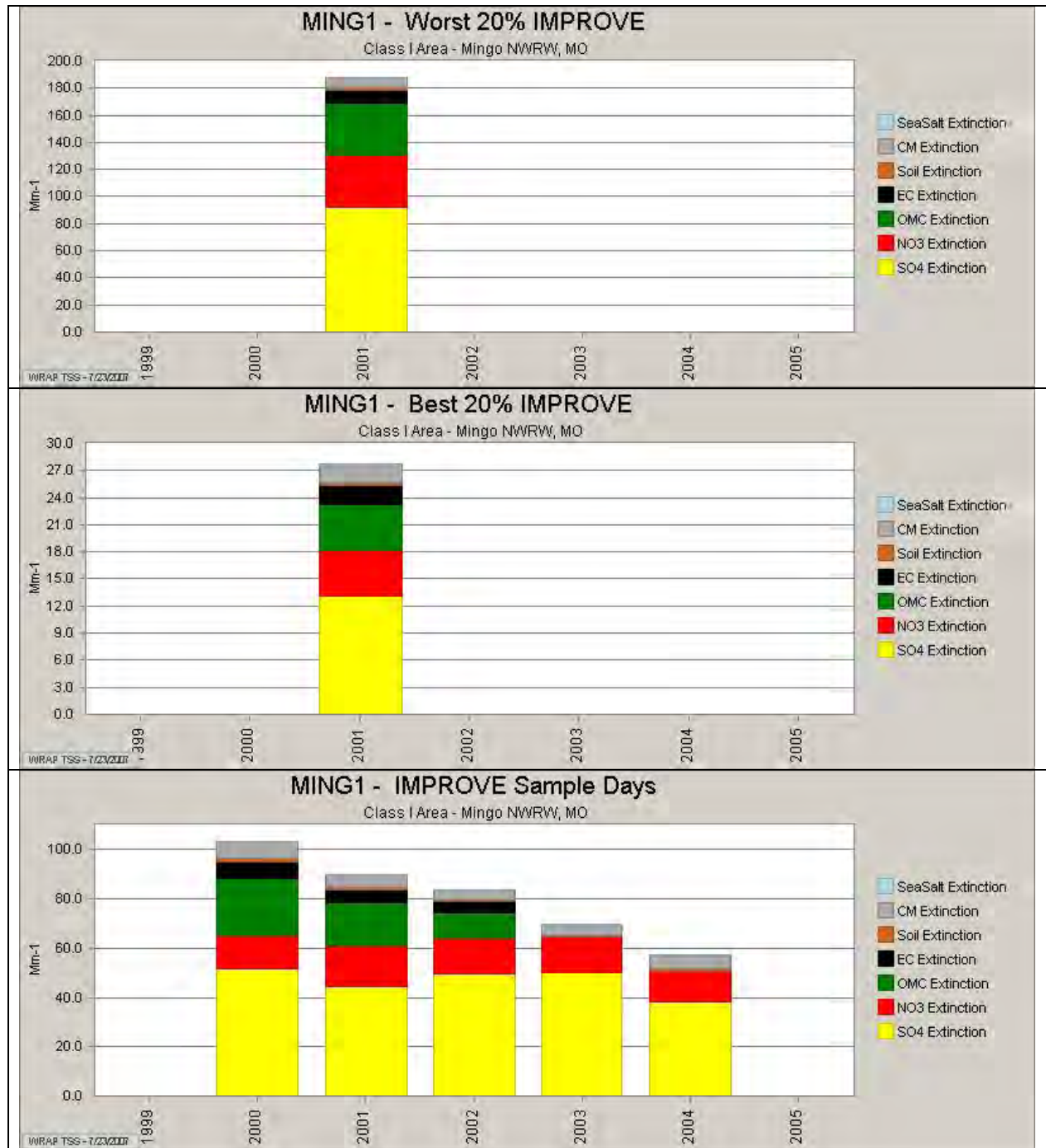


Figure 5-19g. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Mingo (MING), Missouri for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

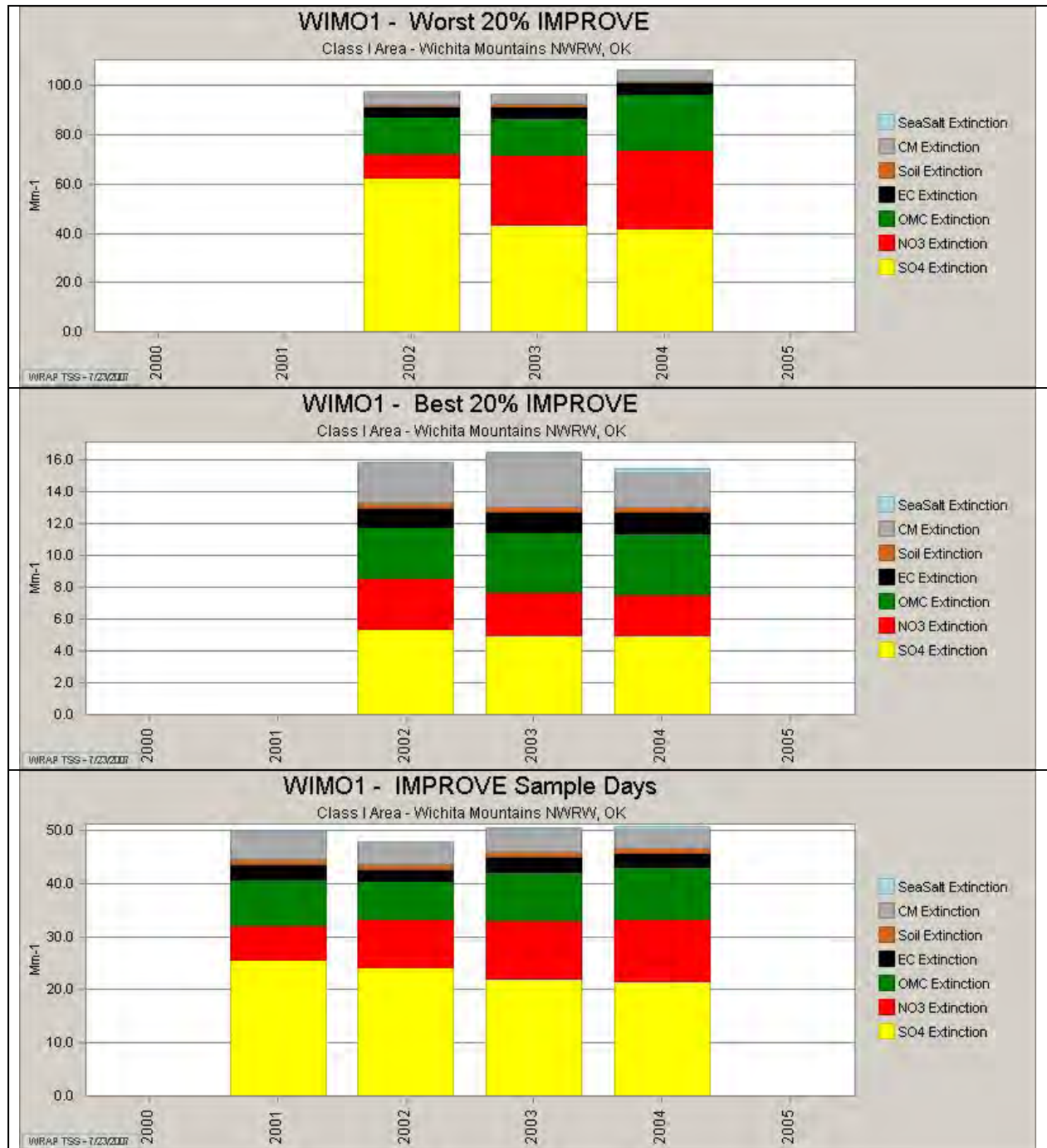


Figure 5-19h. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Wichita Mountains (WIMO), Oklahoma for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

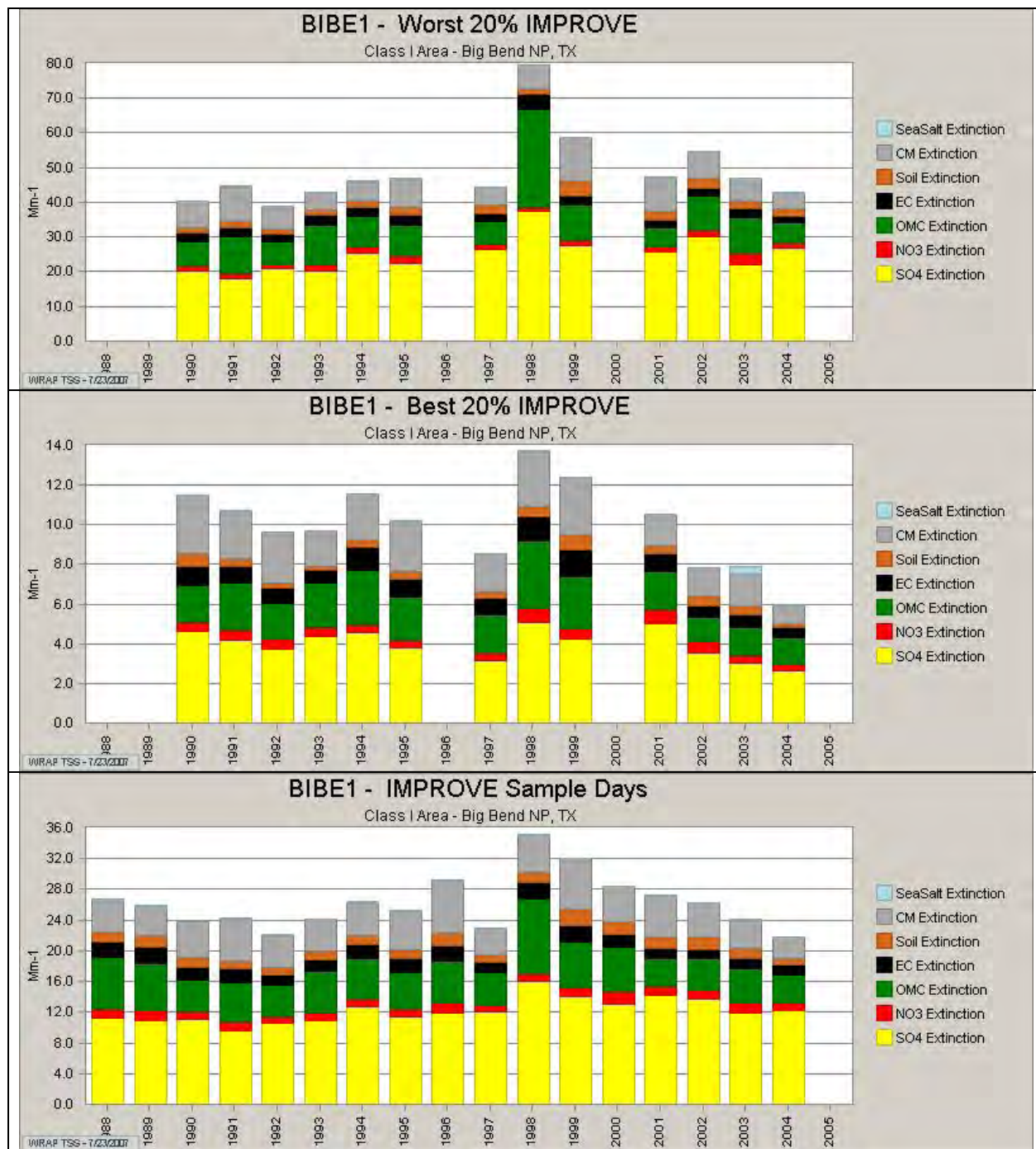


Figure 5-19i. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Big Bend (BIBE), Texas for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

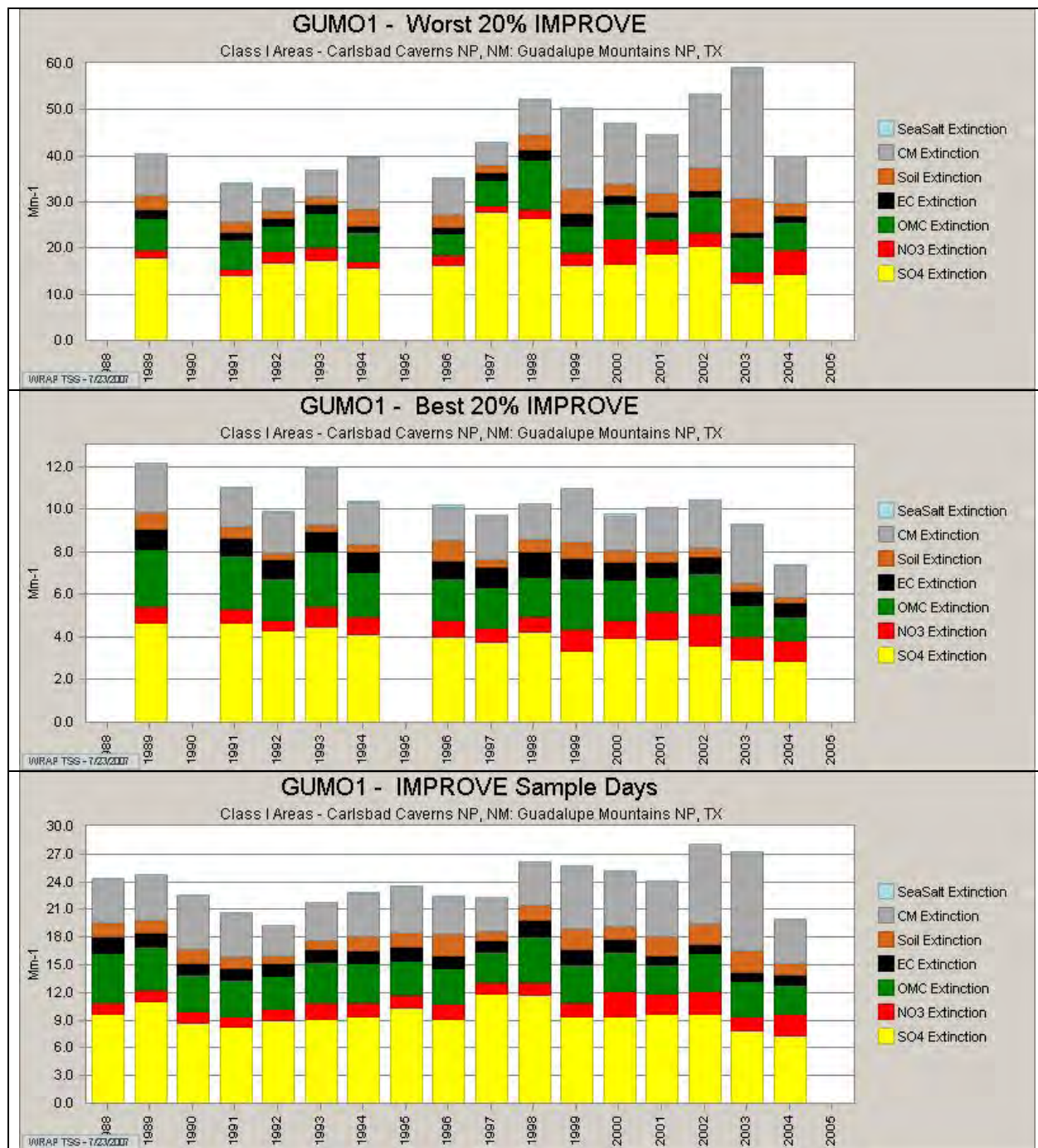


Figure 5-19j. Time series of observed IMPROVE reconstructed light extinction (New IMPROVE) at Guadalupe Mountains (GUMO), Texas for the average of the Worst 20 Percent days (top), Best 20 Percent days (middle) days and all IMPROVE sampling days during the period of record.

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APPENDIX A

**Model Performance Evaluation of the 2002 36 km
MM5 Meteorological Model Simulation used in the
CENRAP Modeling and Comparison to VISTAS Final
2002 36 km MM5 and WRAP Interim
2002 36 km MM5 Simulations**

The CENRAP 2002 36 km MM5 simulation (Johnson, 2007) was evaluated against observed surface and upper-air meteorological observations and observed precipitation amounts and its performance was compared against the VISTAS final and the WRAP interim 2002 36 km MM5 simulations. The CENRAP, VISTAS and WRAP 2002 36 km MM5 simulations used several common science options:

- Lambert Conformal Projection with center at (97°, 40°) and standard parallels at (33°, 45°).
- 164 by 128 36 km by 36 km horizontal grids covering the continental U.S. and adjacent regions.
- 34 vertical layers up to 100 mb (~15 km AGL).
- Pleim-Xiu Land Surface Module (LSM).
- Asymmetric Convective Mixing (ACM) Planetary Boundary Layer (PBL) model.
- RRTM long-wave radiation.
- Dudhia short-wave radiation.
- No Shallow convection.

However, there were some differences in the choice of science options:

- VISTAS and CENRAP MM5 simulations used the Kain Fritsch 2 cumulus parameterization, whereas WRAP MM5 used Kain Fritsch 1.
- VISTAS and CENRAP MM5 simulations used the Reisner 1 moist physics while WRAP MM5 used Reisner 2.
- All three MM5 simulations used Four Dimensional Data Assimilation (FDDA) analysis nudging at the surface for winds, but WRAP also used surface analysis nudging to temperature and moisture.
- All three MM5 simulations used analysis nudging FDDA above the PNL to winds, temperature and moisture.

Much of the difference in the model performance for the three MM5 simulations was related to the surface temperature and moisture analysis nudging used in the interim WRAP MM5 simulations that resulted in better surface temperature model performance, but caused instabilities resulting in degradation in meteorological model performance above the surface. The final WRAP 2002 36 km MM5 simulation did not use the surface temperature and moisture FDDA and used the Betts-Miller cumulus scheme instead of Kain Fritsch that resulted in much improved meteorological model performance in the western States (Kemball-Cook et al., 2005).

A.1 Surface Meteorological Model Performance

The performance of the three MM5 simulations at the surface was evaluated through comparisons against observed surface wind, temperature and humidity measurements from the ds472 observational database. The METSTAT program was used to evaluate the MM5 simulations for each month of 2002 and across the 11 subdomains shown in Figure A-1. These subdomains are as follows:

- 1 = Pacific NW
- 2 = SW
- 3 = North
- 4 = Desert SW
- 5 = CenrapN
- 6 = CenrapS
- 7 = Great Lakes
- 8 = Ohio Valley
- 9 = SE
- 10 = NE
- 11 = MidAtlantic

Emery and Tai (2001) have developed model performance benchmarks by analyzing over 30 MM5RAMS meteorological model simulations and tabulating the typical level of performance that a good meteorological model achieves. These performance benchmarks are not intended to be pass/fail grades; rather they provide a framework to evaluate the model performance against past applications. Since many of the past MM5/RAMS meteorological model simulations that the benchmarks were developed from were in support of urban ozone modeling that are typically fairly stagnant conditions with little or no precipitation and involved multiple iterations to achieve the final base case simulation. Thus, we may not expect the 2002 annual MM5 simulations to achieve a similar level of performance given the complicating factors of precipitation and complex terrain associate with many Class I areas in the west. Table A-1 lists the meteorological model performance benchmarks for wind speed, wind direction, temperature and humidity.

Table A-1. Meteorological model performance benchmarks (Source: Emery et al., 1999).

Statistic	Wind Speed	Wind Direction	Temperature	Humidity
RMSE	≤ 2 m/s			
Mean Bias	$\leq \pm 0.5$ m/s	$\leq \pm 10^\circ$	$\leq \pm 0.5$ K	$\leq \pm 1.0$ g/kg
Index of Agreement	≤ 0.6		≤ 0.8	≤ 0.6
Gross Error		$\leq 30^\circ$	≤ 2.0 K	≤ 2.0 g/kg

Below we present the evaluation of the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations against surface meteorological observations for the four seasonal months of January, March, July and October and the CENRAP North (CenrapN) and CENRAP South (CenrapS) subdomains (i.e., subdomains 5 and 6 in Figure A-1). The surface evaluation of the three MM5 2002 36 km simulations outside of the CENRAP subdomains can be found in Kemball-Cook et al., (2004).

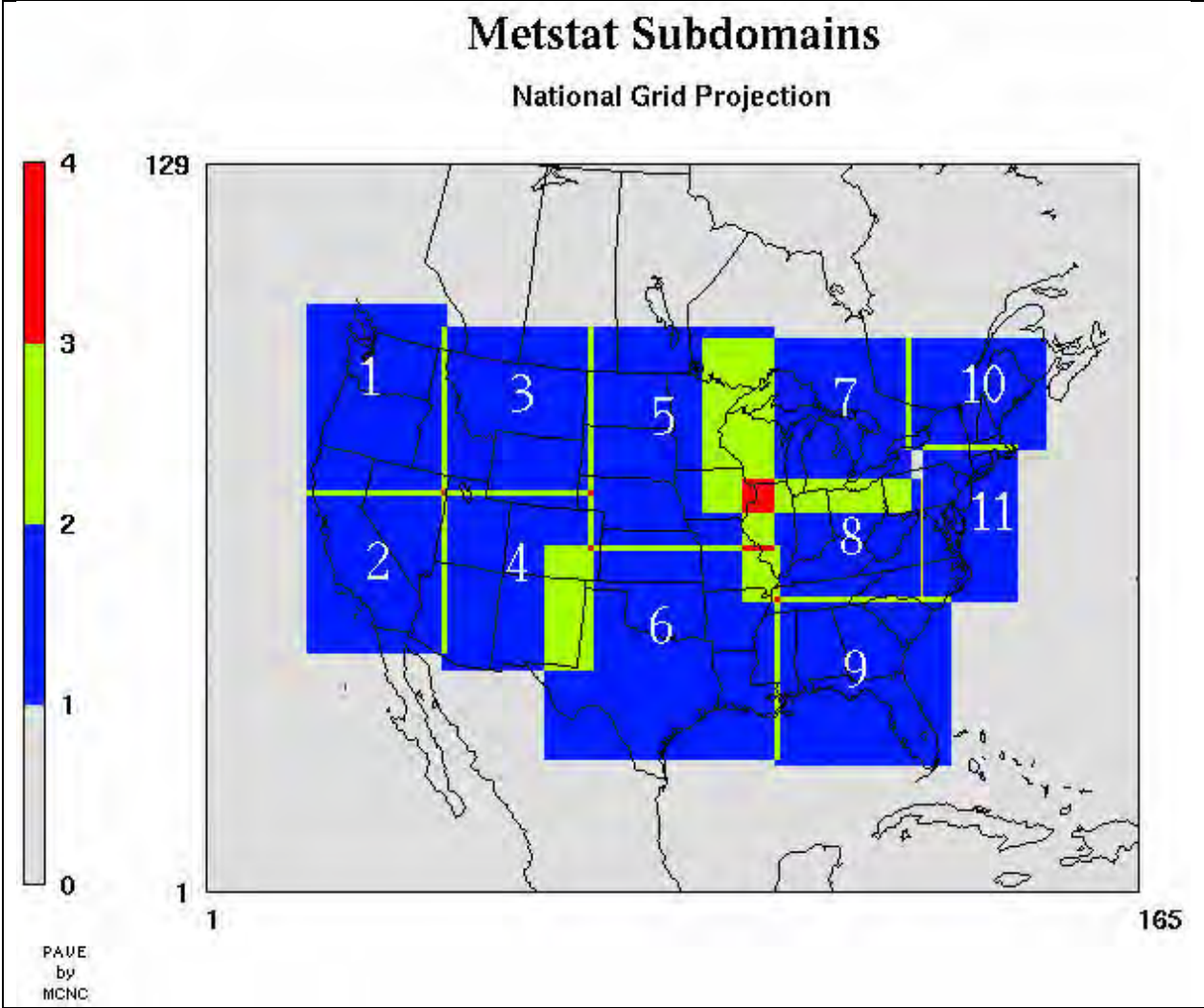


Figure A-1. Eleven subdomains where monthly evaluation of the MM5 simulations surface model performance was evaluated.

A.1.1 Temperature

Figure A-2 displays the surface temperature model performance for the CENRAP, VISTAS and WRAP 2002 36 km MM5 simulations in the CenrapN and CenrapS subdomains and the months of January, March, July and October. The WRAP MM5 simulations are performing best for January temperature in both CENRAP domains exhibiting low bias and the lowest error that are within the benchmark. The VISTAS MM5 run is performing next best with bias well within the benchmark and error within but close to the error benchmark. The CENRAP MM5 simulation performs well for the CenrapS domain with zero bias and error within, but approaching the benchmark. However, the CENRAP performance for the CenrapN domain does not achieve the performance benchmarks due to a too cold bias.

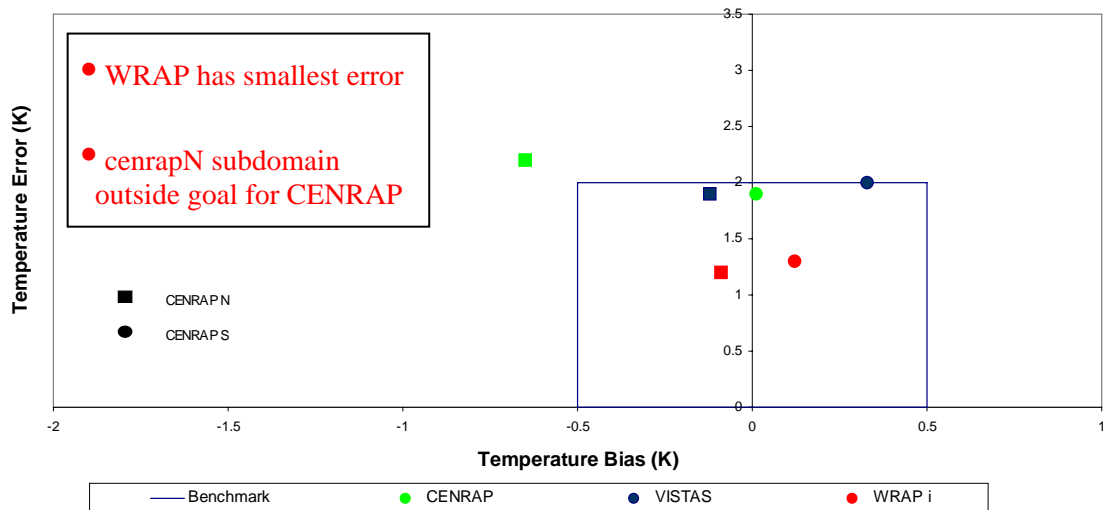
The temperature performance in March is similar to January with both the VISTAS and WRAP MM5 simulations achieving the benchmark for both CENRAP subdomains. Again the CENRAP MM5 simulation has a near zero bias and achieves the error benchmark in the CenrapS subdomain, but is too cold in the CenrapN domain falling out of the bias benchmark range.

In July the three simulations achieve the temperature benchmark in both CENRAP subdomains, although the WRAP MM5 simulation is cooler with the CenrapS bias right at the -0.5 K lower bound benchmark. The CENRAP MM5 simulation is slightly warmer than the VISTAS MM5 simulation.

In October, all three MM5 simulations achieve the temperature performance benchmarks. The WRAP MM5 simulation performs best with near zero bias and lower error than either the VISTAS or CENRAP simulations. The VISTAS and CENRAP MM5 simulations exhibit nearly identical temperature performance in October with a near zero bias for the CenrapS subdomain and a cool bias for the CenrapN subdomain.

In conclusion, the WRAP MM5 simulation is always performing best for surface temperature with the lowest bias and usually the lowest error. The VISTAS MM5 simulation is performing next best as the CENRAP MM5 simulation exhibits a cool bias for the CenrapN subdomain in January and March that exceed the performance benchmarks.

CENRAP / VISTAS / WRAP January Temperature Performance Comparison Over CENRAP Domain



CENRAP / VISTAS / WRAP March Temperature Performance Comparison Over CENRAP Domain

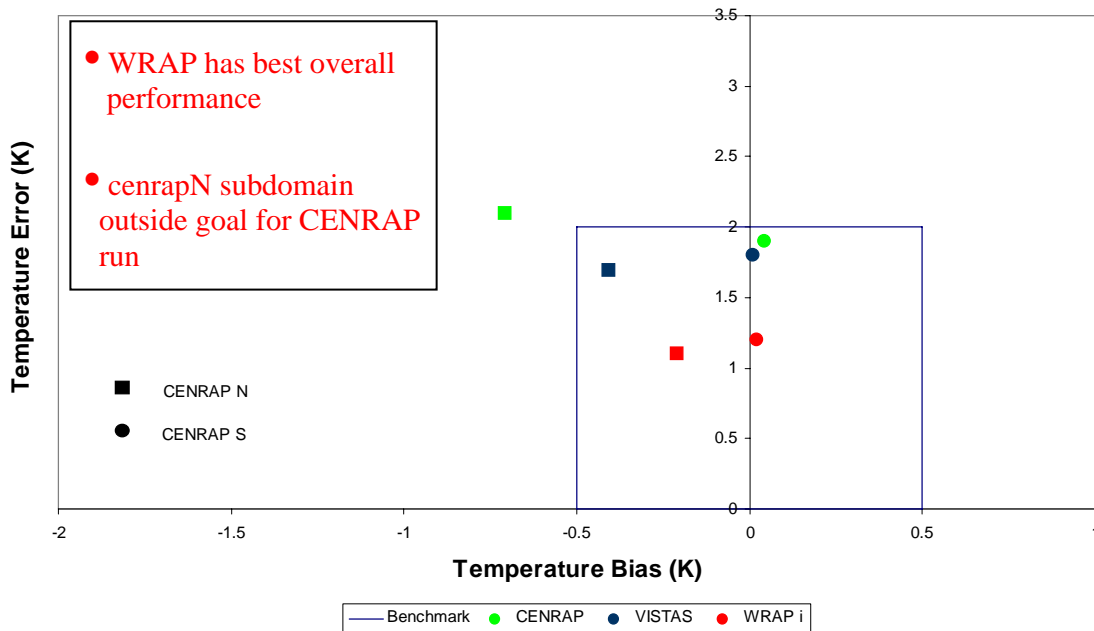
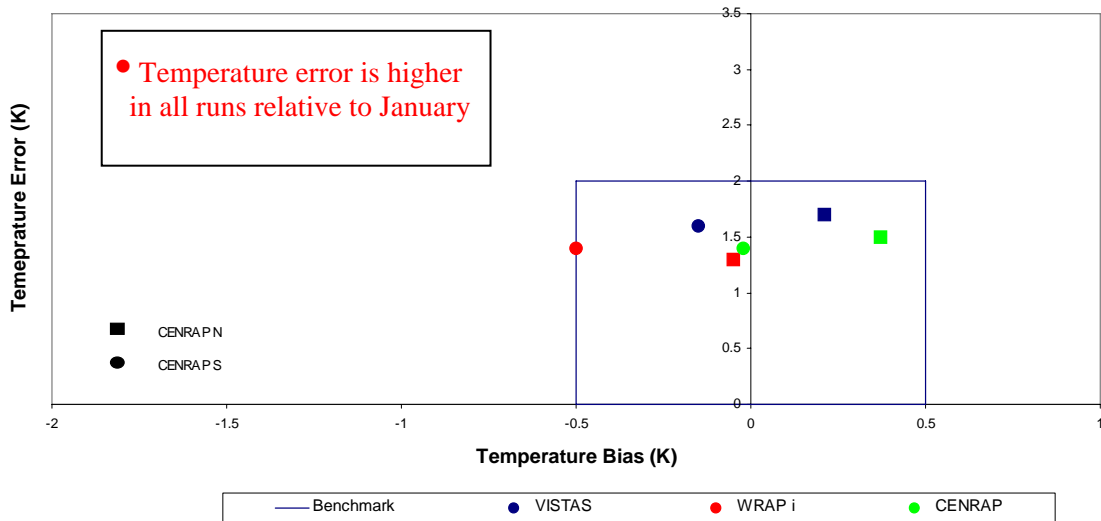


Figure A-2a. Temperature performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and January (top) and March (bottom).

CENRAP / VISTAS / WRAP July Temperature Performance Comparison Over CENRAP Domain



CENRAP / VISTAS / WRAP October Temperature Performance Comparison Over CENRAP Domain

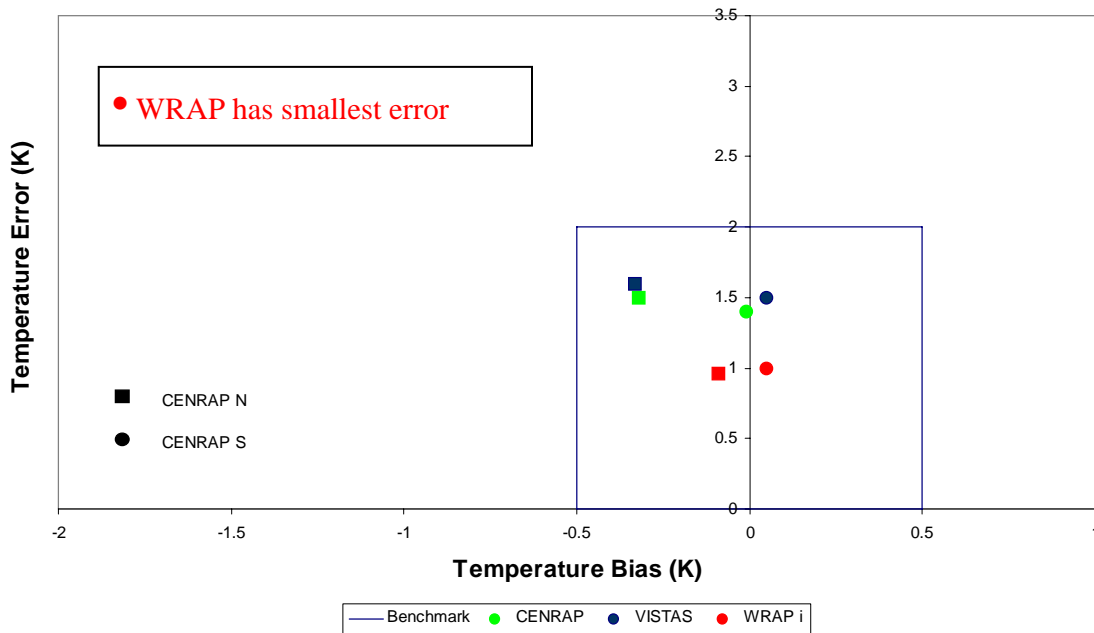


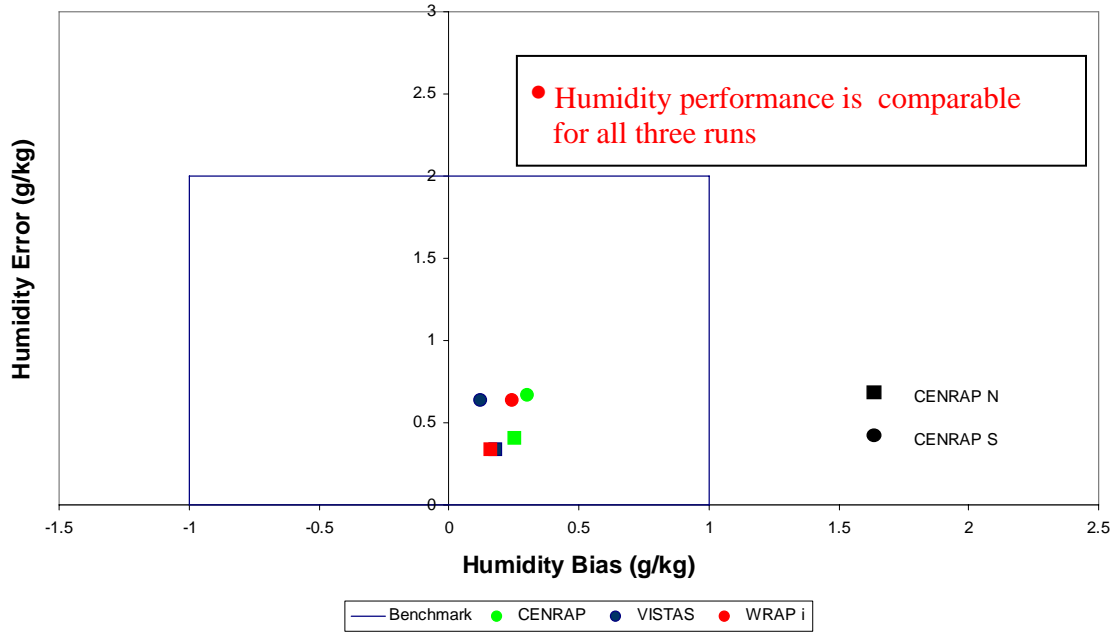
Figure A-2b. Temperature performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and July (top) and October (bottom).

A.1.2 Humidity

The humidity performance for the three MM5 simulations is comparable and always achieves the performance benchmarks. The humidity bias is always near zero for all three runs and four months. In January, March and October the humidity error is at or less than half of the 2.0 g/kg benchmark. However, in July there is more error in the humidity with it within but approaching the benchmark value for all three models.

In conclusion, all three MM5 simulations achieved the humidity benchmark performance goals for all months studied. No model simulation exhibited superior performance over another.

CENRAP / VISTAS / WRAP January Humidity Performance Comparison Over CENRAP Domain



CENRAP / VISTAS / WRAP March Humidity Performance Comparison Over CENRAP Domain

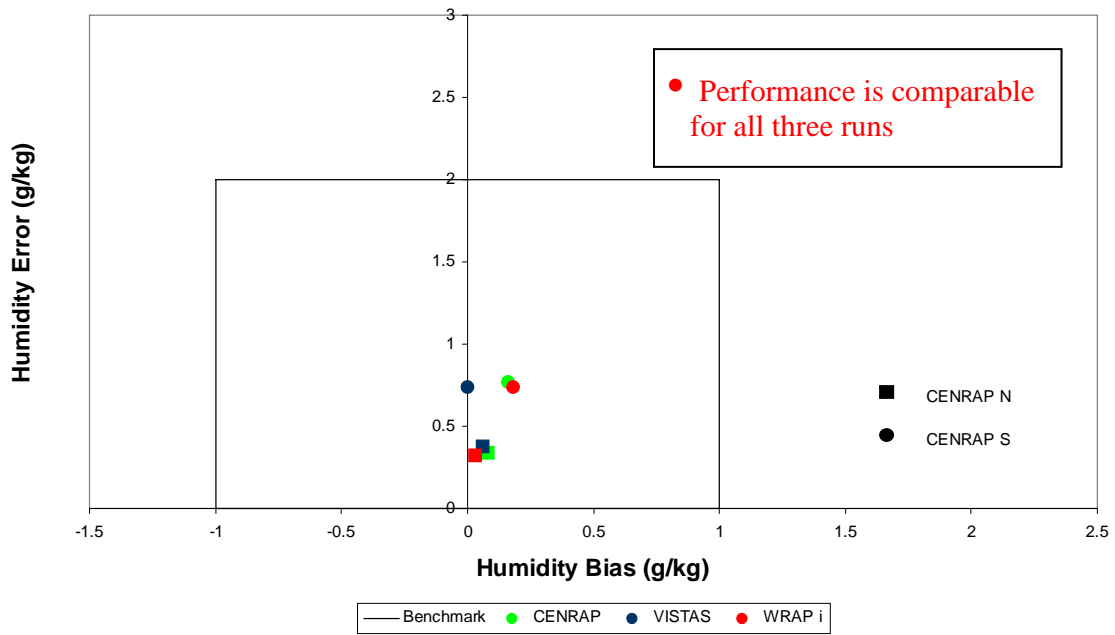
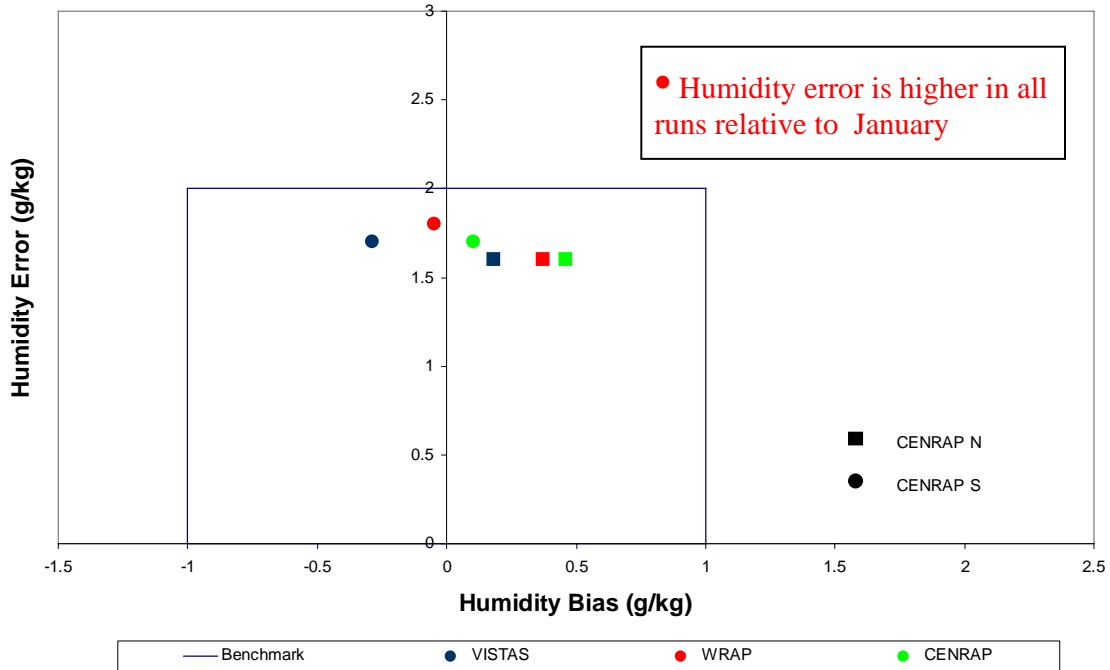


Figure A-3a. Humidity performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and January (top) and March (bottom).

**CENRAP / VISTAS / WRAP July Humidity Performance
Comparison Over CENRAP Domain**



**CENRAP / VISTAS / WRAP October Humidity Performance
Comparison Over CENRAP Domain**

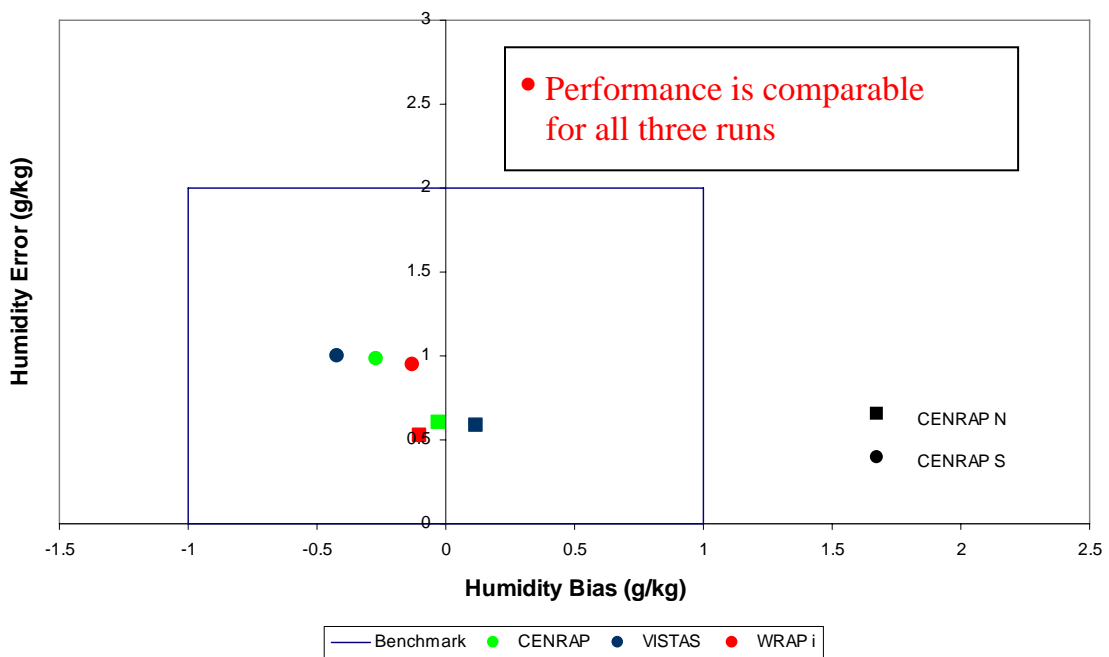


Figure A-3b. Humidity performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and July (top) and October (bottom).

A.1.3 Winds

The model performance for wind speed and direction and January is almost identical and within the benchmarks for all three models and both CENRAP subdomains. In fact, the performance is so close the CenrapS symbols are plotted over and obliterate the CenrapN performance symbols.

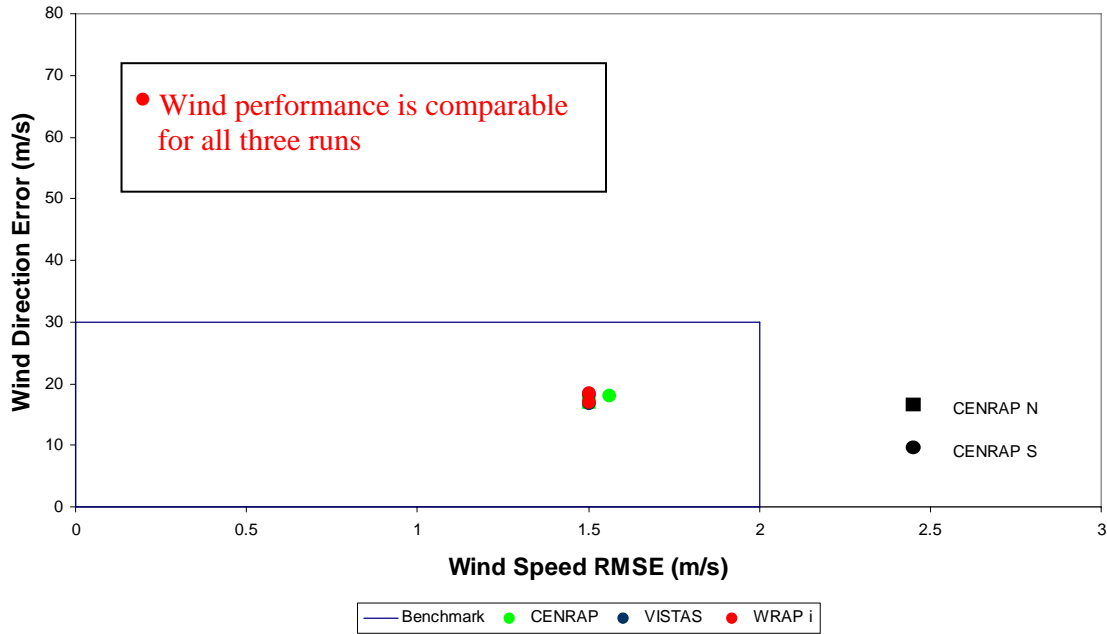
In March, the wind performance is within the benchmark for all three MM5 simulations, which exhibit similar performance statistics. The wind performance in the CenrapS subdomain is slightly better than CenrapN with the CENRAP MM5 simulations showing the largest wind speed RMSE in the CenrapN subdomain, although still within the benchmarks.

Slight degraded wind direction performance is seen in July with the error increases to just below 20 degrees to just below the 30 degree benchmark value for all three models. Similar wind speed RMSE is seen for all three models.

The October wind performance is within the benchmarks for all three models with performance between that seen for January/March and July.

In summary, the models exhibited similar model performance for surface wind speed and direction.

CENRAP / VISTAS / WRAP January Wind Performance Comparison over CENRAP Domain



CENRAP / VISTAS / WRAP March Wind Performance Comparison Over CENRAP Domain

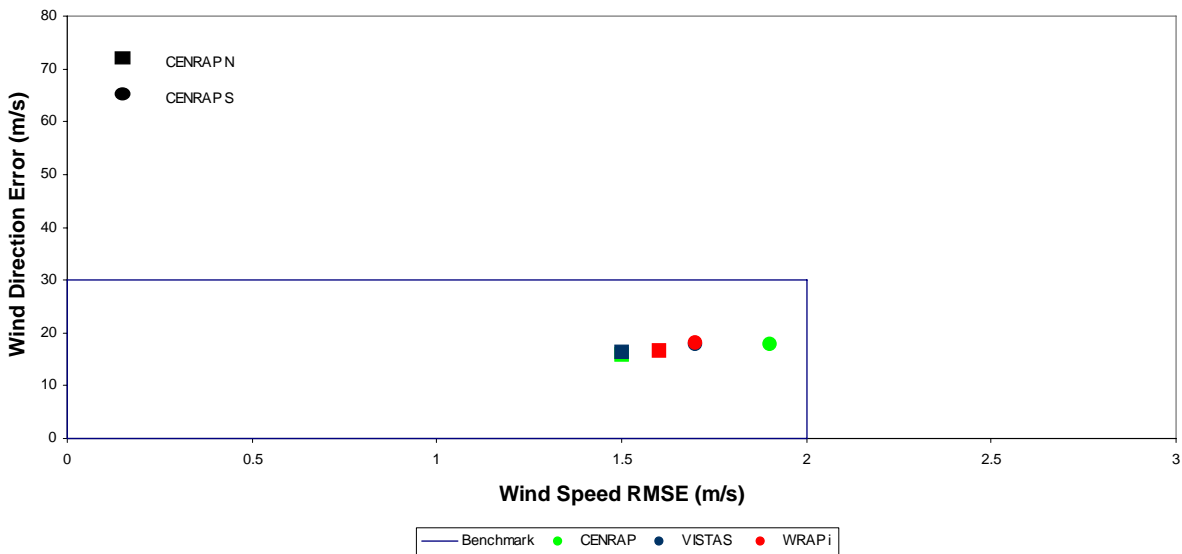


Figure A-4a. Wind Speed and Wind Direction performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and January (top) and March (bottom).

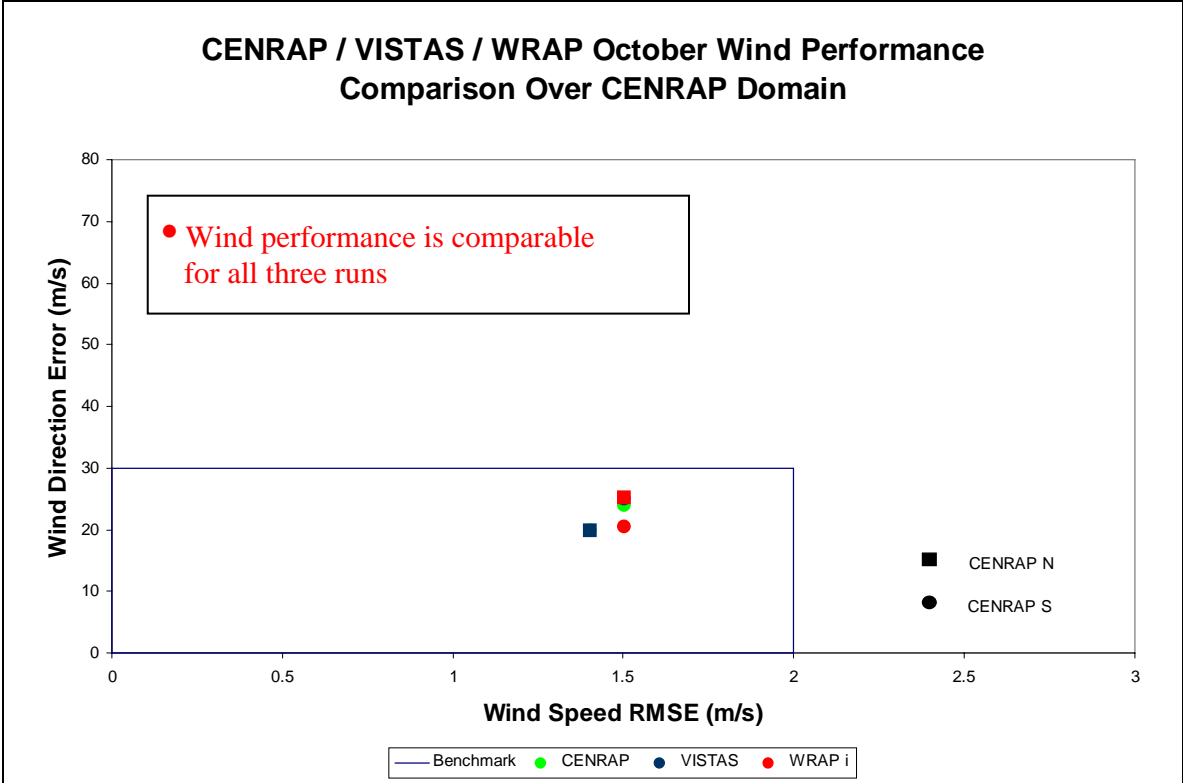
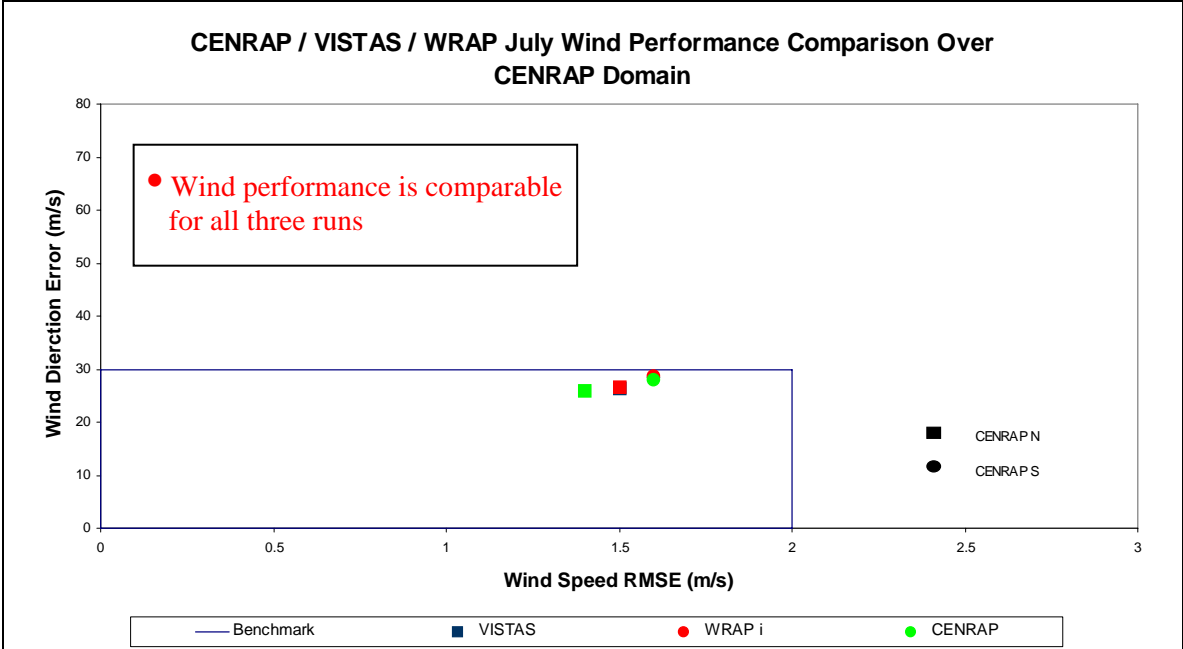


Figure A-4b. Wind Speed and Wind Direction performance for the CENRAP, VISTAS and interim WRAP 2002 36 km MM5 simulations, the CenrapN and CenrapS subdomains and July (top) and October (bottom).

A.2 Upper-Air Meteorological Evaluation

Figure A-5 displays an example comparison of the vertical profile of predicted and observed winds and temperature for Midland, Texas and January 7 2002 at 12 GMT (6am LST) and for July 16, 2002 at 00 GMT (6pm LST). Above the surface, all three models do a good job in replicating the observed temperature, dew point temperature and winds at 6a on January 7, 2002. Although the WRAP MM5 simulation predicts the surface temperature better than the other two simulations, the vertical structure of the temperature and the surface temperature inversion is not reproduced as well.

All three models understate the afternoon PBL depth on July 16, 2002 at Midland Texas. This phenomenon was seen at other sites as well.

The upper-air meteorological model evaluation found that all three models had difficulty reproducing the observed nocturnal inversion. The day time convective mixing depths were also typically underestimated.

Although the WRAP MM5 simulation reproduced the surface temperature the best of the three models, it was worst at reproducing the observed vertical temperature structure and resultant level of mixing. These results are likely due to the surface data assimilation of temperature employed by the WRAP interim MM5 simulation and resulted in WRAP eliminating the surface temperature and humidity FDDA in their final simulation.

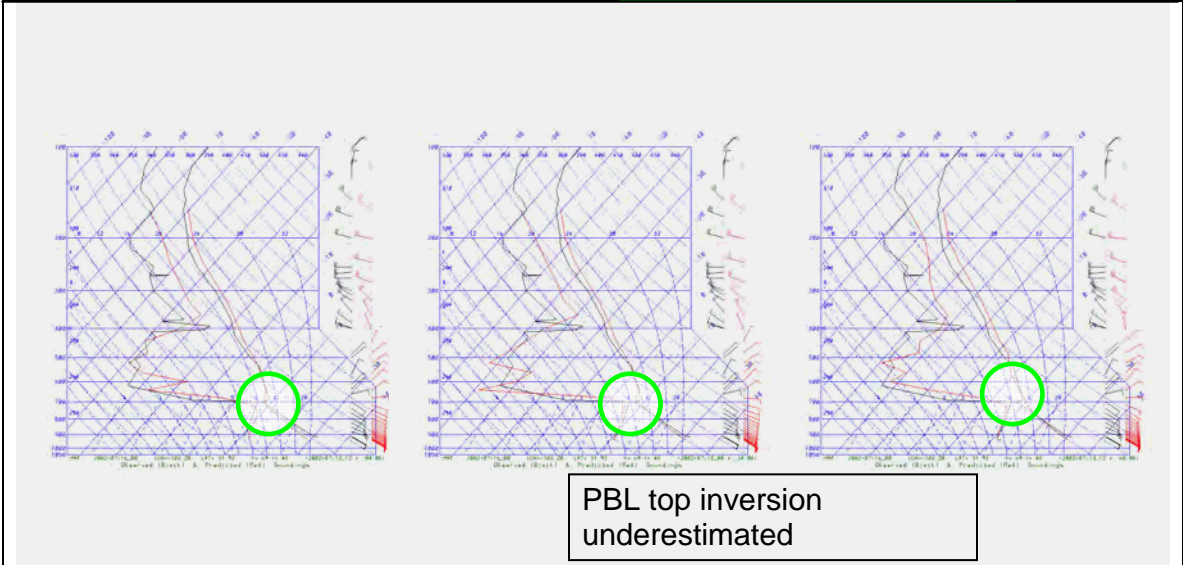
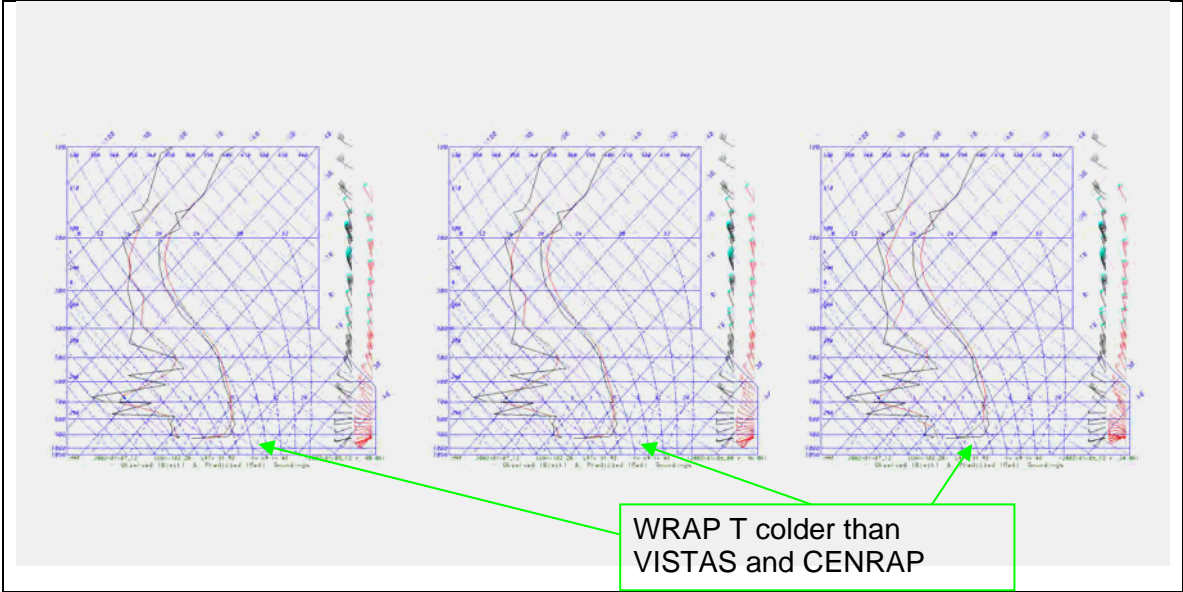


Figure A-5. Comparison of predicted and observed vertical temperature, dew point and winds profiles for the CENRAP (left), VISTAS (middle) and WRAP (right) at Midland Texas on January 7, 2002 at 12 GMT (top) and July 16, 2002 at 00 GMT (bottom).

A.4 Precipitation Model Performance Evaluation

The three MM5 model simulation precipitation estimates were evaluated by comparing the monthly average spatial distributions and amounts with observed values from the observed CPC 0.25 by 0.25 degree (approximately 28 km by 28 km) gridded analysis fields. The CPC analysis fields are gridded from on U.S. land-based observations, consequently the gridded observed fields are not available over the oceans and Canada and Mexico. The CPC observed monthly average precipitation fields were displayed using the MM5 modeling domain. The MM5 total precipitation estimates were accumulated for a month and plotted. Here total precipitation includes both explicit large scale synoptic precipitation as well as the subgrid-scale convective precipitation from the cumulus parameterization (Kain Fritsch 1 or 2).

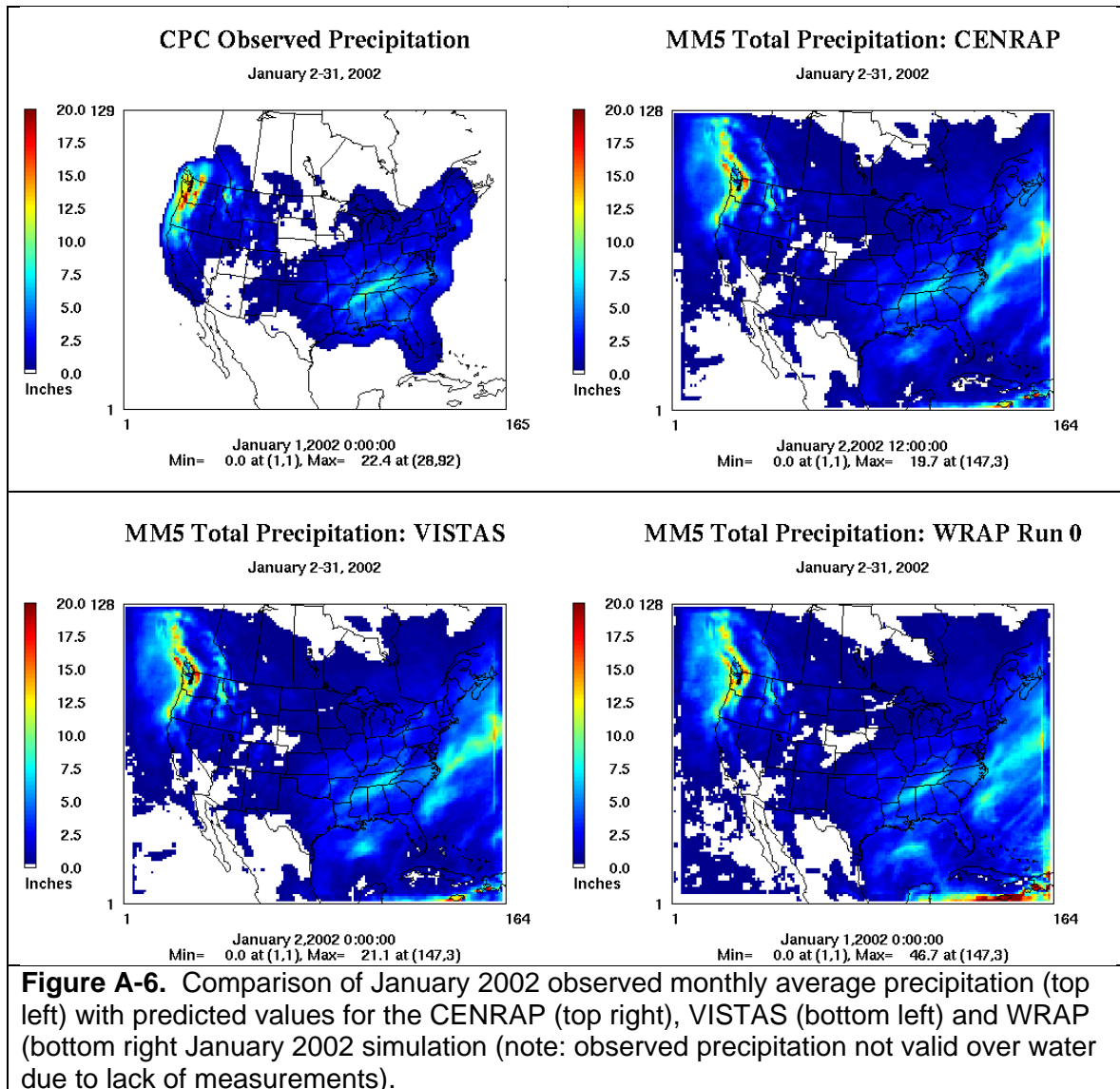
Figures A-6 through A-9 display the monthly average precipitation fields for the months of January, March, July and October and the CPC observed and CENRAP, VISTAS and interim WRAP MM5 simulations. In January (Figure A-6), all three models reproduce the observed monthly average precipitation well with enhanced predicted and observed precipitation over the Pacific Northwest and the Appalachian Mountains. The MM5 simulations also estimated enhanced precipitation in off-shore areas north of Seattle, over the Atlantic Ocean and in the Gulf of Mexico that can not be either confirmed or refuted by the CPC observations. MM5 does overstate the amount of precipitation in January over the northern CENRAP region including over Minnesota, Iowa and Nebraska.

The three models also do a good job in reproducing the observed spatial distribution and amounts of the precipitation in March 2002 (Figure A-7). Elevated precipitation areas in the Pacific Northwest and across the lower Midwest from Arkansas and up into the Ohio River Valley and adjacent areas. The MM5 simulations do understate the highest observed precipitation amounts in Arkansas. The MM5 simulations also overstate the amount of precipitation in the desert southwest (Four Corners) area in March.

The MM5 monthly average precipitation performance is dramatically worse in July 2002 (Figure A-8). Precipitation is overstated by all three MM5 simulations throughout the U.S. and particularly in the southern states, from Arkansas across Texas to the southeastern U.S. particularly Florida South and North Carolina. This over-prediction bias is due to convective precipitation from the cumulus parameterization (either Kain Fritsch 1 or 2). This overactive precipitation is the result of the over-prediction bias I humidity seen in many subdomains (see Table A-3b and Kemball-Cook et al., 2004a).

In October 2002, the three MM5 simulations reproduced the observed monthly average rainfall fairly well across the U.S. (Figure A-9). The models predict the location of the maximum precipitation in southern Louisiana well, but under-predict the magnitude, which may be due to a slight spatial displacement offshore in the Gulf of Mexico. The MM5 simulations understate the precipitation over the CENRAP region, which explains the dry humidity bias in the CenrapS subdomain in October (Figure A-3b).

In conclusion, the three MM5 simulations do a good job in simulating the observed precipitation when it is due to synoptic weather systems. However, when precipitation is due to convective activity as seen in July that is simulated by the MM5 cumulus parameterization, MM5 greatly overstates the precipitation amounts. This is particularly pronounced in the southern states from the Four Corners area to Florida with the interim WRAP simulation exhibiting the largest over-prediction bias. In the final WRAP MM5 simulation the Betts-Miller cumulus parameterization was used that greatly reduced the convective precipitation amounts resulting in better model performance (Kemball-Cook et al., 2005). However, an overestimation bias under convective precipitation conditions still was present.



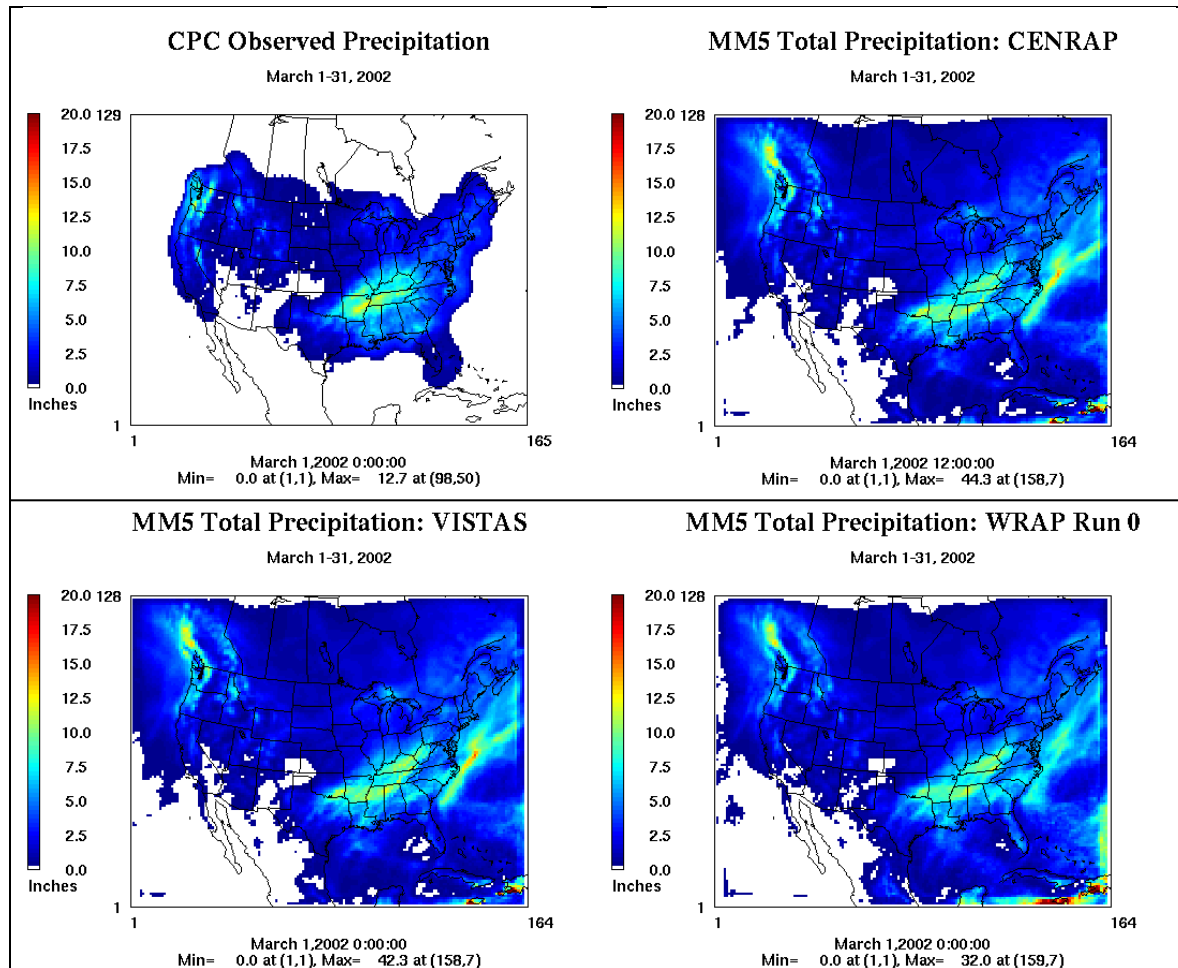
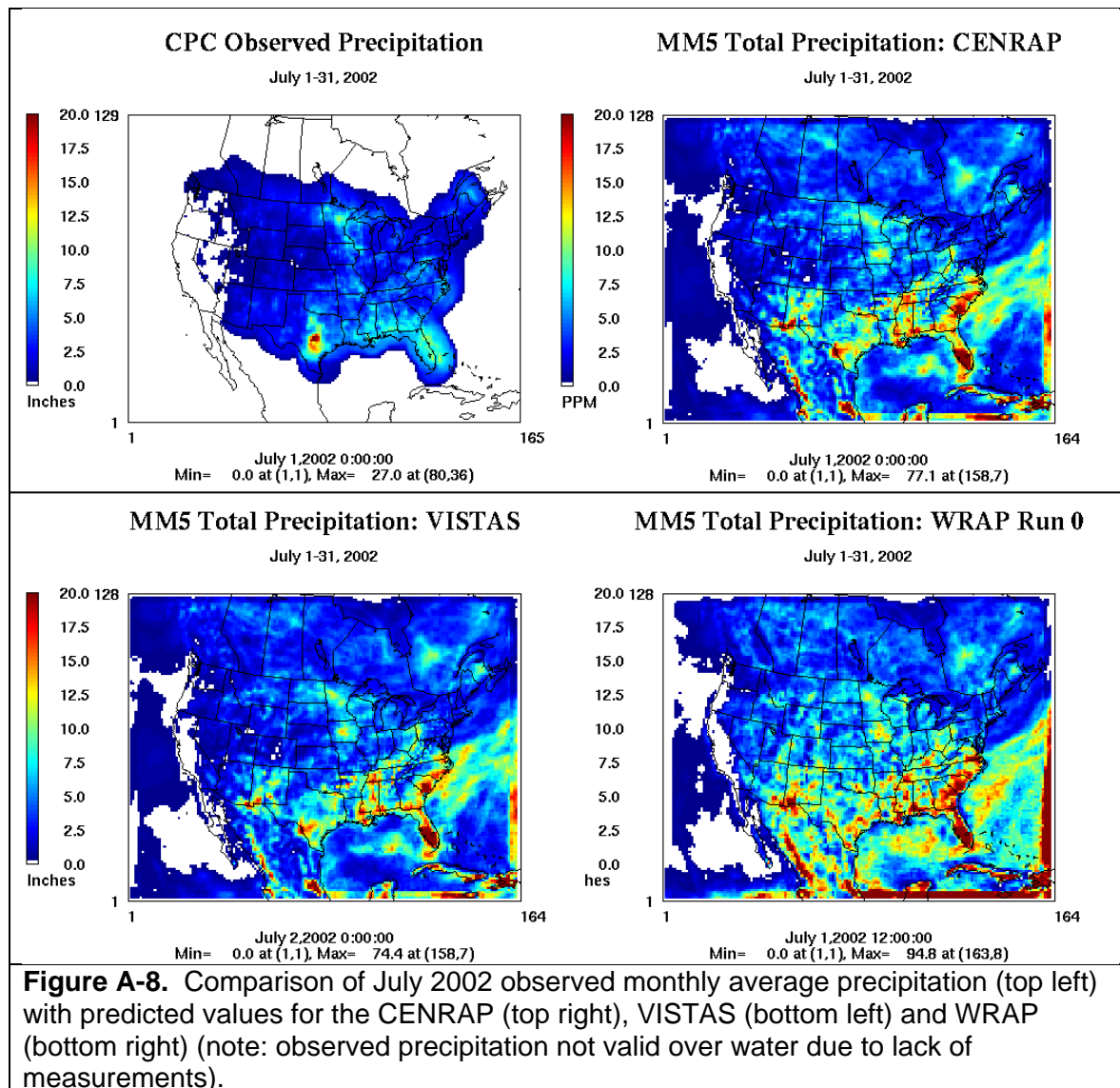


Figure A-7. Comparison of March 2002 observed monthly average precipitation (top left) with predicted values for the CENRAP (top right), VISTAS (bottom left) and WRAP (bottom right January 2002 simulation (note: observed precipitation not valid over water due to lack of measurements)).



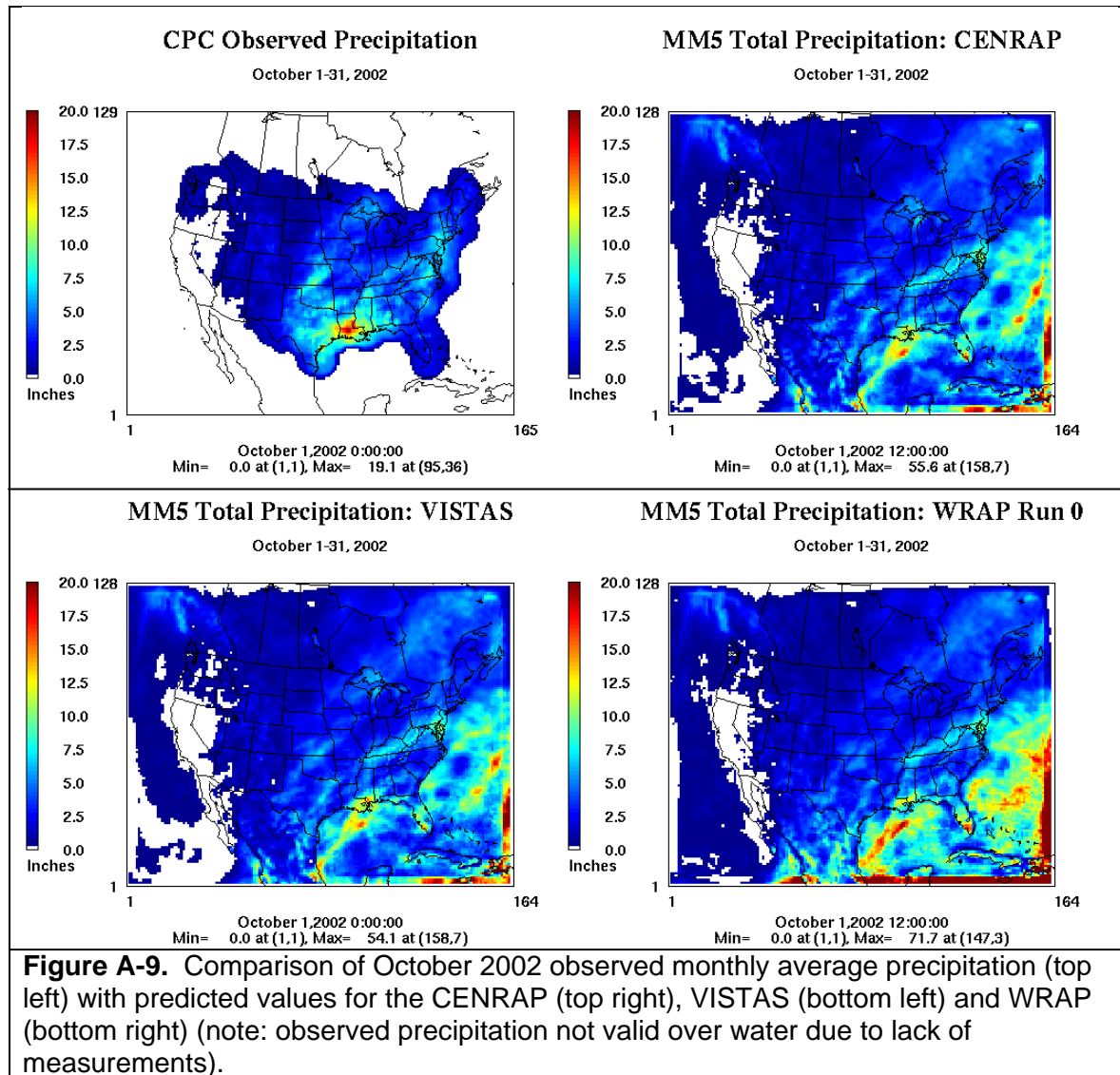


Figure A-9. Comparison of October 2002 observed monthly average precipitation (top left) with predicted values for the CENRAP (top right), VISTAS (bottom left) and WRAP (bottom right) (note: observed precipitation not valid over water due to lack of measurements).

APPENDIX B

**File Names, Data Source and Type and Description of Emissions
Used in the 2002 Typical and 2018 Base G Emissions Inventories**

Table A-1. CENRAP 2002 Typical Base G (Typ02G) emissions inventory.

Filename	Source	Data type	Description
<i>1 Stationary Area Sources</i>			
arinv_Mexico99phase3_border_20051027v4_noDust_noFire.ida	ERG	Text	1999 BRAVO Mexico inventory for the six Northern states; annual
arinv_Mexico99phase3_interior_ERG_Oct06_noDust_noFire.ida	ERG	Text	1999 BRAVO Mexico inventory for the Southern states; annual
arinv_nodust_noOilGas_CA2002_111105.ida	ERG	Text	California 2002 inventory; annual
arinv_noDUST_noREF_vistas_2002g_2453908.ida	Alpine Geophysics	Text	VISTAS 2002 inventory; annual
arinv_nodust_wrap2002_v1_noCAWANDORUT_081205.ida	ERG	Text	WRAP 2002 inventory for AZ, CO, ID, MT, NM, NV, SD, and WY ; annual
arinv_nodust_wrap2002_v2_WANDORUT_102105.ida	ERG	Text	WRAP 2002 inventory for ND, OR, UT, and WA; annual
arinv_NoFire_CANADA2000_v2.ida	Environment, Canada 011205		2000 Canada inventory; annual
arinv_NoFire_noDUST_noREF_mrpok_2002_20jun2006.ida	Alpine Geophysics	Text	MWRPO 2002 inventory; annual
arinv_NoFire_nodust_ref_manevu2002_011705.ida	MARAM web site	Text	MANE_VU 2002 inventory, annual
arinv_NoFire_nodust_ref_nh3_cenrap2002_081705.ida	Pechan	Text	CENRAP 2002 inventory; annual
arinv_vistas2002_TypicalFires2610000_112704.ida	Alpine Geophysics	Text	VISTAS 2002 inventory for SCC 2610000500
<i>2 Fugitive Dust</i>			
fdinv1_CA2002_v2_wfac_111105.ida	ERG	Text	CA 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_CANADA2000_v2_wfac.ida	Environment Canada	Text	Canada 2000 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_cenrap2002_wfac_081705.ida	Pechan	Text	CENRAP 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_manevu2002_wfac_011705.ida	MARMA web site	Text	MANE-VU2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_Mexico99phase3_border_20051027v4_wTfac.ida	MARMA web site	Text	Mexico Northern states 1999 inventory; extracted from stationary area inventory using initial list of

Filename	Source	Data type	Description
			SCCs; transport fractions applied; annual
fdinv1_Mexico99phase3_interior_ERG_Oct06_wo_pmfac.ida	ERG	Text	Mexico Southern states 1999 inventory; extracted from stationary area inventory using initial list of SCCs; no transport fractions applied; annual
fdinv1_mrpok_2002_20jun2006_w_tfrac.ida	Alpine Geophysics	Text	MWRPO 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_vistas_2002g_2453908_w_pmfac.ida	Alpine Geophysics	Text	VISTAS 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_wrap2002_wfac_noCAWANDORUT_081205.ida	ERG	Text	WRAP 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_wrap2002_wfac_WANDORUT_102105.ida	ERG	Text	WRAP 2002 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv2_CA2002_111105.w_tfrac.ida	ERG	Text	CA 2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2_CANADA_v2.w_tfrac.ida	Environment Canada	Text	Canada 2000 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2_cenrap2002_081705.w_tfrac.ida	Pechan	Text	CENRAP 2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2_manv-vu2002_011705.w_tfrac.ida	MARAMA web site	Text	MANE-VU2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2_vistas_2002g_2453908_w_pmfac.ida	Alpine Geophysics	Text	VISTAS 2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport

Filename	Source	Data type	Description
			fractions applied; annual
fdinv2_wrap2002_v1_noCAWANDORUT_081205.w_tfrac.ida	ERG	Text	WRAP 2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2_wrap2002_v2_WANDORUT_102105.w_tfrac.ida	ERG	Text	WRAP 2002 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
<i>3 Road Dust</i>			
rdinv_CA2002_v2_wfac_111105.ida	Environ	Text	California 2002 inventory; extracted from stationary area inventory; transport fractions applied; annual
rdinv_CANADA2000_v2_wfac.ida	Environment Canada	Text	Canada 2000 inventory; extracted from stationary area inventory; transport fractions applied; annual
rdinv_cenrap2002_wfac_081705.ida	Pechan	Text	CENRAP 2002 inventory; extracted from stationary area inventory; transport fractions applied; annual
rdinv_manevu2002_wfac.ida	Alpine Geophysics	Text	MANE-VU 2002 inventory; extracted from stationary area inventory; transport fractions applied; annual
rdinv_vistas_2002g_2453908_w_pmfac.txt	Alpine Geophysics	Text	VISTAS 2002 inventory; extracted from stationary area inventory; transport fractions applied; annual
rdinv_wrap2002_wfac_\${season}_082205.ida	ENVIRON	Text	WRAP 2002 inventory; transport fractions applied; seasonal
<i>4 Ammonia</i>			
arinv_nh3_2002_mrpok_\${month}_3may2006.ida	Alpine Geophysics	Text	MWRPO 2002 agricultural ammonia inventory; monthly
arinv_nh3_cenrap02_082406_\${month}.ida	Pechan	Text	CENRAP 2002 xxxx inventory; monthly
CENRAP_AREA_MISC_SMOKE_INPUT_NH3_MONTH_\${month}_072805_NoBio.txt	Pechan	Text	CENRAP 2002 xxxx inventory; monthly
NH3_CENRAP_ANN.082506.txt	Pechan	Text	CENRAP 2002 xxxx inventory; annual
CENRAP_AREA_MISC_SMOKE_INPUT_ANN_STATE_071905.txt	Pechan	Text	CENRAP 2002 xxxx inventory; annual
<i>5 WRAP Ammonia</i>			
nh3gts_I.2002###.1.WRAP36.base02b_nosoil.ncf	Environ	Binary, netCDF	Includes domestic, livestock, fertilizer, and wild life gridded inventory; daily
<i>6 Area Anthropogenic Fires</i>			
arfinv_anthro_cenrap2002_081705.ida	Pechan	Text	CENRAP 2002 inventory; extracted

Filename	Source	Data type	Description
			from stationary area inventory; annual
AREA_BURNING_SMOKE_INPUT_ANN_TX_NELI_071905.txt	Pechan	Text	CENRAP 2002 inventory; extracted from stationary area inventory; annual
arfinv_anthro_CANADA2000_v2.ida	Environment Canada	Text	Canada 2000 inventory; extracted from stationary area inventory; annual
arfinv_anthro_mane-vu2002_011705.ida	MARAM web site	Text	MANE-VU2002 inventory; extracted from stationary area inventory; annual
arfinv_anthro_Mexico99phase3_border_20051027v4.ida	ERG	Text	Mexico 1999 inventory for Northern states; extracted from stationary area inventory; annual
arfinv_anthro_Mexico99phase3_interior_ERG_Oct06.ida	ERG	Text	Mexico 1999 inventory for Southern states inventory; extracted from stationary area inventory; annual
arfinv_anthro_mrpok_2002_20jun2006.ida	Alpine Geophysics	Text	MWRPO 2002 inventory; extracted from stationary area inventory; annual
arfinv_anthro_vistas2002_TypicalFires_No2610000_112704.ida	Alpine Geophysics	Text	VISTAS 2002 inventory; annual
<i>7 Area Wild Fires</i>			
arfinv_wf_CANADA2000_v2.ida	Environment Canada	Text	Canada 2000 inventory; extracted from stationary area inventory; annual
arfinv_wf_cenrap2002_081705.ida	Pechan	Text	CENRAP 2002 inventory; extracted from stationary area inventory; annual
arfinv_wf_mane-vu2002_011705.ida	MARAM web site	Text	MANE-VU 2002 inventory; extracted from stationary area inventory; annual
arfinv_wf_Mexico99phase3_border_20051027v4.ida	ERG	Text	Mexico 1999 inventory for Northern states inventory; extracted from stationary area inventory; annual
arfinv_wf_Mexico99phase3_interior_ERG_Oct06.ida	ERG	Text	Mexico 1999 inventory for Southern states inventory; extracted from stationary area inventory; annual
arfinv_wf_mrpok_2002_20jun2006.ida	Alpine Geophysics	Text	MWRPO 2002 inventory; extracted from stationary area inventory; annual
arfinv_wf_vistas2002_TypicalFires_No2610000_112704.ida	Alpine	Text	VISTAS 2002 inventory; annual

Filename	Source	Data type	Description
Geophysics			
<i>8 Offshore Area Sources (Gulf of Mexico)</i>			
CO_noCM.txt	MMS	Text	Commercial marines records were removed; they are modeled in offshore shipping
NOX_noCM.txt	MMS	Text	Commercial marines records were removed; they are modeled in offshore shipping
PM_noCM.txt	MMS	Text	Commercial marines records were removed; they are modeled in offshore shipping
SO2_noCM.txt	MMS	Text	Commercial marines records were removed; they are modeled in offshore shipping
VOC_noCM.txt	MMS	Text	Commercial marines records were removed; they are modeled in offshore shipping
<i>9 Non Road (Annual Inventory)</i>			
arinv_marine_mrpok_2002_27apr2006.ida	Alpine Geophysics	Text	MWRPO 2002 Marine inventory; annual
marinv_vistas_2002g_2453972.ida	Alpine Geophysics	Text	VISTAS 2002 Marine inventory; annual
nrinv_CANADA2000_v2_aircraft.ida	Environment Canada	Text	Canada 2000 aircraft inventory; extracted from non-road inventory; annual
nrinv_CANADA2000_v2.ida	Environment Canada	Text	Canada 2000 inventory; annual
nrinv_CANADA2000_v2_locomotive.ida	Environment Canada	Text	Canada 2000 locomotive inventory; extracted from non-road inventory; annual
nrinv_CANADA2000_v2_marine.ida	Environment Canada	Text	Canada 2000 marine inventory; extracted from non-road inventory; annual
nrinv_cenrap2002_annual_071305.ida	Pechan	Text	CENRAP 2002 inventory; annual
nrinv_mane-vu2002_052505.ida	MARAM web site	Text	MANE_VU 2002 inventory; annual
nrinv_mane-vu2002_aircraft_052505.ida	MARAM web site	Text	MANE-VU 2002 aircraft inventory; extracted from non-road inventory; annual
nrinv_mane-vu2002_locomotive_052505.ida	MARAM web site	Text	MANE-VU 2002 locomotive inventory; extracted from non-road inventory; annual
nrinv_mane-vu2002_shipping_052505.ida	MARAM web site	Text	MANE-VU 2002 marine inventory;

Filename	Source	Data type	Description
			extracted from non-road inventory; annual
nrinv_Mexico1999_ERG_Aircraft_Locomotive_Rec_102705.ida	ERG	Text	Mexico 1999 aircraft and locomotive inventory; annual
nrinv_Mexico99phase3_border_20061025v4.ida	ERG	Text	Mexico 1999 inventory for Northern states; annual
nrinv_Mexico99phase3_interior_ERG_Oct06.ida	ERG	Text	Mexico 1999 inventory for Southern states; annual
nrinv_vistas_2002g_2453908.ida	Alpine Geophysics	Text	VISTAS 2002 inventory; annual
nrinv_wrap2002_InshoreMarine_annual_tpd_080205.ida	ENVIRON	Text	WRAP marine inventory; annual
nrinv_wrap2002_v2_locomotive_annual_tpd_102705.ida	ENVIRON	Text	WRAP locomotive inventory; annual
<i>11 Non Road (Monthly and Seasonal Inventory)</i>			
nrinv_2002_mrpok_\$month_3may2006.ida	Missouri DNR	Text	MWRPO 2002 inventory; monthly
nrinv_CA2002_v2_OffRoad_\${season}_103105.ida	EENVIRON	Text	California 2002 inventory, seasonal
nrinv_cenrap2002_\$month_082806.ida	Pechan	Text	CENRAP 2002 inventory; monthly
nrinv_wrap2002_nonCA_\${season}_060705.ida	ENVIRON	Text	WRAP 2002 inventory, monthly
nrinv_wrap2002_v2_Aircraft_\${season}_103105.ida	ENVIRON	Text	WRAP 2002 aircraft inventory; seasonal
<i>12 Stationary Point</i>			
pthour_2002typ_baseg_\${month}_28jun2006.ems	Alpine Geophysics	Text	VISTAS 2002 hourly inventory for the EGUs; monthly
egu_ptinv_vistas_2002typ_baseg_2453909.ida	Alpine Geophysics	Text	VISTAS 2002 EGUs inventory; annual
negu_ptinv_vistas_2002typ_baseg_2453909.ida	Alpine Geophysics	Text	VISTAS 2002 non EGUs inventory, annual
ptinv_CA2002_101405.ida	ERG	Text	California 2002 inventory; annual
ptinv_CA2002_CARBofs_v1.ida	ARB	Text	California 2002 offshore inventory; annual
Ptinv_CANADA2000_v2_032407.ida	Environment Canada	Text	Canada 2000 inventory; annual
Ptinv_cenrap2002_033007.ida	Pechan	Text	CENRAP 2002 inventory; annual
ptinv_egu_2002_mrpok_1may2006.ida	Alpine Geophysics	Text	MWRPO 2002 EGUs inventory; annual
ptinv_manv-vu2002_v2_\${WINSUM}_041905.ida	MARAM web site	Text	MANE-VU 2002 inventory, seasonal; winter summer
ptinv_Mexico99phase3_border_20061025v4.ida	ERG	Text	Mexico 1999 inventory for Northern states; annual
ptinv_Mexico99phase3_interior_ERG_Oct06.ida	ERG	Text	Mexico 1999 inventory for Southern states; annual
ptinv_negu_2002_mrpok_1may2006.ida		Text	MWRPO 2002 non EGUs inventory;

Filename	Source	Data type	Description
			annual
ptinv_wrap2002_AKAZMTNMORUTWAWY_102405.ida	ERG	Text	WRAP 2002 inventory for AK, AZ, MT, NM, OR, UT, WA, and WY; annual
tiniv_wrap2002_v2_NVIDSDNDCO_090805.ida	ERG	Text	WRAP 2002 inventory for NV, ID, SD, ND, and CO; annual
ptinv_WRAPTribes2002_102005.ida	ERG	Text	WRAP/Tribes 2002 inventory; annual
<i>13 Offshore Point (Gulf)</i>			
CO.afs.gwei2000.20000801.latlong.ida	MMS	Text	
PM10.afs.gwei2000.20000801.latlong.ida	MMS	Text	
SO2.afs.gwei2000.20000801.latlong.ida	MMS	Text	
NOX.afs.gwei2000.20000801.latlong.ida	MMS	Text	
PM2_5.afs.gwei2000.20000801.latlong.ida	MMS	Text	
VOC.afs.gwei2000.20000801.latlong.ida	MMS	Text	
<i>14 On Road Mobile (Emissions)</i>			
mbinv_wrap2002_v2_noCA_\${season}_101305.ida	ENVIRON	Text	WRAP 2002 inventory; seasonal
mbinv_CA2002_v2_\${season}_102705.ida	ENVIRON	Text	California 2002 inventory; seasonal
mbinv_CANADA2000.ida	Environment Canada	Text	Canada 2000 inventory; annual
mbinv_Mexico99phase3_border_20051021v4.ida	ERG	Text	Mexico 1999 inventory for Northern states; annual
mbinv_Mexico99phase3_interior_ERG_Oct06.ida	ERG	Text	Mexico 1999 inventory for Southern states; annual
<i>15 On Road Mobile (Activities, VMT)</i>			
mbinv#_vmt_cenrap.ida	STI	Text	CENRAP 2002 inventory; divided into three files; annual
mbinv_2002_vmt_mane-vu.ida	MARAM web site	Text	MANE-VU 2002 inventory; annual
mbinv_mrpo_02f_vmt_02may06.ida	Alpine Geophysics	Text	MWRPO 2002 inventory; annual
mbinv_vistas_02g_vmt_12jun06.ida	Alpine Geophysics	Text	VISTAS 2002 inventory; annual
<i>16 Point Fires</i>			
ptday_2002CENRAP_ptfires_mon##.ida	STI	Text	CENRAP 2002 prescribed fires; daily emissions; monthly
ptday_agfires_##_vistas.ida	Alpine Geophysics	Text	VISTA 2002 all fire sources; daily emissions; monthly
PTDAY_200504051315_wrap2002_nfr.mon##.ida	AirSciences	Text	WRAP 2002 non federal rangeland fires; daily emissions; monthly
PTDAY_200507011516_wrap2002_agf_base.mon##.ida	AirSciences	Text	WRAP 2002 Ag. Fires; daily emissions; monthly
PTDAY_200510210936_wrap2002_wild_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fires; daily emissions; monthly

Filename	Source	Data type	Description
PTDAY_200510211022_wrap2002_wfu_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fire use; daily emissions; monthly
PTDAY_200510211029_wrap2002_rx_base.mon##.ida	AirSciences	Text	WRAP 2002 prescribed fires; daily emissions; monthly
pthour_2002CENRAP_ptfires_mon##.ida	STI	Text	CENRAP 2002 prescribed fires; hourly plume distribution; monthly
pthour_agfires_##_vistas.ida	Alpine Geophysics	Text	VISTA 2002 all fire sources; hourly plume distribution; monthly
PTHOUR_200504051315_wrap2002_nfr.mon##.ida	AirSciences	Text	WRAP 2002 non federal rangeland; hourly plume distribution; monthly
PTHOUR_200507011516_wrap2002_agf_base.mon##.ida	AirSciences	Text	WRAP 2002 Ag. Fires; hourly plume distribution; monthly
PTHOUR_200510210936_wrap2002_wild_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fires; hourly plume distribution; monthly
PTHOUR_200510211022_wrap2002_wfu_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fire use; hourly plume distribution; monthly
PTHOUR_200510211029_wrap2002_rx_base.mon##.ida	AirSciences	Text	WRAP 2002 prescribed fires; hourly plume distribution; monthly
ptinv_2002CENRAP_ptfires_mon##.ida	STI	Text	CENRAP 2002 prescribed fires; fire location info.; monthly
ptinv_agfires_##_vistas.ida	Alpine Geophysics	Text	VISTA 2002 all fire sources fire location info; monthly
PTINV_200504051315_wrap2002_nfr.mon##.ida	AirSciences	Text	WRAP 2002 non federal rangeland fires; fire location info; monthly
PTINV_200507011516_wrap2002_agf_base.mon##.ida	AirSciences	Text	WRAP 2002 Ag. Fires; fire location info.; monthly
PTINV_200510210936_wrap2002_wild_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fires; fire location info.; monthly
PTINV_200510211022_wrap2002_wfu_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fire use; fire location info.; monthly
PTINV_200510211029_wrap2002_rx_base.mon##.ida	AirSciences	Text	WRAP 2002 prescribed fires; fire location; monthly
ptday.ontario_fires.2002.txt.ida	Environment Canada	Text	Ontario/Canada wild fires; daily emissions and fire info.; monthly
ptinv.ontario_fires.2002.txt.ida	Environment Canada	Text	Ontario/Canada wild fires; fire location info.; monthly
<i>17 Biogenecs</i>			
b3fac.beis3_efac_v0.98.txt	EPA	Text	Version 0.98 biogenic emission factors
b3_a.VISTAS36_148X112.beld3_v2.ncf	Alpine Geophysics	Binary	Gridded land use
b3_b.VISTAS36_148X112.beld3_v2.ncf	Alpine	Binary	Gridded land use

Filename	Source	Data type	Description
	Geophysics		
b3_t.VISTAS36_148X112.beld3_v2.ncf	Alpine Geophysics	Binary	Gridded land use
<i>18 Windblown Dust</i>			
wb_dust_ii_cenrap_cmaq_RPO36_2002###_agadj_tf_b.ncf	ENVIRON/UCR	Binary; netCDF	Domain wide wind blown dust emissions from WRAP wind blown dust model; hourly
<i>19 WRAP Oil and Gas</i>			
arinv_CA2002_v2_OilGas_111105.ida	ENVIRON	Text	California 2002 oil and gas inventory; annual
arinv_wrap2002_v2_OilGas_annual_082505.ida	ENVIRON	Text	WRAP 2002 oil and gas inventory; annual
<i>20 Offshore Shipping</i>			
ofsgts_l.2002###.1.vista36.baseg_2002.shipping.ncf	ENVIRON/VISTAS	Binary; netCDF	Pacific, Gulf of Mex. and Atlantic 2002 Offshore shipping inventory; daily

Table A-2. CENRAP 2018 Base G (Base18G) emissions inventory.

Filename	Source	Data type	Description
<i>1 Stationary Area Sources</i>			
arinv_Mexico99phase3_border_20051027v4_noDust_noFire.ida	ERG	Text	1999 BRAVO Mexico inventory for the six Northern states; annual
arinv_Mexico99phase3_interior_ERG_Oct06_noDust_noFire.ida	ERG	Text	1999 BRAVO Mexico inventory for the Southern states; annual
arinv_CA2018_112205.ida	ERG	Text	California 2018 inventory; annual
arinv_NoDust_NoREF_vistas_2018g_2453922.ida	Alpine Geophysics	Text	VISTAS 2018 inventory; annual
arinv_wrap2018.091205.ida	ERG	Text	WRAP 2018 inventory; annual
arinv_canada_2020_noDust_NoFire.ida	Environment, Canada		Canada 2020 inventory; annual
arinv_NoFire_NoDust_NoREF_mrpok_2018_22aug2006.ida	Alpine Geophysics	Text	MWRPO 2018 inventory; annual
arinv_mane_vu_2018v3_1_NoDust_NoFire.ida		Text	MANE_VU 2018 inventory, annual
arinv_NoFire_nodust_ref_nh3_cenrap2002-2018_101606.ida	UCR; grown from 2002	Text	CENRAP 2018 inventory; annual
arinv_vistas_baseg_2018t_lofire_11feb2007_scc2610000500.ida	Alpine Geophysics	Text	VISTAS 2018 inventory for SCC 2610000500
<i>2 Fugitive Dust</i>			
fdinv1.CA2018_wfac.ida	ERG	Text	CA 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1.canada_2020.wTfac.ida	Environment Canada	Text	Canada 2000 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1.cenrap2002_2018_wfac.ida	UCR; grown from 2002	Text	CENRAP 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1.mane_vu2018_wfac.ida	MARAM web site	Text	MANE-VU 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions

Filename	Source	Data type	Description
			applied; annual
fdinv1_Mexico99phase3_border_20051027v4_wTfac.ida	ERG	Text	Mexico Northern states 1999 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_Mexico99phase3_interior_ERG_Oct06_wo_pmfac.ida	ERG	Text	Mexico Southern states 1999 inventory; extracted from stationary area inventory using initial list of SCCs; no transport fractions applied; annual
fdinv1_mrpok_2018_22aug2006_wfac.ida	Alpine Geophysics	Text	MWRPO 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1_vistas_2018g_2453922_w_pmfac.ida	Alpine Geophysics	Text	VISTAS 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv1.wrap2018_wfac.ida	ERG	Text	WRAP 2018 inventory; extracted from stationary area inventory using initial list of SCCs; transport fractions applied; annual
fdinv2.CA2018_wfac.ida	ERG	Text	CA 2018 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2.canada_2020.wTfac.ida	Environment Canada	Text	Canada 2020 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2.cenrap2002_2018_wfac.ida	UCR; grown from 2002	Text	CENRAP 2018 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2.mane-vu2018_wfac.ida	MARAM web site	Text	MANE-VU 2018 inventory;

Filename	Source	Data type	Description
			extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2_vistas_2018g_2453922_w_pmfac.ida	Alpine Geophysics	Text	VISTAS 2018 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
fdinv2_wrap2018.091205_wfac.ida	ERG	Text	WRAP 2018 inventory; extracted from stationary area inventory using extended list of SCCs; transport fractions applied; annual
<i>3 Road Dust</i>			
rdinv.CA2018_wfac.ida	Environ	Text	California 2018 inventory; extracted from stationary area inventory; transport fractions applied; annual
rdinv_canada_2020_wTfac.ida	Environment Canada	Text	Canada 2020 inventory; extracted from stationary area inventory; transport fractions applied; annual
rdinv.cnrap2002_2018.wfac.ida	UCR; grown from 2002	Text	CENRAP 2018 inventory; extracted from stationary area inventory; transport fractions applied; annual
rdinv_mane_vu_2018v3_1_wTfac.ida	MARAM web site	Text	MANE-VU 2018 inventory; extracted from stationary area inventory; transport fractions applied; annual
rdinv_vistas_vistas_2018g_2453922_w_pmfac.ida	Alpine Geophysics	Text	VISTAS 2018 inventory; extracted from stationary area inventory; transport fractions applied; annual
rdinv.wrap2018_wfac_\${season}.ida	ENVIRON	Text	WRAP 2018 inventory; transport fractions applied; seasonal
<i>4 Ammonia</i>			
arinv_nh3_2018_mrpok_\${month}_22aug2006.ida	Alpine Geophysics	Text	MWRPO 2018 agricultural ammonia inventory; monthly
nh3minv.cenrap2018gr_18.apr.ida	UCR; grown from 2002	Text	CENRAP 2018 xxxx inventory; monthly

Filename	Source	Data type	Description
nh3inv.misc.cnrp2002_2018.feb.ida	UCR; grown from 2002	Text	CENRAP 2018 xxxx inventory; monthly
nh3yinv.annual.cnrp2002_2018.100406.ida	UCR; grown from 2002	Text	CENRAP 2018 xxxx inventory; annual
nh3inv.misc_annual.cnrp2002_2018.ida	UCR; grown from 2002	Text	CENRAP 2018 xxxx inventory; annual
<i>5 WRAP Ammonia</i>			
nh3gts_l.2002###.1.WRAP36.base02b_nosoil.ncf	Environ	Binary, netCDF	Includes domestic, livestock, fertilizer, and wild life gridded inventory; daily
<i>6 Area Anthropogenic Fires</i>			
arfinv_anthro_cenrap2002_081705.ida	Pechan	Text	CENRAP 2002 inventory; extracted from stationary area inventory; annual
AREA_BURNING_SMOKE_INPUT_ANN_TX_NELI_071905.txt	Pechan	Text	CENRAP 2002 inventory; extracted from stationary area inventory; annual
arfinv_anthro_canda2020.ida	Environment Canada	Text	Canada 2000 inventory; extracted from stationary area inventory; annual
arfinv_anthro_mane_vu_2018v3_1.ida	MARAM web site	Text	MANE-VU 2018 inventory; extracted from stationary area inventory; annual
arfinv_anthro_Mexico99phase3_border_20051027v4.ida	ERG	Text	Mexico 1999 inventory for Northern states; extracted from stationary area inventory; annual
arfinv_anthro_Mexico99phase3_interior_ERG_Oct06.ida	ERG	Text	Mexico 1999 inventory for Southern states inventory; extracted from stationary area inventory; annual
arfinv_anthro_mrpok_2018_22aug2006.ida	Alpine Geophysics	Text	MWRPO 2018 inventory; extracted from stationary area inventory; annual
arfinv_anthro_vistas_baseg_2018t_11feb2007_NOsc2610000500.ida	Alpine Geophysics	Text	VISTAS 2018 inventory; annual
<i>7 Area Wild Fires</i>			
arfinv_wf_canada2020.ida	Environment Canada	Text	Canada 2020 inventory; extracted from stationary area inventory; annual
arfinv_wf_cenrap2002-2018_101606.ida	UCR; grown from 2002	Text	CENRAP 2018 inventory; extracted from stationary area inventory; annual

Filename	Source	Data type	Description
arfinv_wf_mane_vu_2018v3_1.ida	MARAM web site	Text	MANE-VU 2018 inventory; extracted from stationary area inventory; annual
arfinv_wf_Mexico99phase3_border_20051027v4.ida	ERG	Text	Mexico 1999 inventory for Northern states inventory; extracted from stationary area inventory; annual
arfinv_wf_Mexico99phase3_interior_ERG_Oct06.ida	ERG	Text	Mexico 1999 inventory for Southern states inventory; extracted from stationary area inventory; annual
arfinv_wf_mrpok_2018_22aug2006.ida	Alpine Geophysics	Text	MWRPO 2018 inventory; extracted from stationary area inventory; annual
arfinv_wf_vistas_baseg_2018t_11feb2007_NOsc2610000500.ida	Alpine Geophysics	Text	VISTAS 2018 inventory; annual
<i>8 Offshore Area Sources (Gulf of Mexico)</i>			
ofsarinv.cnrap2002_2018_noCM.ida	UCR; grown from 2002	Text	Commercial marines records were removed; they are modeled in offshore shipping; all pollutants; annual
<i>9 Non Road (Annual Inventory)</i>			
arinv_mar_mrpok_2018_22aug2006.ida		Text	MWRPO 2018 Marine inventory; annual
marinv_vistas_2018g_2453972.ida	Alpine Geophysics	Text	VISTAS 2018 Marine inventory; annual
NONROAD2020_Canada.ida	Environment Canada	Text	Canada 2020 aircraft inventory; extracted from non-road inventory; annual
CENRAP_2018_Fnl_Nrd_Emissions091506.ida	Pecahn	Text	CENRAP 2018 inventory; annual
nrinv_mane_vu_2018v3_1.ida	MARAM web site	Text	MANE_VU 2018 inventory; annual
nrinv_Mexico1999_ERG_Aircraft_Locomotive_Rec_102705.ida	ERG	Text	Mexico 1999 aircraft and locomotive inventory; annual
nrinv_Mexico99phase3_border_20061025v4.ida	ERG	Text	Mexico 1999 inventory for Northern states; annual
nrinv_Mexico99phase3_interior_ERG_Oct06.ida	ERG	Text	Mexico 1999 inventory for Southern states; annual
nrinv_vistas_2018g_2453908.ida	Alpine Geophysics	Text	VISTAS 2018 inventory; annual
nrinv_wrap2018_Locomotive_annual_tpd_111805.ida	ENVIRON	Text	WRAP 2018 locomotive inventory; annual

Filename	Source	Data type	Description
<i>11 Non Road (Monthly and Seasonal Inventory)</i>			
nrinv_2018_mrpok_apr_22aug2006.ida	Alpine Geophysics	Text	MWRPO 2018 inventory; monthly
nrinv_CA2018_win_111805.ida	EENVIROn	Text	California 2018 inventory, seasonal
2018NONROAD_AG_IA_{\$month}.ida	Missouri DNR	Text	CENRAP/IA 2018 inventory; monthly
nrinv.mrpok.minn.apr_2018.011306.ida	Missouri DNR	Text	CENRAP/MN 2018 inventory; monthly
nrinv_WRAP2018_{\$season}_102105.ida	ENVIRON	Text	WRAP 2018 inventory, monthly
nrinv_WRAP2018_Aircraft_{\$season}.111805.ida	ENVIRON	Text	WRAP 2018 aircraft inventory; seasonal
<i>12 Stationary Point</i>			
pthour_2018_baseg_sep_2453993.ems	Alpine Geophysics	Text	VISTAS 2018 hourly inventory for the EGUs; monthly
ptinv_egu_18_vistas_g_2453993.ida	Alpine Geophysics	Text	VISTAS 2018 EGUs inventory; annual
ptinv_nonEGU_vistas_2018_baseg_2453957.ida	Alpine Geophysics	Text	VISTAS 2018 non EGUs inventory, annual
pgts3d_l.2002###.1.cmaq.cb4p25.us36b.CANADA_20i01.19L.ncf	EPA	Binary; netCDF	Canada 2020 inventory; daily
Ptinv_cenrap2018_EGU_{\$WINSUM}_annual_050407.ida	CENRAP	Text	CENRAP 2018 EGUs inventory, seasonal; winter summer
ptinv_o.cenrap2002_2018_nonEGU050307.ida	UCR; grown from 2002	Text	CENRAP 2018 non EGUs inventory; annual
ptinv_cenrapNonegu_2018_050707_refin_new_sources.ida	CENRAP	Text	CENRAP 2018 Additional sources; annual
ptinv_egu_2018_mrpok_11sep006.ida	Alpine Geophysics	Text	MWRPO 2002 EGUs inventory; annual
Ptinv_manevu2018_EGU_{\$WINSUM}_ANNUAL_080805.ida	MARAM web site	Text	MANE-VU 2018 EGUs inventory, seasonal; winter summer
ptinv_manevu2018_nonEGU_112105.ida		Text	MANE-VU 2018 non EGUs inventory, annual
ptinv_Mexico99phase3_border_20061025v4.ida	ERG	Text	Mexico 1999 inventory for Northern states; annual
ptinv_Mexico99phase3_interior_ERG_Oct06.ida	ERG	Text	Mexico 1999 inventory for Southern states; annual
ptinv_negu_2018_mrpok_23aug2006.ida	Alpine Geophysics	Text	MWRPO 2018 non EGUs inventory; annual
ptinv_wrap2018_NoOG_050406.ida	ERG	Text	WRAP 2018 inventory; no oil and gas; annual

Filename	Source	Data type	Description
ptinv_wrap2018_OG_091205.ida	ERG	Text	WRAP 2018 inventory; oil and gas; annual
ptinv_WRAPTribes2018_NoOG_091205.ida	ERG	Text	WRAP/Tribes 2018 inventory; no oil and gas annual
ptinv_WRAPTribes2018_OG_091205.ida	ERG		WRAP/Tribes 2018 inventory; oil and gas annual
<i>13 Offshore Point (Gulf)</i>			
ofsinv_o_CO.cnrap2002_2018.ida	UCR; grown from 2002 emissions	Text	
ofsinv_o_NOX.cnrap2002_2018.ida	UCR; grown from 2002 emissions	Text	
ofsinv_o_PM10.cnrap2002_2018.ida	UCR; grown from 2002 emissions	Text	
ofsinv_o_PM2_5.cnrap2002_2018.ida	UCR; grown from 2002 emissions	Text	
ofsinv_o_SO2.cnrap2002_2018.ida	UCR; grown from 2002 emissions	Text	
ofsinv_o_VOC.cnrap2002_2018.ida	UCR; grown from 2002 emissions	Text	
<i>14 On Road Mobile (Emissions)</i>			
mbinv_WRAP2018_aut_102105.ida	ENVIRON	Text	WRAP 2018 inventory; seasonal
mbinv_CA2018_win_111805.ida	ENVIRON	Text	California 2018 inventory; seasonal
mbinv_CANADA2020.ida	Environment Canada	Text	Canada 2020 inventory; annual
mbinv_Mexico99phase3_border_20051021v4.ida	ERG	Text	Mexico 1999 inventory for Northern states; annual
mbinv_Mexico99phase3_interior_ERG_Oct06.ida	ERG	Text	Mexico 1999 inventory for Southern states; annual
<i>15 On Road Mobile (Activities, VMT)</i>			
mbinv.mbv#_vmt_cenrap2018_072005.ida	STI	Text	CENRAP 2018 inventory; divided into tow files; annual
mbinv_vmt_manevu2018_update.ida	MARAM web site	Text	MANE-VU 2018 inventory; annual
mbinv_mrpo_18f_vmt_11aug06.ida	Alpine Geophysics	Text	MWRPO 2018 inventory; annual
mbinv_vistas_18g_vmt_12jun06.ida	Alpine Geophysics	Text	VISTAS 2018 inventory; annual
<i>16 Point Fires</i>			
ptday_2002CENRAP_ptfires_mon##.ida	STI	Text	CENRAP 2002 prescribed fires; daily emissions; monthly
ptday.plume.vistasG2_2018.##.ida	Alpine	Text	VISTA 2018 all fire sources; daily

Filename	Source	Data type	Description
	Geophysics		emissions; monthly
PTDAY_200504051315_wrap2002_nfr.mon##.ida	AirSciences	Text	WRAP 2002 non federal rangeland fires; daily emissions; monthly
PTDAY_200604272314_wrap02_04_agf.mon##.ida	AirSciences	Text	WRAP 2002-4 Ag. Fires; daily emissions; monthly
PTDAY_200510210936_wrap2002_wild_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fires; daily emissions; monthly
PTDAY_200510211022_wrap2002_wfu_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fire use; daily emissions; monthly
PTDAY_200604281056_wrap02_04_arx.mon##.ida	AirSciences	Text	WRAP 2002-4 prescribed fires; daily emissions; monthly
PTDAY_200604281056_wrap02_04_nrx.mon##.ida	AirSciences	Text	WRAP 2002-4 natural prescribed fires; daily emissions; monthly
pthour_2002CENRAP_ptfires_mon##.ida	STI	Text	CENRAP 2002 anthro. prescribed fires; hourly plume distribution; monthly
pthour.plume.vistasG2_2018.##.ida	Alpine Geophysics	Text	VISTA 2002 all fire sources; hourly plume distribution; monthly
PTHOUR_200504051315_wrap2002_nfr.mon##.ida	AirSciences	Text	WRAP 2002 non federal rangeland; hourly plume distribution; monthly
PTHOUR_200604272314_wrap02_04_agf.mon##.ida	AirSciences	Text	WRAP 2002 Ag. Fires; hourly plume distribution; monthly
PTHOUR_200510210936_wrap2002_wild_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fires; hourly plume distribution; monthly
PTHOUR_200510211022_wrap2002_wfu_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fire use; hourly plume distribution; monthly
PTHOUR_200604281056_wrap02_04_arx.mon##.ida	AirSciences	Text	WRAP 2002 natural prescribed fires; hourly plume distribution; monthly
PTHOUR_200604281056_wrap02_04_nrx.mon##.ida	AirSciences	Text	WRAP 2002 anthro. prescribed fires; hourly plume distribution; monthly
ptinv_2002CENRAP_ptfires_mon##.ida	STI	Text	CENRAP 2002 prescribed fires; fire location info.; monthly
ptinv.plume.vistasG2_2018.11.ida	Alpine Geophysics	Text	VISTA 2002 all fire sources fire location info; monthly
PTINV_200504051315_wrap2002_nfr.mon##.ida	AirSciences	Text	WRAP 2002 non federal rangeland fires; fire location info; monthly

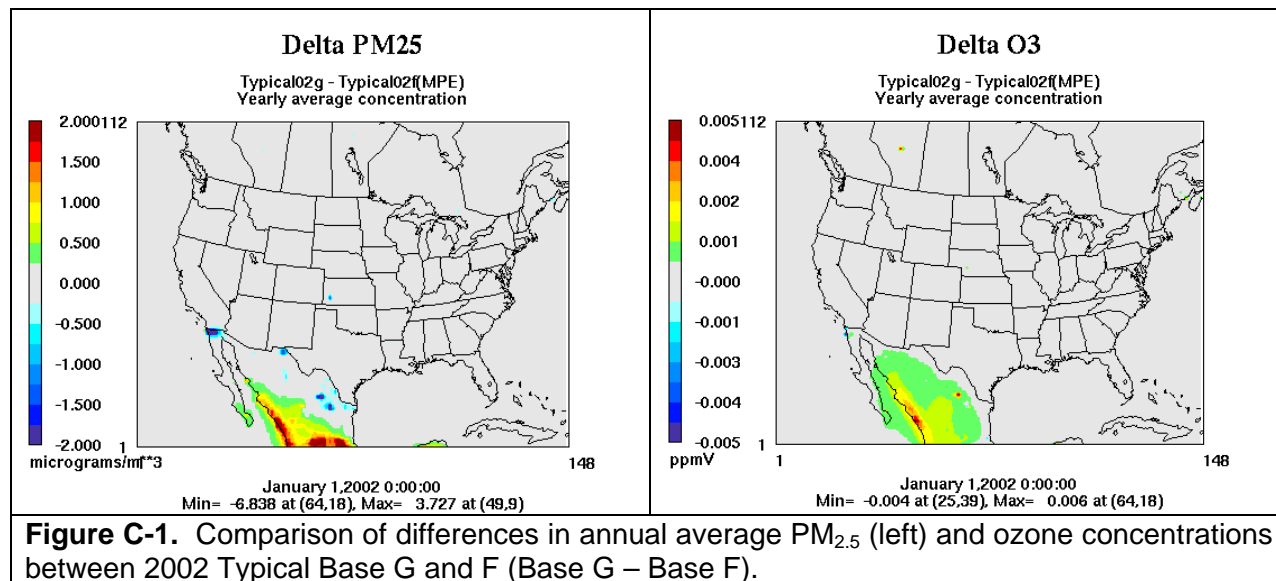
Filename	Source	Data type	Description
PTINV_200507011516_wrap2002_agf_base.mon##.ida	AirSciences	Text	WRAP 2002 Ag. Fires; fire location info.; monthly
PTINV_200510210936_wrap2002_wild_base.mon##.ida	AirSciences	Text	WRAP 2002 wild fires; fire location info.; monthly
PTINV_200604272314_wrap02_04_agf.mon##.ida	AirSciences	Text	WRAP 2002 wild fire use; fire location info.; monthly
PTINV_200604281056_wrap02_04_arx.mon##.ida	AirSciences	Text	WRAP 2002 anthro. prescribed fires; fire location; monthly
PTINV_200604281056_wrap02_04_nrx.mon##.ida	AirSciences		WRAP 2002 natural prescribed fires; fire location; monthly
ptday.ontario_fires.2002.txt.ida	Environment Canada	Text	Ontario/Canada wild fires; daily emissions and fire info.; monthly
ptinv.ontario_fires.2002.txt.ida	Environment Canada	Text	Ontario/Canada wild fires; fire location info.; monthly
<i>17 Biogenecs</i>			
b3fac.beis3_efac_v0.98.txt	EPA	Text	Version 0.98 biogenic emission factors
b3_a.VISTAS36_148X112.beld3_v2.ncf	Alpine Geophysics	Binary	Gridded land use
b3_b.VISTAS36_148X112.beld3_v2.ncf	Alpine Geophysics	Binary	Gridded land use
b3_t.VISTAS36_148X112.beld3_v2.ncf	Alpine Geophysics	Binary	Gridded land use
<i>18 Windblown Dust</i>			
wb_dust_ii_cenrap_cmaq_RPO36_2002###_agadj_tf_b.ncf	ENVIRON/UCR	Binary; netCDF	Domain wide wind blown dust emissions from WRAP wind blown dust model; hourly
<i>19 WRAP Oil and Gas</i>			
arinv_CA2018_OilGas_112205.ida	ENVIRON	Text	California 2018 oil and gas inventory; annual
oginv_WRAP2018_annual_tpd_111605.ida	ENVIRON	Text	WRAP 2018 oil and gas inventory; annual
<i>20 Offshore Shipping</i>			
ofsgts_l.2002###.1.vista36.baseg_2002.shipping.ncf	ENVIRON/VISTAS	Binary; netCDF	Pacific, Gulf of Mex. and Atlantic 2002 Offshore shipping inventory; daily

APPENDIX C

Model Performance Evaluation for the CMAQ 2002 Base F Base Case Simulation in the CENRAP Region

C.1 2002 Typical Base F Model Performance Evaluation Scenario

This Appendix presents the operational evaluation of the CMAQ model for the 2002 36 km Typical Base F emissions scenario. The final CENRAP 2002 and 2018 emissions scenarios used in the 2018 visibility projections was Base G. The main differences between Base G and Base F emissions inventories were updated Mexican emissions in the northern states, addition of Mexican emissions in the southern states that were not included in CENRAP's emission inventories prior to Base G and correction of a few point source stack parameters and emissions in the CENRAP states and Canada (see: http://pah.cert.ucr.edu/aqm/cenrap/OA_typ02g36.plots/log_inv_catg_Typ02g.doc). Figure C-1 displays the differences in annual average PM_{2.5} and ozone concentrations between the 2002 Typical Base G and Base F simulations. Most of the differences in the two simulations are concentrations within Mexico where no monitoring data were available for the model evaluation. Thus, given the very small differences between the 2002 Typical Base F and G base case simulations, the model performance evaluation is presented for just the 2002 Typical Base F simulation (for additional comparisons of Base G and F see: http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml#typ02gvstyp02f_mpe).



The CENRAP emissions and air quality modeling initially conducted 2002 base case modeling for two 2002 base case emissions scenarios: a 2002 Actual emissions base case; and a 2002 Typical emissions base case. For the 2002 Actual base case, day-specific SO₂ and NO_x emissions for large stationary point sources were used based on measured continuous emissions monitoring (CEM) data along with actual 2002 fire emissions. In the 2002 Typical base case, emissions for large stationary sources and fires were more representative of the 2000-2004 Baseline period. For large stationary sources' typical emissions, 5-years of CEM data were analyzed and typical seasonal and diurnally varying emissions were defined for when the sources were operating. For the typical fire emissions, the locations of the 2002 Actual fire emissions were retained, but the intensity was reduced or increased to match the average conditions over the 5-year Baseline. The original intent of the CENRAP modeling of both a 2002 Actual and Typical base cases was to use the 2002 Actual base case for the model performance evaluation and the 2002 Typical base case with the 2018 emission scenario for the 2018 visibility projections.

The need to generate both the 2002 Typical and Actual base case inventories and perform CMAQ model simulations each time an emissions update or correction to the modeling occurred became burdensome and potentially could compromise the CENRAP schedule and available resources. For the Base F vintage emissions database, a model performance evaluation was conducted that compared the model performance of the 2002 Actual and Typical Base F CMAQ base case simulations to determine whether use of the Actual emissions substantially changed the interpretation of the model performance. The maximum change in model performance between the 2002 Actual and Typical base case was for sulfate and occurred during the summer months, when sulfate is the highest. Figure C-2 displays sulfate (SO₄), nitrate (NO₃), elemental carbon (EC) and organic matter carbon (OMC) performance for July 2002 across IMPROVE sites in the CENRAP region for the 2002 36 km Actual and Typical Base F CMAQ base case simulations. Although differences in predicted 24-hour SO₄ concentrations are sometimes discernable in the scatter plot, the basic model performance conclusions remains the same and the difference in fractional bias (-48% vs. -49%) and fraction error (58% vs. 59%) are not significant. Similarly, the difference in NO₃ model performance between the Actual and Typical Base F simulations are not significant. The performance of the CMAQ Actual and Typical simulation for EC and OMC is essentially identical. Given the similarity of the 2002 Base F Actual and Typical model performance evaluation, future CENRAP CMAQ model performance analysis were just performed on the Typical simulation.

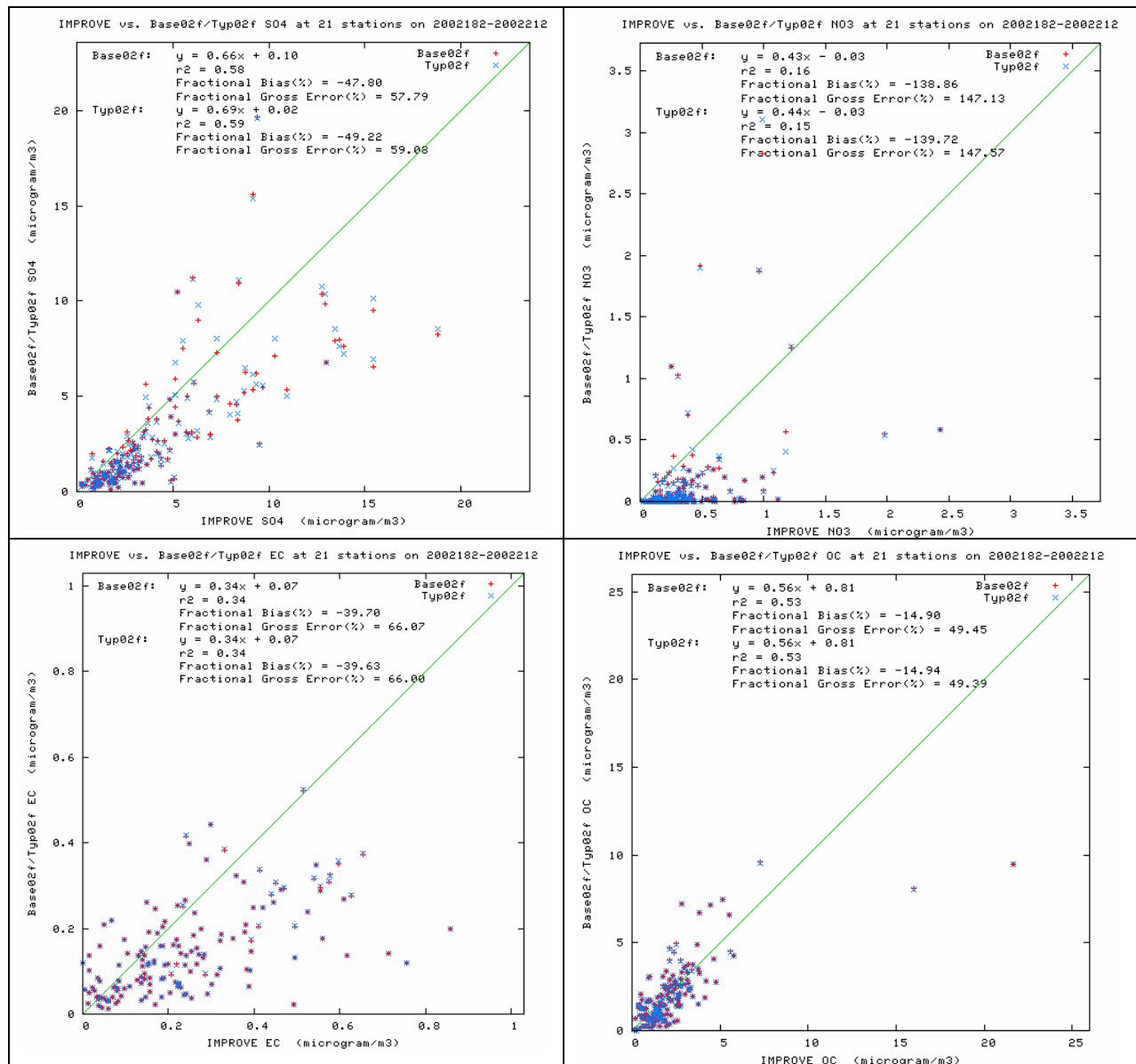


Figure C-2. Comparison of SO4 (top left), NO3 (top right), EC (bottom left) and OMC (bottom right) model performance for July 2002, the CENRAP region and the 2002 36 km Base F Actual (red) and Typical (blue) CMAQ base case simulation.

C.2 CMAQ Evaluation Methodology

EPA's integrated ozone, PM_{2.5} and regional haze modeling guidance calls for a comprehensive, multi-layered approach to model performance testing, consisting of the four major components: operational, diagnostic, mechanistic (or scientific) and probabilistic (EPA, 2007). The CMAQ model performance evaluation effort focused on the first two components, namely:

- **Operational Evaluation:** Tests the ability of the model to estimate PM concentrations (both fine and coarse) and the components at PM₁₀ and PM_{2.5} including the quantities used to characterize visibility (i.e., sulfate, nitrate, ammonium, organic carbon, elemental carbon, other PM_{2.5}, and coarse matter (PM_{2.5-10}). This evaluation examines whether the measurements are properly represented by the model predictions but does not necessarily ensure that the model is getting “the right answer for the right reason”; and
- **Diagnostic Evaluation:** Tests the ability of the model to predict visibility and extinction, PM chemical composition including PM precursors (e.g., SO_x, NO_x, and NH₃) and associated oxidants (e.g., ozone and nitric acid); PM size distribution; temporal variation; spatial variation; mass fluxes; and components of light extinction (i.e., scattering and absorption).

The diagnostic evaluation also includes the performance of diagnostic tests to better understand model performance and identify potential flaws in the modeling system that can be corrected. The diagnostic evaluation may also include the use of “probing tools” to understand why the model obtains a given prediction; probing tools include Process Analysis (PA), decoupled direct method (DDM) and source apportionment (SA).

In this final model performance evaluation for the 2002 Typical Base F CMAQ simulation, the operational evaluation has been given the greatest attention since this is the primary thrust of EPA's modeling guidance. However, we have also examined certain diagnostic features dealing with the model's ability to simulate sub-regional and monthly/diurnal gas phase and aerosol concentration distributions. In the course of the CENRAP and other modeling process numerous diagnostic sensitivity tests were performed to investigate and improve model performance. Key diagnostic tests performed are discussed and the results for the rest are available on the CENRAP modeling website: <http://pah.cert.ucr.edu/aqm/cenrap/index.shtml>.

C.2.1 Ambient Air Quality Data for CENRAP Model Evaluation

The ground-level model evaluation database for 2002 was compiled by the modeling team using several routine and research-grade databases. The first is the routine gas-phase concentration measurements for ozone, NO, NO₂ and CO archived in EPA's Aerometric Information Retrieval System (AIRS) Air Quality System (AQS) database. Other sources of observed information come from the various PM monitoring networks in the U.S. These include the: (a) Interagency Monitoring of Protected Visual Environments (IMPROVE); (b) Clean Air Status and Trends Network (CASTNET); (c) Southeastern Aerosol Research and Characterization (SEARCH); (d) EPA Federal Reference Method PM_{2.5} and PM₁₀ Mass Networks (EPA-FRM); (e) EPA Speciation Trends Network (STN) of PM_{2.5} species; and (f) National Acid Deposition Network (NADP). These PM

monitoring networks may also provide ozone and other gas phase precursors and product species, and visibility measurements at some sites. During the course of the CENRAP modeling, the numerous base case simulations were evaluated across the continental U.S. In this section we focus our evaluation on model performance within the CENRAP region. Table C-1 summarizes the observations collected at each monitoring network within the CENRAP region and their sampling frequency with Figure C-3 displaying the locations of the monitors for the various monitoring networks operating in the CENRAP region during 2002.

Table C-1. Ambient monitoring data available in the CENRAP region during 2002.

Monitoring Network	Chemical Species Measured	Sampling Frequency; Duration
IMPROVE	Speciated PM _{2.5} and PM ₁₀	1 in 3 days; 24 hr
CASTNET	Speciated PM _{2.5} , Ozone	Hourly, Weekly; 1 hr, Week
SEARCH	24-hr PM ₂₅ (FRM Mass, OC, BC, SO ₄ , NO ₃ , NH ₄ , Elem.); 24-hr PM coarse (SO ₄ , NO ₃ , NH ₄ , elements); Hourly PM _{2.5} (Mass, SO ₄ , NO ₃ , NH ₄ , EC, TC); and Hourly gases (O ₃ , NO, NO ₂ , NO _y , HNO ₃ , SO ₂ , CO)	Daily, Hourly;
NADP	WSO ₄ , WNO ₃ , WNH ₄	Weekly
EPA-FRM	Only total fine mass (PM _{2.5})	1 in 3 days; 24 hr
EPA-STN	Speciated PM _{2.5}	Varies; Varies
AIRS/AQS	CO, NO, NO ₂ , NO _x , O ₃	Hourly; Hourly

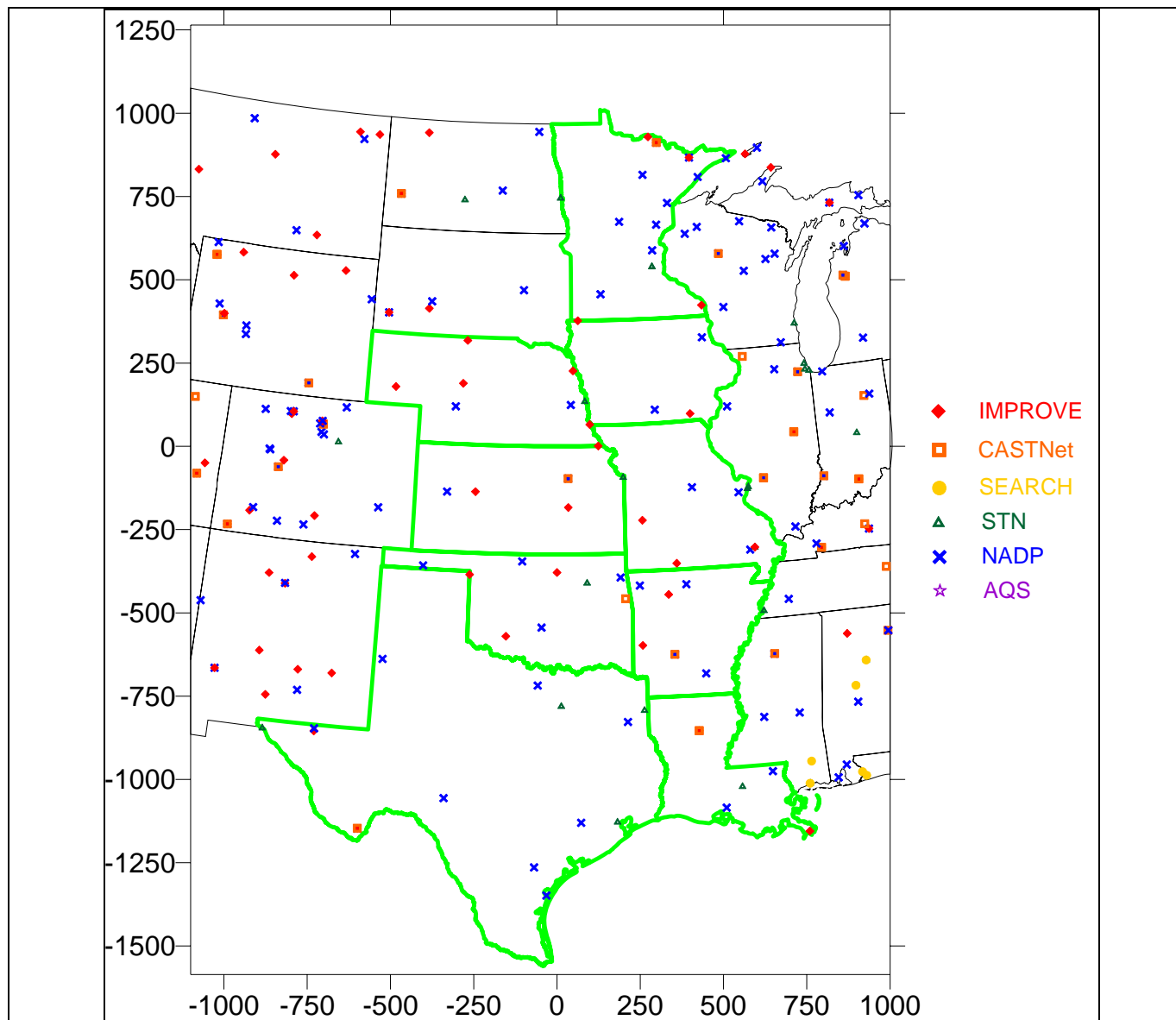


Figure C-3. Locations of surface monitors within the CENRAP states for sites operating during 2002.

C.2.2 Scope of CMAQ Model Performance Evaluation

The primary focus of the CMAQ Base F evaluation is on how well the model is able to replicate observed concentrations gas-phase pollutants and precursors, the various components of PM_{2.5}, total observed mass of PM_{2.5}, and wet deposition amounts. The CMAQ operational evaluation, model outputs are compared statistically and graphically with observational data obtained from the IMPROVE, CASTNet, STN, NADP and AQS monitoring networks. Because the SEARCH network is located in the southeastern U.S. (VISTAS region) outside of the CENRAP region, it is not a major component of our evaluation. Also, since the EPA-FRM network focuses on just PM_{2.5} mass measurements primarily in PM_{2.5} nonattainment or near nonattainment areas it is not very relevant for simulating regional haze at mainly remote Class I areas so is also not used in our model performance evaluation. The primary focus of the operational evaluation of the CMAQ 2002 Base F simulation is the performance of PM components in the CENRAP region for predicting regional haze at Class I areas.

Many statistical performance measures have been calculated using the different monitoring networks and across the different model performance subdomains (e.g., RPO regions). Table C-2 lists the definitions of the model performance evaluation statistical metrics. These performance metrics are routinely generate by the UCR Analysis Tool and are available on the project website. Many of them are measures of bias and error that are somewhat redundant.

Table C-2. Statistical Measures Used in the CENRAP CMAQ Model Evaluation.

Statistical Measure	Shorthand Notation	Mathematical Expression	Notes
Accuracy of paired peak (A_p)	Paired_Peak	$\frac{P - O_{peak}}{O_{peak}}$	P_{peak} = paired (in both time and space) peak prediction
Coefficient of determination (r^2)	Coef_Determ	$\frac{\left[\sum_{i=1}^N (P_i - \bar{P})(O_i - \bar{O}) \right]^2}{\sum_{i=1}^N (P_i - \bar{P})^2 \sum_{i=1}^N (O_i - \bar{O})^2}$	P_i = prediction at time and location i ; O_i = observation at time and location i ; \bar{P} = arithmetic average of P_i , $i=1,2,\dots,N$; \bar{O} = arithmetic average of O_i , $i=1,2,\dots,N$
Normalized Mean Error (NME)	Norm_Mean_Err	$\frac{\sum_{i=1}^N P_i - O_i }{\sum_{i=1}^N O_i}$	Reported as %
Root Mean Square Error ($RMSE$)	Rt_Mean_Sqr_Err	$\left[\frac{1}{N} \sum_{i=1}^N (P_i - O_i)^2 \right]^{1/2}$	Reported as %
Fractional Gross Error (F_E)	Frac_Gross_Err	$\frac{2}{N} \sum_{i=1}^N \left \frac{P_i - O_i}{P_i + O_i} \right $	Reported as %
Mean Absolute Gross Error ($MAGE$)	Mean_Abs_G_Err	$\frac{1}{N} \sum_{i=1}^N P_i - O_i $	
Mean Normalized Gross Error ($MNGE$)	Mean_Norm_G_Err	$\frac{1}{N} \sum_{i=1}^N \frac{ P_i - O_i }{O_i}$	Reported as %
Mean Bias (MB)	Mean_Bias	$\frac{1}{N} \sum_{i=1}^N (P_i - O_i)$	Reported as concentration (e.g., $\mu\text{g}/\text{m}^3$)

Statistical Measure	Shorthand Notation	Mathematical Expression	Notes
Mean Normalized Bias (MNB)	Mean_Norm_Bias	$\frac{1}{N} \sum_{i=1}^N \frac{(P_i - O_i)}{O_i}$	Reported as %
Mean Fractionalized Bias (Fractional Bias, MFB)	Mean_Fract_Bias	$\frac{2}{N} \sum_{i=1}^N \left(\frac{P_i - O_i}{P_i + O_i} \right)$	Reported as %
Normalized Mean Bias (NMB)	Norm_Mean_Bias	$\frac{\sum_{i=1}^N (P_i - O_i)}{\sum_{i=1}^N O_i}$	Reported as %
Bias Factor (BF)	Bias Factor	$\frac{1}{N} \sum_{i=1}^N \left(\frac{P_i}{O_i} \right)$	Reported as BF:1 or 1: BF or in fractional notation (BF/1 or 1/BF).

C.2.3 Operational Model Evaluation Approach

The CENRAP modeling databases will be used to develop the visibility State Implementation Plan (SIP) due in December 2007 as required by the Regional Haze Rule (RHR). Accordingly, the primary focus of the operational evaluation is on the six components of fine particulate (PM_{2.5}) and Coarse Matter (PM_{2.5-10}) within the CENRAP region that are used to characterize visibility at Class I areas:

- Sulfate (SO₄);
- Particulate Nitrate (NO₃);
- Elemental Carbon (EC);
- Organic Mass Carbon (OMC);
- Other inorganic fine particulate (IP or Soil); and
- Coarse Matter (CM).

The model performance for ozone and precursor and product species (e.g., SO₂ and HNO₃) is also evaluated to build confidence that the modeling system is sufficiently reliable to project future-year visibility.

C.2.5 Performance Evaluation Tools

One of the many challenges in evaluating an annual PM/ozone model simulation is how to synthesize model performance given the sheer volume of output from an annual simulation. The model is run on a 148 x 112 x 19 grid with approximately 30 species producing hourly outputs for each day of the year. This results in approximately 90 trillion concentration estimates that are produced for an annual simulation. Thus, the synthesis and interpretation of numerous graphical and tabular displays of model performance into a few concise and descriptive displays that identify the most salient features of model performance is necessary. As part of the CENRAP modeling, as well as work performed by WRAP, VISTAS, MRPO and MANE-VU, several analysis tools and summary displays have been developed and are used:

UCR Analysis Tools: The University of California at Riverside (UCR) Analysis Tools have been used extensively to evaluate the CMAQ and CAMx models for CENRAP (e.g., Morris et al., 2005), WRAP (Tonnesen et al., 2004), VISTAS (Morris et al., 2004) as well as other studies and are run on a Linux platform separately for each network. Numerous graphical displays of model performance are automatically generated using gnuplot. The software generates the following summary and graphical displays of model performance:

- Tabular statistical measures (see Table C-2);
- Time Series Plots for each site and species; and
- Scatter Plots for each species by allsite_allday, allday_onesite and allsite_oneday.

The UCR Analysis Tool is run for a specific subregion (e.g., by RPO region) and for selected monitoring networks. Because each monitoring network has its own measurement artifacts, the model is evaluated separately for each monitoring network.

Summary Bias/Error Plots: The modeling team has developed additional displays of model performance statistics that elucidate model performance in a concise manner: (1) monthly time series plots of average bias and error; (2) soccer plots that display bias versus error and compares them to model performance goals and criteria; and (3) tools to analyze visibility model performance for the worst and best 20 percent visibility days that are used in visibility projections.

GA DNR Analysis Plots: Dr. James Boylan of the Georgia Department of Natural Resources has extended the concept in EPA's draft PM fine particulate and regional haze modeling guidance that model performance for species that make up a major contribution to visibility impairment be subjected to more stringent goals than species that are minor contributors by developing concentration-dependent performance goals and "Bugle Plots" to display them (Boylan, 2004).

The evaluation of the CENRAP 2002 36 km Base F CMAQ simulation used each of the analysis tools listed above taking advantage of their different descriptive and complimentary nature. The use of these analysis tools generated thousands of statistical measures and graphical displays of model performance that cannot all be displayed in this report. The modeling team has gone through the plots and measures using slide shows to identify those displays that are most descriptive in conveying model performance so should be included in this TSD. The complete set of model performance statistics and graphical performance displays can be found on the CENRAP modeling Website at:

http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml#cmaq_typ02f_mpe

Note that model performance statistics are calculated separately for each of the monitoring networks. Different PM measurement technology can produce different measurement values even when measuring the same air parcel. Thus, when calculating model performance metrics, measurements in different networks are not mixed.

C.2.4 Subdomains Analyzed

CENRAP has been analyzing model performance in five subdomains corresponding to the states contained in the five RPOs (see Figure 1-1):

- CENRAP
- MRPO
- VISTAS
- MANE-VU
- WRAP

As CENRAP has refined its emissions inventory, the changes in model performance from one 2002 base case to another has diminished to the point where little has changed in the last few iterations. Thus, the CMAQ 2002 36 km Base F evaluation presented in this section was just performed for the CENRAP region and the reader is referred to the modeling Website (<http://pah.cert.ucr.edu/aqm/cenrap/cmaq.shtml>) and Morris and co-workers (2005) for the evaluation outside of the CENRAP region and the diagnostic model evaluation.

C.2.5 Model Performance Goals and Criteria

The issue of model performance goals for PM species is an area of ongoing research and debate. For ozone modeling, EPA has established performance goals for 1-hour ozone normalized mean bias and gross error of $\pm 15\%$ and $\pm 35\%$, respectively (EPA, 1991). EPA's draft fine particulate modeling guidance notes that performance goals for ozone should be viewed as upper bounds of model performance that PM models may not be able to always achieve and we should demand better model performance for PM components that make up a larger fraction of the PM mass than those that are minor contributors (EPA, 2001). EPA's final modeling guidance does not list any specific model performance goals for PM and visibility modeling and instead provides a summary of PM model performance across several historical applications that can be used for comparisons if desired. Measuring PM species is not as precise as ozone monitoring. In fact, the differences in measurement techniques for some species likely exceed the more stringent performance goals, such as those for ozone. For example, recent comparisons of the PM species measurements using the IMPROVE and STN measurement technologies found differences of approximately $\pm 20\%$ (SO₄) to $\pm 50\%$ (EC) (Solomon et al., 2004).

For the CENRAP, VISTAS and WRAP modeling we have adopted three levels of model performance goals and criteria for bias and gross error as listed in Table C-3. Note that we are not suggesting that these performance goals be adopted as guidance or that they are the most appropriate goals to use. Rather, we are just using them to frame and put the PM model performance into context and to facilitate model performance intercomparison across episodes, species, models and sensitivity tests.

Table C-3. Model performance goals and criteria used to assist in interpreting modeling results.

Fractional Bias	Fractional Error	Comment
#∇15%	#35%	Ozone model performance goal for which PM model performance would be considered good – note that for many PM species measurement uncertainties may exceed this goal.
#∇30%	#50%	Proposed PM model performance goal that we would hope each PM species could meet
#∇60%	#75%	Proposed PM criteria above which indicates potential fundamental problems with the modeling system.

As noted in EPA’s PM modeling guidance, less abundant PM species should have less stringent performance goals (EPA, 2001; 2007). Accordingly, we are also using performance goals that are a continuous function of average concentrations, as proposed by Dr. James Boylan at the Georgia Department of Natural Resources (GA DNR), that have the following features (Boylan, 2004):

- Asymptotically approaching proposed performance goals or criteria (i.e., the ∇30%/50% and ∇60%/75% bias/error levels listed in Table C-1) when the mean of the observed concentrations are greater than 2.5 ug/m³.
- Approaching 200% error and ∇200% bias when the mean of the observed concentrations are extremely small.

Bias and error are plotted as a function of average concentrations. As the mean concentration approach zero, the bias performance goal and criteria flare out to ∇200% creating a horn shape, hence the name “Bugle Plots”. Dr. Boylan has defined three Zones of model performance: Zone 1 meets the ∇30%/50% bias/error performance goal and is considered “good” model performance; Zone 2 lies between the ∇30%/50% performance goal and ∇60%/75% performance criteria and is an area where concern for model performance is raised; and Zone 3 lies above the ∇60%/75% performance criteria and is an area of questionable model performance.

C.2.6 Performance Time Periods

The CMAQ 2002 36 km Base F evaluation, model performance statistics and graphical displays are generated monthly using the native averaging times of each monitoring network (i.e., 24-hour for IMPROVE and STN; weekly for CASTNet and NADP; and hourly for AQS). As the focus of the RHR is on daily average visibility that is calculated from daily average PM species concentrations then the evaluation of the model for 24-hour concentrations is particularly relevant. The RHR places particular emphasis on the Worst 20% (W20%) and Best 20% (B20%) days at Class I areas. Thus, we also place particular emphasis on the model performance for PM species on the W20% and B20% days during 2002 at Class I areas.

C.2.7 Key Measures of Model Performance

Although we have generated numerous statistical performance measures (see Table C-2) that are available on the CENRAP modeling website, when comparing model performance across months, subdomains, networks, grid resolution, models, studies, etc. it is useful to have a few key measurement statistics to be used to facilitate the comparisons. It is also useful to have a subset of the 2002 year that can represent the entire year so that a more focused evaluation can be conducted. We have found that the Mean Fractional Bias and Mean Fractional Gross Error appear to be the most consistent descriptive measure of model performance (Morris et al., 2004b; 2005). The Fractional Bias and Error normalize by the average of the observed and predicted value (see Table C-2) because it provides descriptive power across different magnitudes of the model and observed concentrations and is bounded by -200% to +200%. This is in contrast to the normalized bias and error (as recommended for ozone performance goals, EPA, 1991) that is normalized by just the observed value so can “blow up” to infinity as the observed value approaches zero. Below we perform a focused evaluation of model performance for four months of the 2002 year that are used to represent the seasonal variation in performance:

- January
- April
- July
- October

We also present fractional bias and error for all months of 2002 using time series and bugle plots.

C.3 Operational Model Performance Evaluation in the CENRAP Region

In the following discussions we use selected monthly scatter plots, time series plots and model performance statistical measures from the UCR Analysis Tools application to the 2002 CMAQ Base F base case simulation in an operational evaluation of the model for PM species. We focus on the six main components of PM that are used to project visibility.

C.3.1 Sulfate (SO₄) Monthly Model Performance

C.3.1.1 SO₄ in January 2002

Figure C-4a displays scatter plots of predicted and observed SO₄ concentrations or wet depositions for sites in the CENRAP regions using observations from the IMPROVE, STN, CASTNet and NADP monitoring networks; the IMPROVE and STN SO₄ concentrations are 24-hour averages whereas the CASTNet SO₄ concentrations and NADP SO₄ wet deposition are weekly averages. The January SO₄ performance at the IMPROVE and STN networks in the CENRAP region is quite good with low fractional bias (-12% to -13%) and some scatter (fractional error of 42% and 34%) but centered in the 1:1 line of perfect agreement. There is a net SO₄ underestimation bias in January across the CASTNet network (fractional bias of -34%) with wet SO₄ deposition overstated on average across the NADP sites in the CENRAP region (+40% fractional bias). Whether the overstated SO₄ wet deposition is a contributor to the SO₄ concentration underestimation bias is unclear, but it is in the correct direction to account for it.

The time series comparisons of predicted and observed 24-hour SO₄ concentrations at CENRAP Class I area IMPROVE sites during January 2002 shown in Figure C-4b are quite encouraging. Although there are some days and sites with mismatches (e.g., January 26 at BOWA and VOYA) and sites with systematic performance problems (SO₄ underestimated at BIBE), the time series in general are quite good with the model tracking the observed temporal variation in daily sulfate in January and some sites exhibiting remarkable agreement (e.g., MING).

Figure C-4c displays the spatial variations in the predicted and IMPROVE observed SO₄ concentrations for January 20, 23, 26 and 29, 2002, which are four consecutive days of IMPROVE monitoring using its 1:3 day monitoring frequency. On January 20 both the model and observations agree on that an elevated sulfate cloud is entering the CENRAP region across southern Illinois and Missouri. There is a sharp SO₄ concentration gradient going east to west with both the model and observations estimating relatively clean SO₄ values over Colorado. By January 23 the model and observations agree that elevated SO₄ exists along a diagonal orientation from Chicago to East Texas. Although there are some SO₄ model/observed spatial mismatches on this day (e.g., northern Louisiana and western Arkansas) the model generally reproduces the areas of elevated and low observed SO₄. By January 29 the model and observations agree that SO₄ has cleaned out of the CENRAP region. Although there are elevated SO₄ observations in western North Dakota and northern Minnesota not reflected in the model. On January 29 there is an elevated tongue of SO₃ entering the CENRAP region through southern Illinois stretching to the southwest almost to Big Bend in western Texas. Observed SO₄ is measured at Big Bend but the modeled high SO₄ is slightly east of there. There is very good agreement on this day between the predicted and observed spatial distribution of SO₄.

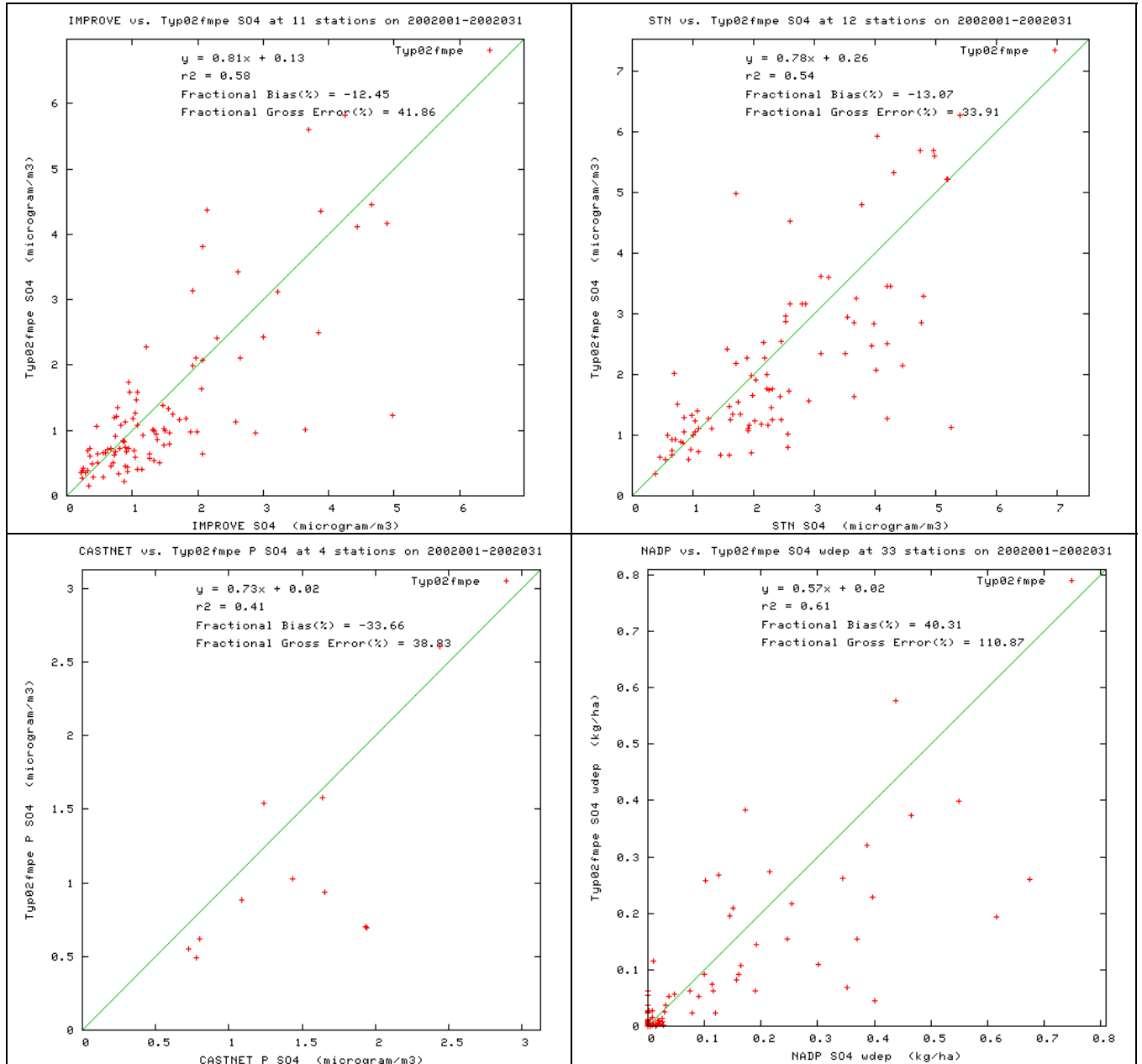
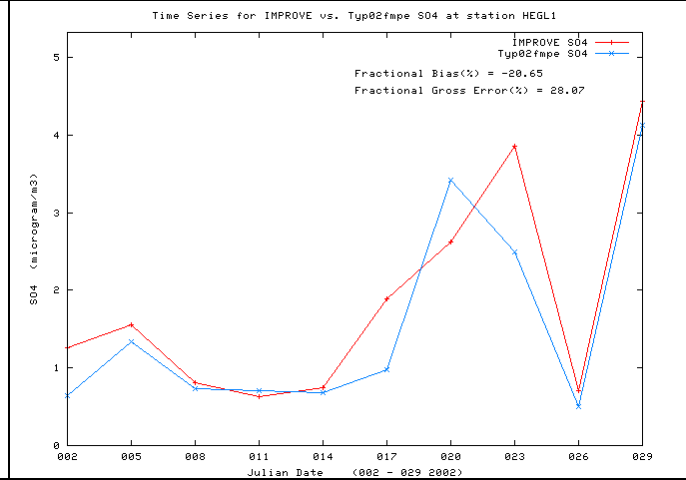
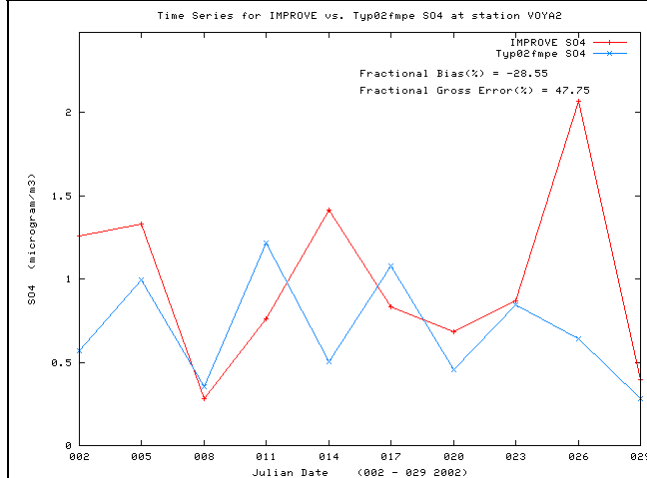
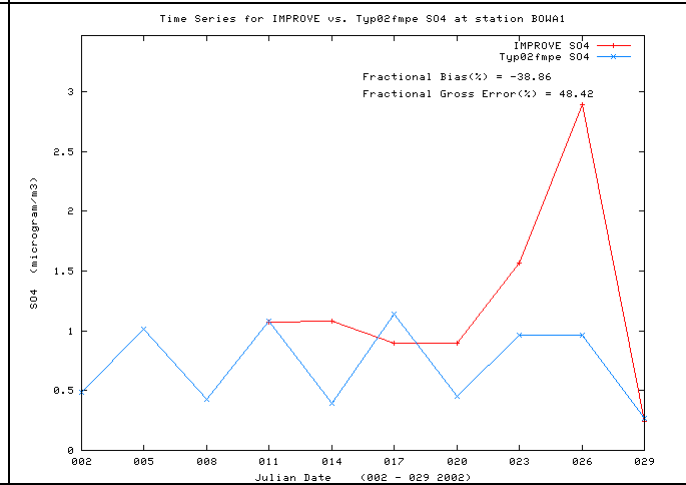
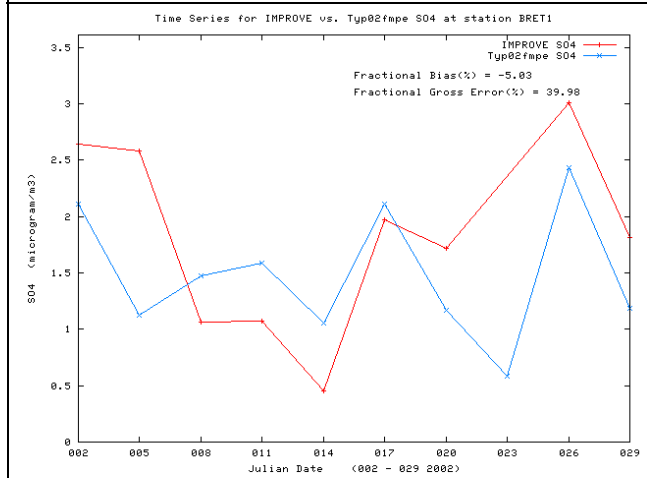
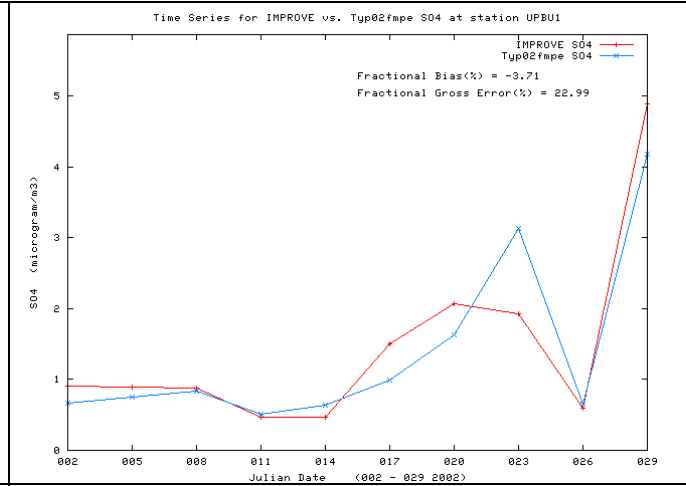
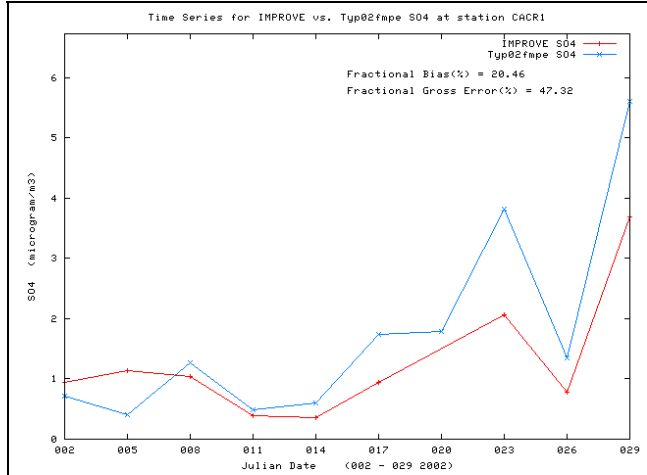


Figure C-4a. Scatter plots of predicted and observed sulfate (SO4) concentrations for January 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



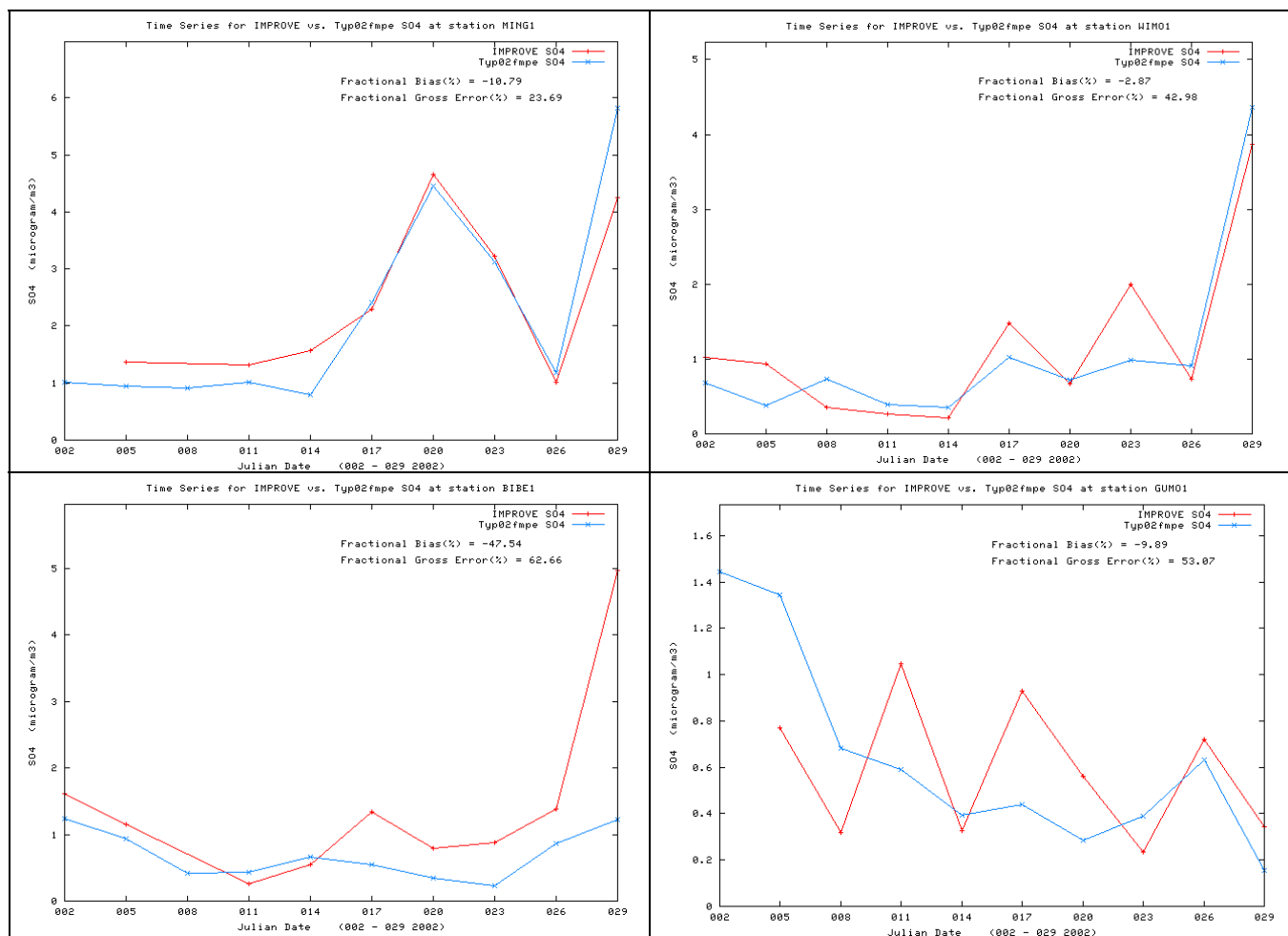


Figure C-4b. Time series of predicted and observed 24-hour sulfate (SO₄) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.

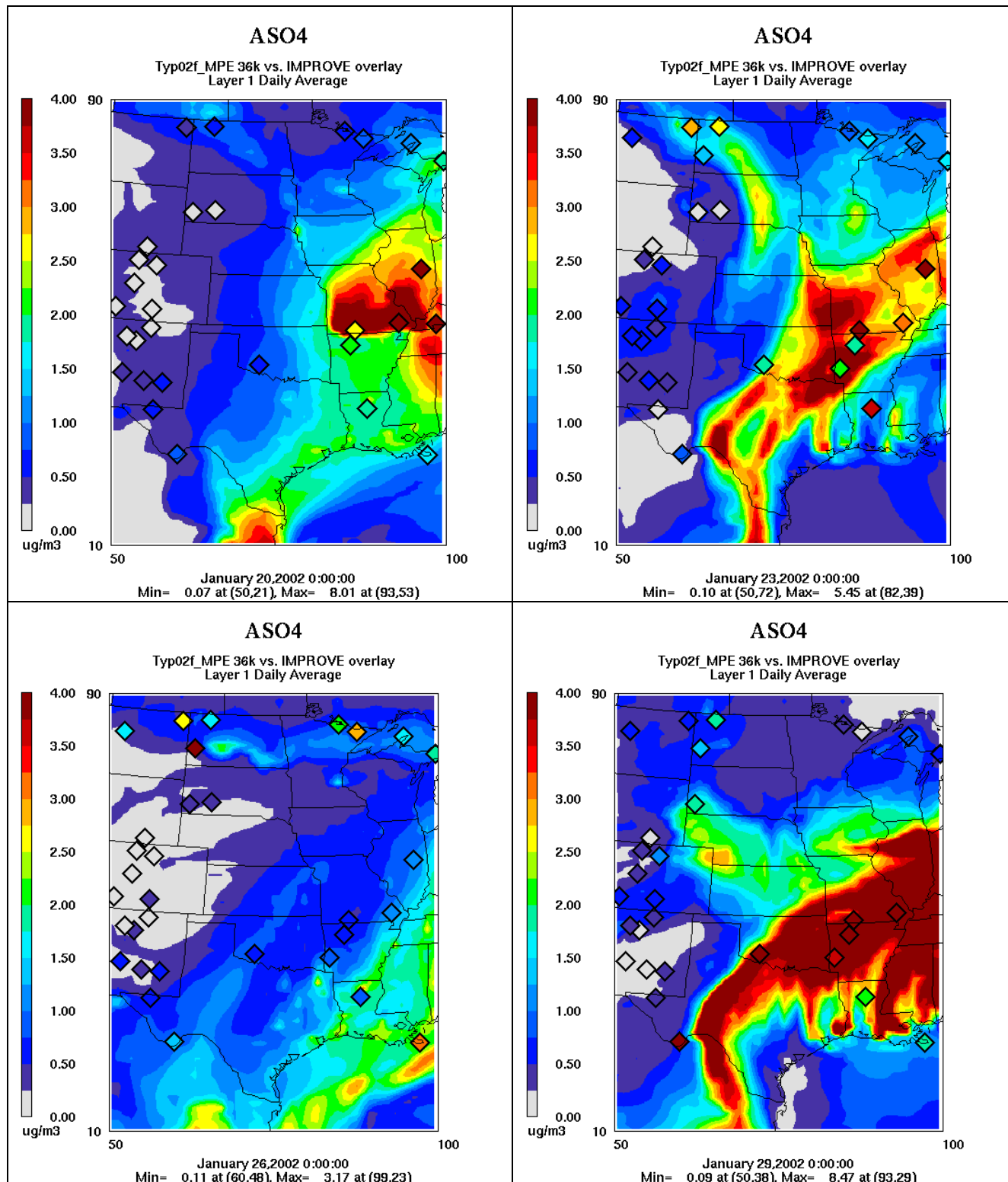


Figure C-4c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour SO4 concentrations for January 20, 23, 26 and 29, 2002.

C.3.1.2 SO₄ in April 2002

In April CMAQ underestimates the observed SO₄ in the CENRAP region with fractional bias values of -52%, -30% and -58% across the IMPROVE, STN and CASTNet networks (Figure C-5a). The fractional bias for wet SO₄ deposition is quite low (3%) albeit with a lot of scatter which is reflected in high fractional error (78%). The ability of the model to reproduce the temporal variability of the April observed SO₄ concentrations at the IMPROVE sites is quite variable. The SO₄ under-prediction bias is clearly present at several sites (e.g., HEGL, BIBE and GUMO), whereas there is quite good agreement at others (UPBU, BRET and VOYA). Comparisons of the spatial distributions of the predicted and observed SO₄ concentrations on April 5, 8, 11 and 14 are shown in Figure C-5c. On April 5 the model reproduces the half circle of elevated SO₄ across Texas-Louisiana, but appears to not be as large an area as observed coming up short from some of the sites (e.g., BIBE and GUMO). Model and observations agree that April 8 is a relatively low SO₄ day in the CENRAP region with just a small intrusion of elevated values across Mississippi. On April 14 the model has two separate clouds of elevated SO₄, one over East Texas-Louisiana and one over northeastern Illinois and eastward with a clean area in between in southern Missouri. The observations agree except that it has these two elevated SO₄ areas connected with the southern Missouri area not as clean as in the model.

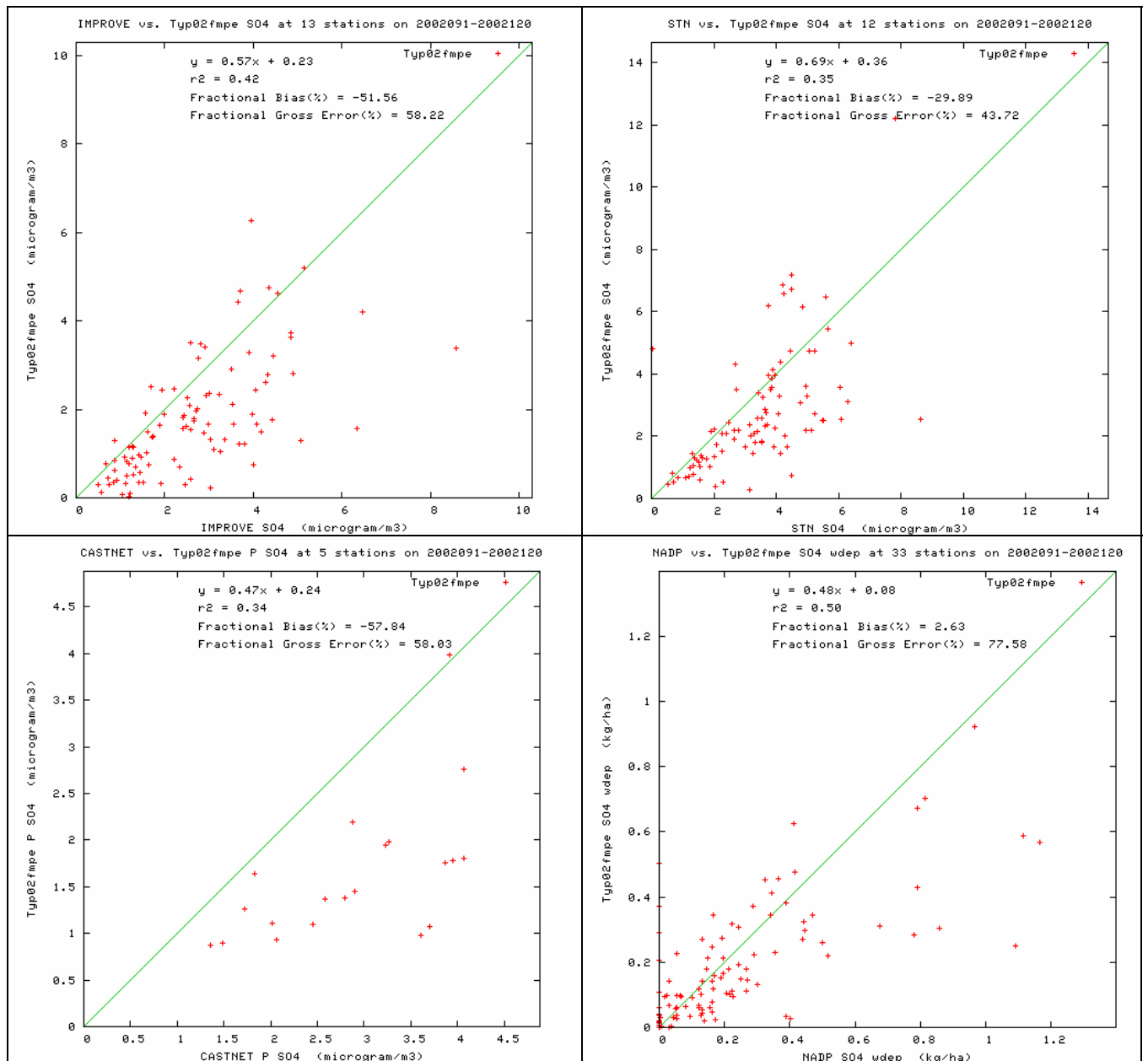
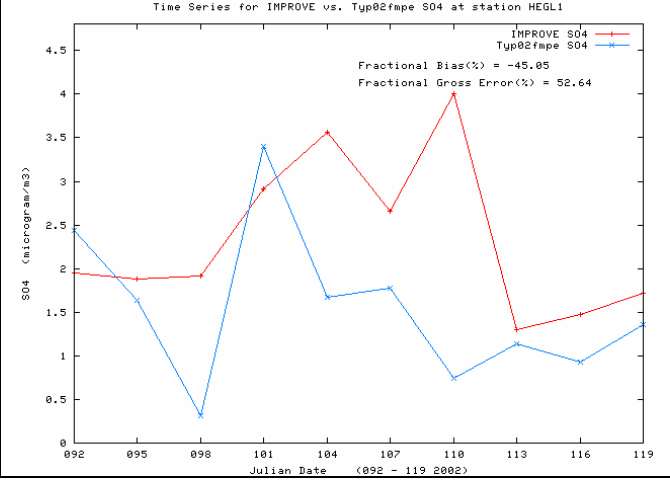
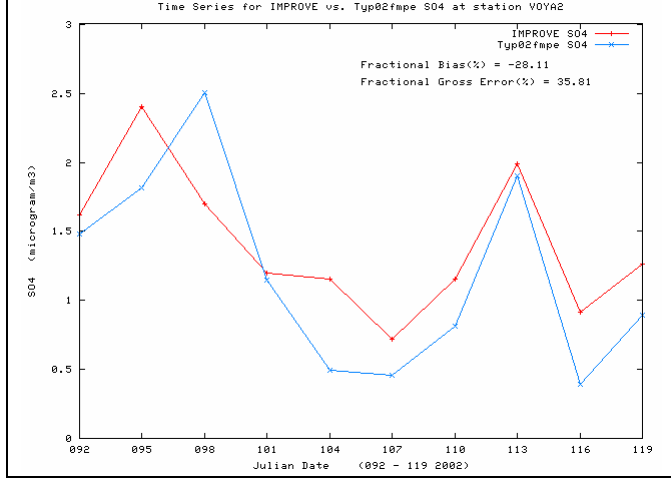
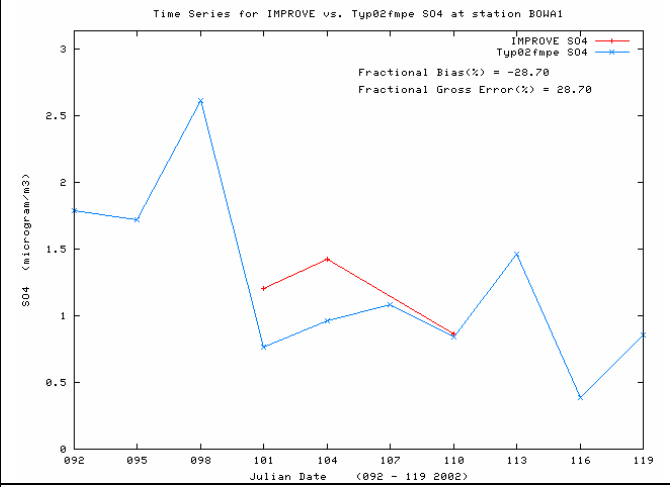
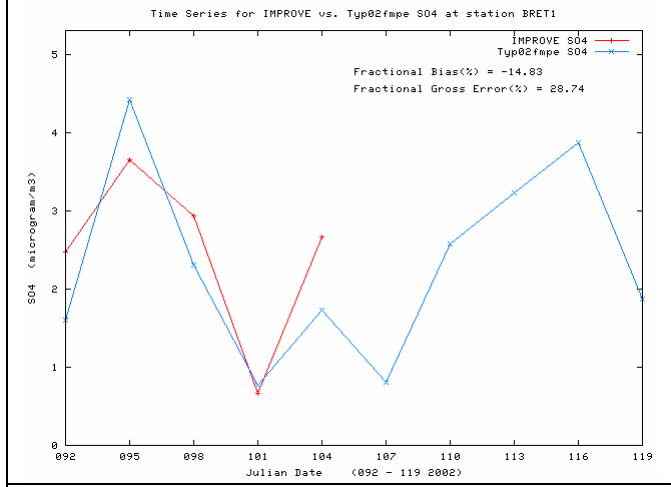
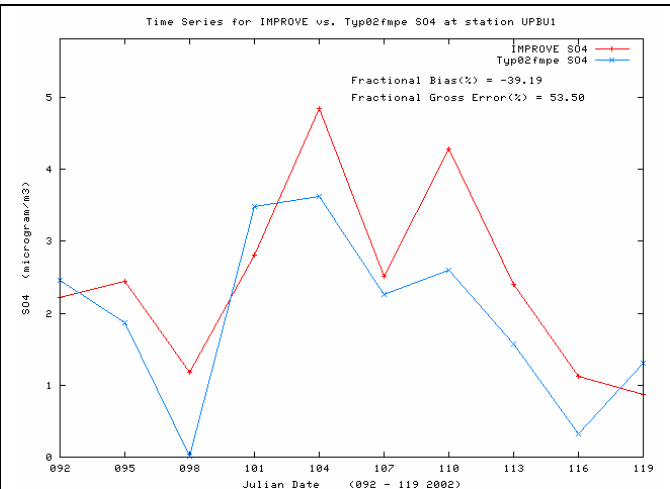
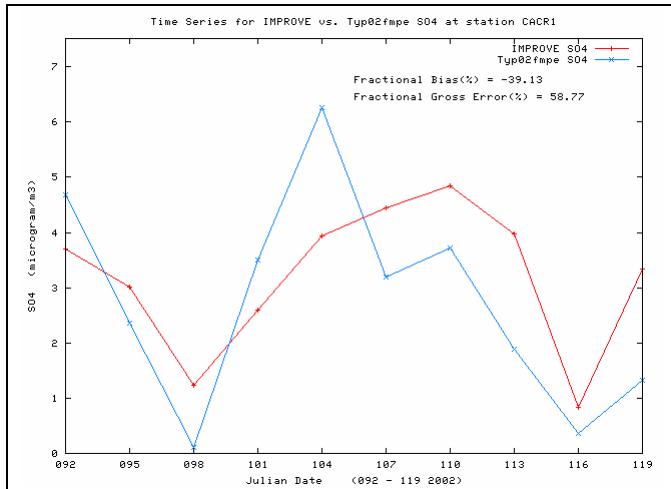


Figure C-5a. Scatter plots of predicted and observed sulfate (SO4) concentrations for April 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



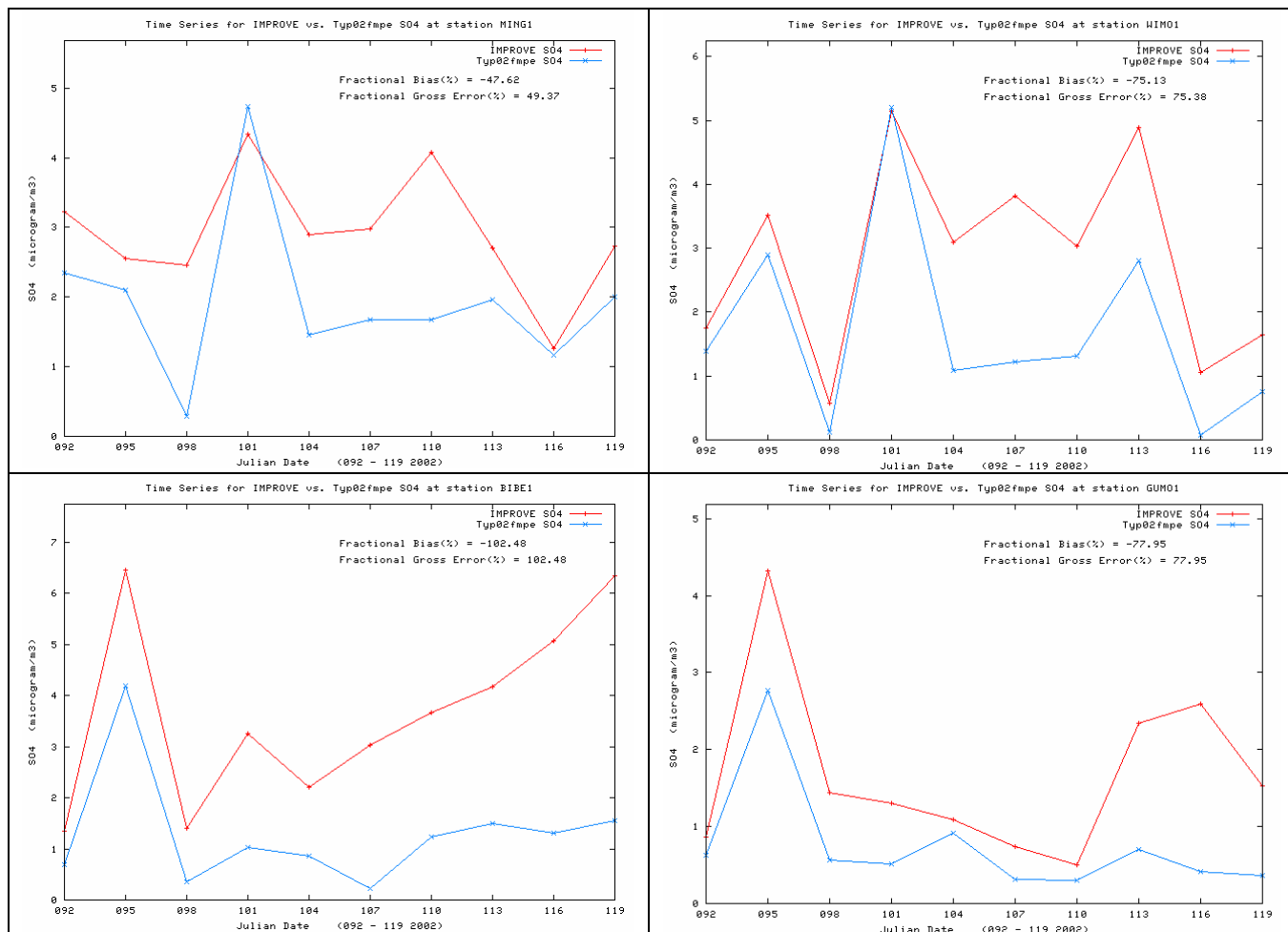
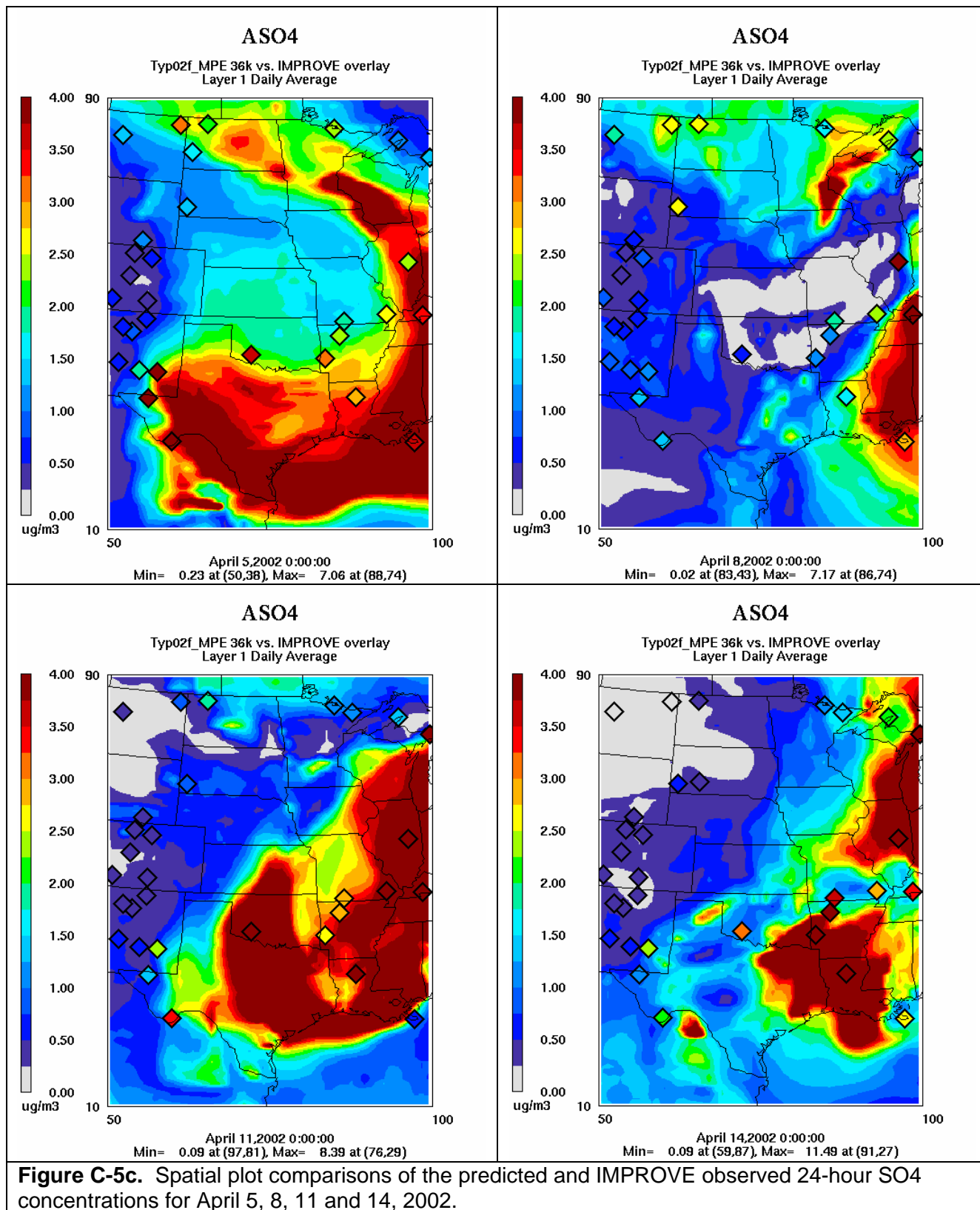


Figure C-5b. Time series of predicted and observed 24-hour sulfate (SO4) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.1.3 SO₄ in July 2002

SO₄ concentrations are also underestimated by CMAQ in July (Figure C-6a) with fractional bias value ranging from -22 to -52%. Wet SO₄ deposition is slightly overstated (22%) with a lot of scatter (83% error). The July SO₄ under-prediction bias is also reflected in the time series plots (Figure C-6b). Comparisons of the predicted and observed spatial distribution of SO₄ in the CENRAP region for July 7, 10, 13 and 16, 2002 are shown in Figure C-6c. In general the model and observations agree on the locations of the elevated SO₄, except that the observed extent is somewhat larger so that the modeled elevated SO₄ fails to impact some of the sites on the edge of the elevated cloud of SO₄ (e.g., Big Bend, Guadalupe Mountains and northwestern Oklahoma).

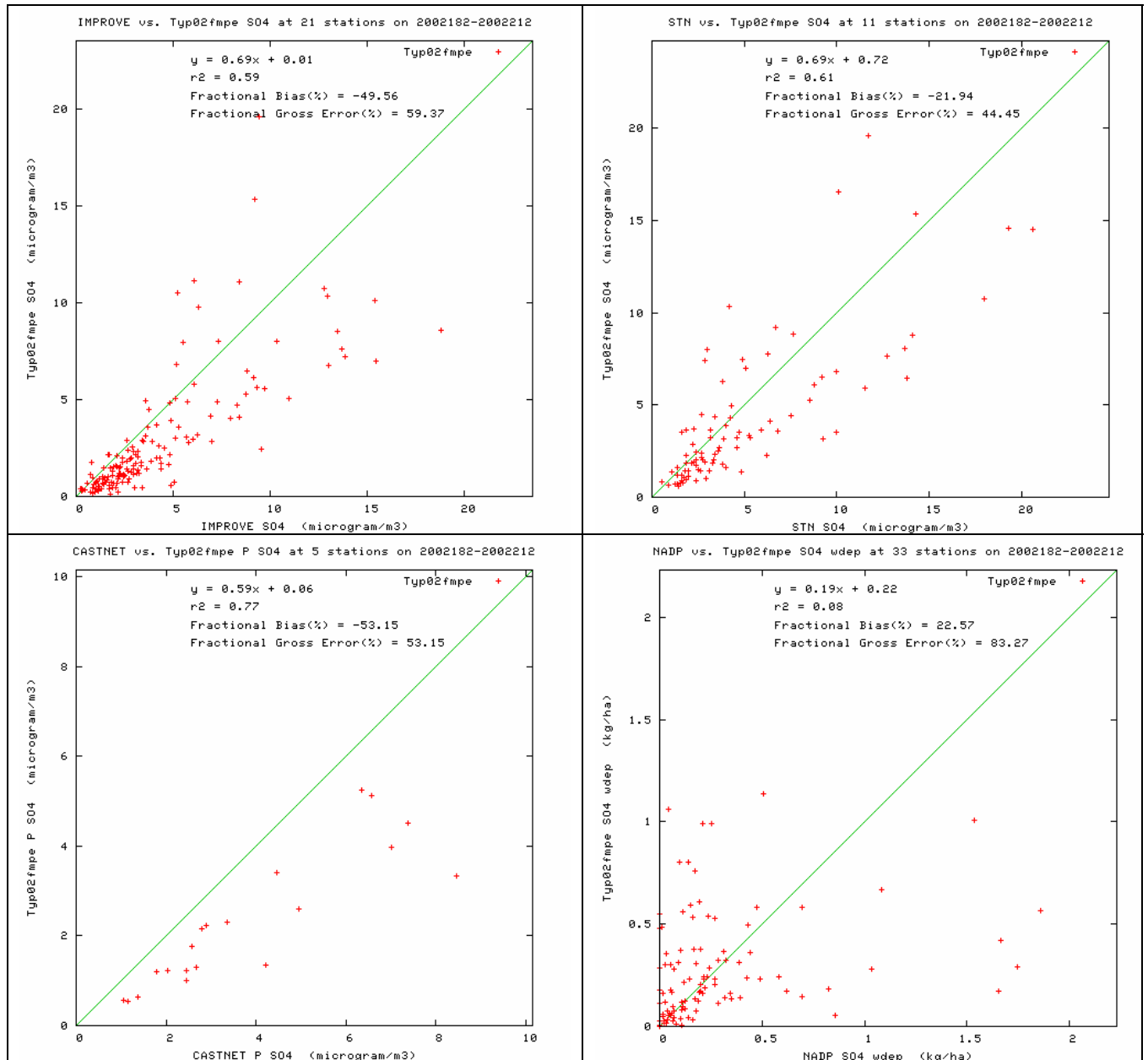
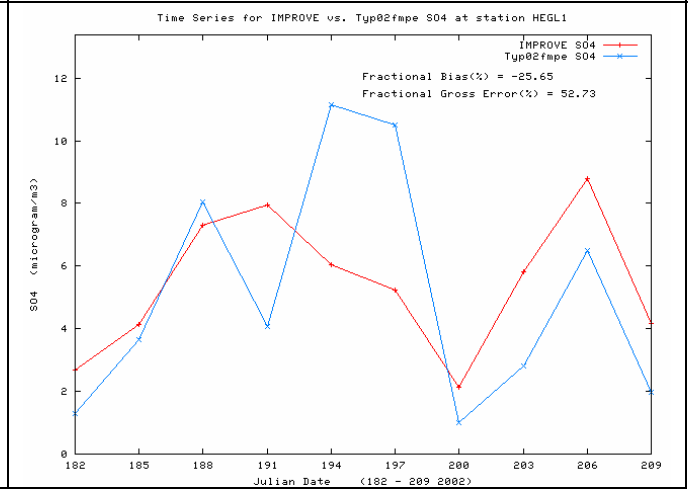
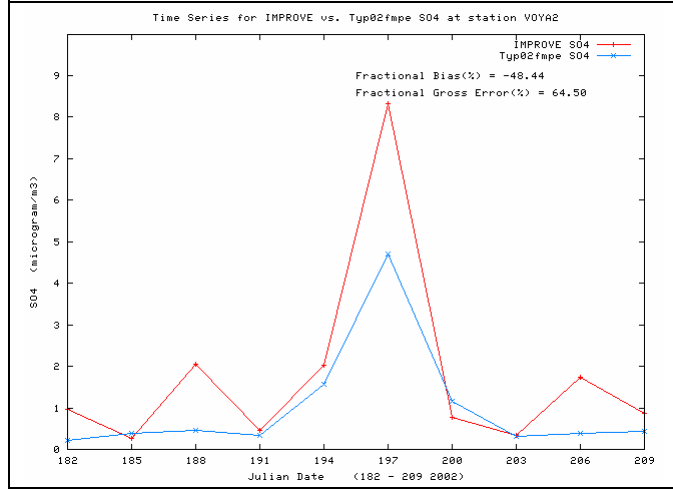
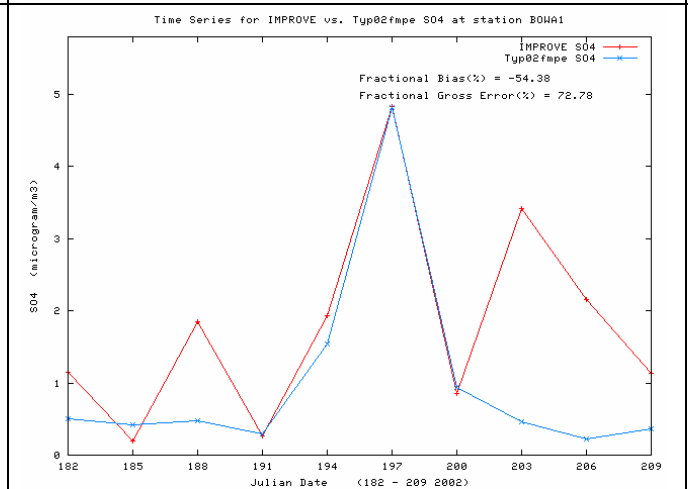
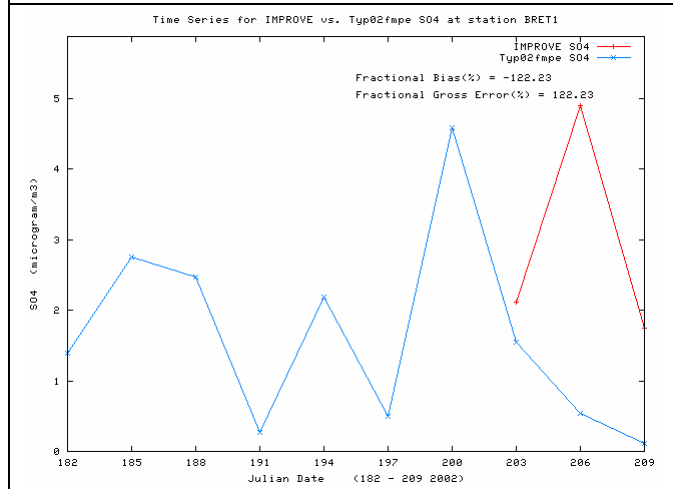
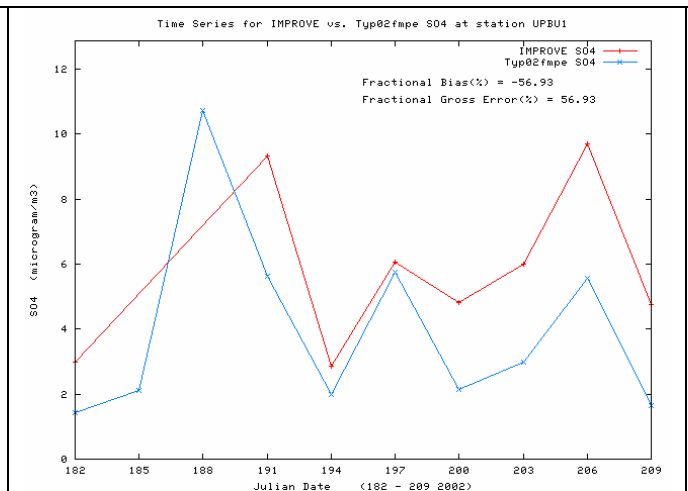
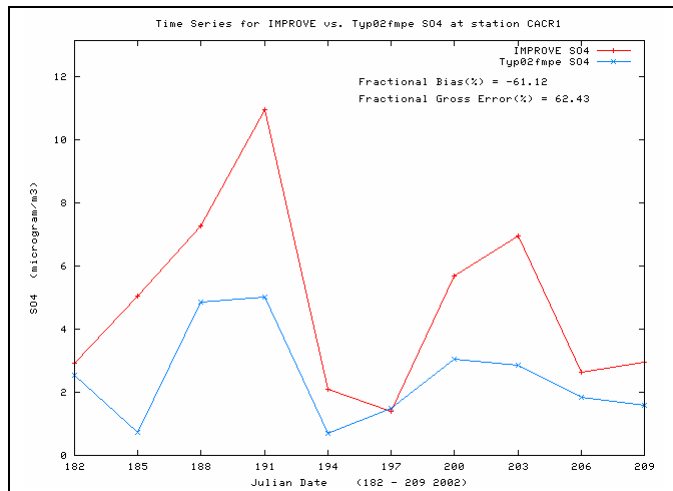


Figure C-6a. Scatter plots of predicted and observed sulfate (SO₄) concentrations for July 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



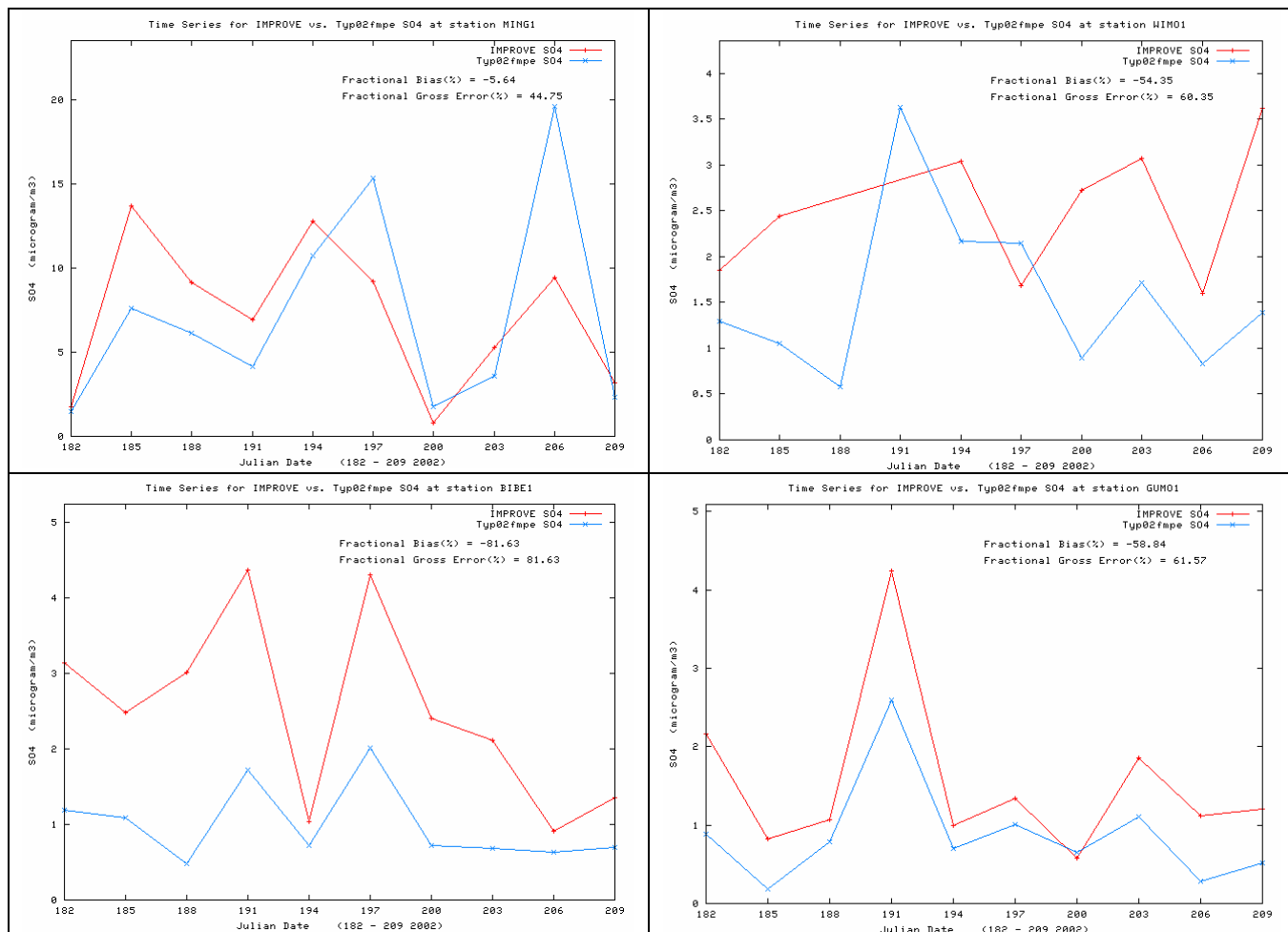


Figure C-6b. Time series of predicted and observed 24-hour sulfate (SO₄) concentrations at CENRAP IMPROVE CLASS I AREA sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

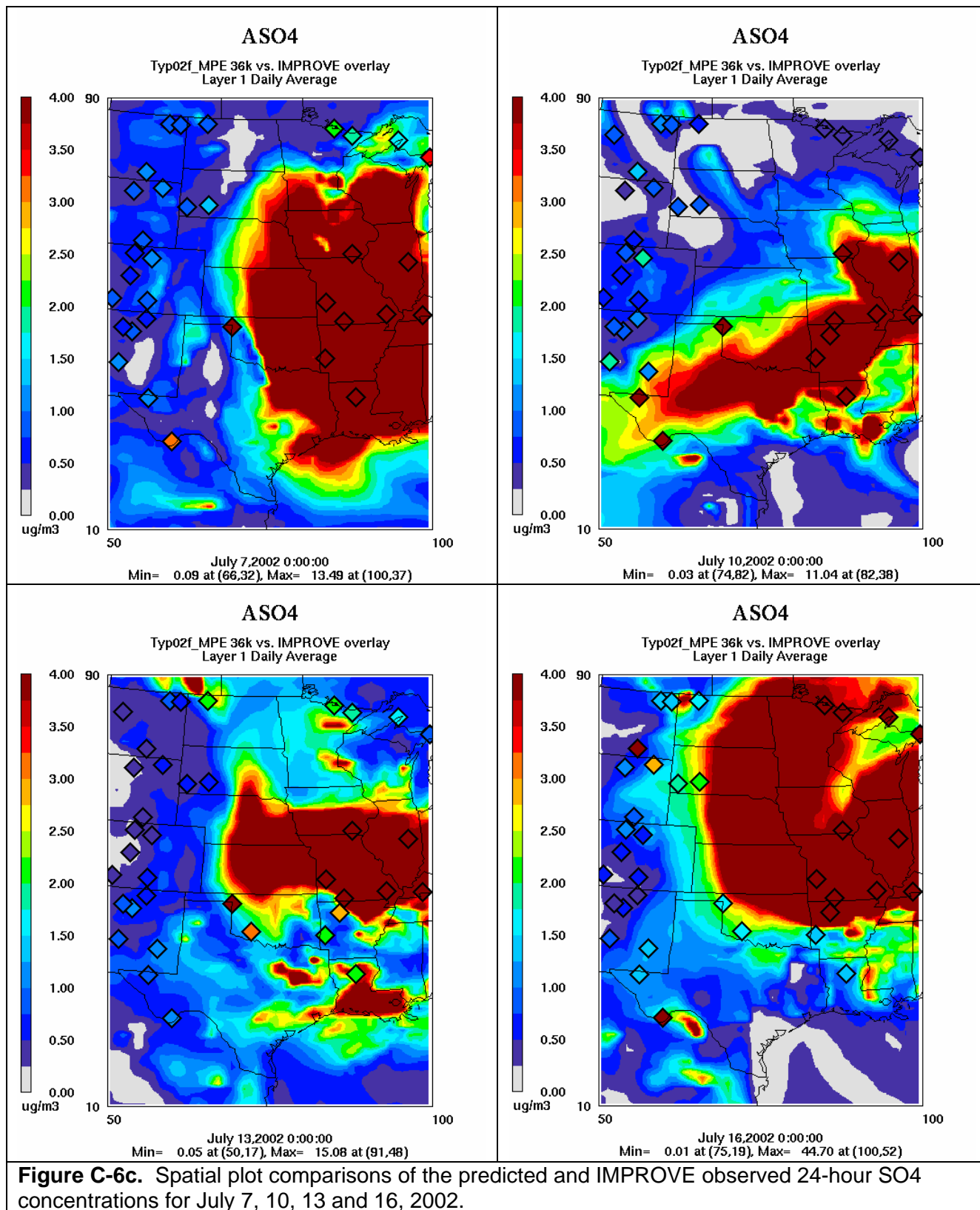


Figure C-6c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour SO4 concentrations for July 7, 10, 13 and 16, 2002.

C.3.1.4 SO4 in October 2002

In October 2002, CMAQ is doing a better job of reproducing the observed SO4 concentrations with much lower fractional bias values (-6%, 0% and -23%) and fractional errors < 40% (Figure C-7a). The observed SO4 time series are also reproduced well by the model, although an under-prediction bias is clearly evident at Big Bend, Guadalupe Mountains and Wichita Mountains. The model also reproduces the observed spatial distribution of SO4 well in October (Figure C-7c).

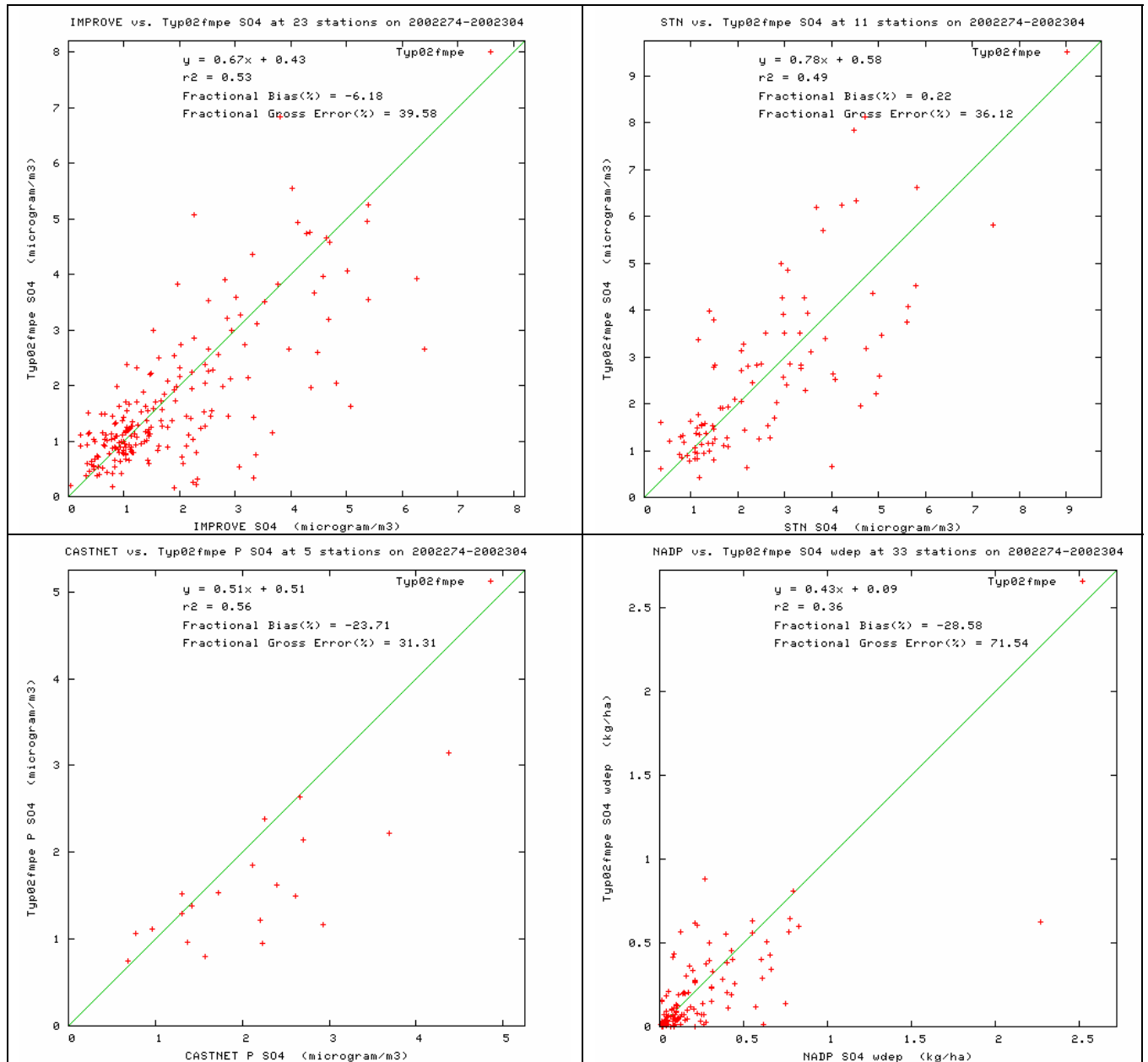
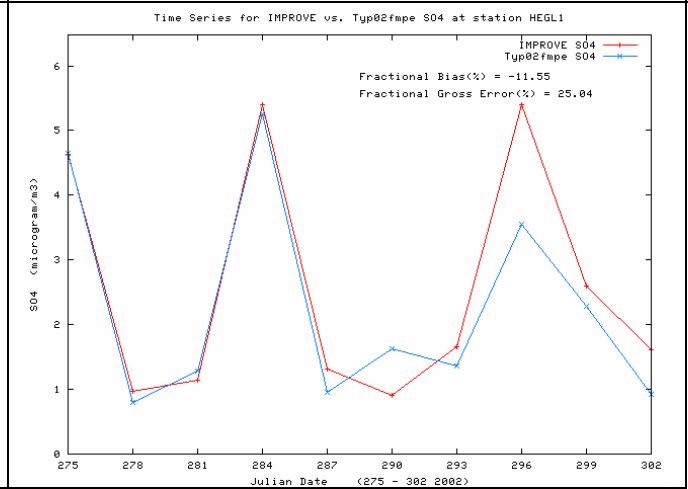
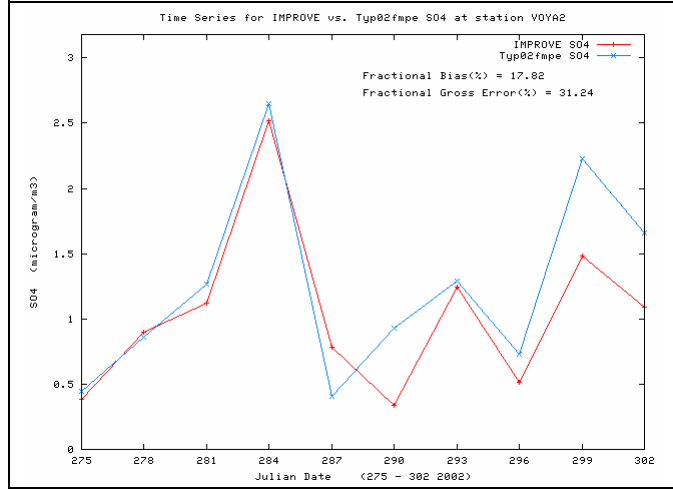
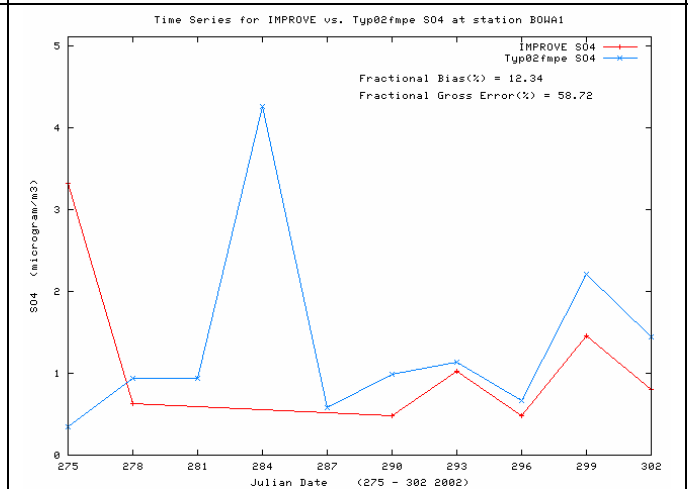
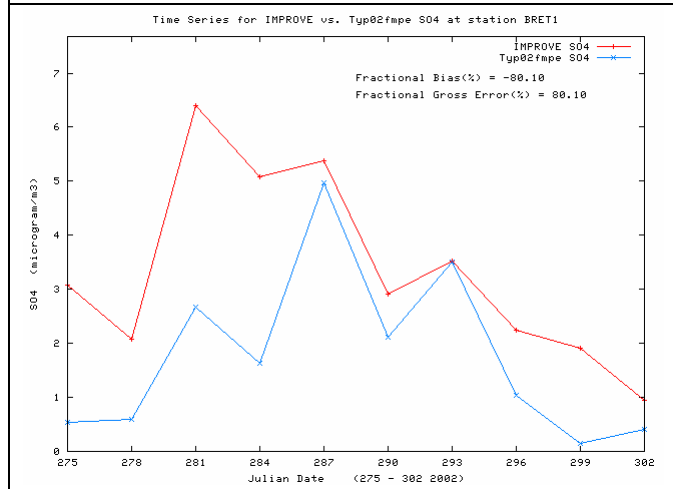
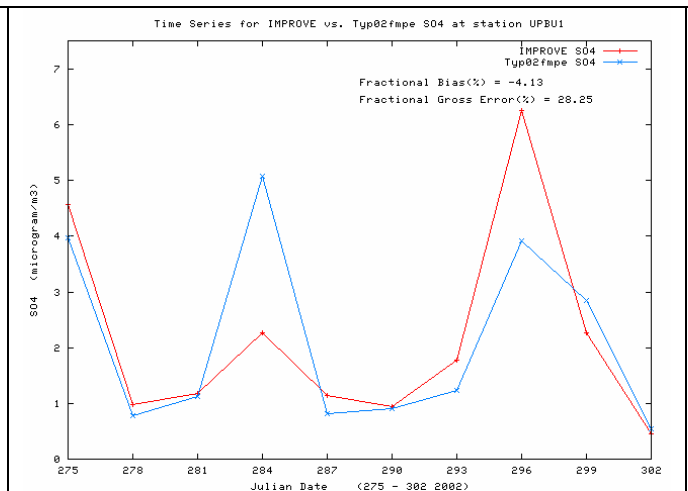
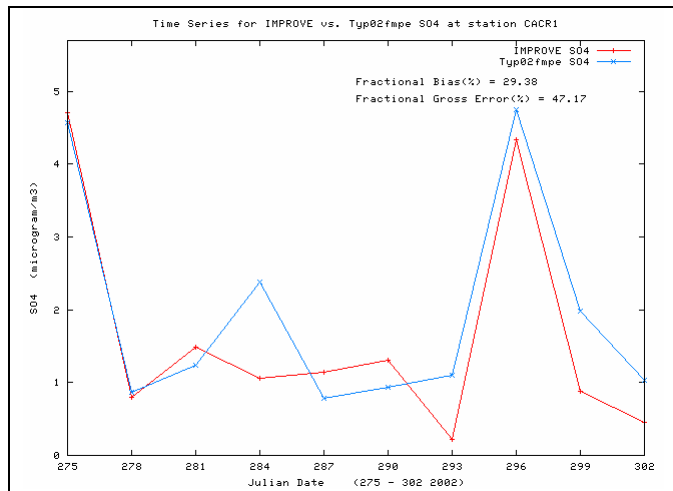


Figure C-7a. Scatter plots of predicted and observed sulfate (SO4) concentrations for October 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



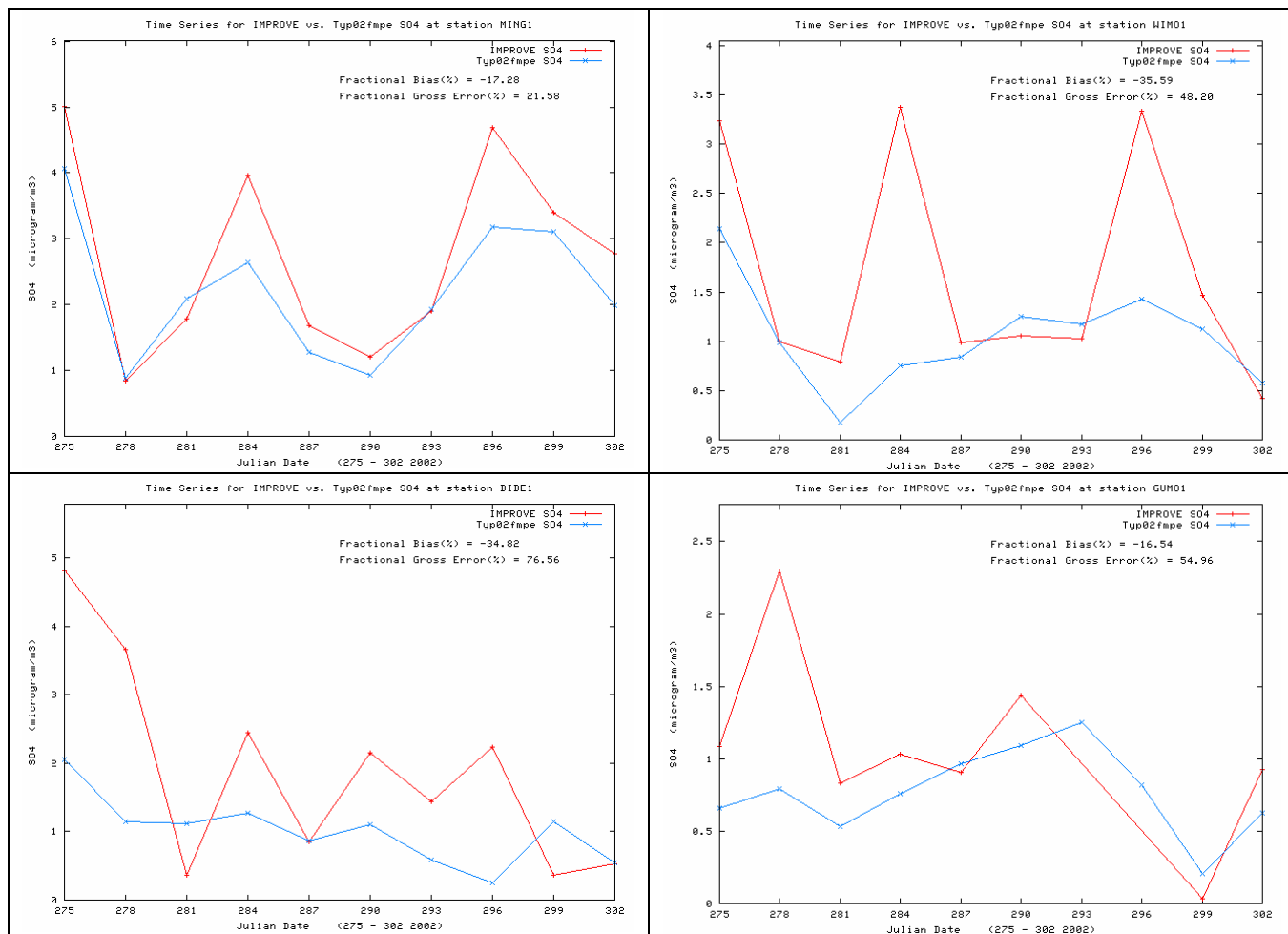
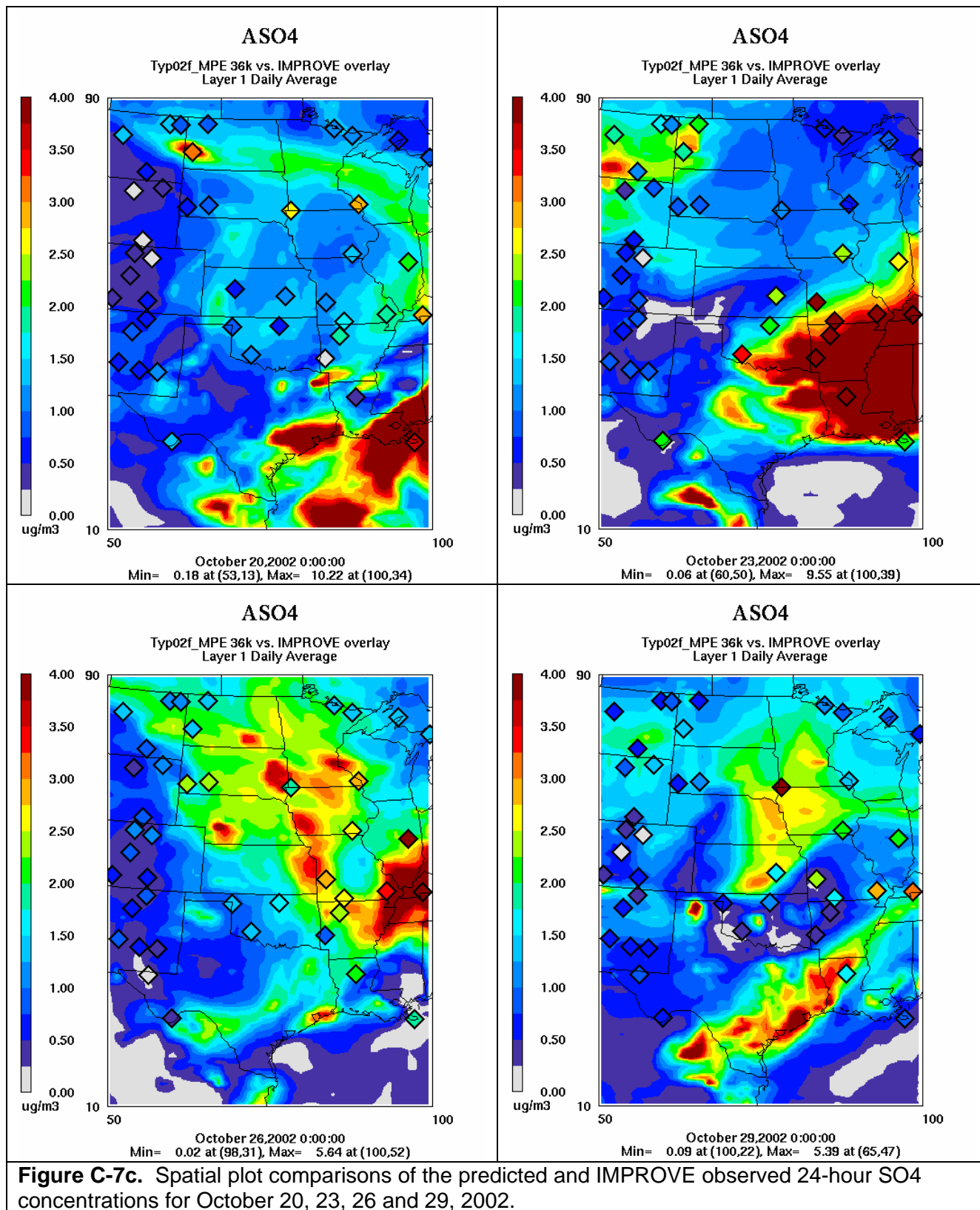


Figure C-7b. Time series of predicted and observed 24-hour sulfate (SO₄) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.1.5 SO₄ Monthly Bias and Error

Figure C-8 compares the monthly SO₄ fractional bias and error across the CENRAP region for the three monitoring networks. The under-prediction bias is clearly evident the first 8-10 months of the year. This underestimation bias is greatest across the CASTNet network which persists through out the year and is least for the STN network where it disappears by August-September. The monthly SO₄ fractional errors are generally between 30% and 60% and are greatest in the summer when SO₄ concentrations are the highest.

Figure C-9 presents a Bugle Plot of monthly So₄ fractional bias and error statistics and compares them against the proposed PM model performance goal and criteria (see Table C-3). For the STN network, it appears that SO₄ performance for all months achieves the proposed PM model performance goal. For the IMPROVE network, approximately half of the months achieve the proposed PM performance goal with the other half exceed the goal but within the performance criteria. Across the CASTNet network most months exceed the proposed goal and are within the criteria. Although the CASTNet fractional bias for some months is right at the criteria ($\leq \pm 60\%$). With the exception of two IMPROVE months, all of the monthly SO₄ fractional error performance statistics achieve the proposed PM model performance goal.

CENRAP Typ02f_MPE

SO4

■ CASTNET
 ■ IMPROVE
 ■ STN

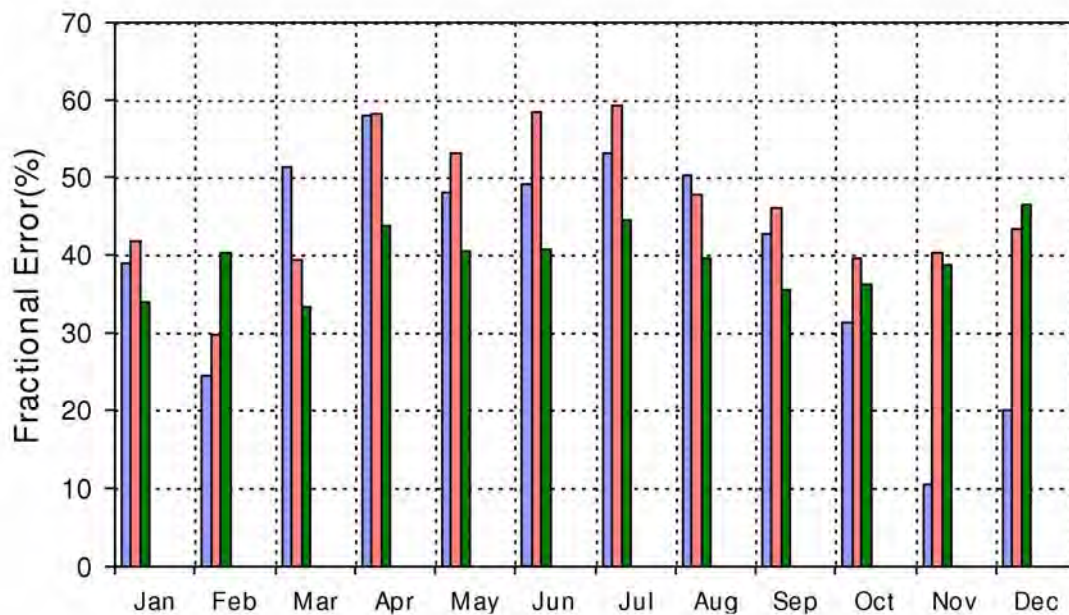
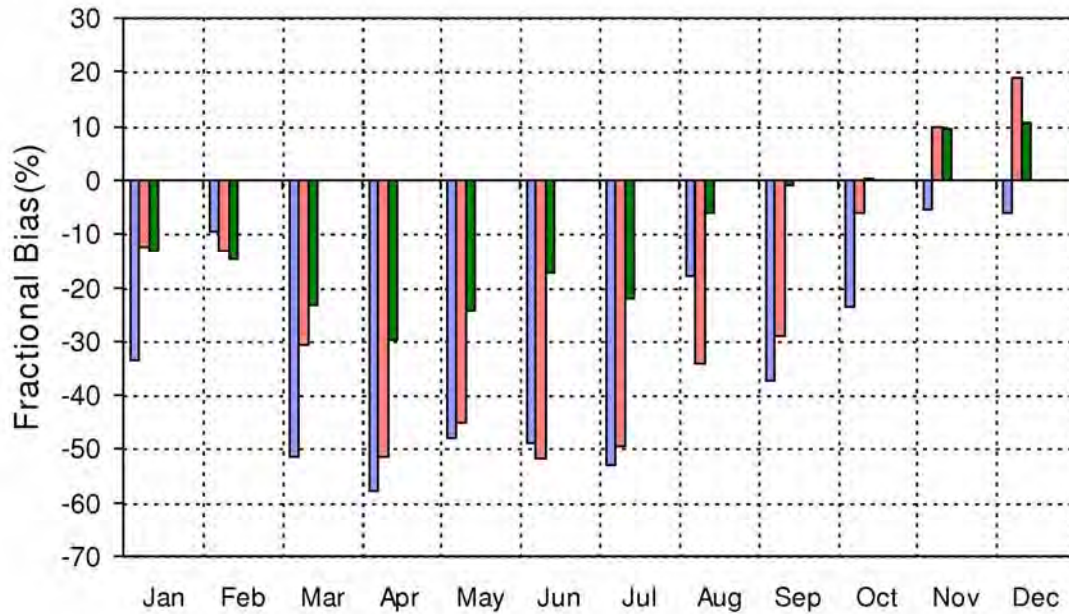


Figure C-8. Monthly SO4 fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE, STN and CASTNet monitoring sites in the CENRAP region.

CENRAP Typ02f_MPE 36k Bugle Plot

SO4

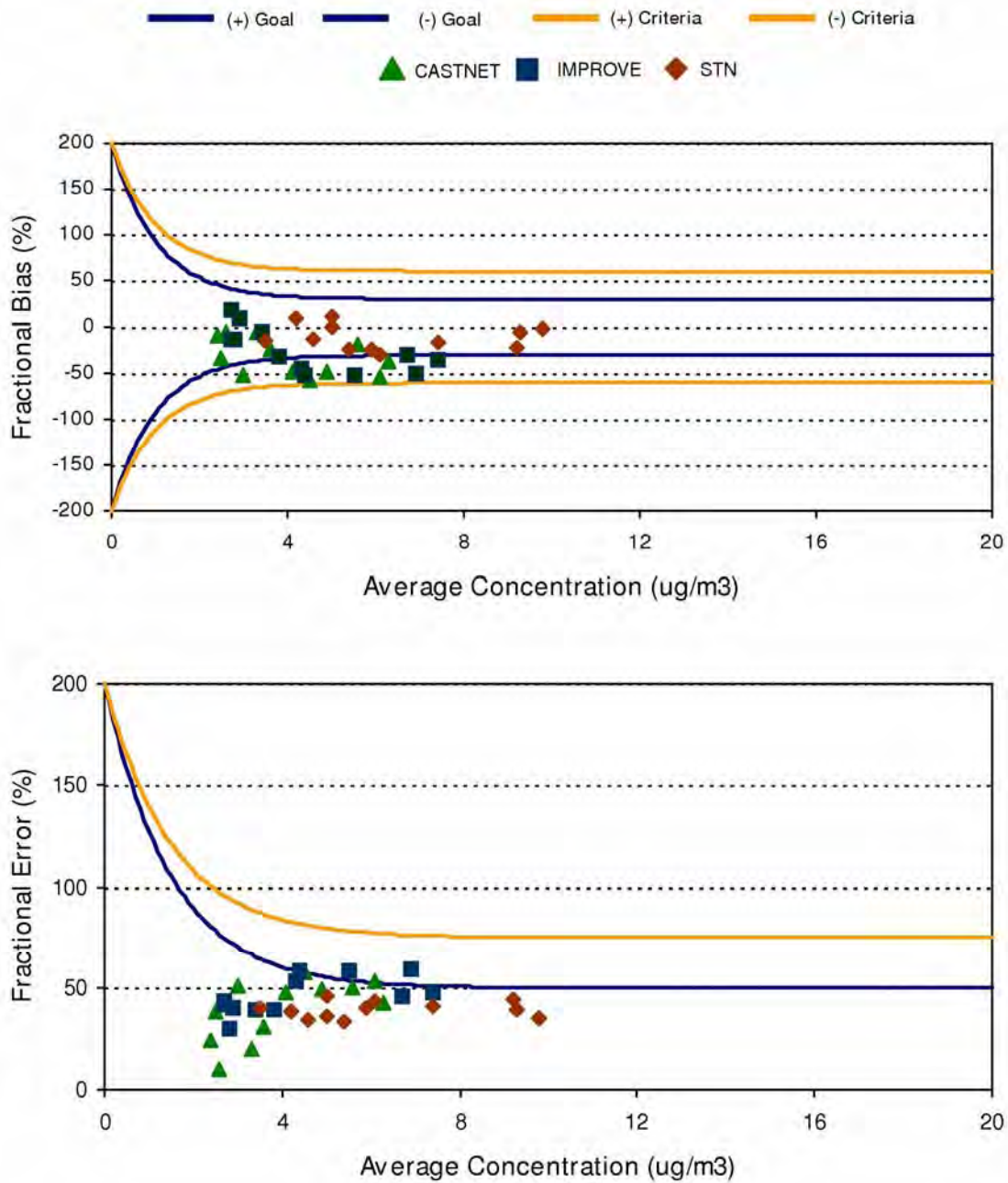


Figure C-9. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for SO4 and IMPROVE, STN and CASTNet monitoring sites in the CENRAP region.

C.3.2 Nitrate (NO₃) Monthly Model Performance

The following sections discuss the monthly NO₃ model performance across the IMPROVE, STN and CASTNet monitoring networks in the CENRAP region.

C.3.2.1 NO₃ in January 2002

January NO₃ CMAQ model performance is characterized by an overestimation bias across the CENRAP region (Figure C-10a). The fractional bias values for the IMPROVE, STN and CASTNet networks are 38%, 29% and 61%. Unlike SO₄, wet deposition of NO₃ is also overstated in January (43%). Fractional errors range from 90%-100% for the IMPROVE and CASTNet networks and are lower (54%) for the STN network and higher (114%) for the NADP network.

With the exception of Breton Island and Big Bend, the model NO₃ over-prediction bias occurs at the other 8 CENRAP Class I areas (Figure C-10b). The observed time series is reproduced reasonable well at a couple sites, such as Wichita Mountains and the first half of January for Voyageurs. However, for most sites the observed NO₃ time series is not reproduced very well and is extremely poorly reproduced for Breton Island, Big Bend and Guadalupe Mountains.

The model typically estimates a larger area of elevated NO₃ concentrations than is observed. This is shown for January 20, 23, 26 and 29 in Figure C-10c. Whereas the model exhibits large areas of brown indicated daily average NO₃ concentrations of 4 µg/m³ or higher, the observed values of this high rarely occur and are usually limited to the central Illinois site. On January 20 the model estimates the entire eastern half of the CENRAP region should be covered by elevated NO₃ concentrations, whereas the observations indicate much lower values. On January 23 the modeled elevated NO₃ concentrations lies between the IMPROVE monitoring sites, although the central Illinois site suggests high NO₃ did occur in the region. The observations on January 26 also suggest lower NO₃ than the model is predicting. On January 29 the model estimates elevated NO₃ from the central Illinois site to Wichita Mountains, Oklahoma that is supported by these two observations. In general, the model is estimating more wide-spread elevated NO₃ concentrations than observed, whereas the observations suggest that the elevated NO₃ occurrences is less frequent and more spotty.

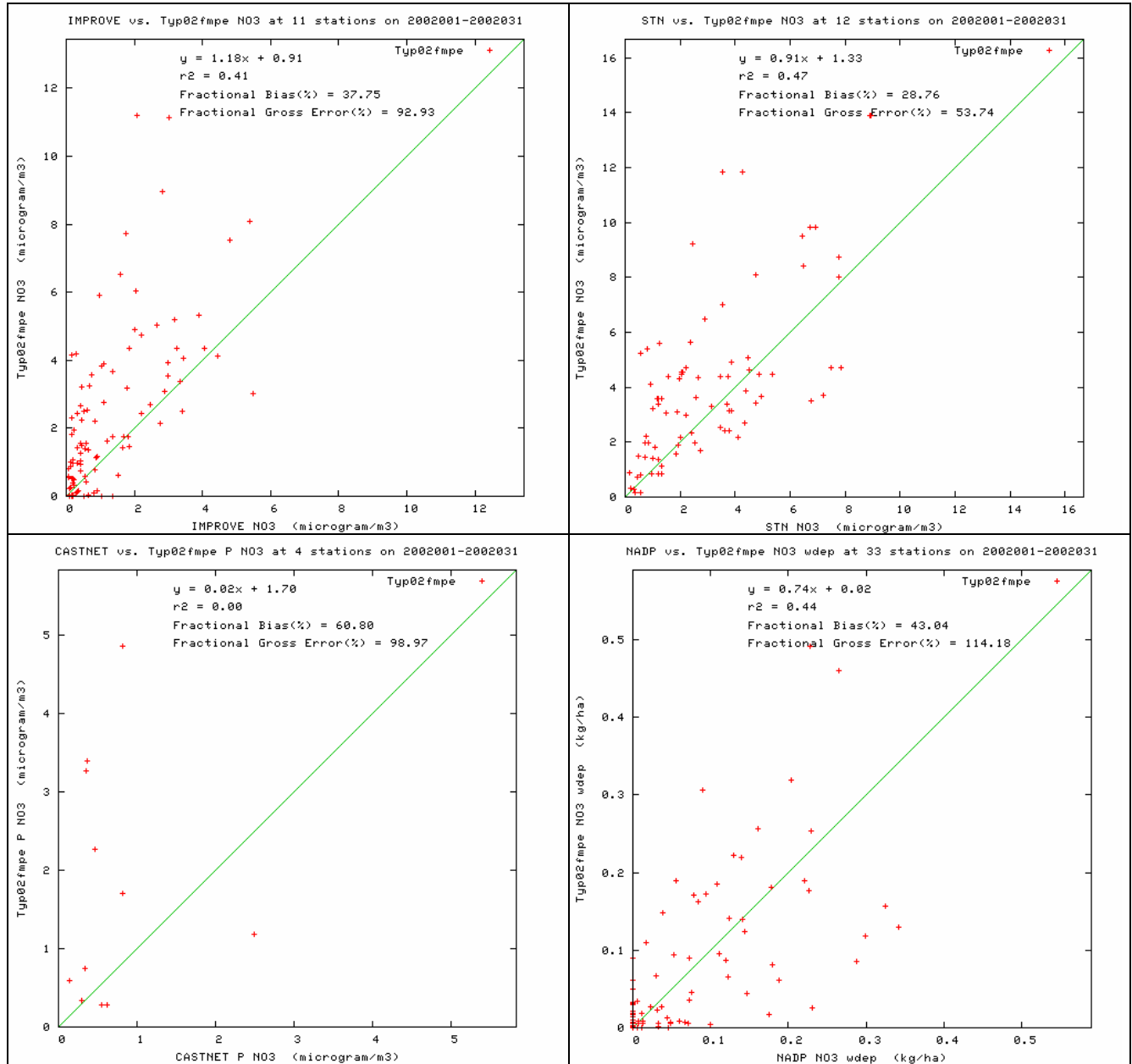
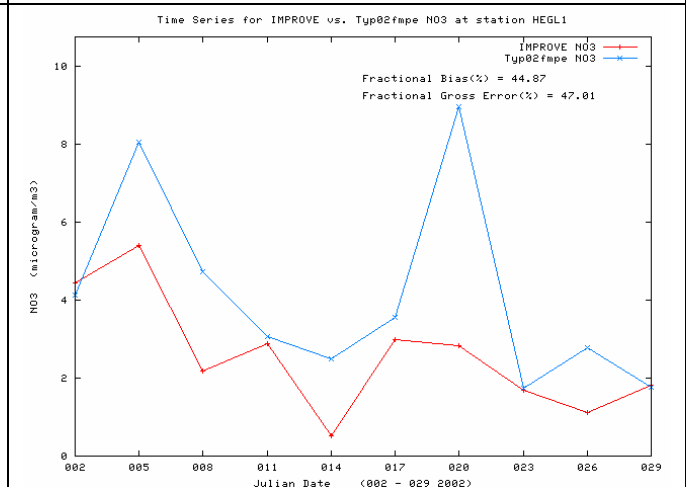
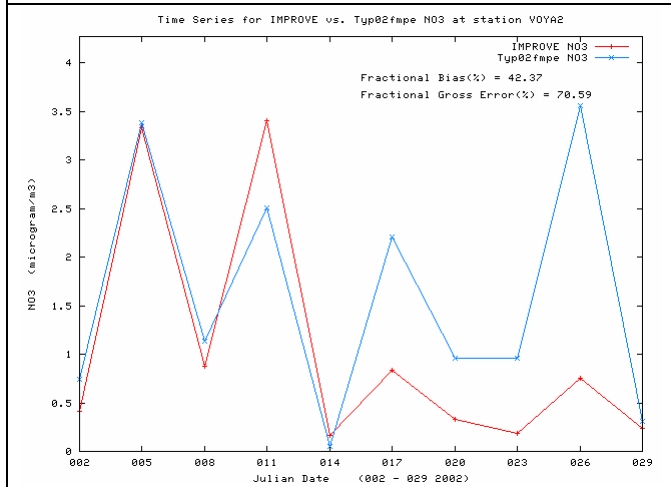
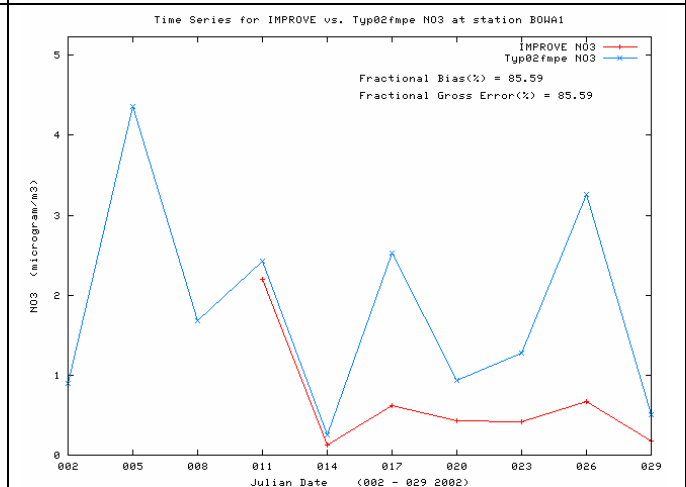
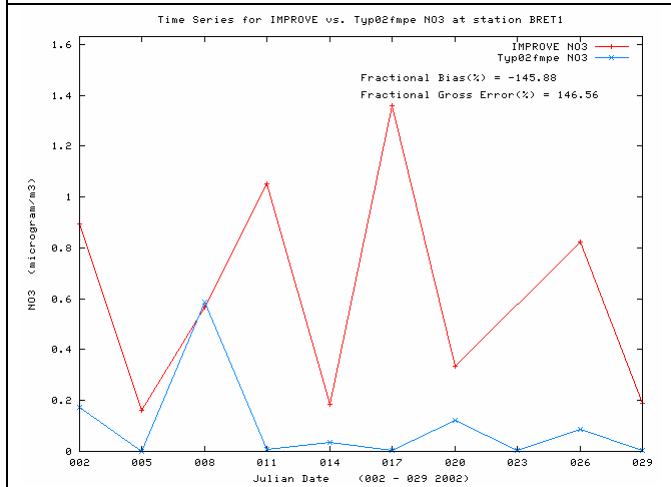
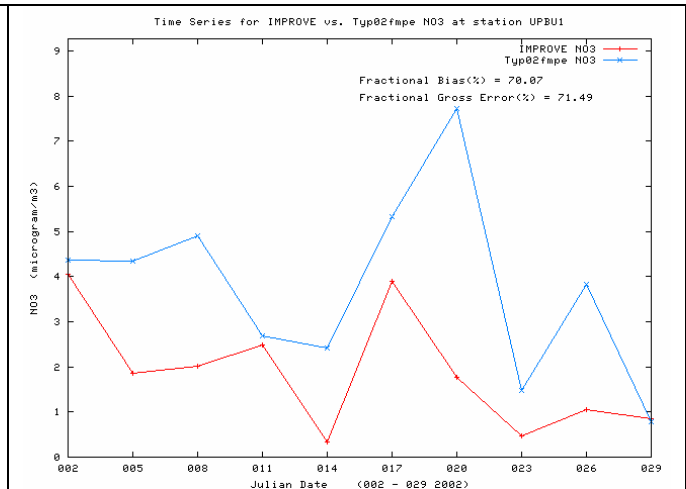
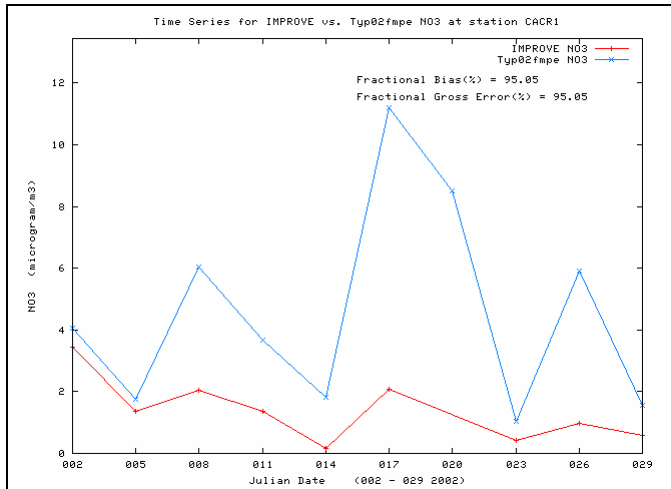


Figure C-10a. Scatter plots of predicted and observed nitrate (NO₃) concentrations for January 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



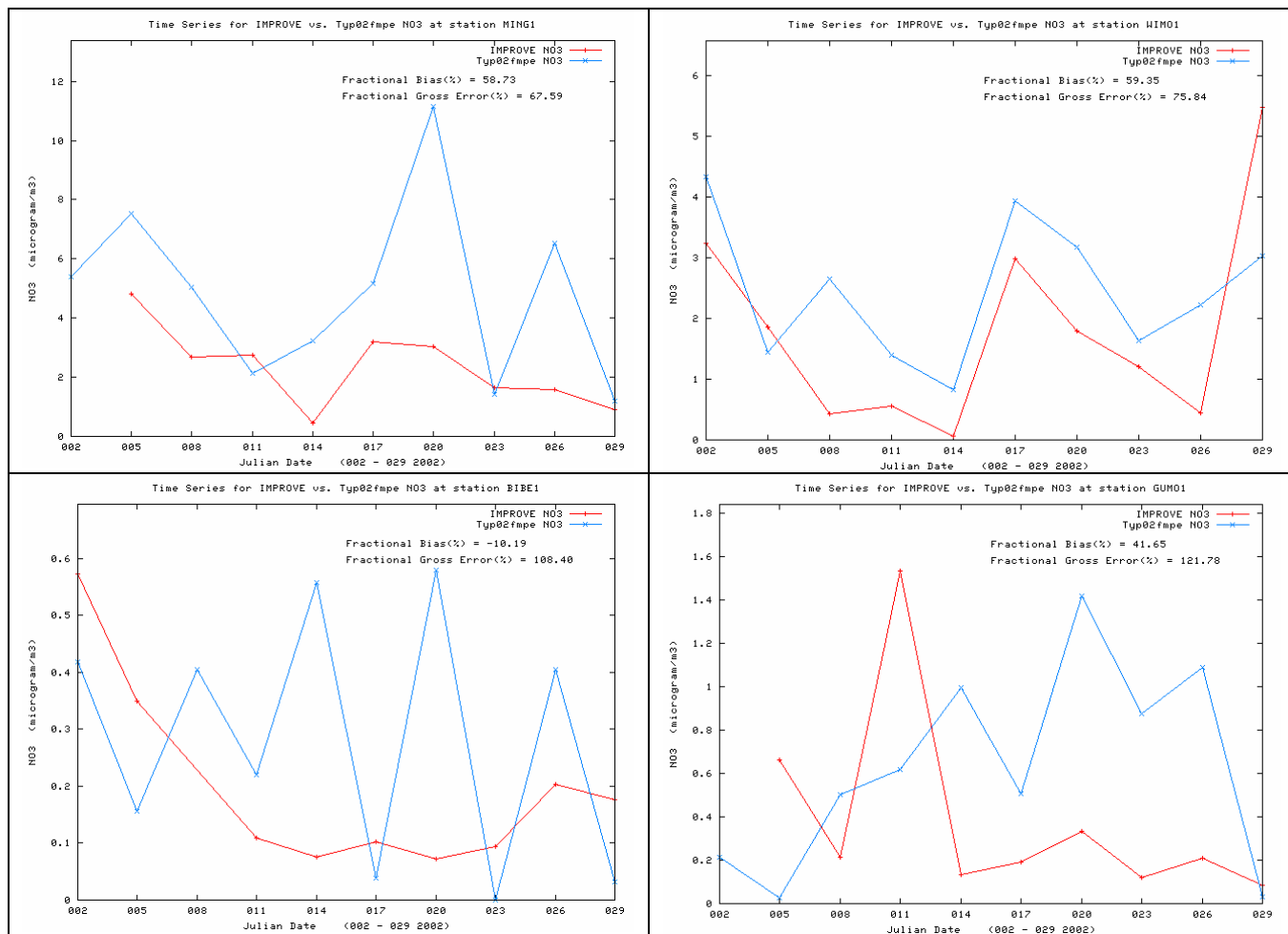
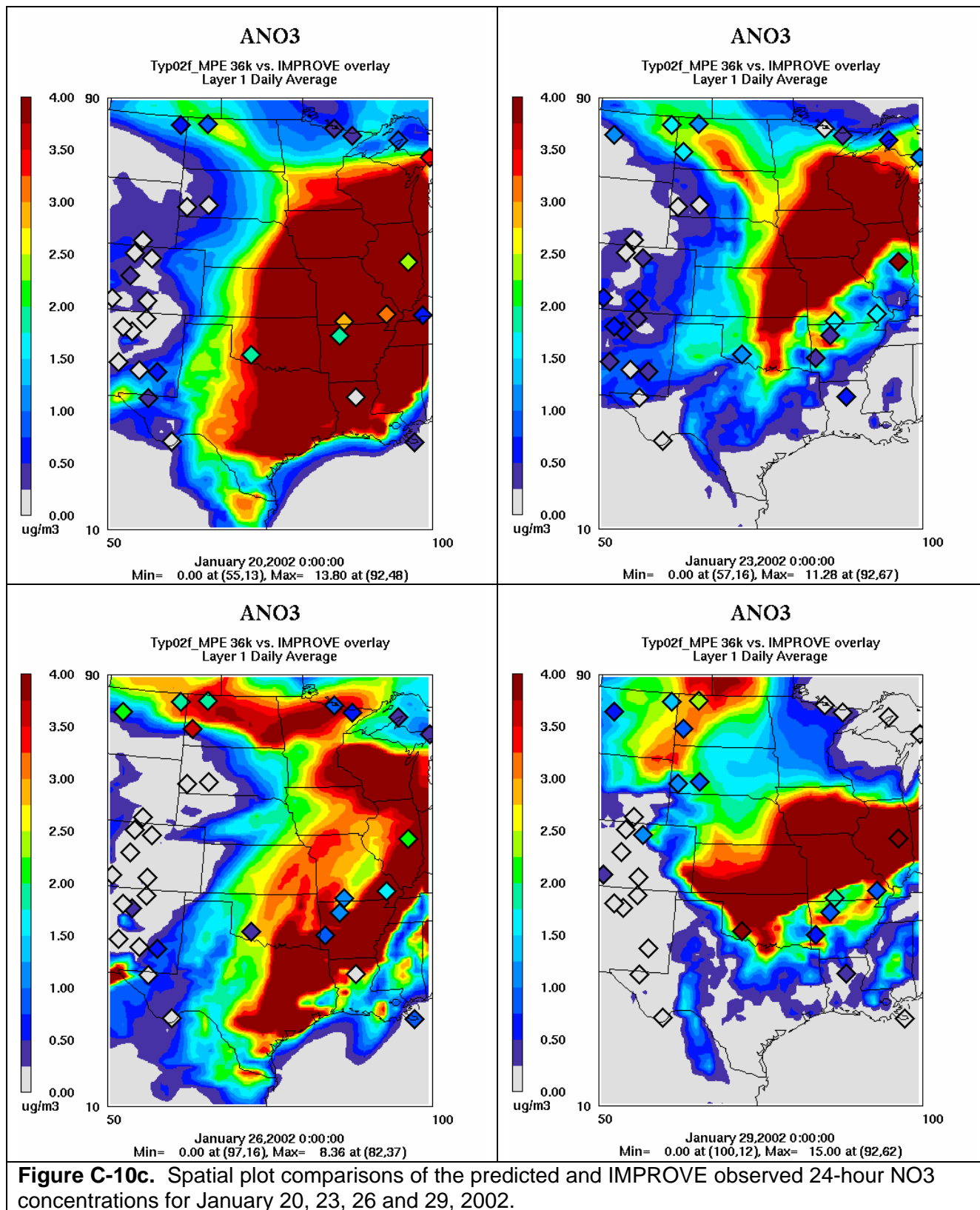


Figure C-10b. Time series of predicted and observed 24-hour nitrate (NO₃) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.2.2 NO₃ in April 2002

Unlike the NO₃ overestimation bias of January, the April NO₃ performance is characterized by an underestimation bias (Figure C-11a). This under-prediction bias appears to be driven by near zero model predictions when the observed values are small ($< 1 \mu\text{g}/\text{m}^3$), but positive. This effect is especially noticeable in the NO₃ time series (Figure C-11b) where at several sites the modeled NO₃ concentrations goes to zero (e.g., BRET, BIBE, GUMO), whereas the observed values has an approximately 0.2 $\mu\text{g}/\text{m}^3$ floor. The spatial maps suggest that the large April NO₃ under-prediction bias indicated by the performance statistics is not as bad as they suggest (Figure C-11c). Mostly the model is predicting low NO₃ values where low values are observed, just that the model approaches zero which results in a large relative difference with the observe values.

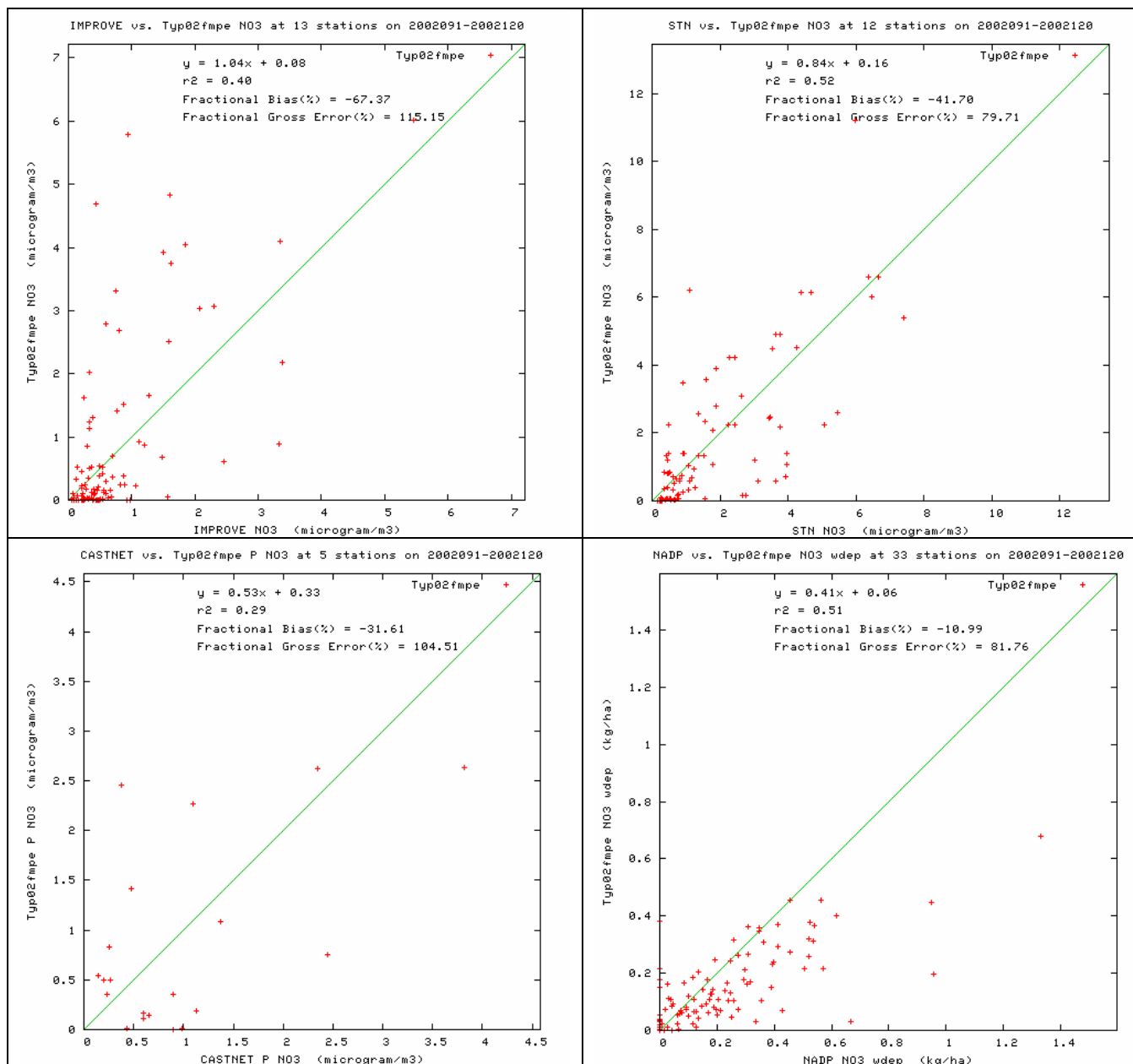
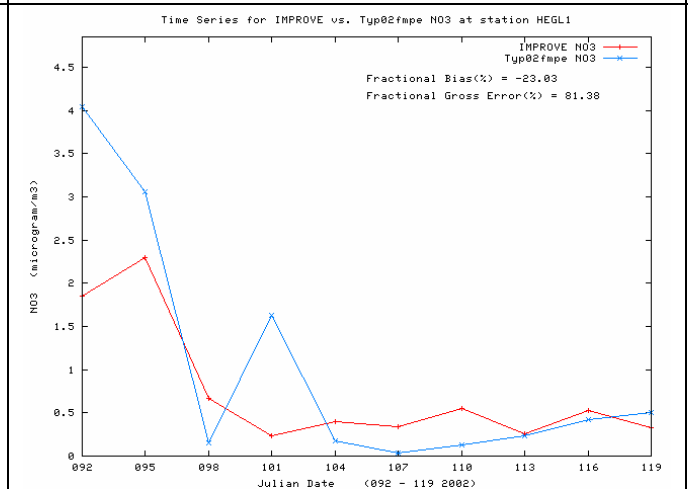
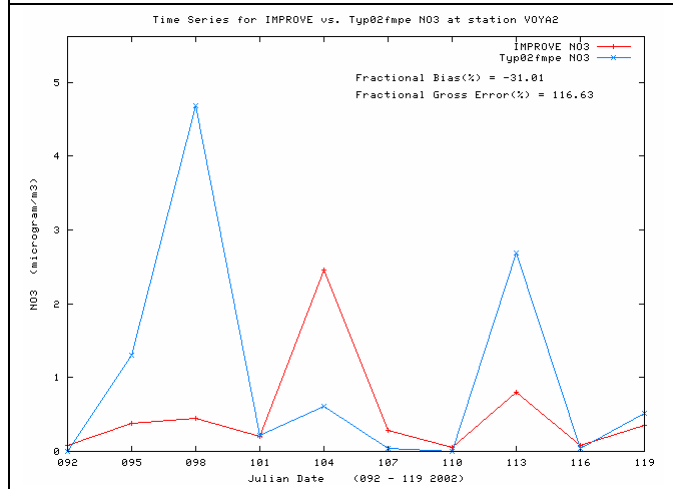
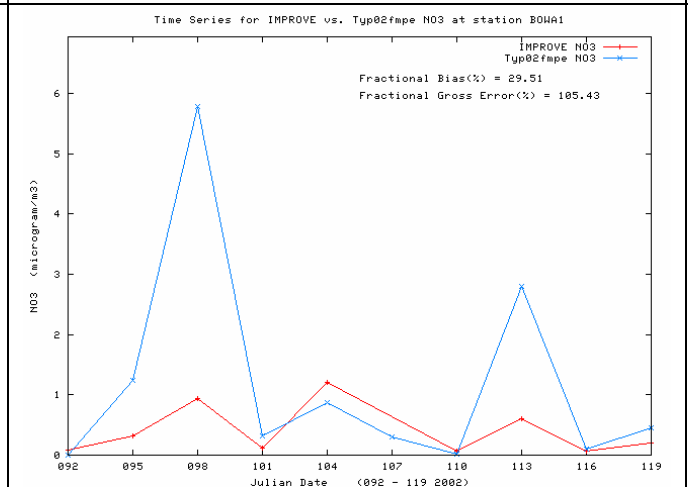
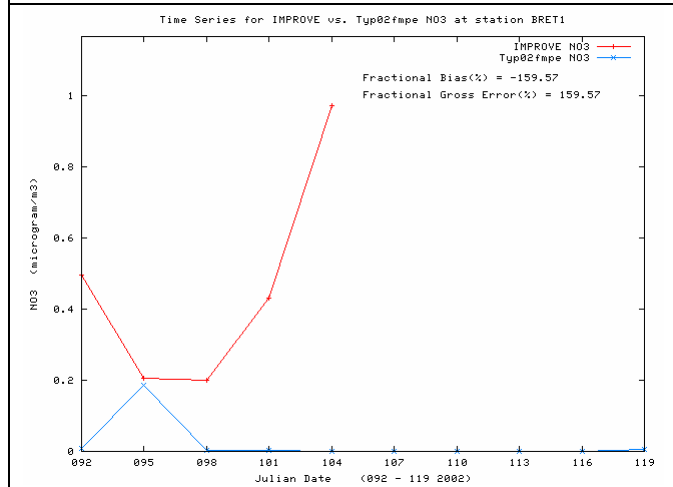
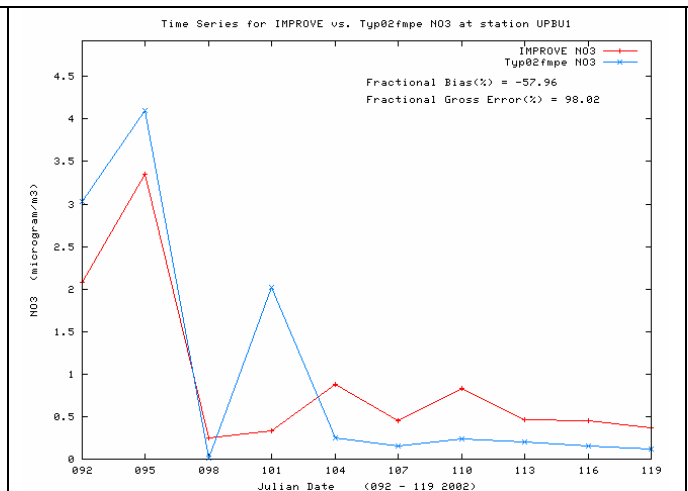
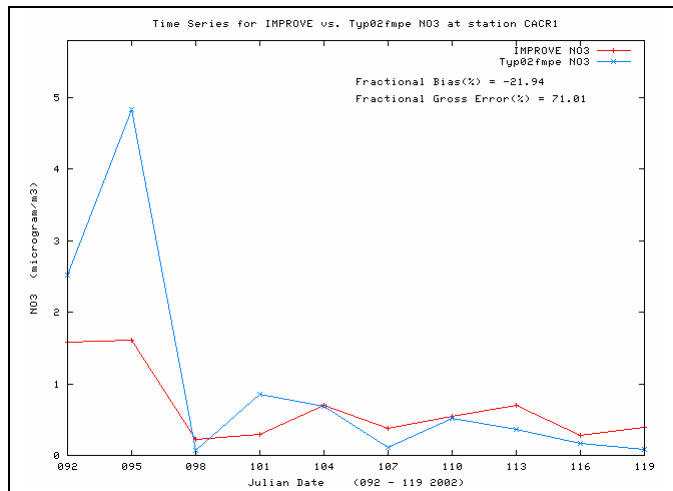


Figure C-11a. Scatter plots of predicted and observed nitrate (NO3) concentrations for April 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



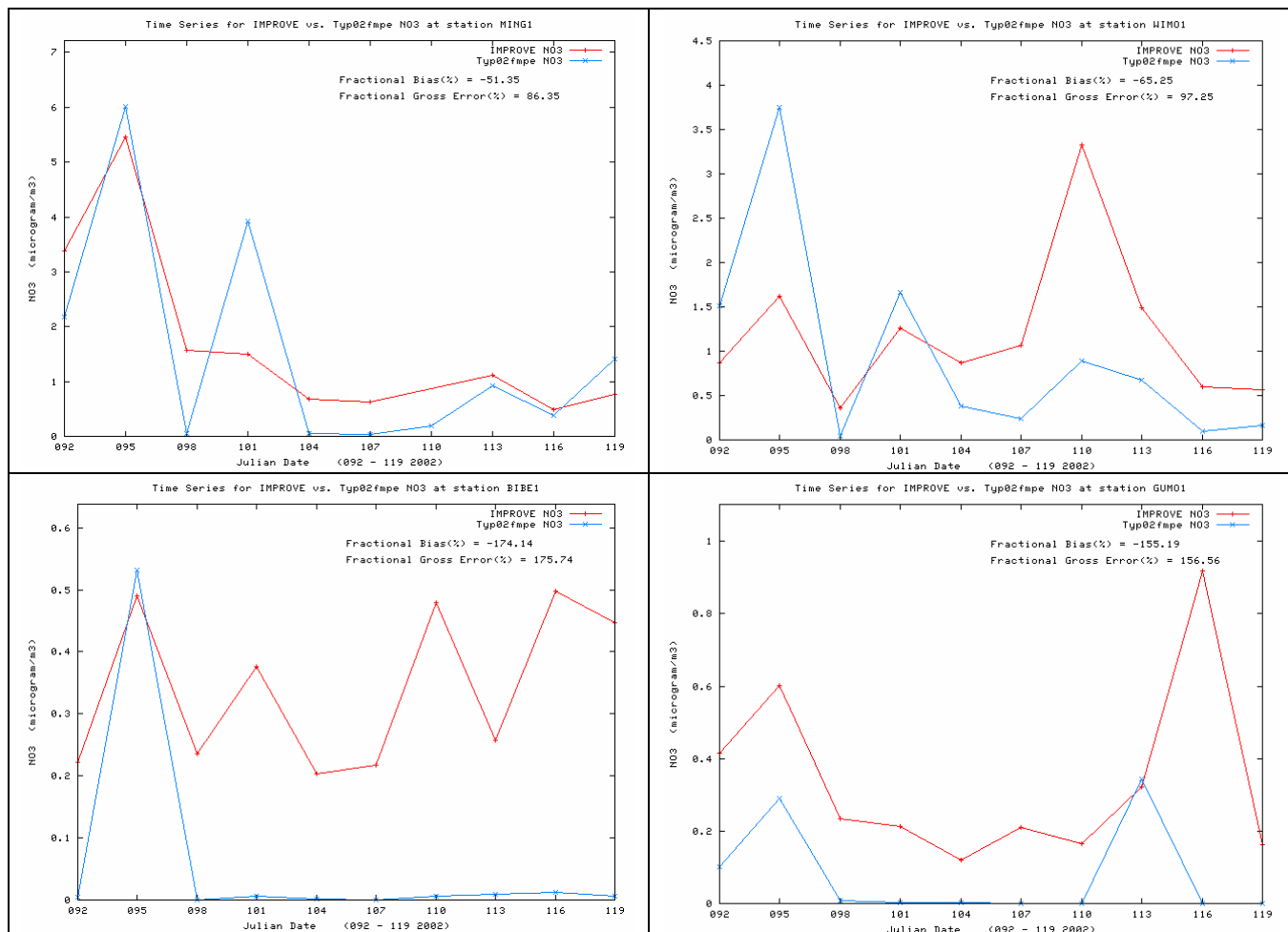


Figure C-11b. Time series of predicted and observed 24-hour nitrate (NO₃) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.

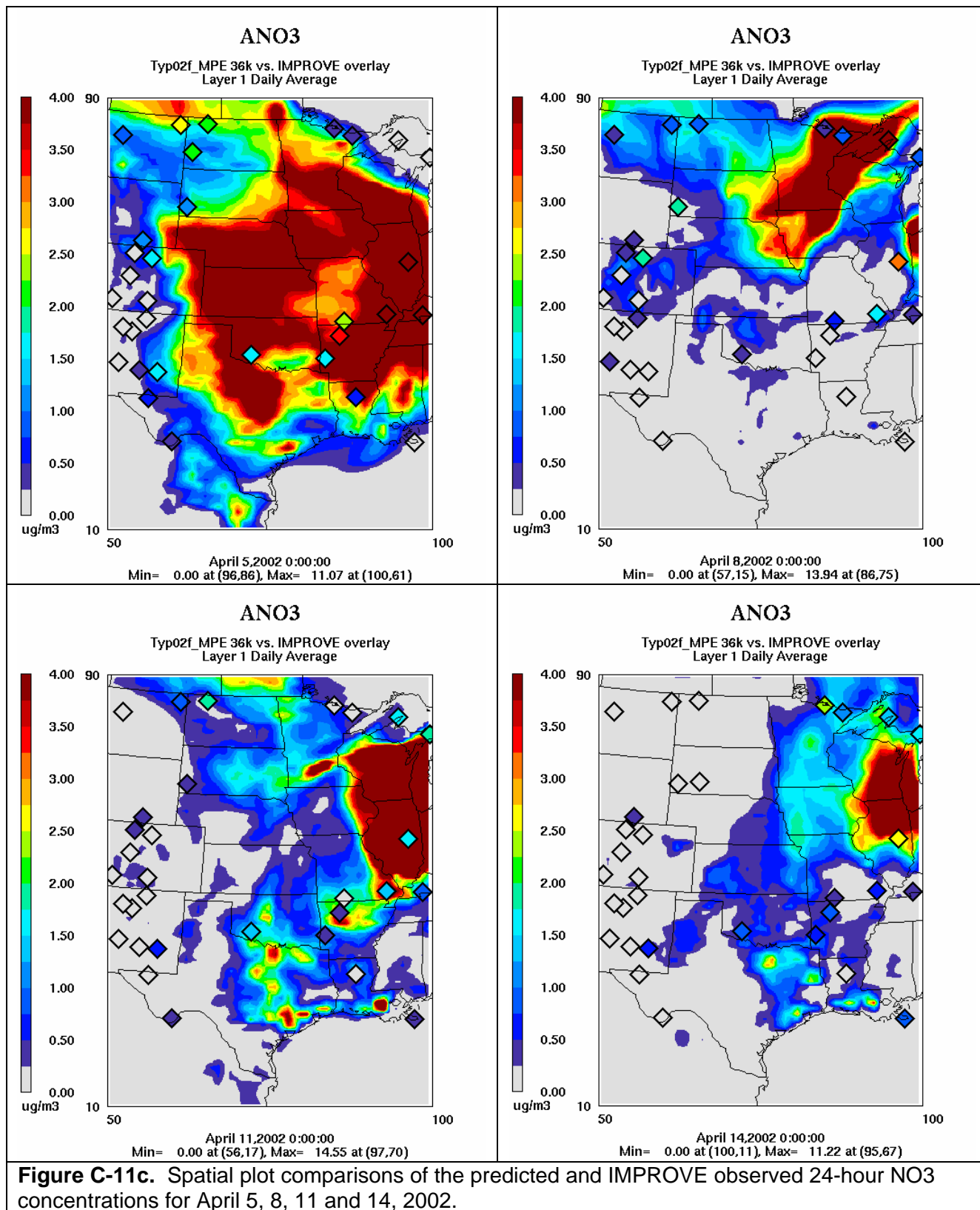


Figure C-11c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour NO₃ concentrations for April 5, 8, 11 and 14, 2002.

C.3.2.3 NO3 in July 2002

NO3 performance in July 2002 is also characterized by a large under-prediction bias that is driven by the frequent occurrence of near zero modeled values (Figure C-12). Both the model and observations agree that NO3 is mostly extremely low in July, just the model produces near zero values and resultant poor performance statistics.

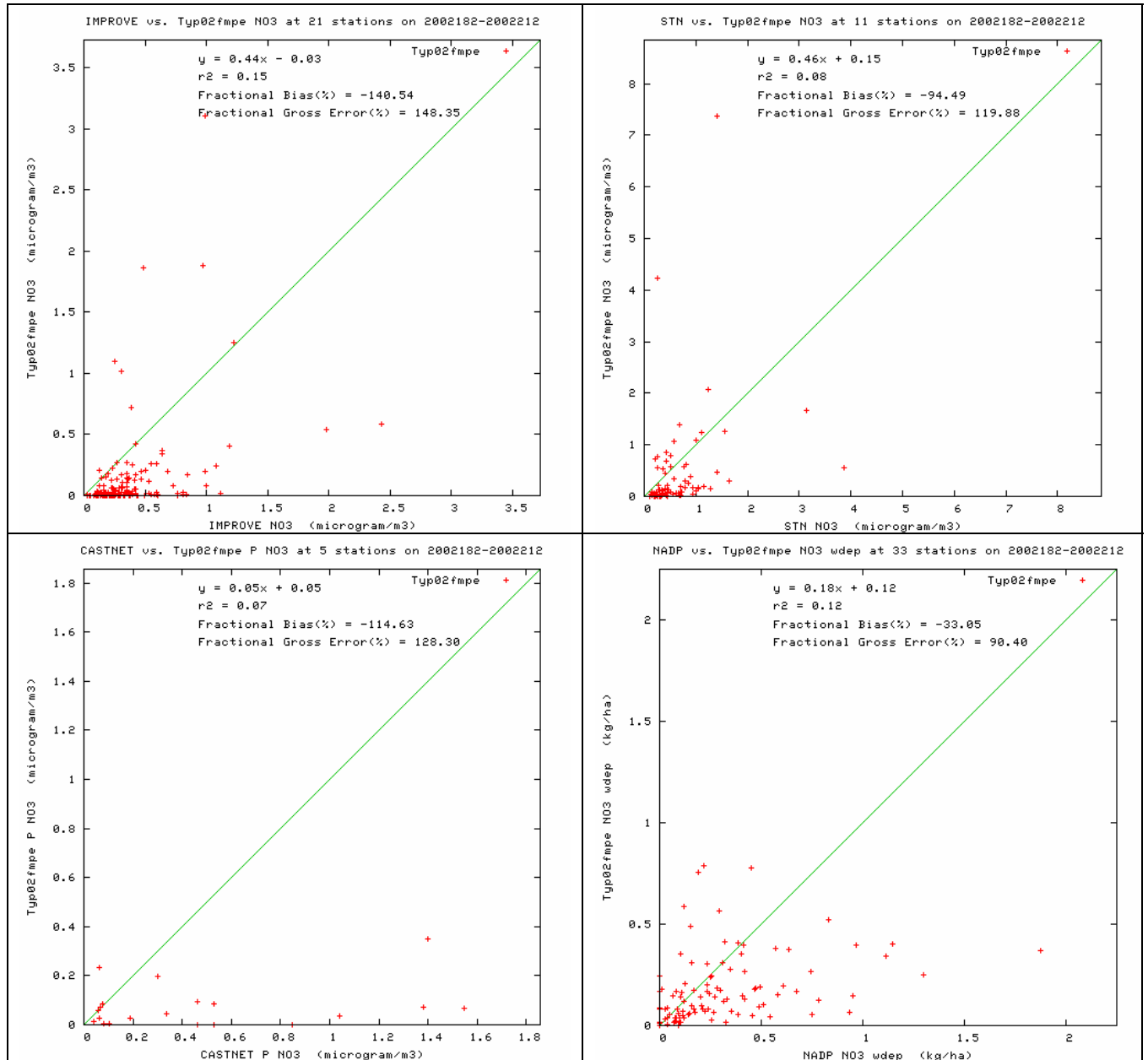
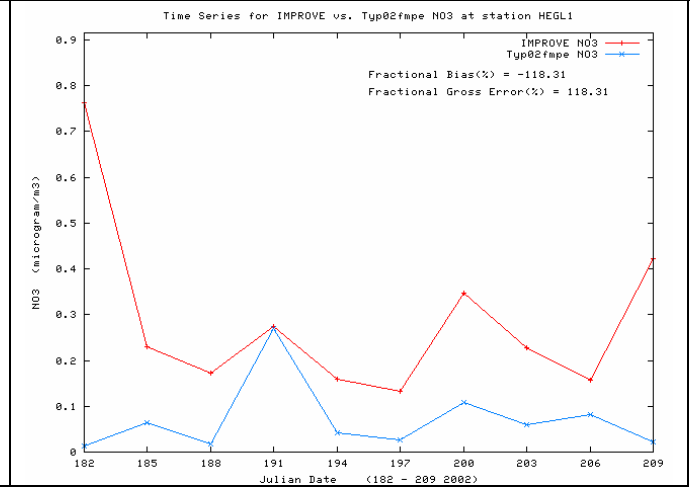
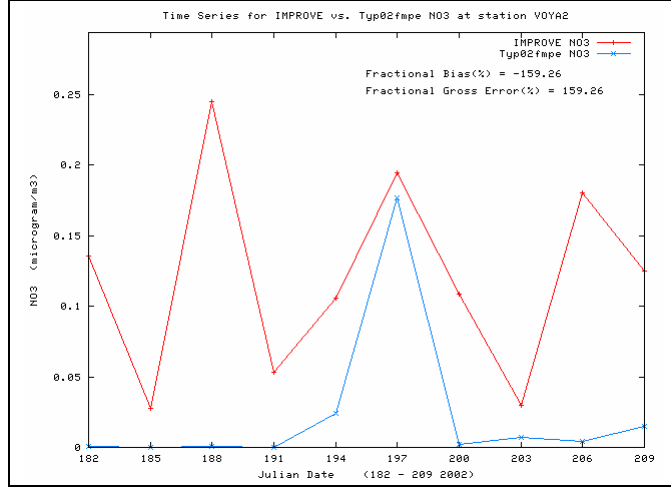
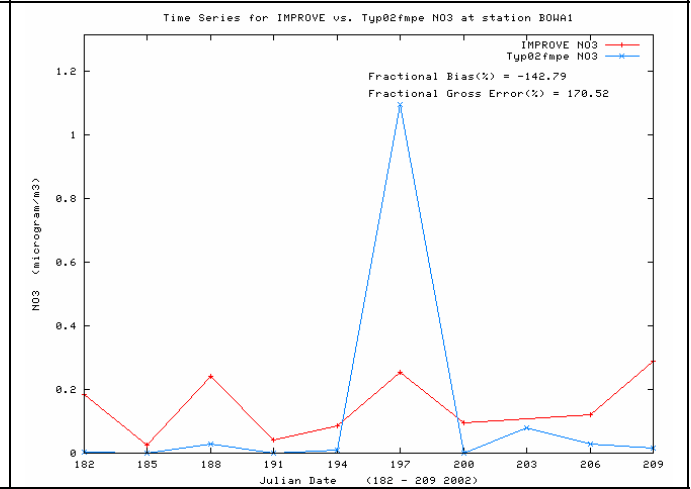
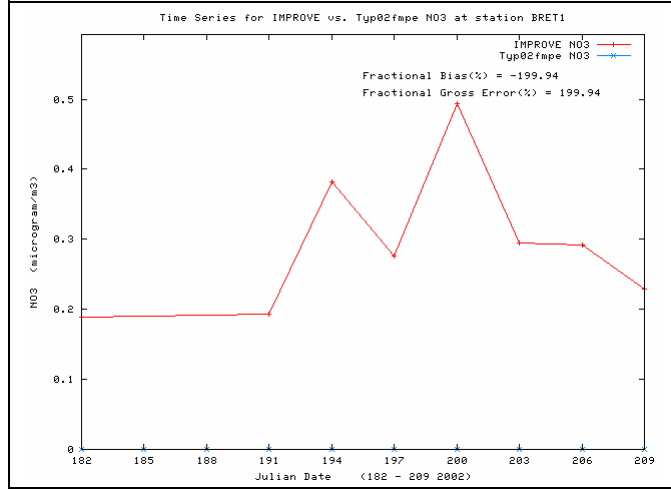
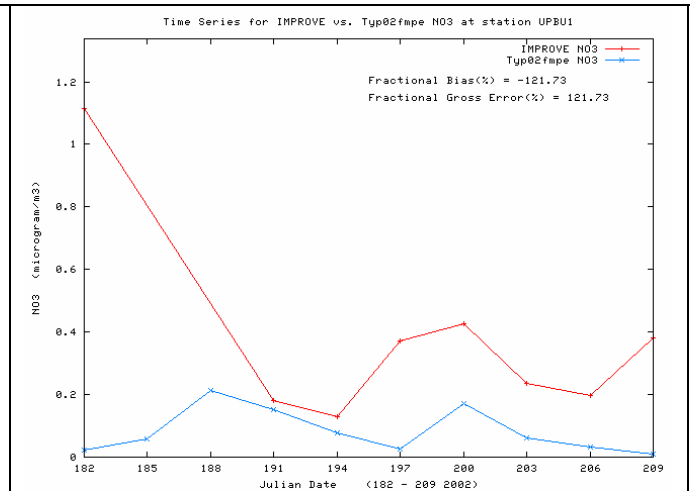
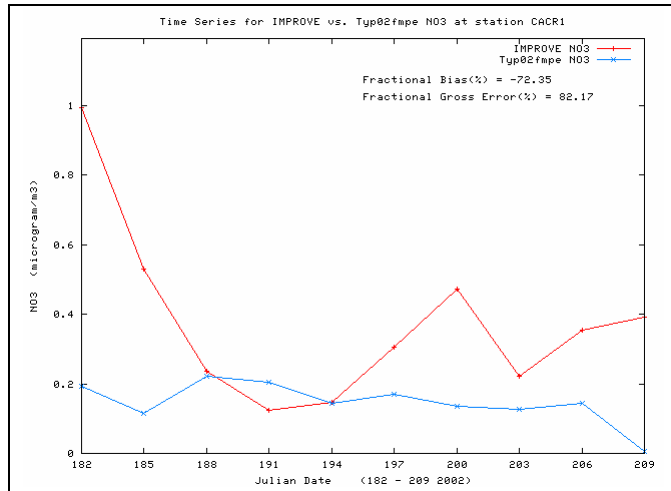


Figure C-12a. Scatter plots of predicted and observed nitrate (NO3) concentrations for July 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



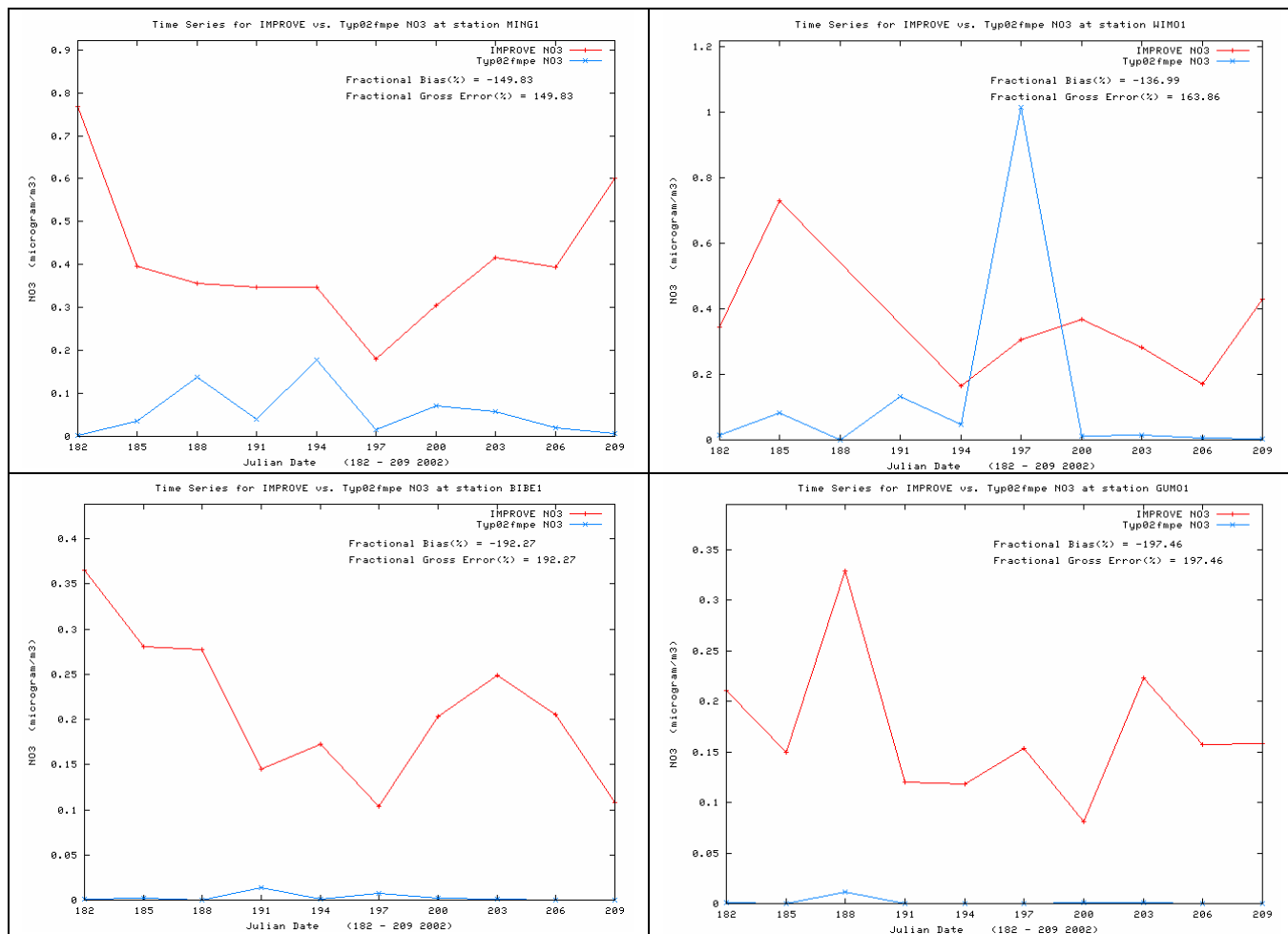


Figure C-12b. Time series of predicted and observed 24-hour nitrate (NO3) concentrations at CENRAP IMPROVE CLASS I AREA sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

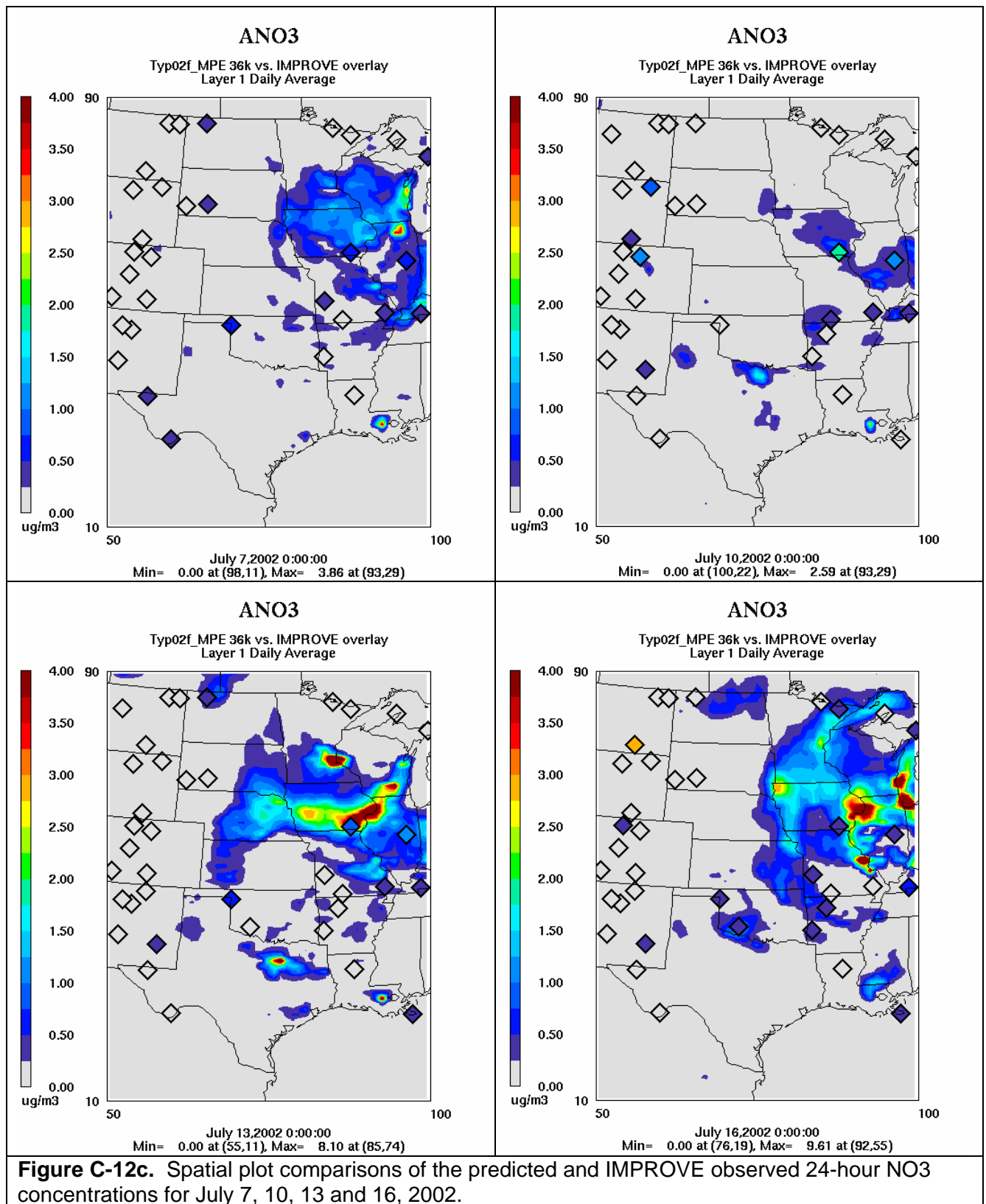


Figure C-12c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour NO3 concentrations for July 7, 10, 13 and 16, 2002.

C.3.2.4 NO3 in October 2002

Like January and unlike April and July, in October the model has a net NO₃ overestimation bias of about 30%-40% (Figure C-13a). This overestimation bias occurs at all sites but BRET, BIBE and GUMO that exhibit a NO₃ underestimation bias (Figure C-13b). The spatial maps suggest that the modeled elevated NO₃ concentrations are more wide-spread and less spotty than observed.

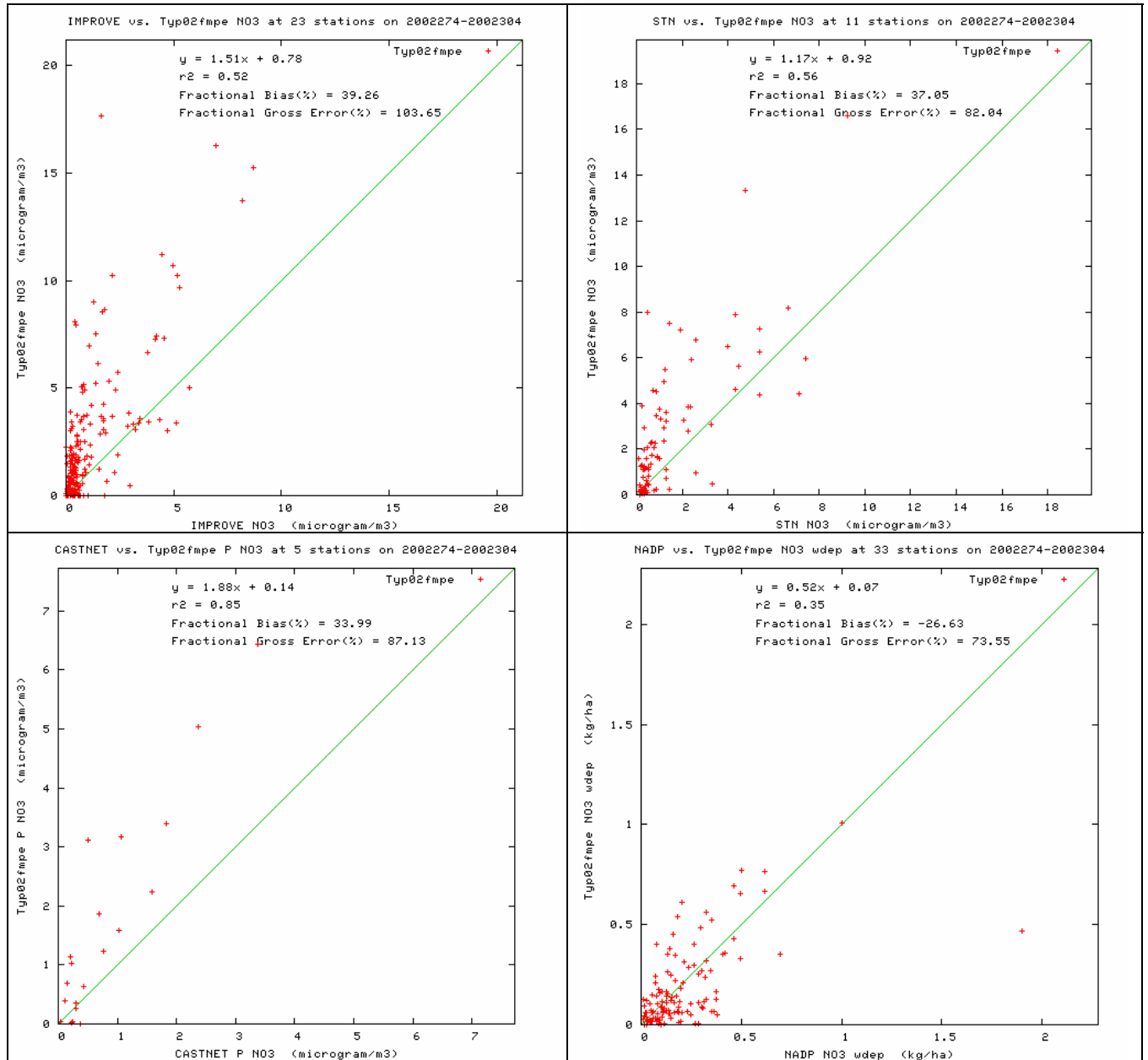
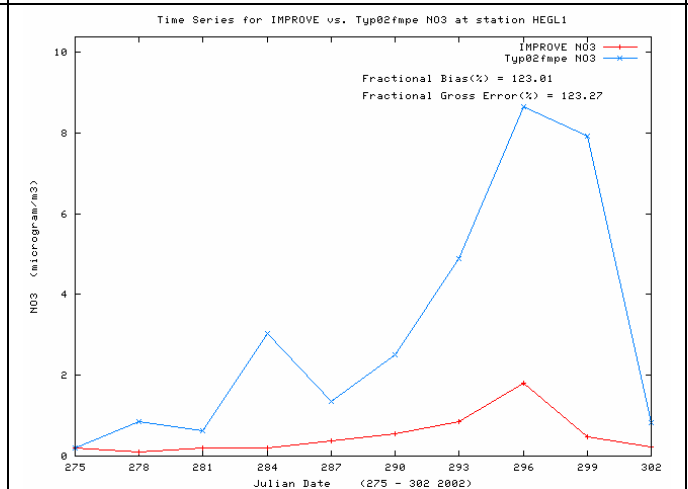
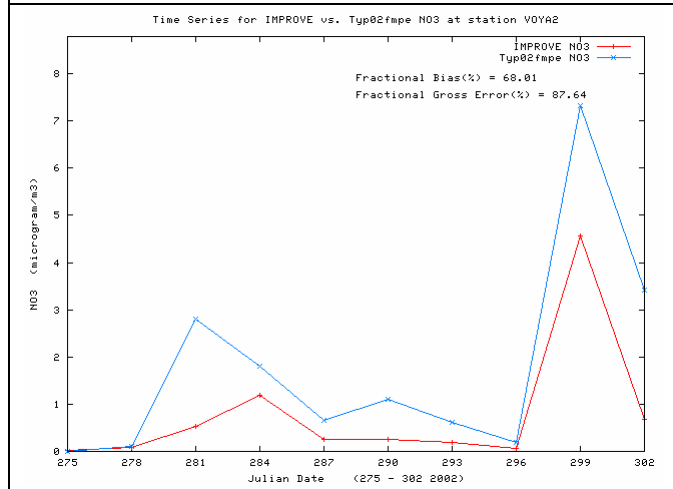
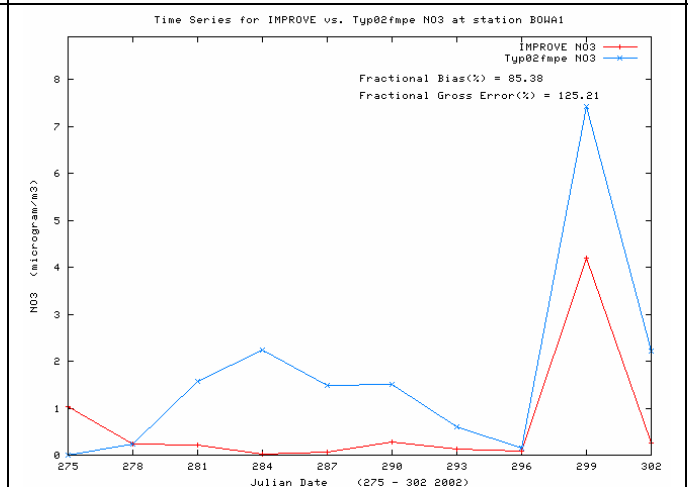
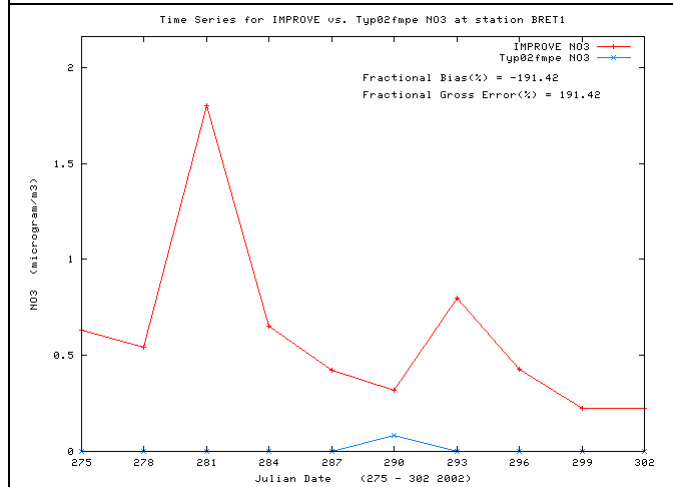
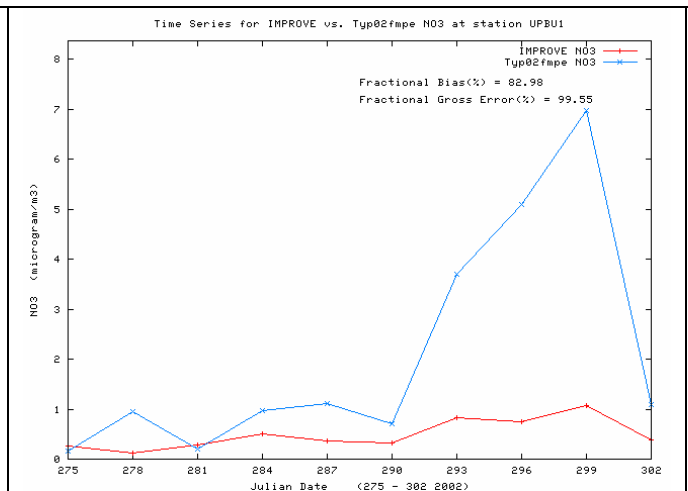
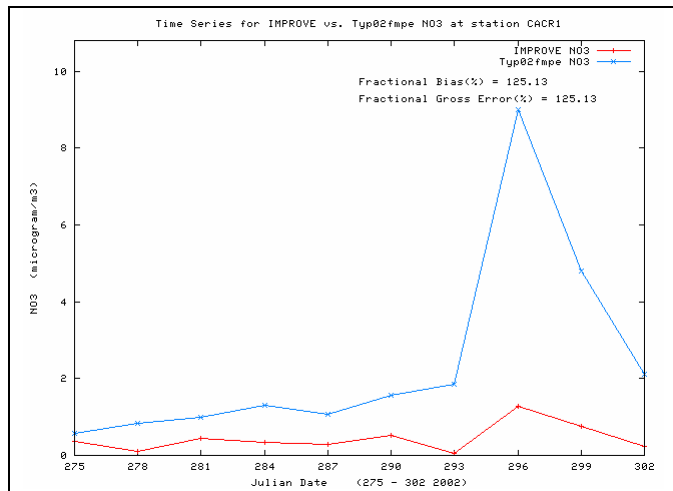


Figure C-13a. Scatter plots of predicted and observed nitrate (NO₃) concentrations for October 2002 and sites in the CENRAP region using IMPROVE (top left), STN (top right), CASTNet (bottom left) and NADP monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



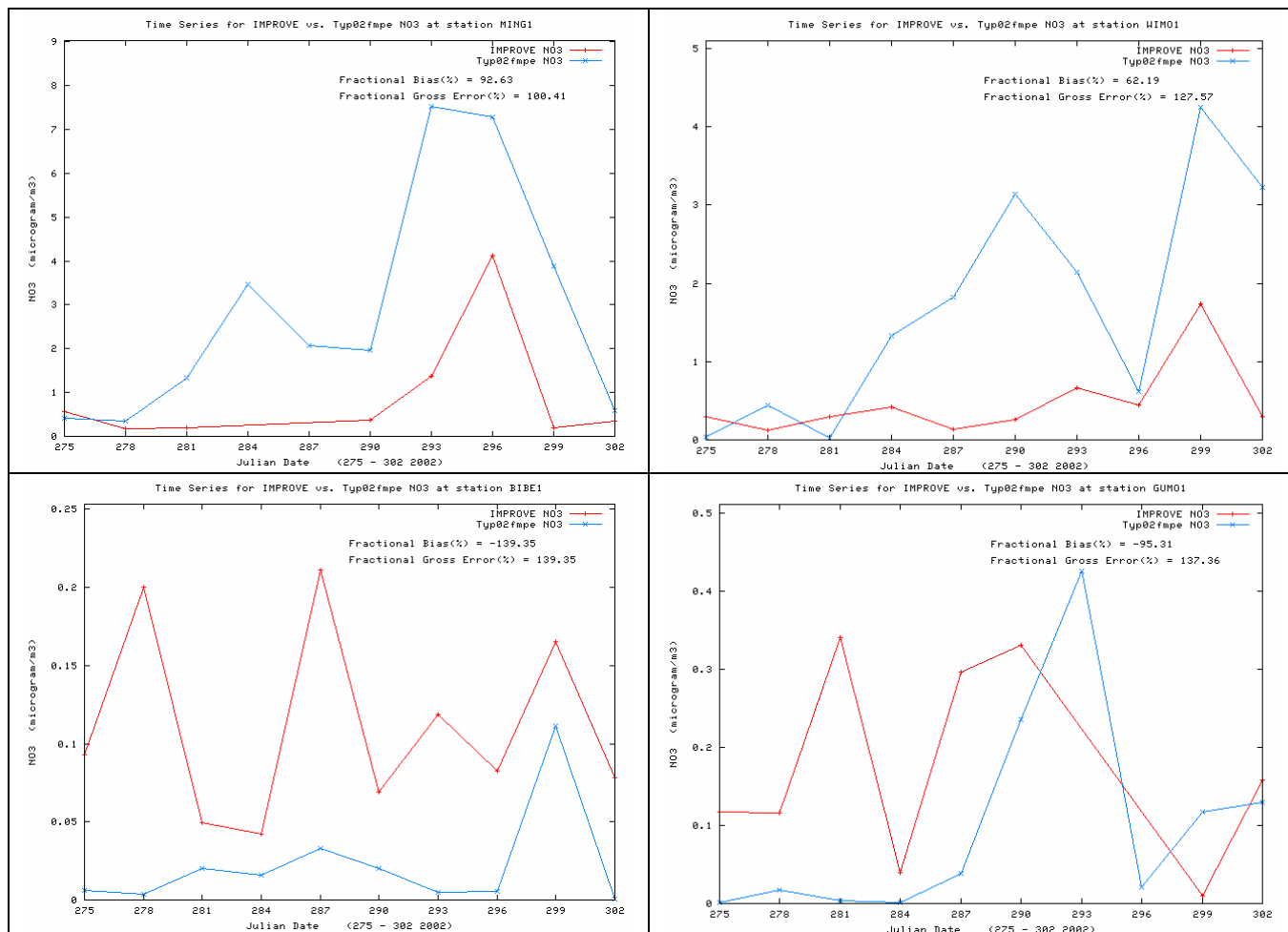


Figure C-13b. Time series of predicted and observed 24-hour nitrate (NO₃) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.

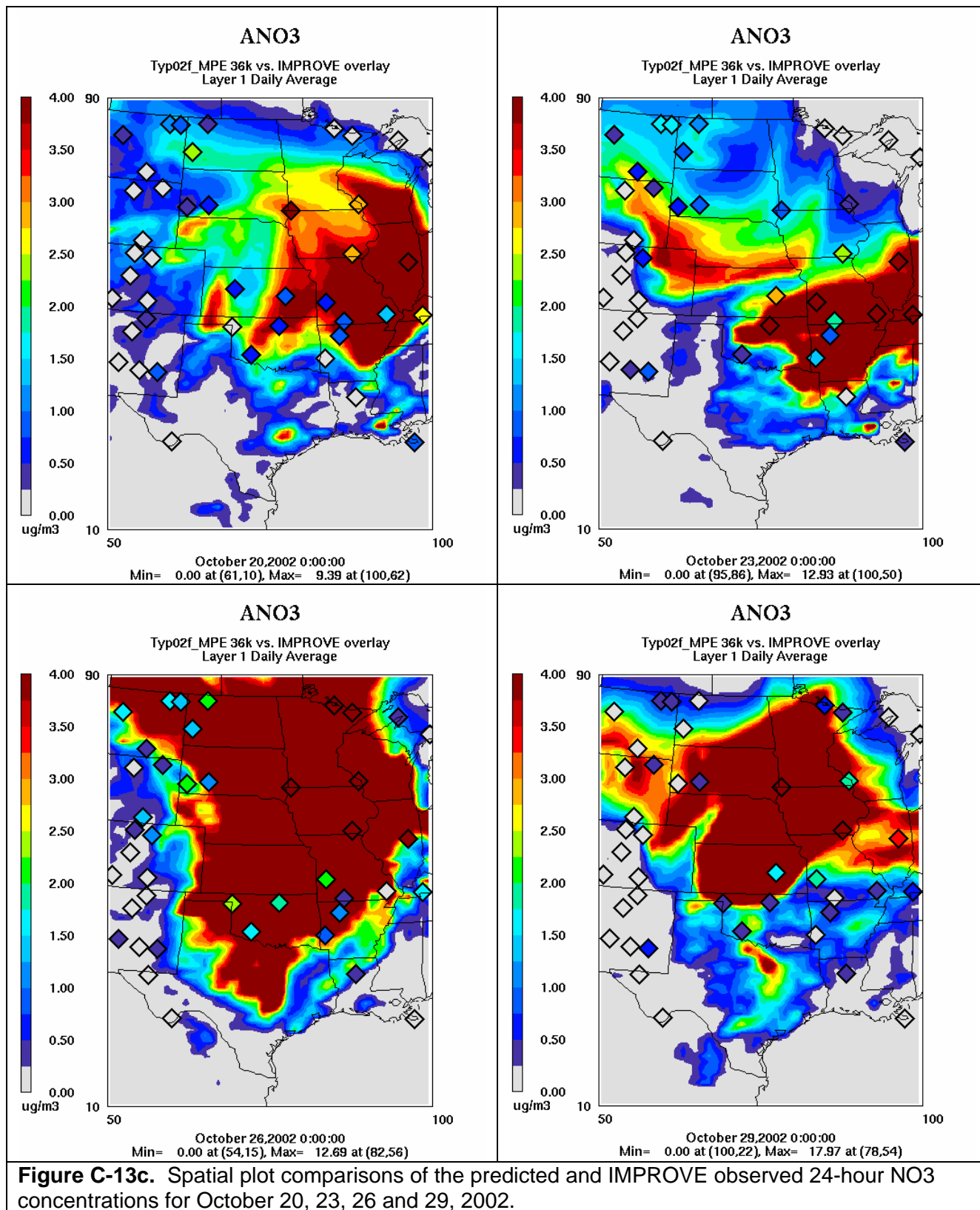


Figure C-13c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour NO3 concentrations for October 20, 23, 26 and 29, 2002.

C.3.2.5 NO₃ Monthly Bias and Error

The monthly fractional bias values for NO₃ clearly show the summer underestimation and winter overestimation bias (Figure C-14). The summer underestimation bias is more severe exceeding -100%, whereas the winter overestimation is closer to 50%. The fractional errors in the summer are also greater than in the winter with some values exceeding 100%. So based on statistics alone, it appears the summer underestimation bias is a bigger concern than the winter overestimation bias. However, the Bugle Plots in Figure C-15 paint a different picture entirely. The summer underestimation bias occurred when NO₃ is low and is not an important component of PM and visibility impairment. These summer values occur in the flared horn part of the Bugle Plot and in fact the summer NO₃ performance mostly achieves the model performance goal and always achieves the performance criteria. Whereas the winter overstated NO₃ performance mostly doesn't meet the performance goal and there are even some months/networks that don't meet the performance criteria.

CENRAP Typ02f_MPE

NO3

CASTNET IMPROVE STN

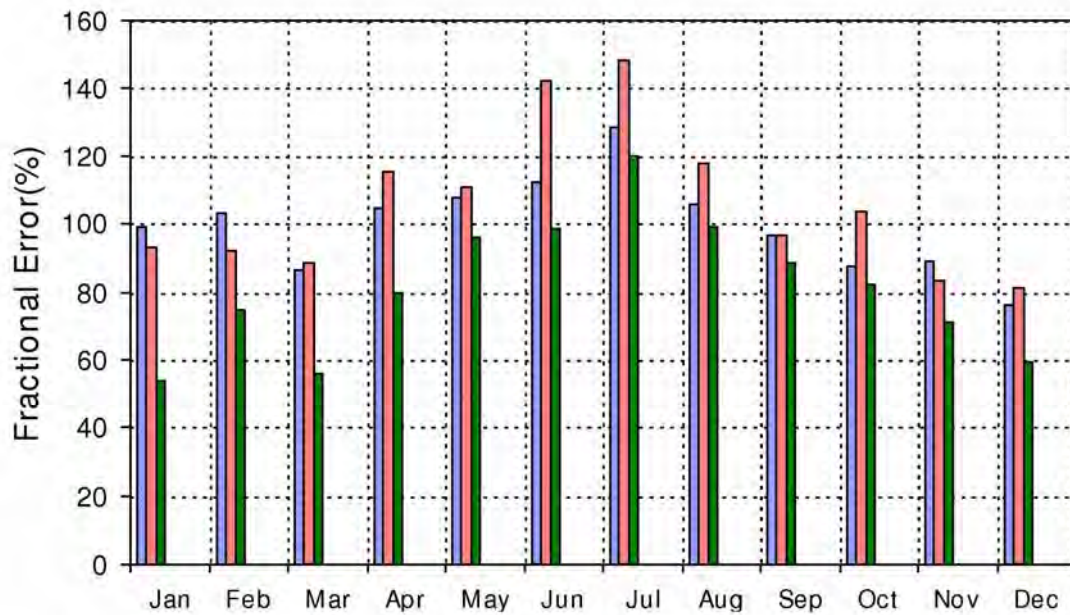
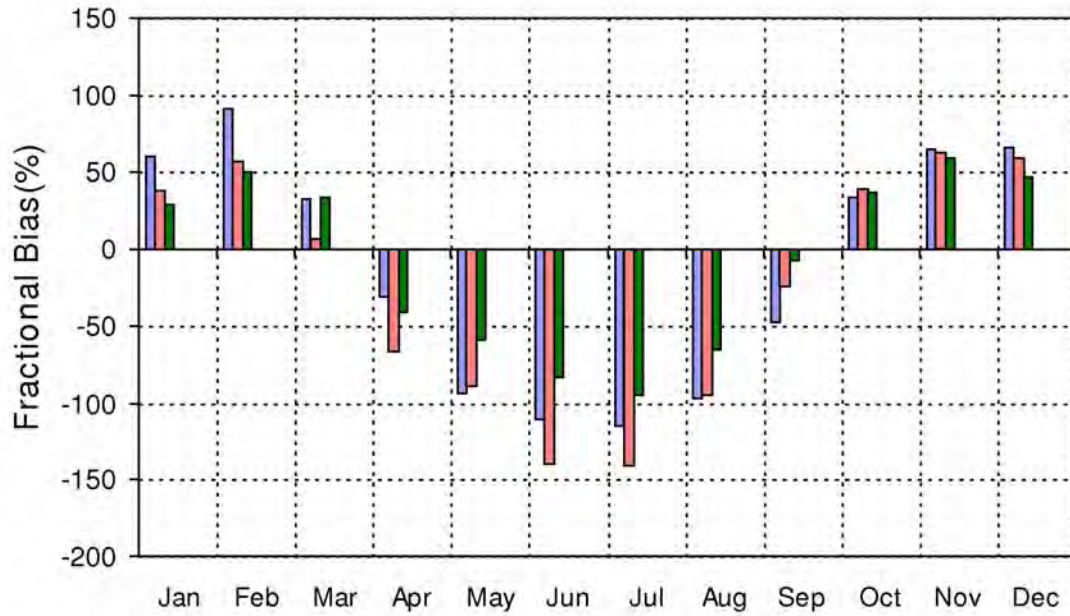


Figure C-14. Monthly NO3 fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE, STN and CASTNet monitoring sites in the CENRAP region.

CENRAP Typ02f_MPE 36k Bugle Plot

NO3

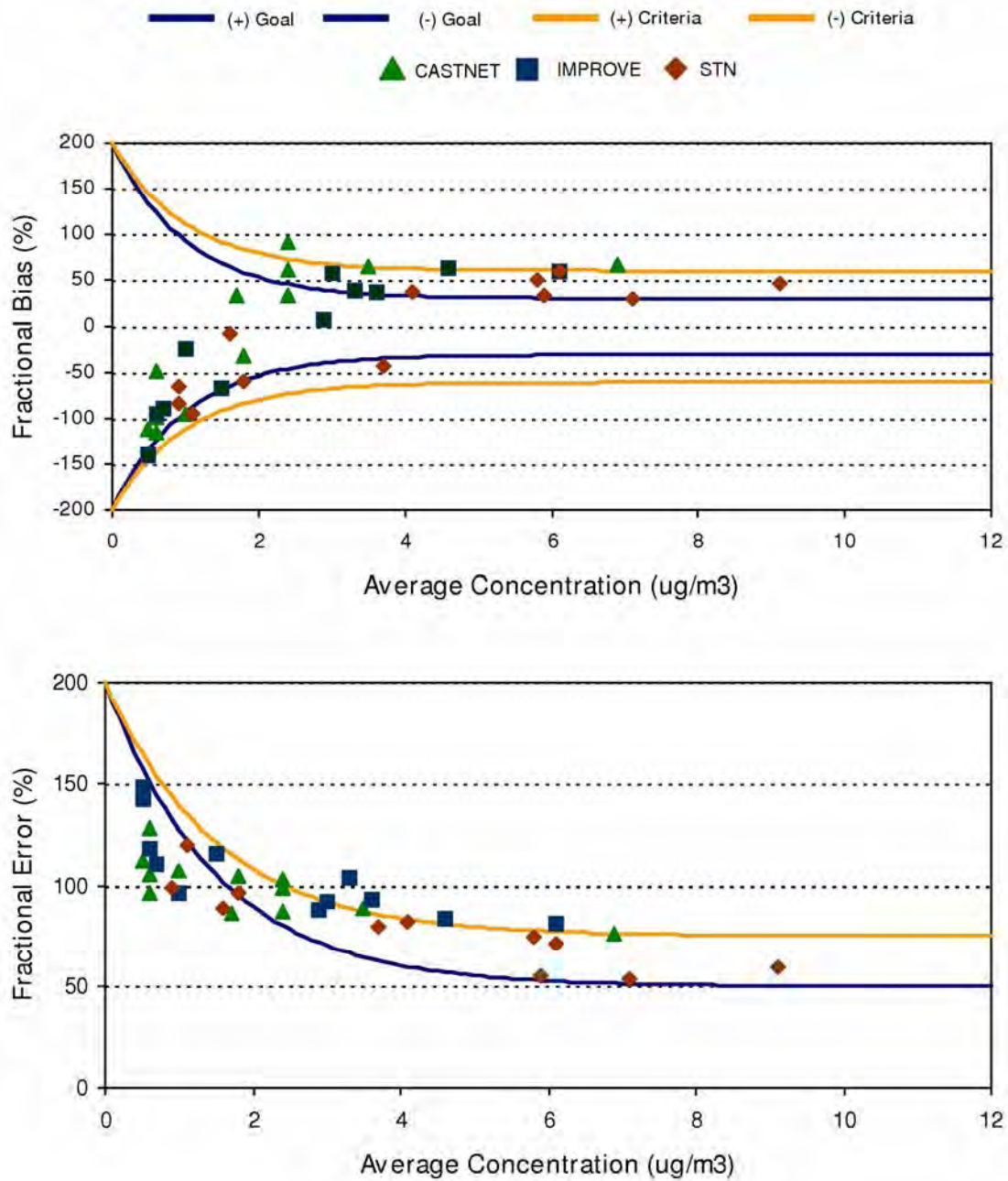


Figure C-15. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for NO3 and IMPROVE, STN and CASTNet monitoring sites in the CENRAP region.

C.3.3 Organic Matter Carbon (OMC) Monthly Model Performance

Organic Matter Carbon (OMC) model performance is presented below. There is incommensurability between the observed and modeled OMC, the model provides estimates of OMC that includes Organic Carbon (OC) as well as other elements attached to the OC (e.g., oxygen), whereas the monitoring networks measure just the carbon component of OMC (i.e., OC). Consequently, the measured OC must be adjusted to OMC for comparison with the model to account for the additional elements attached to the carbon. The OMC/OC ratio is not constant and depends in part on the age of the OMC with fresh OMC having lower OMC/OC ratios than aged OMC. The original IMPROVE equation used an OMC/OC ratio of 1.4 based mainly on urban-oriented measurements. The new IMPROVE equation uses an OMC/OC ratio of 1.8 reflecting the fact that OMC at the more rural IMPROVE monitors is more aged than urban OMC. Thus, selecting a single OMC/OC ratio for adjusting the measured OC to OMC for the model evaluation is somewhat problematic when we have both urban (STN) and rural (IMPPROVE) monitors. In addition, measured OC also has substantial uncertainty with different measurement techniques differing by as much as 50% (Solomon et al., 2005). A 1.4 OMC/OC ratio was used to convert the measured OC to OMC for the model performance evaluation.

C.3.3.1 OMC in January 2002

Figure C-16a displays scatter plots and performance statistics for January OMC model performance across the IMPROVE and STN sites in the CENRAP region. OMC model performance is fairly with near zero bias across the IMPROVE sites, -38% underestimation bias across the STN sites and errors of ~50%. The underestimation of OMC at the urban STN sites is a common occurrence in air quality modeling and may indicate a missing source of urban OMC. With the exception of an underestimation bias at Breton Island and an over-prediction bias at the two Texas IMPORVE sites (BIBE and GUMO), the model reproduces the observed OMC time series in January fairly well. The modeled spatial distribution of OMC is in general agreement with the observations although it sometimes captures the elevated values on some days (e.g., January 29, 2002 in central Illinois) and misses it on others (e.g., January 26, 2002 at Mingo).

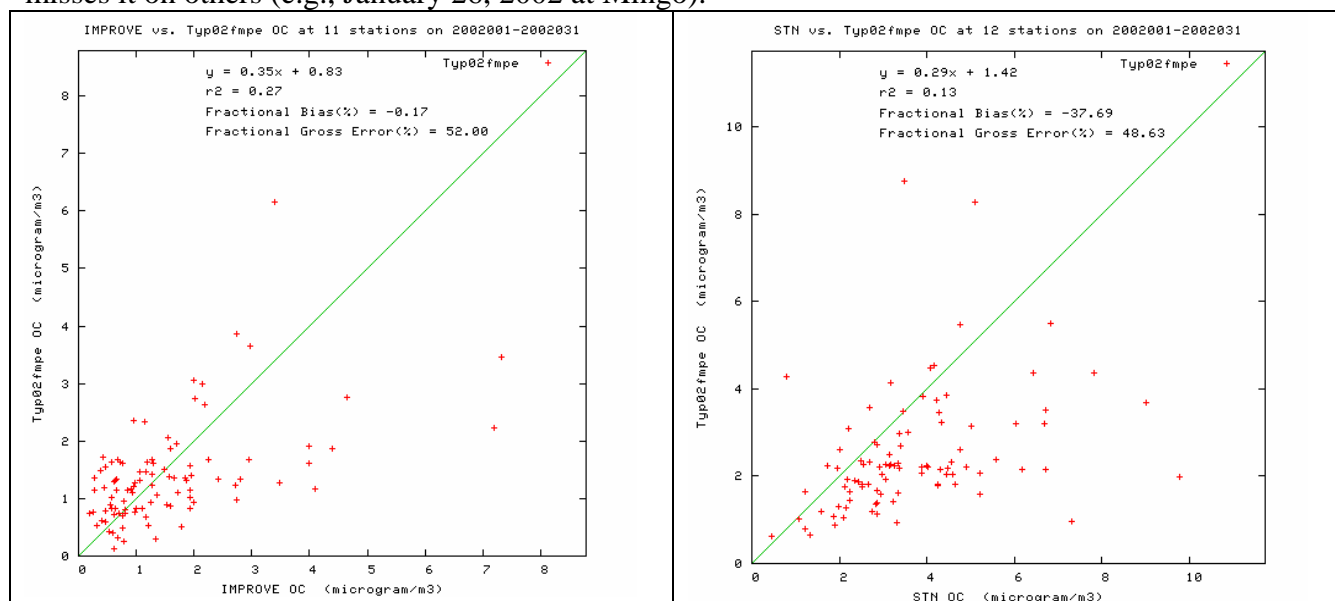
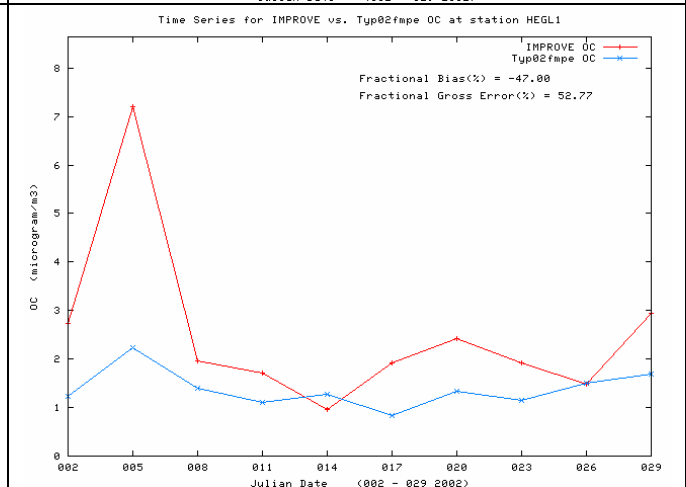
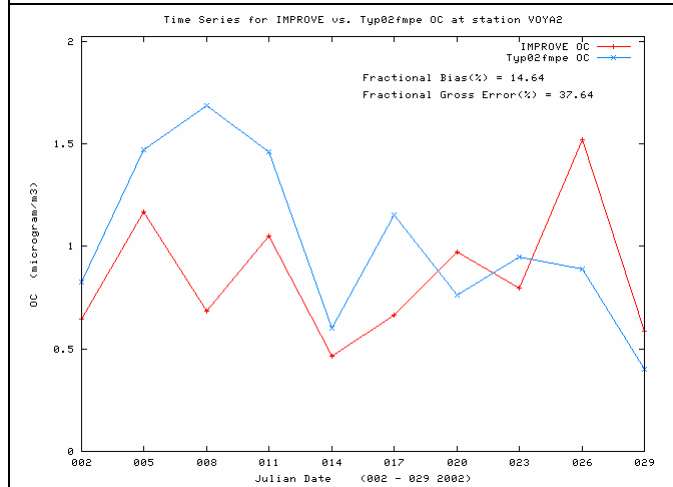
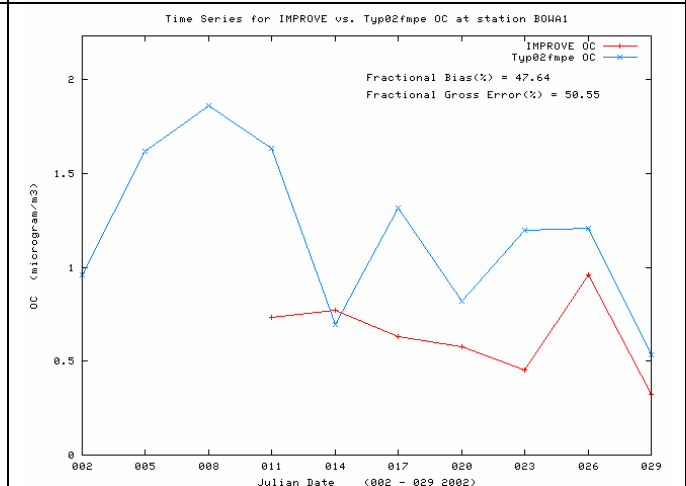
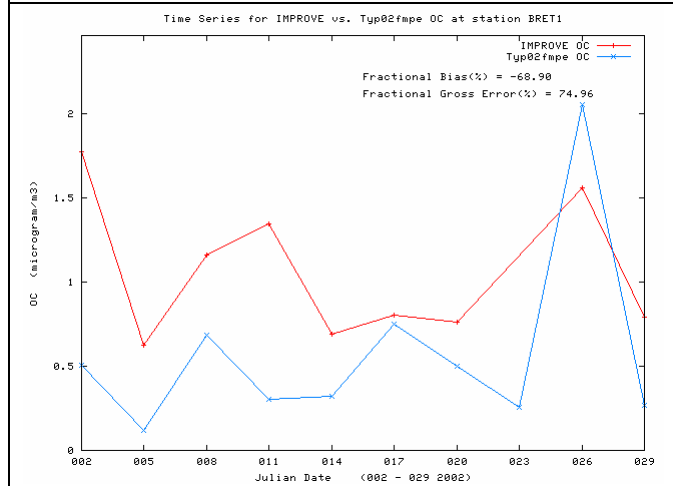
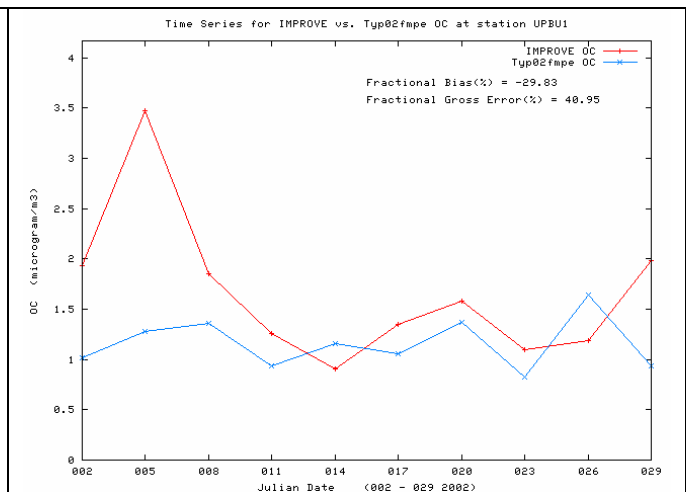
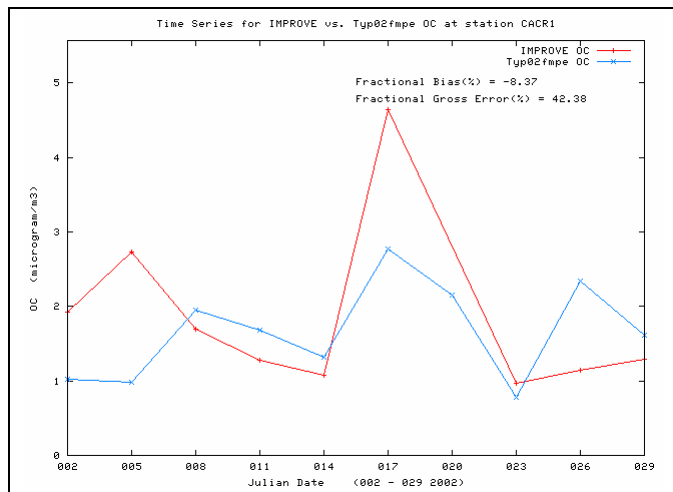


Figure C-16a. Scatter plots of predicted and observed organic matter carbon (OMC) concentrations for January 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



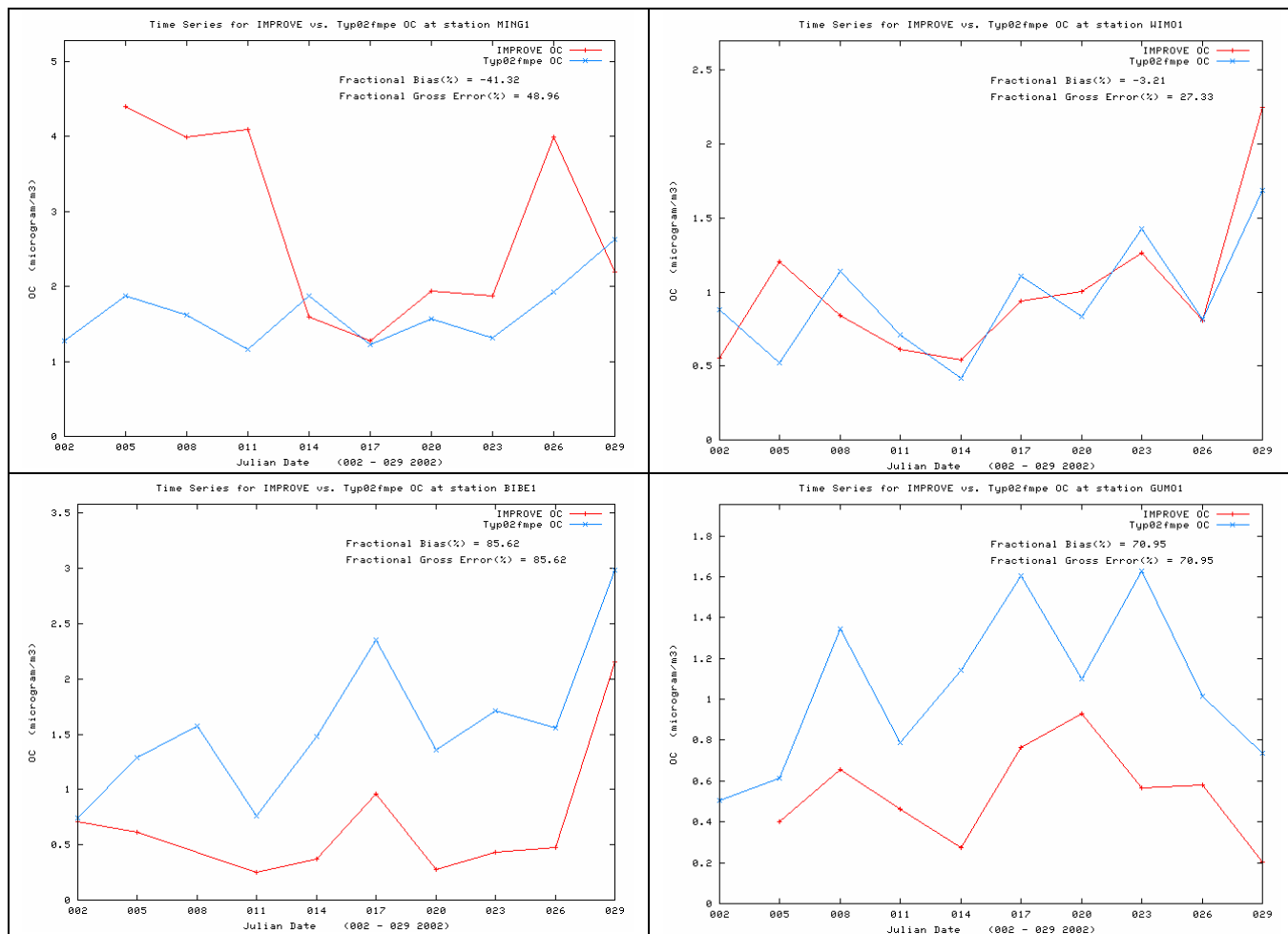
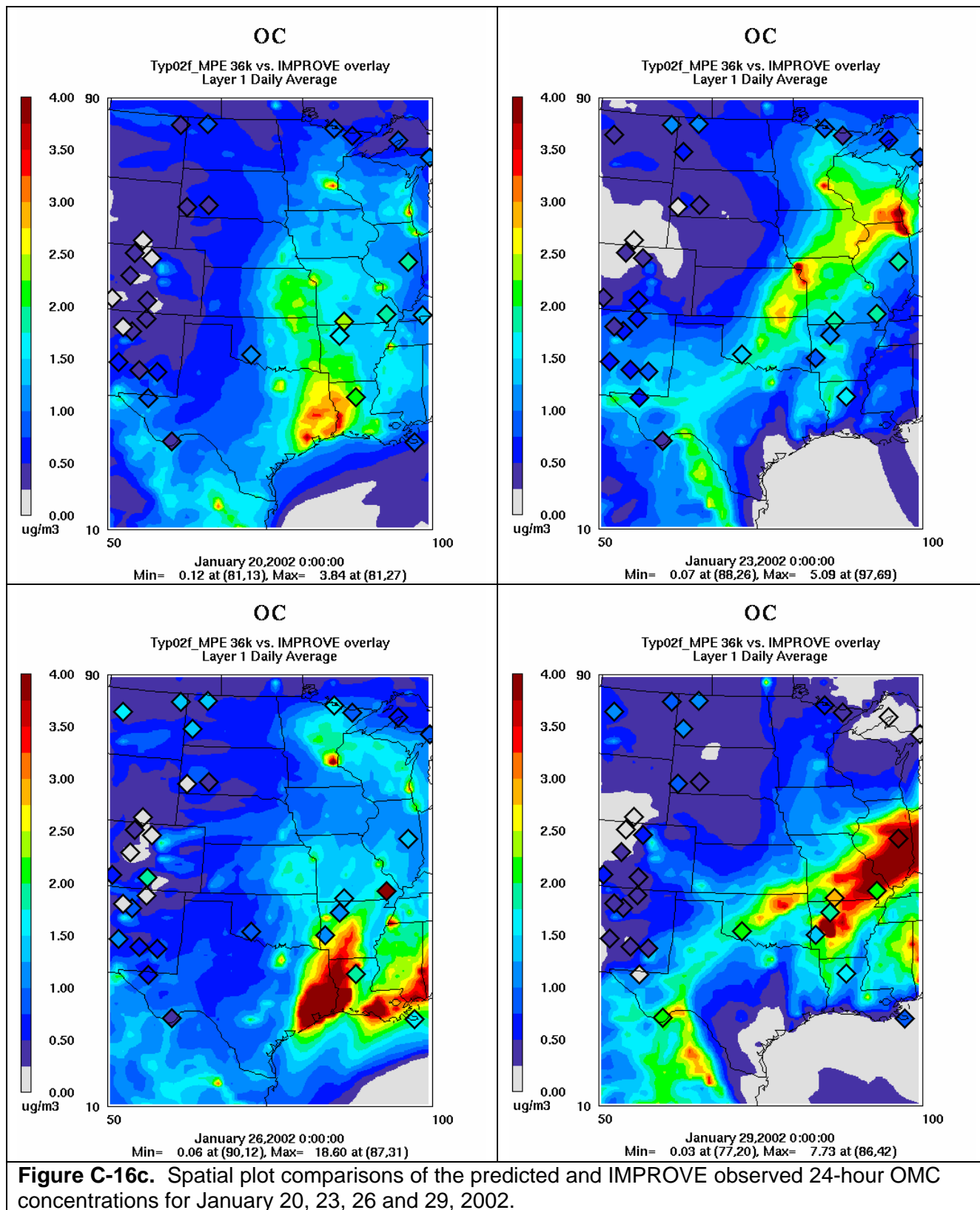
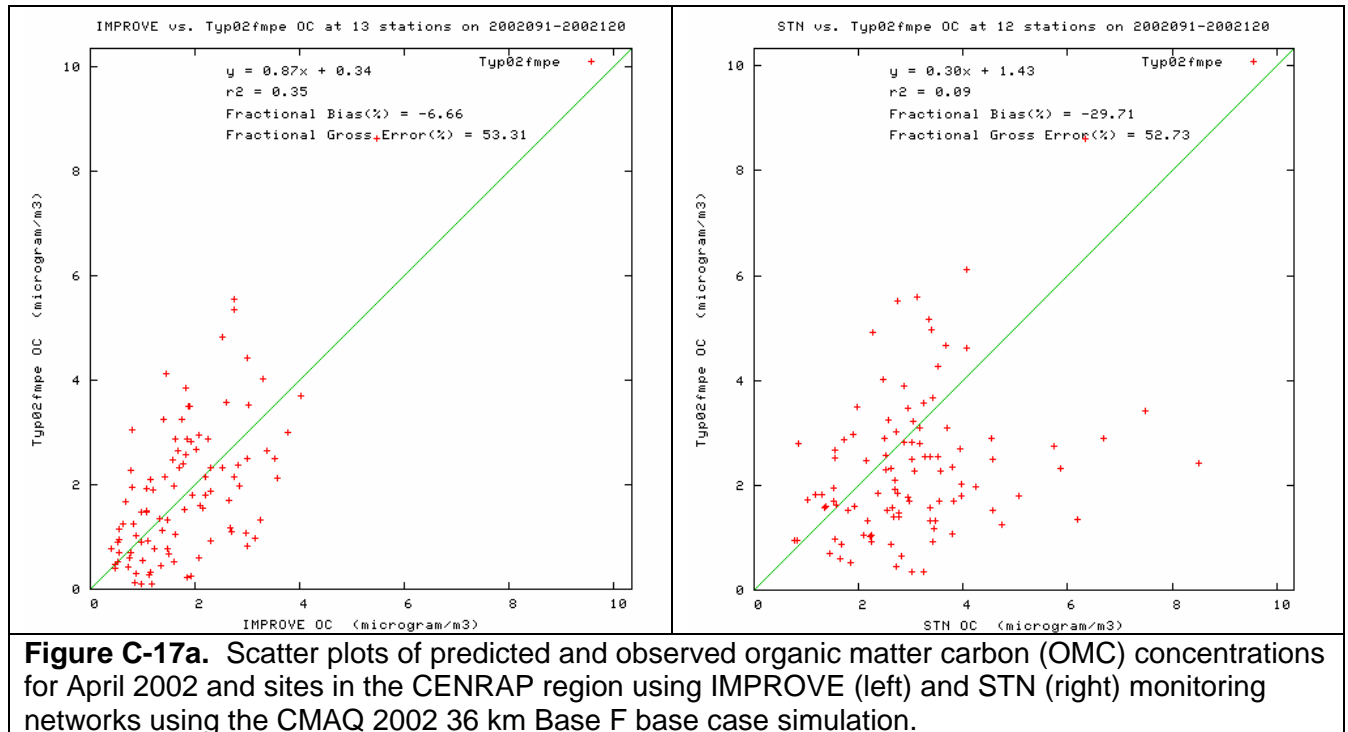


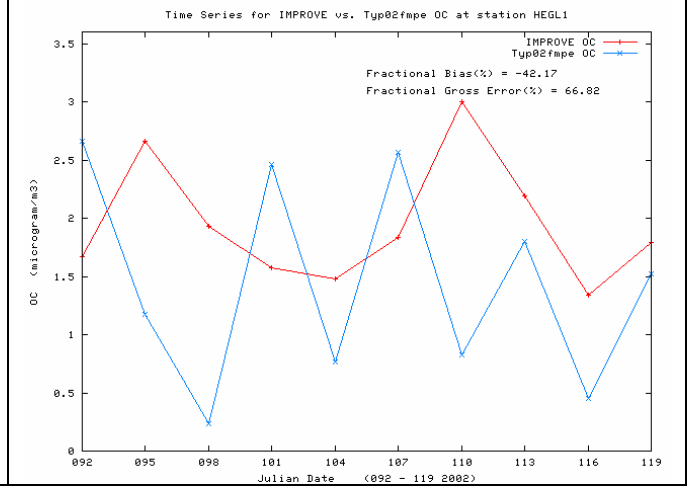
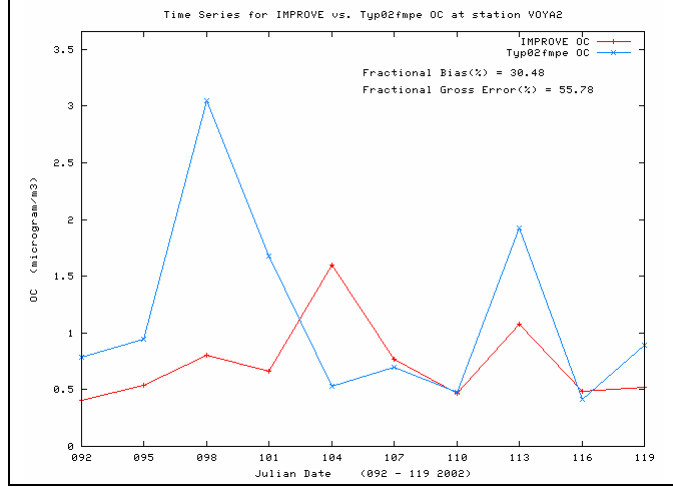
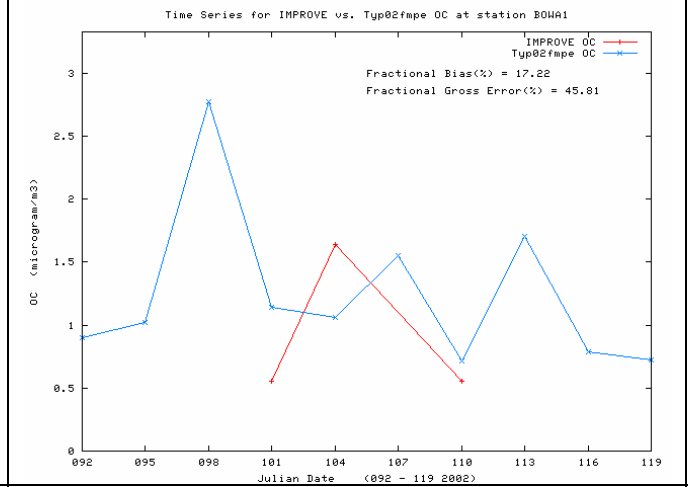
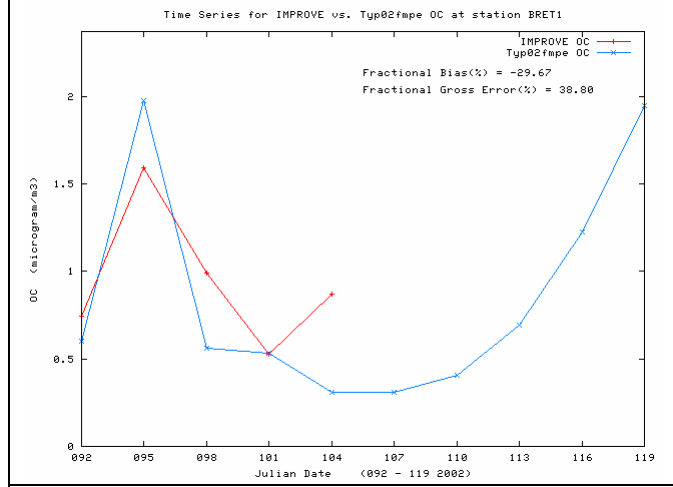
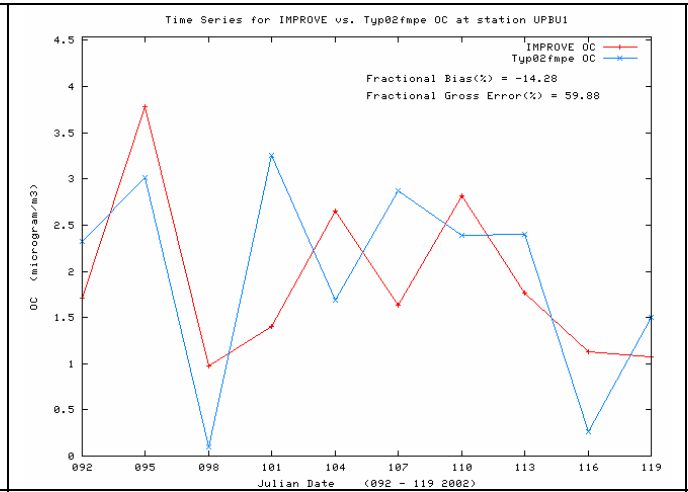
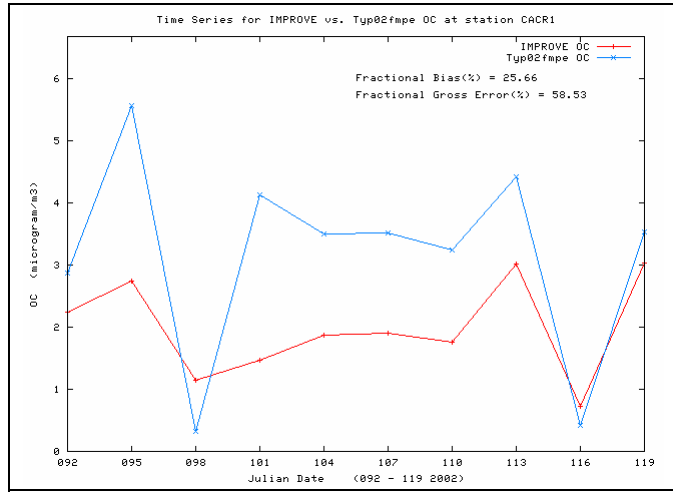
Figure C-16b. Time series of predicted and observed 24-hour organic matter carbon (OMC) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.3.2 OMC in April 2002

The OMC performance in April is also fairly reasonable, again bias across the IMPROVE monitors is near zero (-7%), an underestimation bias exists across the STN sites (-30%) and errors are near 50% (Figure C-17a). The time series comparisons (Figure C-17b) are also reasonable with the model generally agreeing on the magnitudes of the observed OMC, but with an underestimation bias at several sites (e.g., MING and WIMO). The observed spatial distribution of OMCV appears to be much spottier than predicted (Figure C-17c). Thus, when the model reproduces an elevated observed OMC value like at UPBU on April 5th, it overestimates OMC at neighboring sites that have lower values (e.g., HEGL).





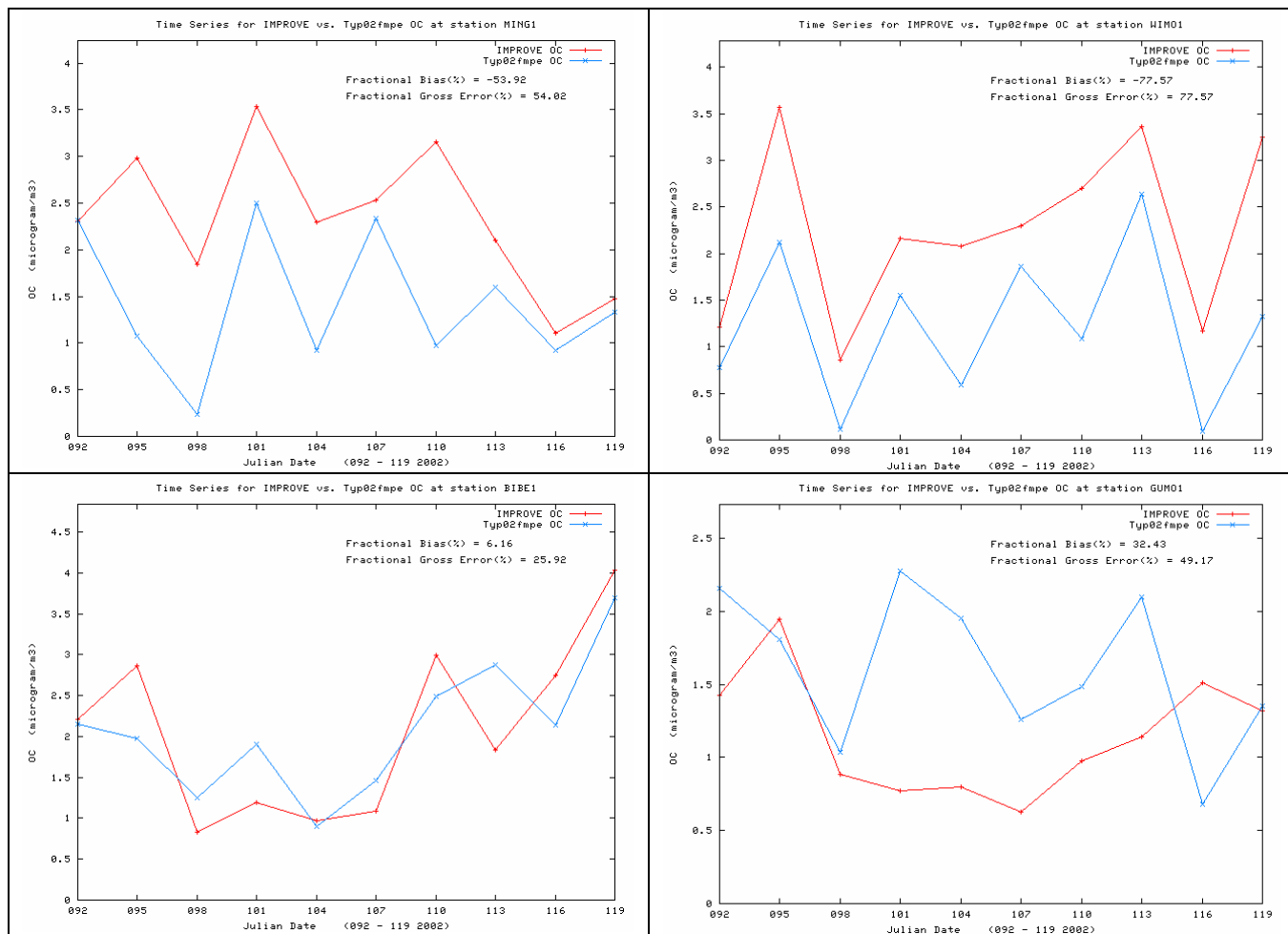


Figure C-17b. Time series of predicted and observed 24-hour organic matter carbon (OMC) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.

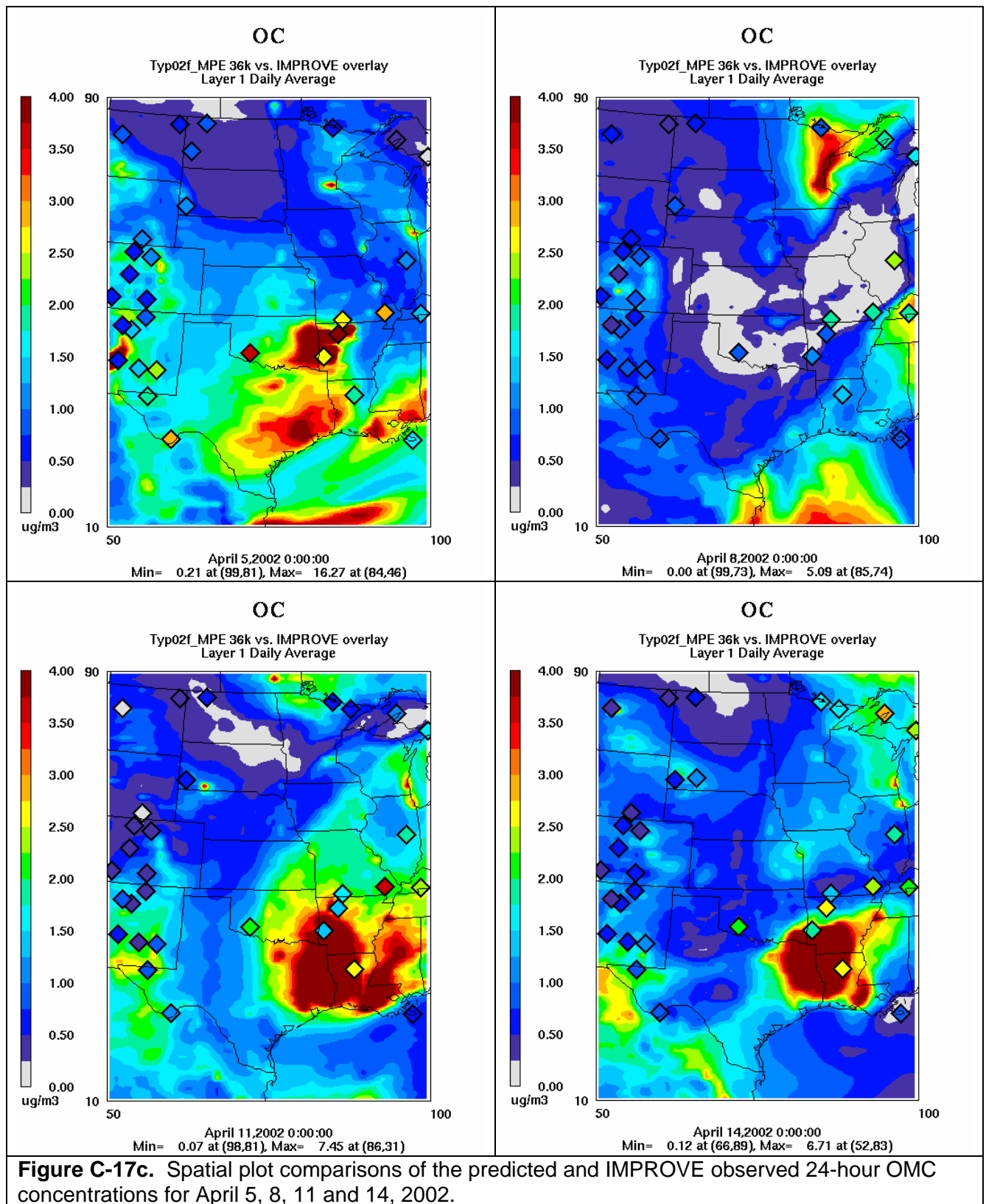


Figure C-17c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour OMC concentrations for April 5, 8, 11 and 14, 2002.

C.3.3.3 OMC in July 2002

Modeled and observed OMC are higher in July due to the impacts of more secondary organic aerosols (SOA) and fires. OMC bias values of -18% and -41% exist across the IMPROVE and STN networks in July (Figure C-18a). Two of the observed OMC values at the IMPROVE sites are very high ($> 15 \mu\text{g}/\text{m}^3$). An examination of the time series plots (Figure C-18b) reveals that these two values occur on Julian Day 200 and the two northern Minnesota sites (VOYA and BOWA) and are likely due to fire impacts. The model is also estimating elevated OMC at these sites on these two days, but not as high as observed. At most sites the model is tracking the temporal variation of the observed OMC reasonably well. OMC data for MING were missing in July 2002. The model reproduces the observed high OMC in northern Minnesota and centered on Louisiana and adjacent areas on July 7 and 10 quite well, but also predicts elevated OMC in the Denver area that is not reflected in the observations (Figure C-18c). The model is exhibiting less skill in predicting the spatial distribution of the observed OMC on July 13 and 16.

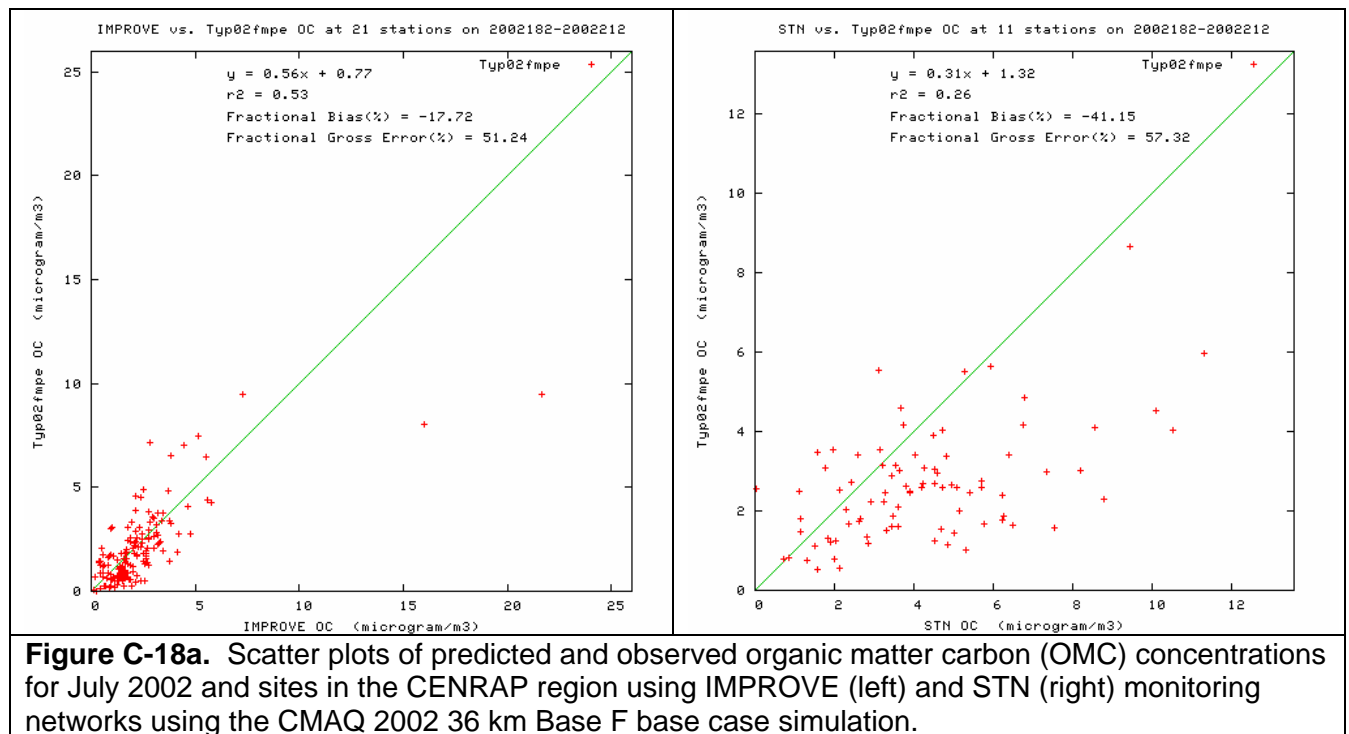
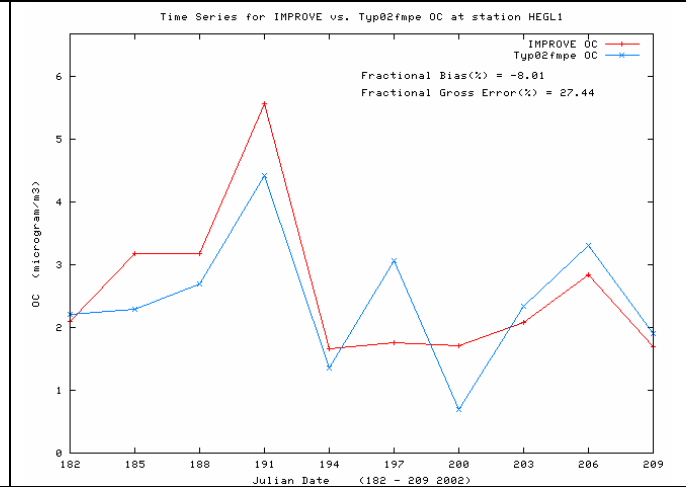
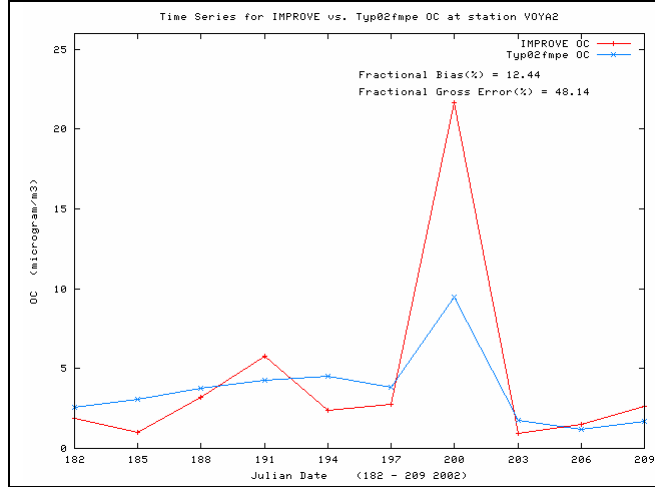
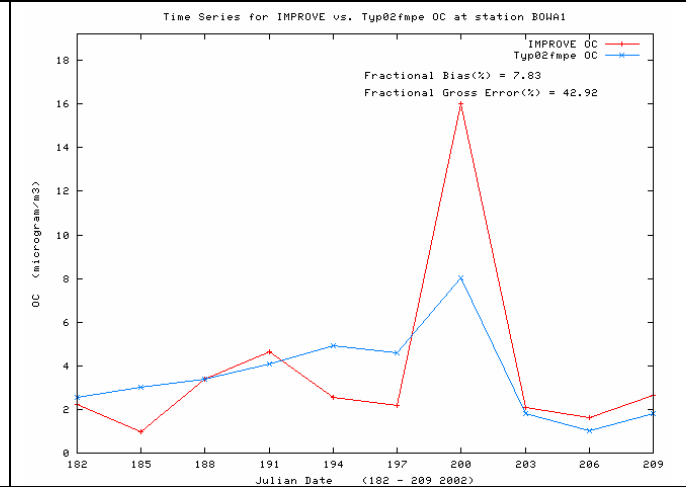
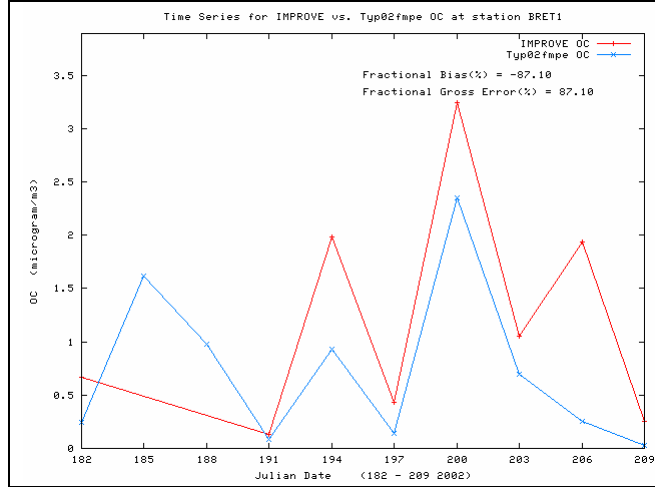
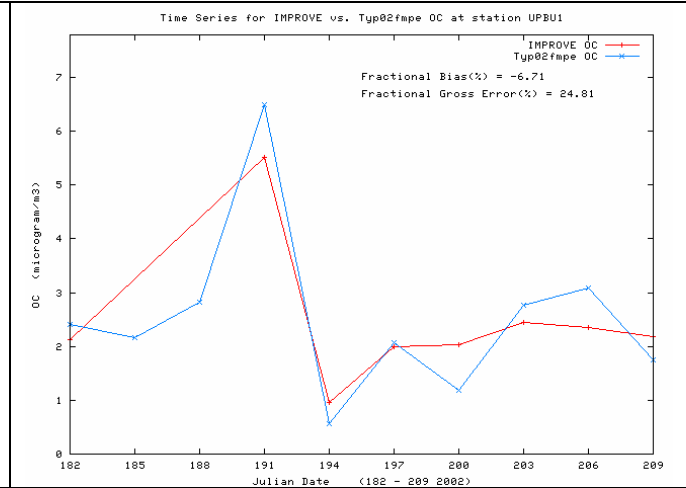
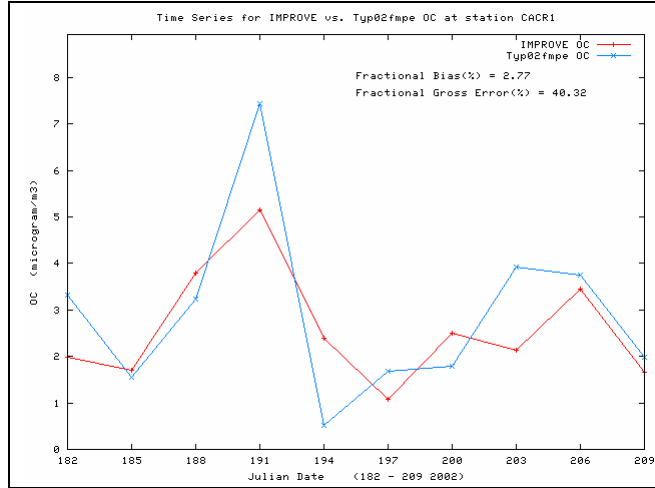


Figure C-18a. Scatter plots of predicted and observed organic matter carbon (OMC) concentrations for July 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



No Data for Mingo (MING)

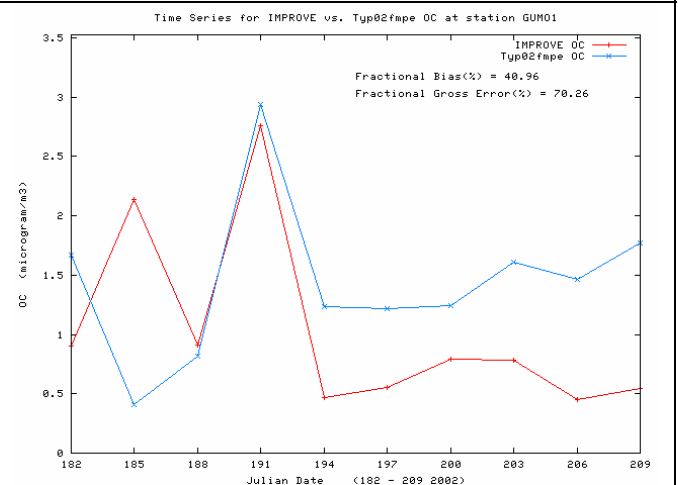
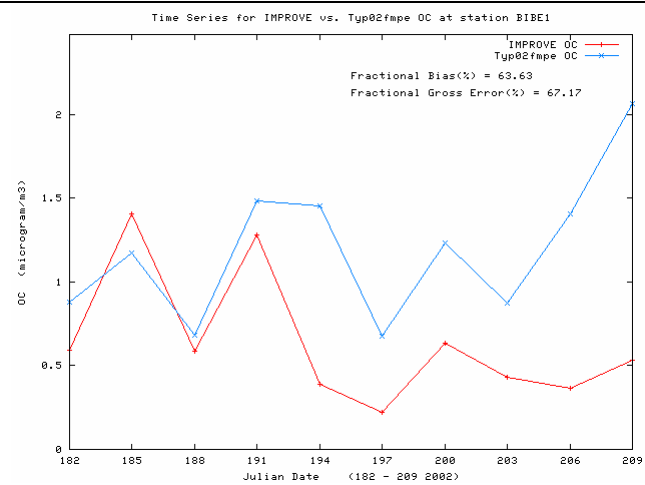
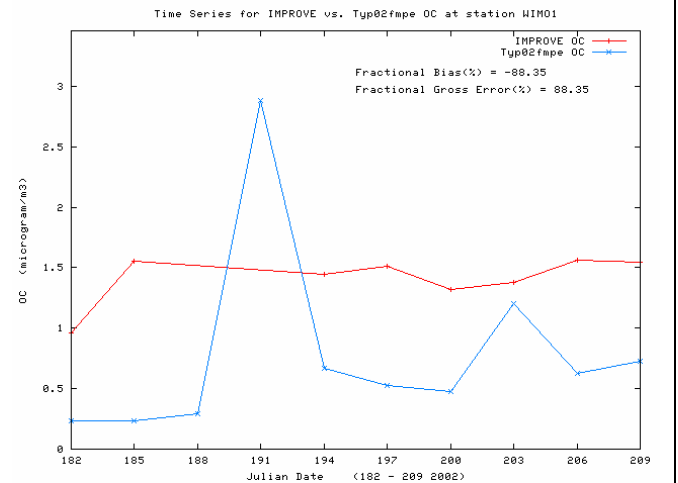


Figure C-18b. Time series of predicted and observed 24-hour organic matter carbon (OMC) concentrations at CENRAP IMPROVE CLASS I AREA sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

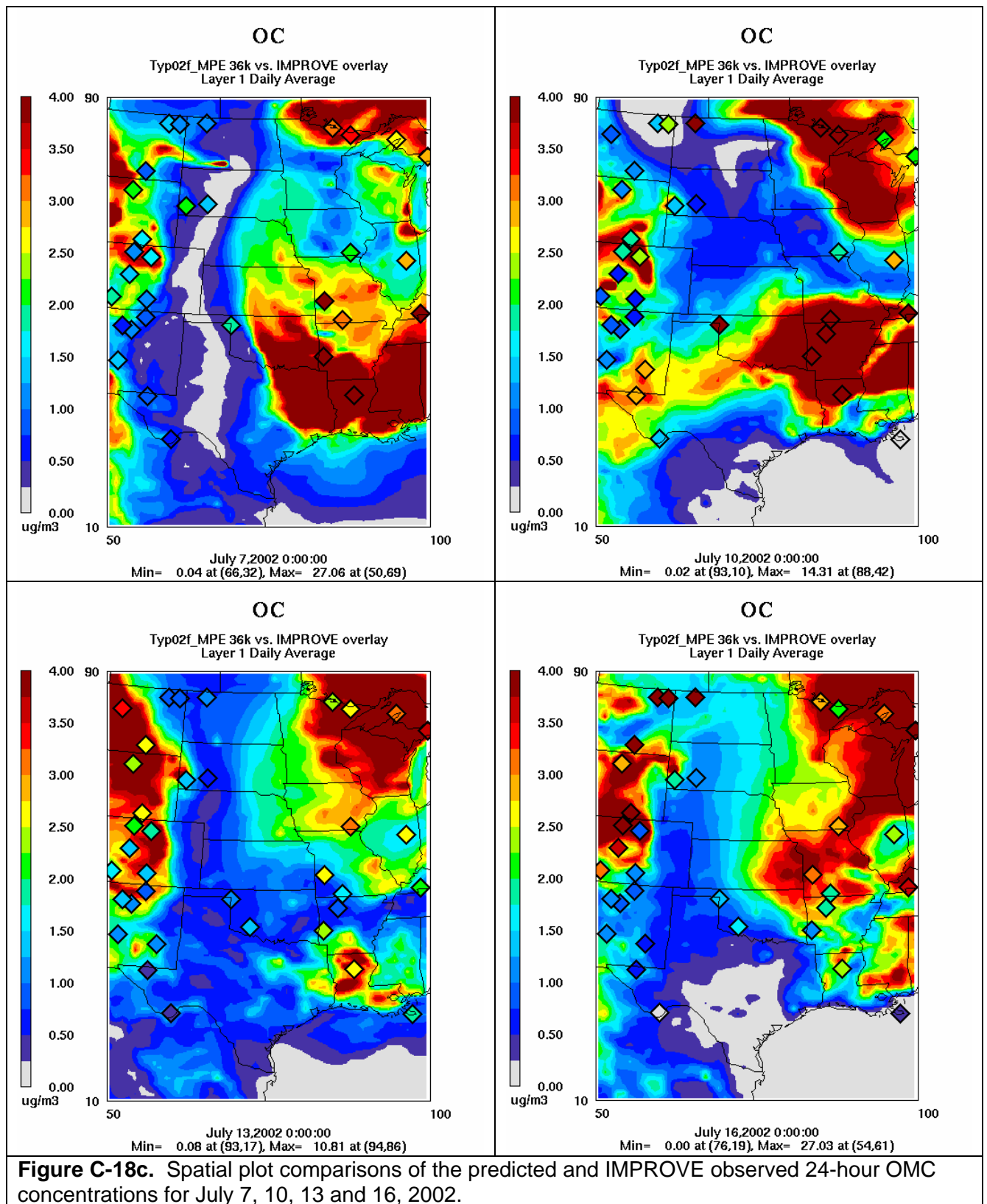
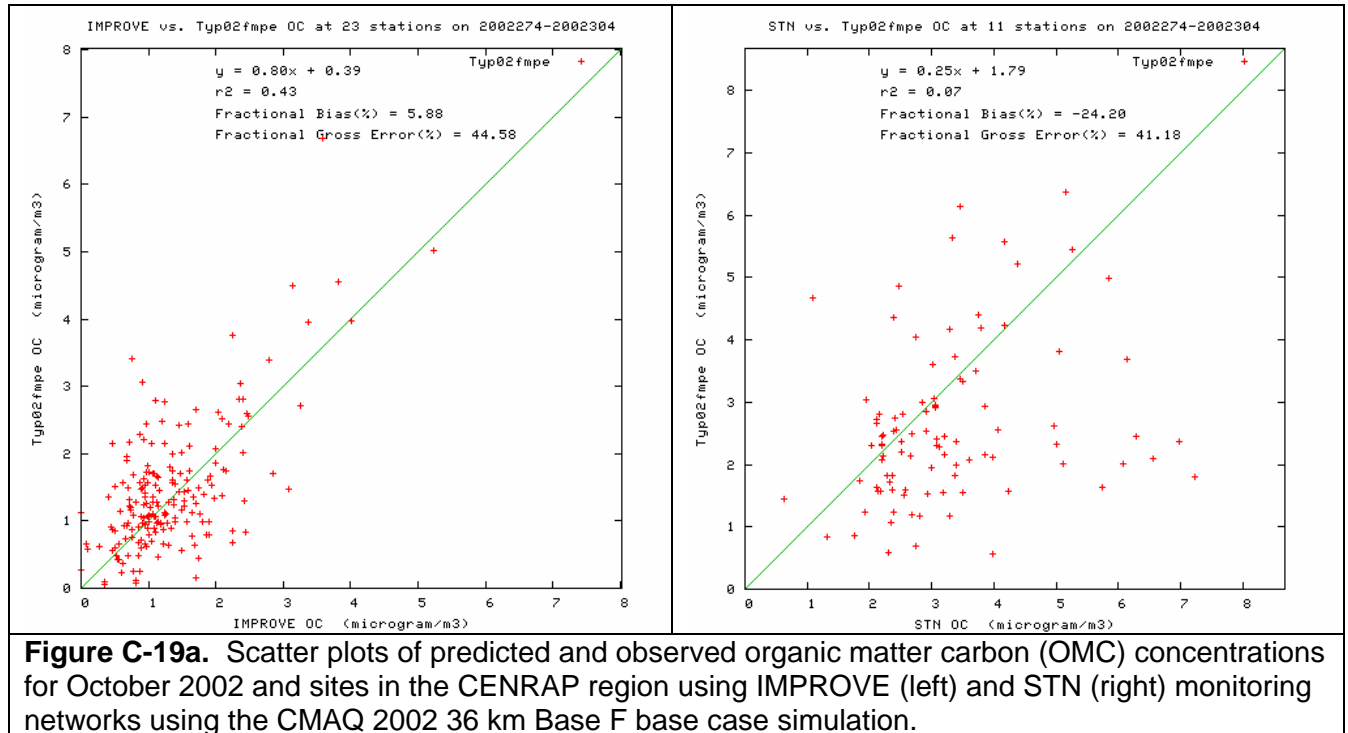
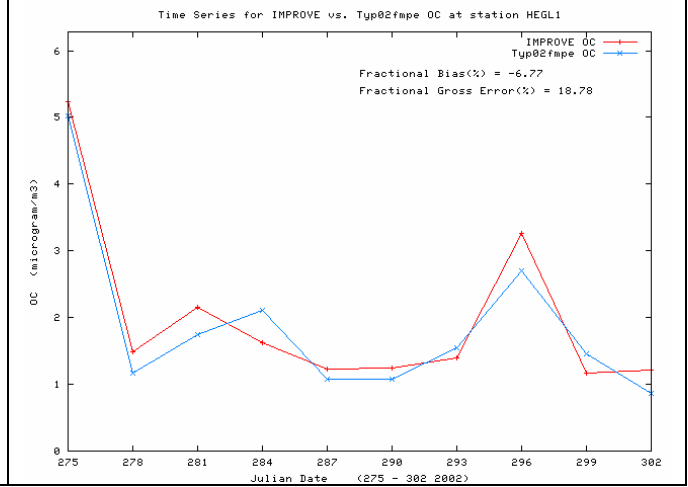
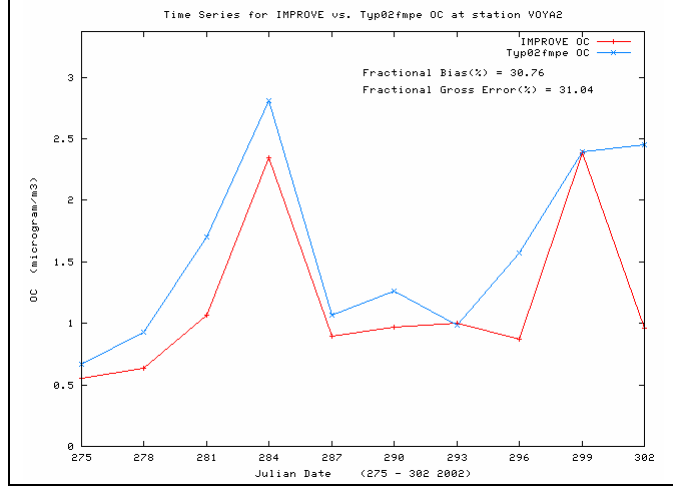
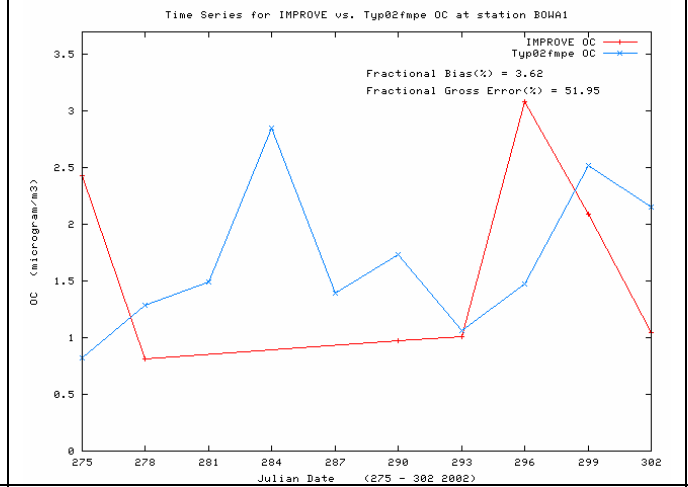
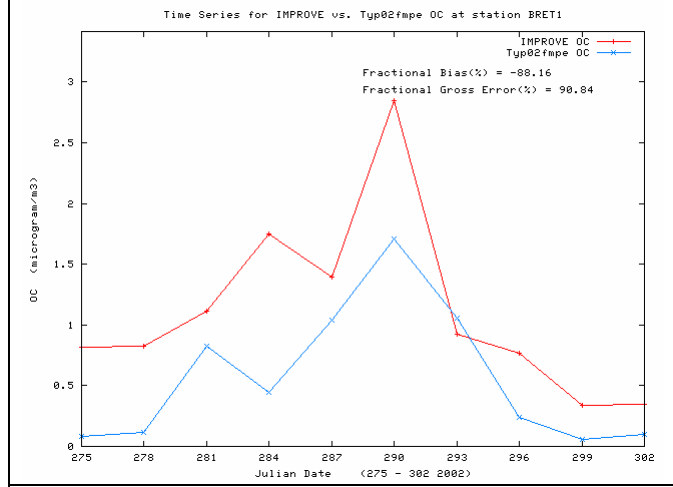
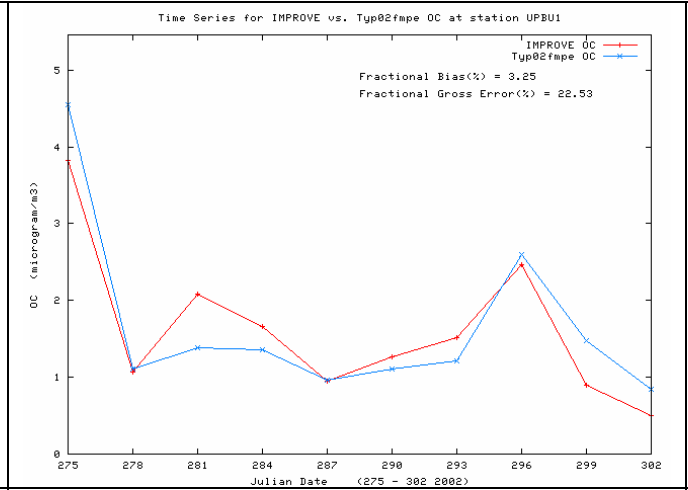
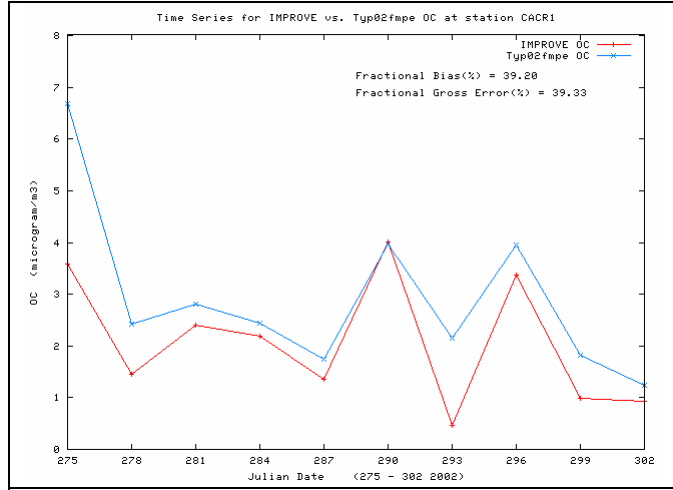


Figure C-18c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour OMC concentrations for July 7, 10, 13 and 16, 2002.

C.3.3.4 OMC in October 2002

OMC model performance in October 2002 is similar to the other months with near zero bias across the IMPROVE sites and an underestimation bias across the STN sites in the CENRAP region (Figure C-19a). Although OMC overestimation bias occurs at the Texas sites (BIBE and GUMO), the model is exhibiting remarkable ability to reproduce the observed temporal variation in OMC at several of the sites (e.g., CACR, UPBU, VOYA and HEGL; Figure C-19b). The model also performs reasonable well in reproducing the day to day and spatial variability in the observed OMC (Figure C-19c).





No Data for Mingo (MING)

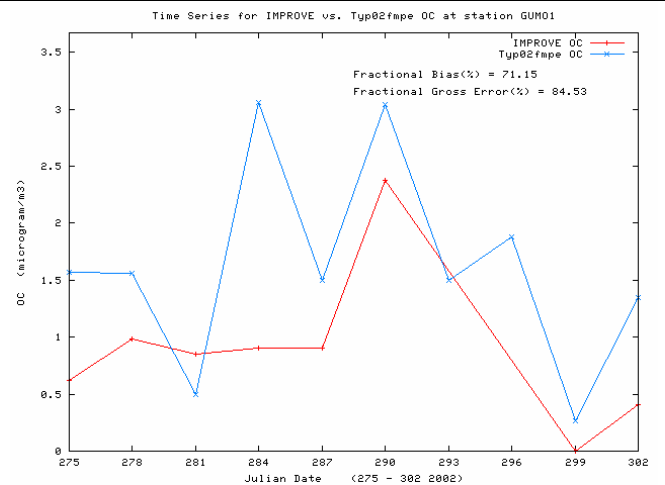
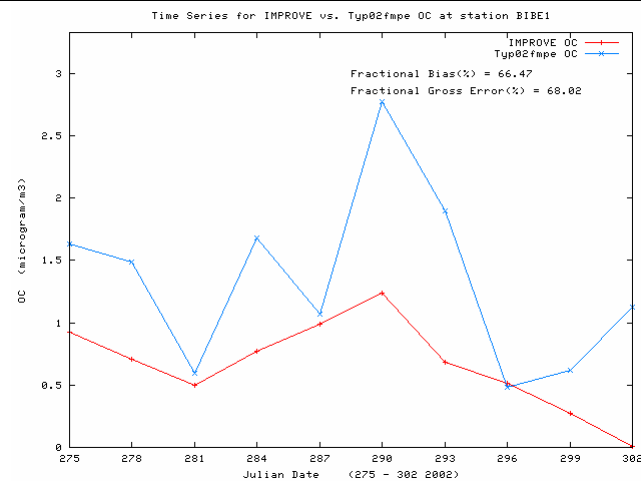
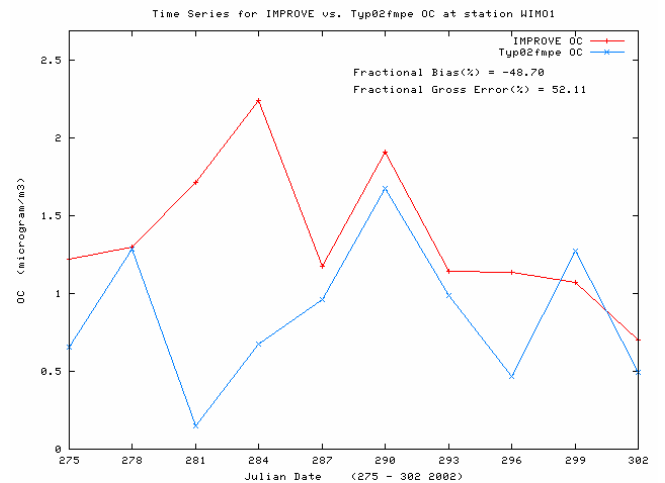


Figure C-19b. Time series of predicted and observed 24-hour organic matter carbon (OMC) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.

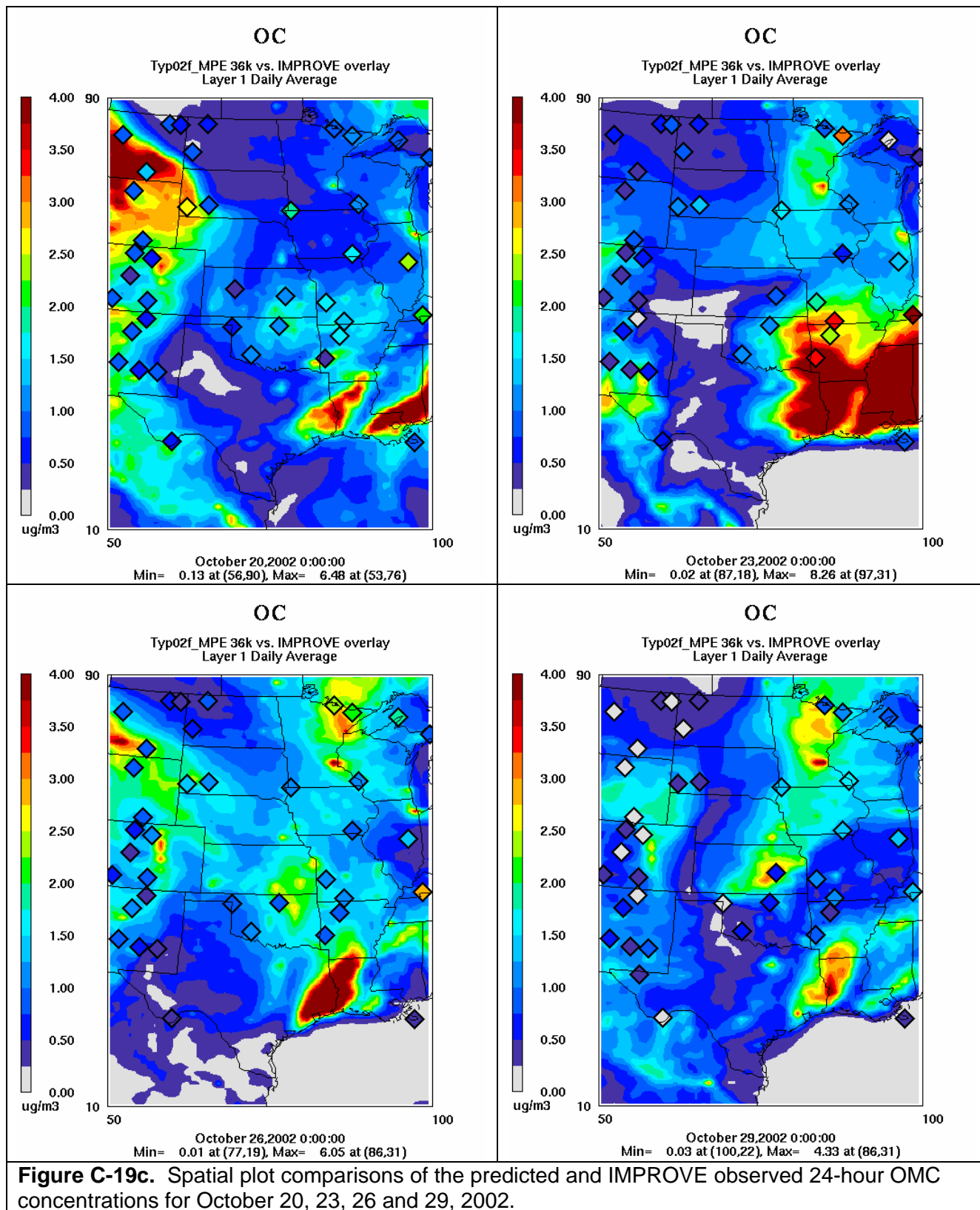


Figure C-19c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour OMC concentrations for October 20, 23, 26 and 29, 2002.

C.3.3.5 OMC Monthly Bias and Error

The OMC monthly bias and error across IMPROVE and STN sites in the CENRAP region are shown in Figure C-20. The bias performance for OMC at the IMPROVE sites are quite good throughout the year with values generally within $\pm 20\%$, albeit with a slight winter overestimation and summer underestimation bias. At the urban STN sites the model exhibits an underestimation bias throughout the year that ranges from -20% to -50%. Fractional errors are mostly within 40% to 60% with the STN network generally exhibiting more error than IMPROVE.

The good performance of the model for OMC at the IMPROVE sites is also reflected in the Bugle Plot (Figure C-21) with the bias and error achieving the proposed PM model performance goal for all months of the year. At the STN sites, however, the OMC bias falls between the proposed PM model performance goal and criteria, with error right at the goal for most months.

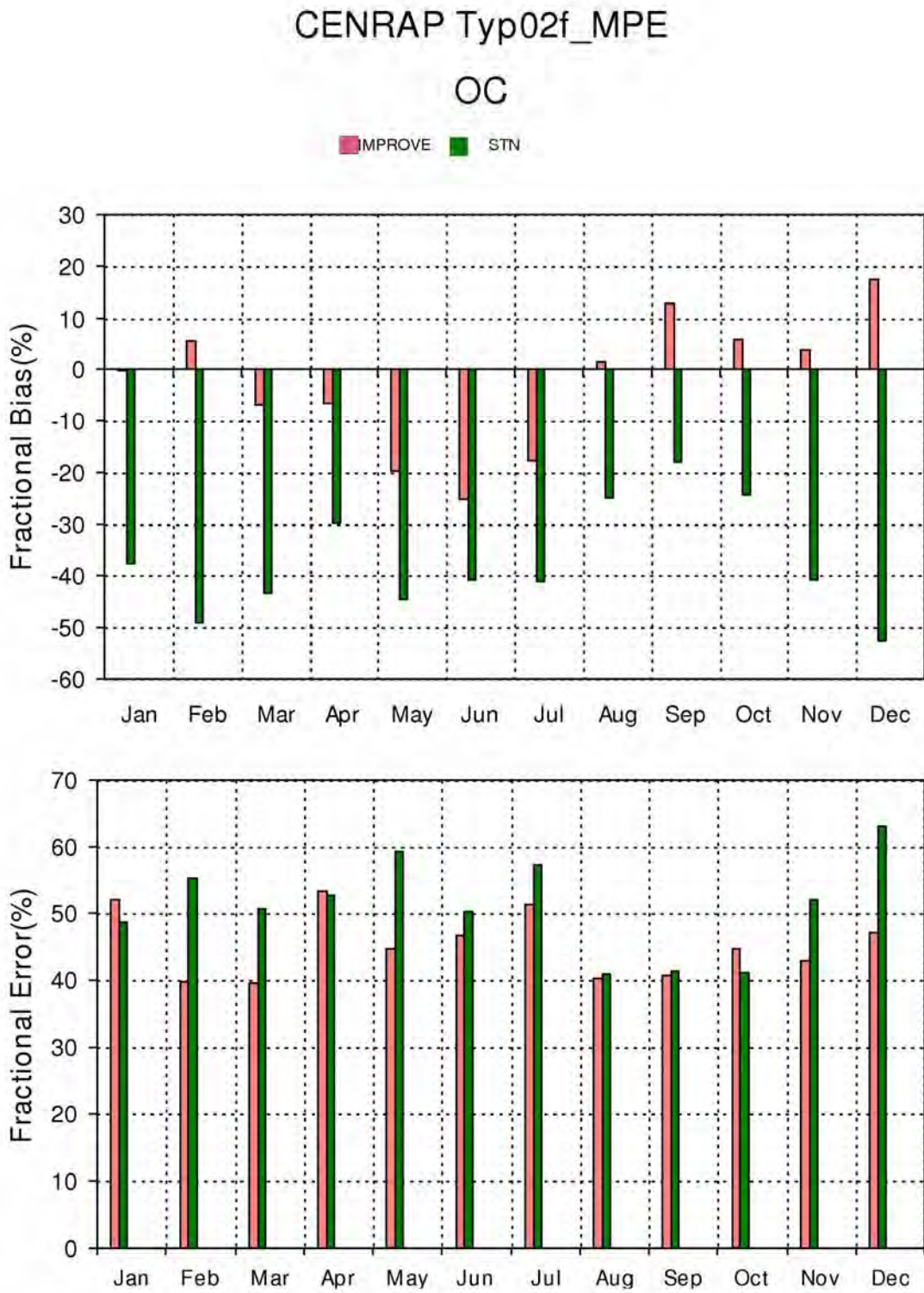


Figure C-20. Monthly OMC fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE and STN monitoring sites in the CENRAP region.

CENRAP Typ02f_MPE 36k Bugle Plot

OC

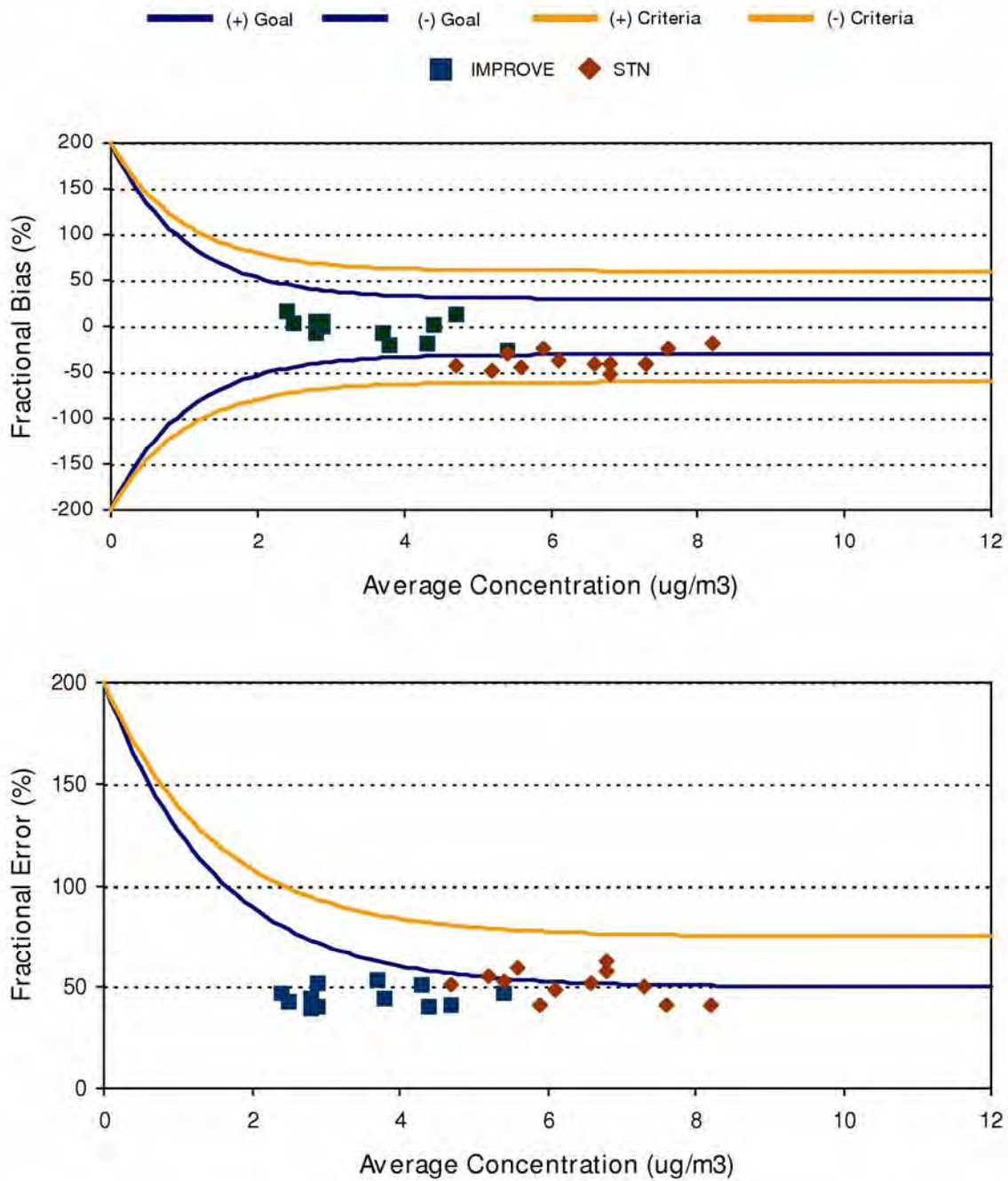


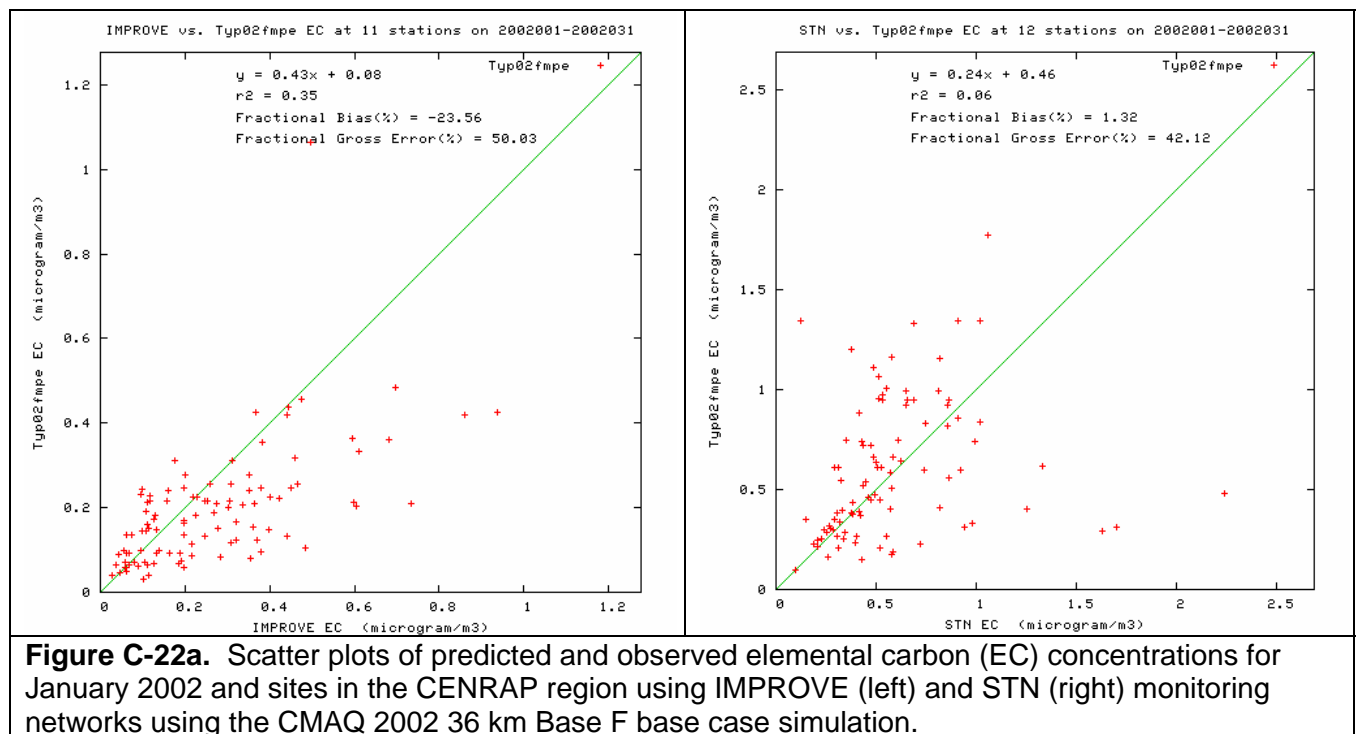
Figure C-21. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for OMC and IMPROVE and STN monitoring sites in the CENRAP region.

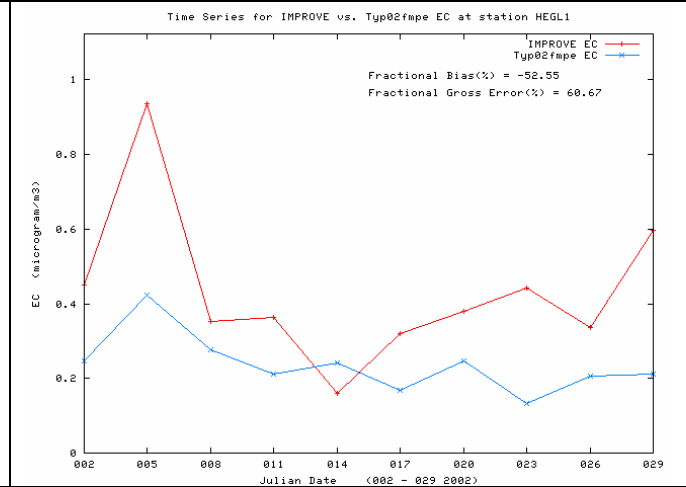
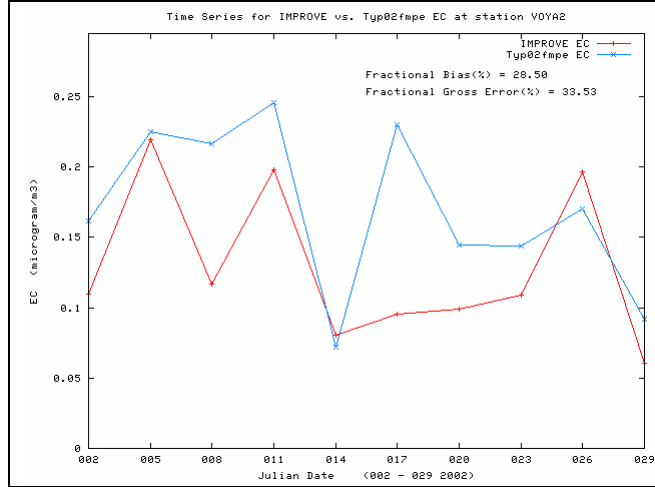
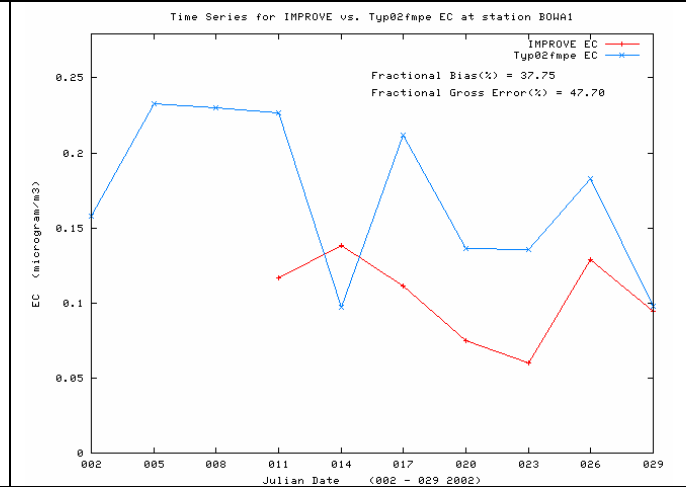
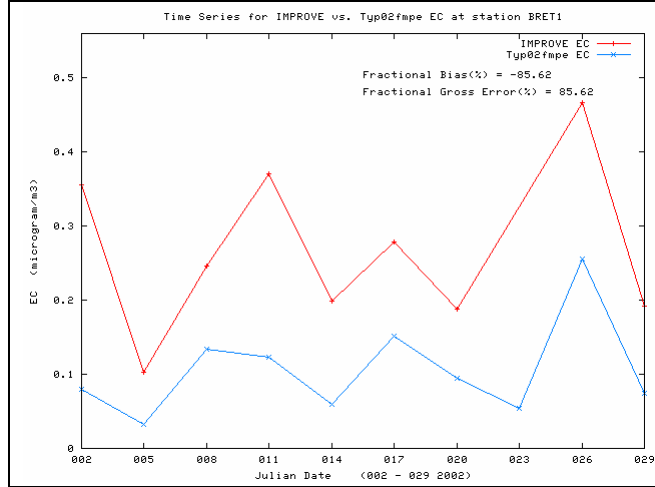
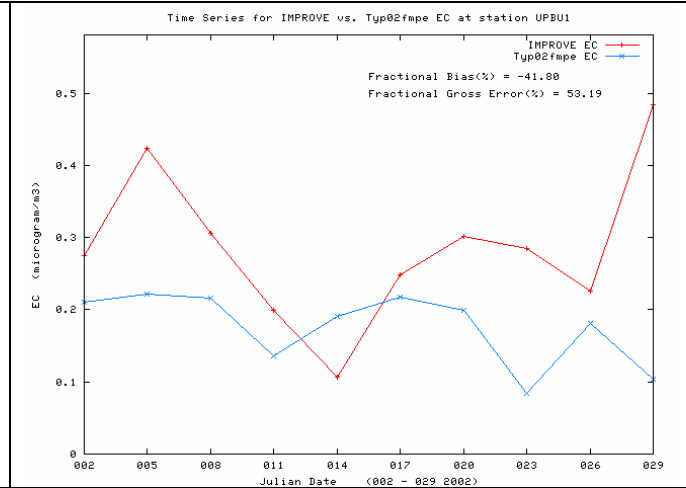
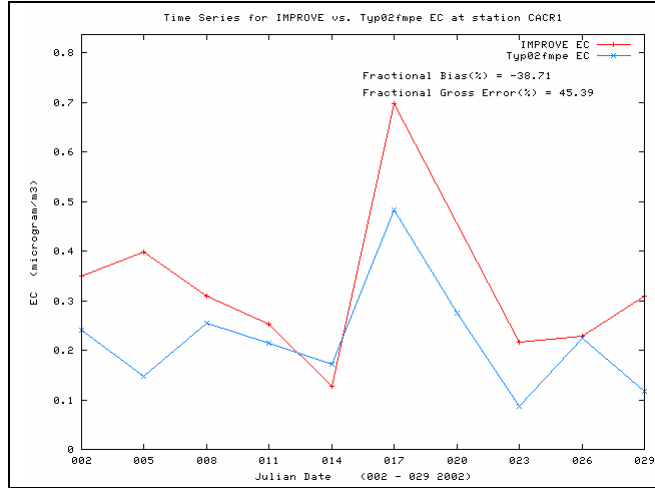
C.3.4 Elemental Carbon (EC) Monthly Model Performance

Elemental Carbon (EC) measurements are also uncertain, with the IMPROVE and STN using different measurement technologies with different measurement artifacts.

C.3.4.1 EC in January 2002

Although there is a lot of scatter in the January EC scatter plots at the IMPROVE and STN sites, the bias is fairly low (-24% and 1%) with errors in the 40%-50% range (Figure C-22a). The time series comparisons (Figure C-22b) suggest an EC underestimation bias at BRET and an overestimation bias at the northern Minnesota sites (VOYA and BOWA). The model generally agrees with the observed spatial distribution of EC in January with higher values on the eastern than western portions of the CENRAP region (Figure C-22c).





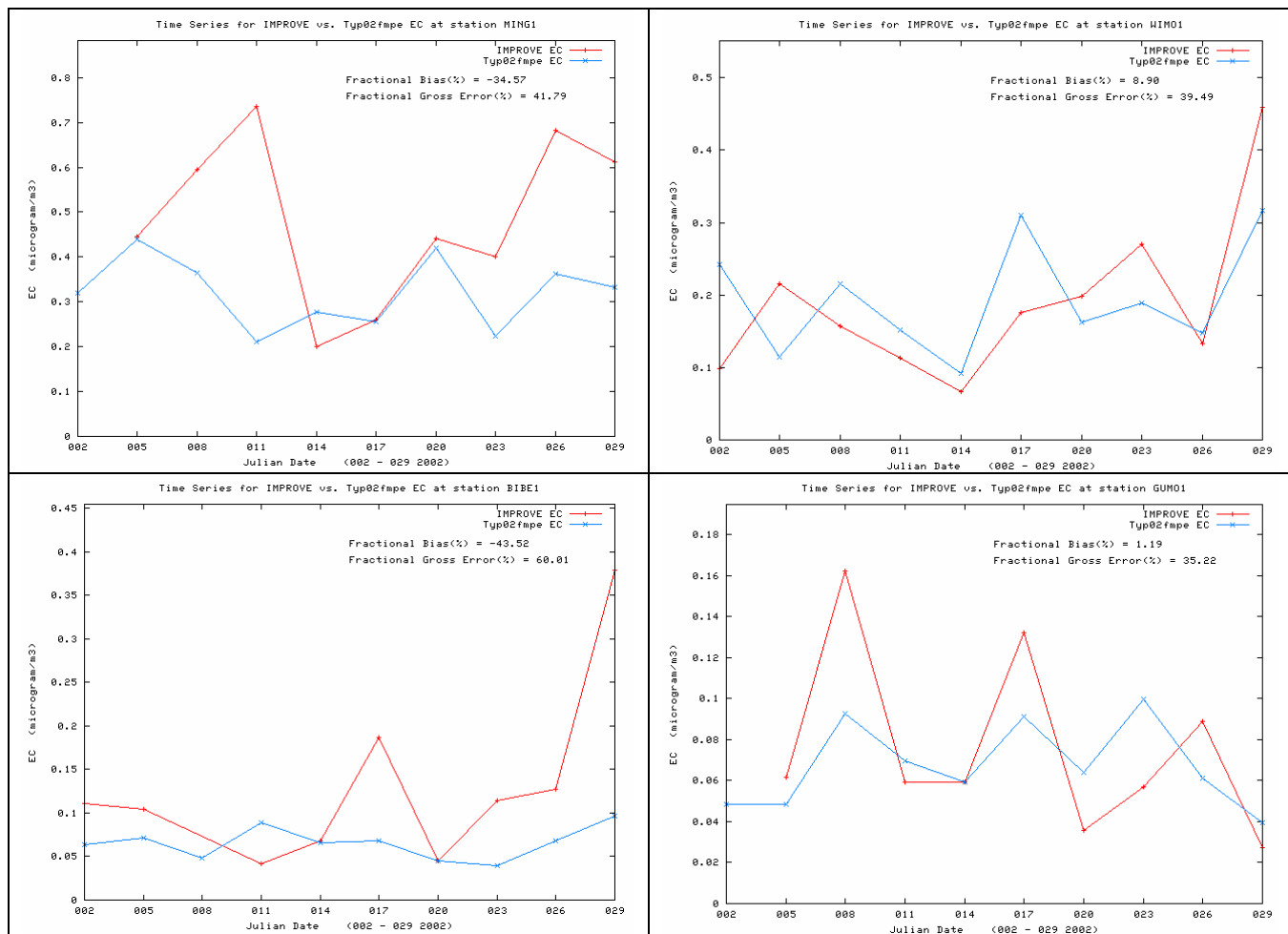
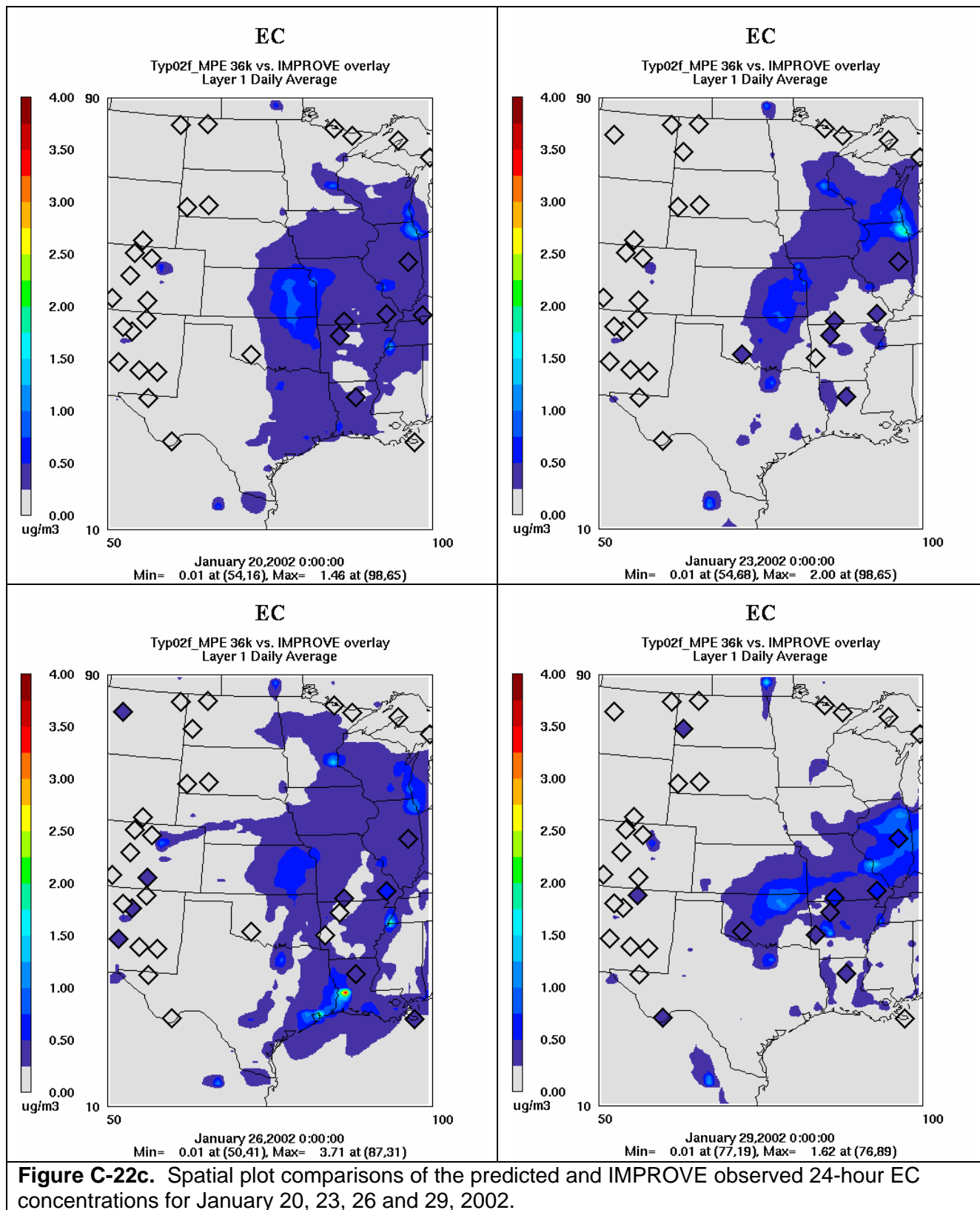


Figure C-22b. Time series of predicted and observed 24-hour elemental carbon (EC) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.4.2 EC in April 2002

EC is underestimated at the IMPROVE sites in April (bias of -48%), but reproduced well at the STN sites (bias of -13%). Although EC is underestimated at the IMPROVE sites both the model and observations agree that EC concentrations are very small and not a significant component of the PM budget. The model fails to capture the day-to-day variability in the observed EC at the IMPROVE sites and exhibits a systematic under-prediction tendency at some sites (Figure C-23b). On April 5 and 11 the model reproduces the spatial distribution of the observed EC reasonable well with higher values in the eastern than western portion of the CENRAP region. But on April 8 and 14 the model is much to clean in the eastern portion of the CENRAP region (Figure C-23c).

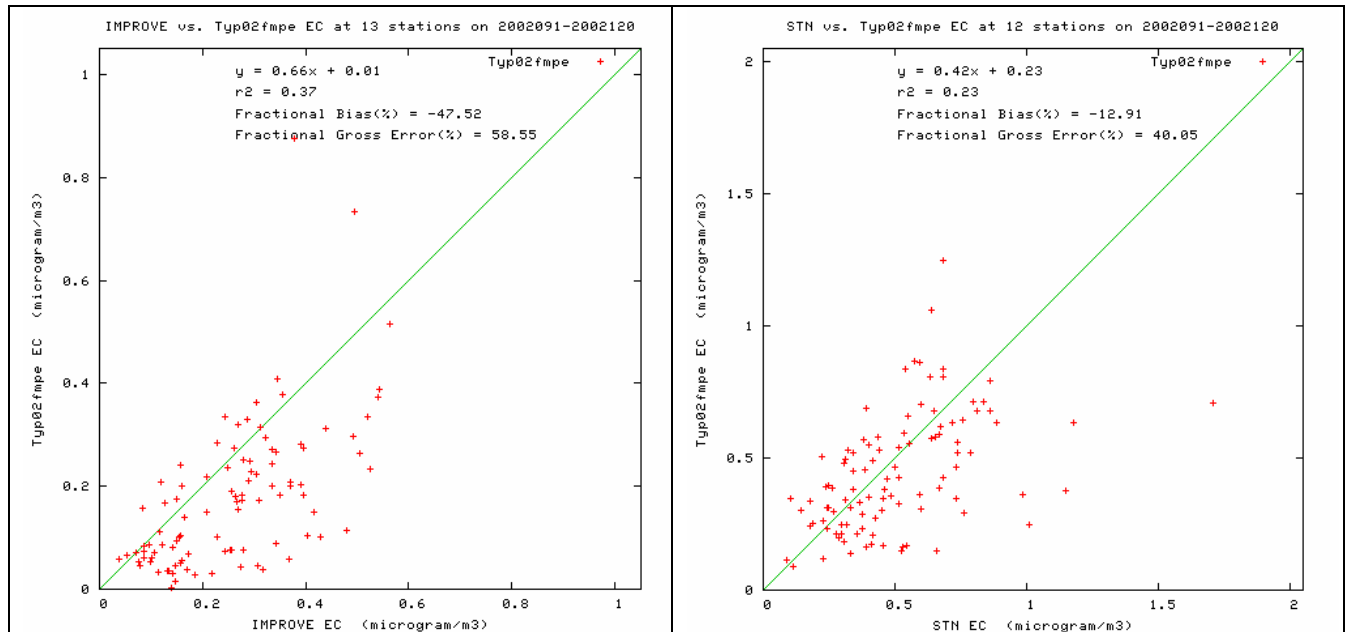
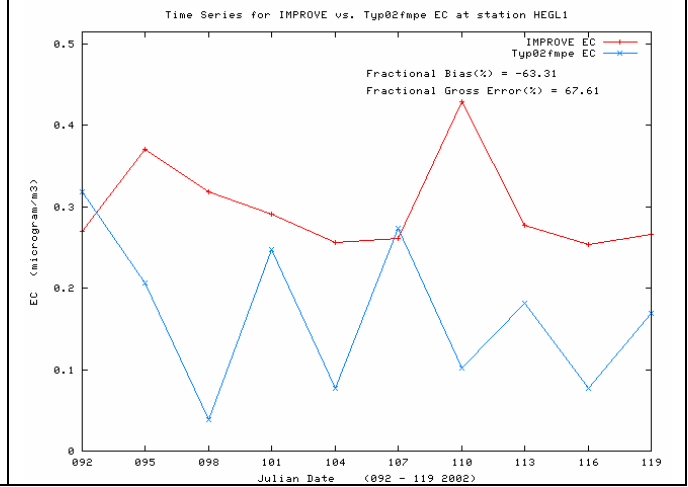
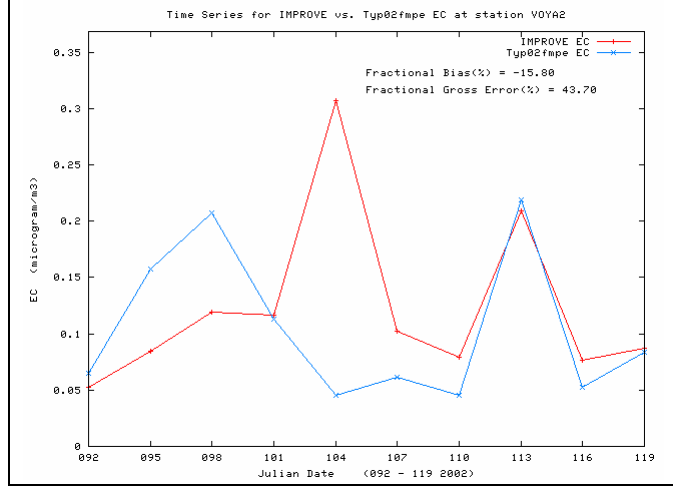
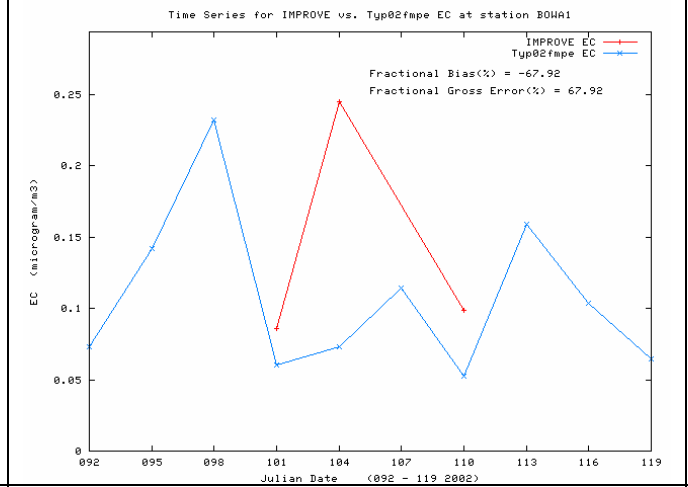
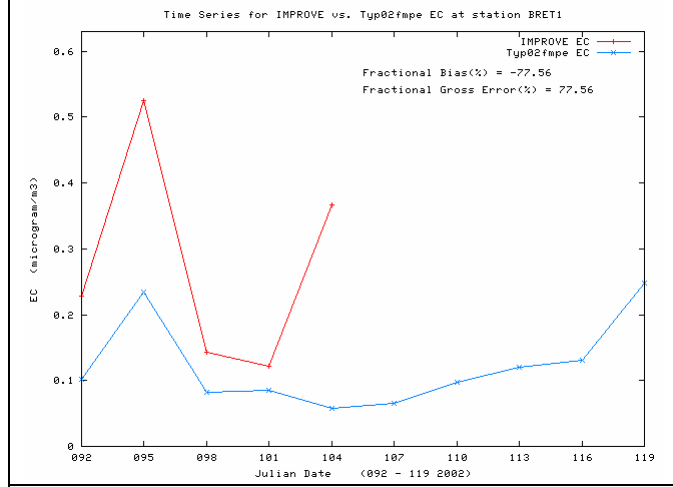
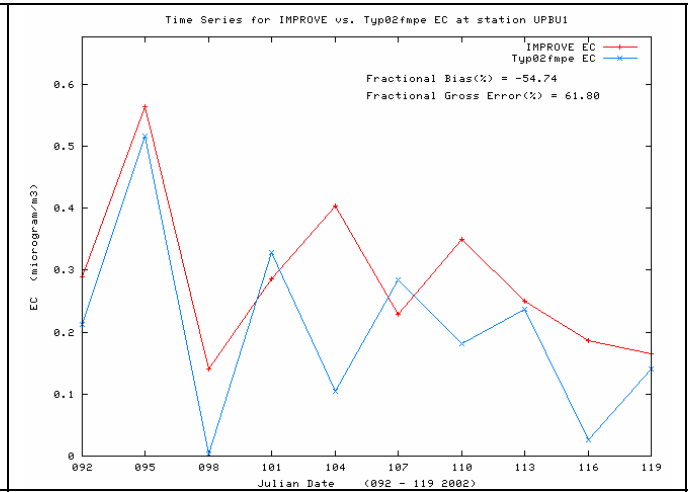
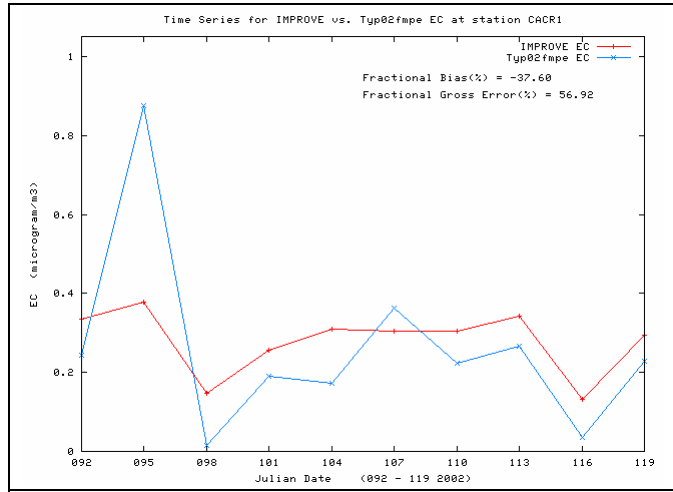


Figure C-23a. Scatter plots of predicted and observed elemental carbon (EC) concentrations for April 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation



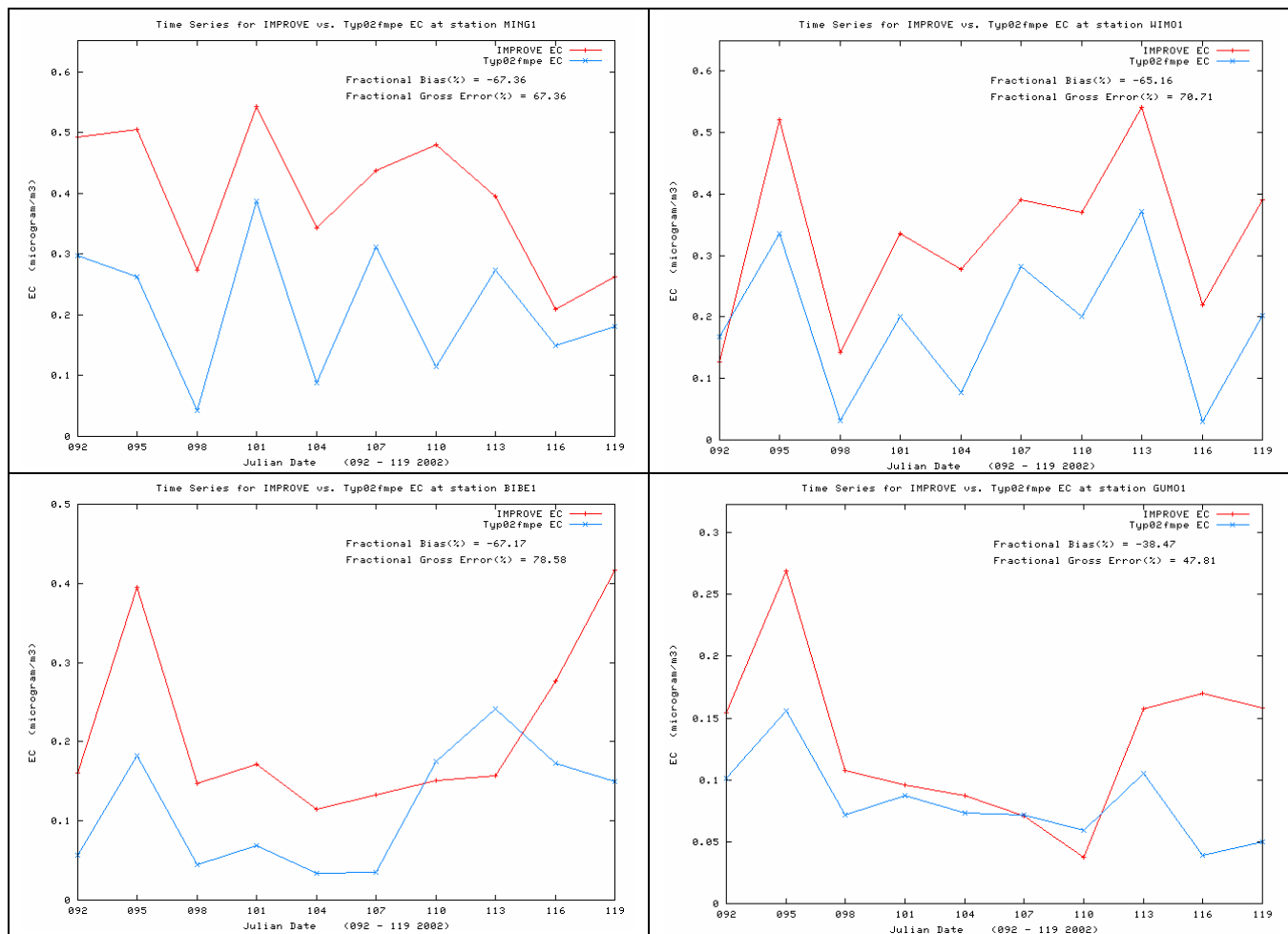
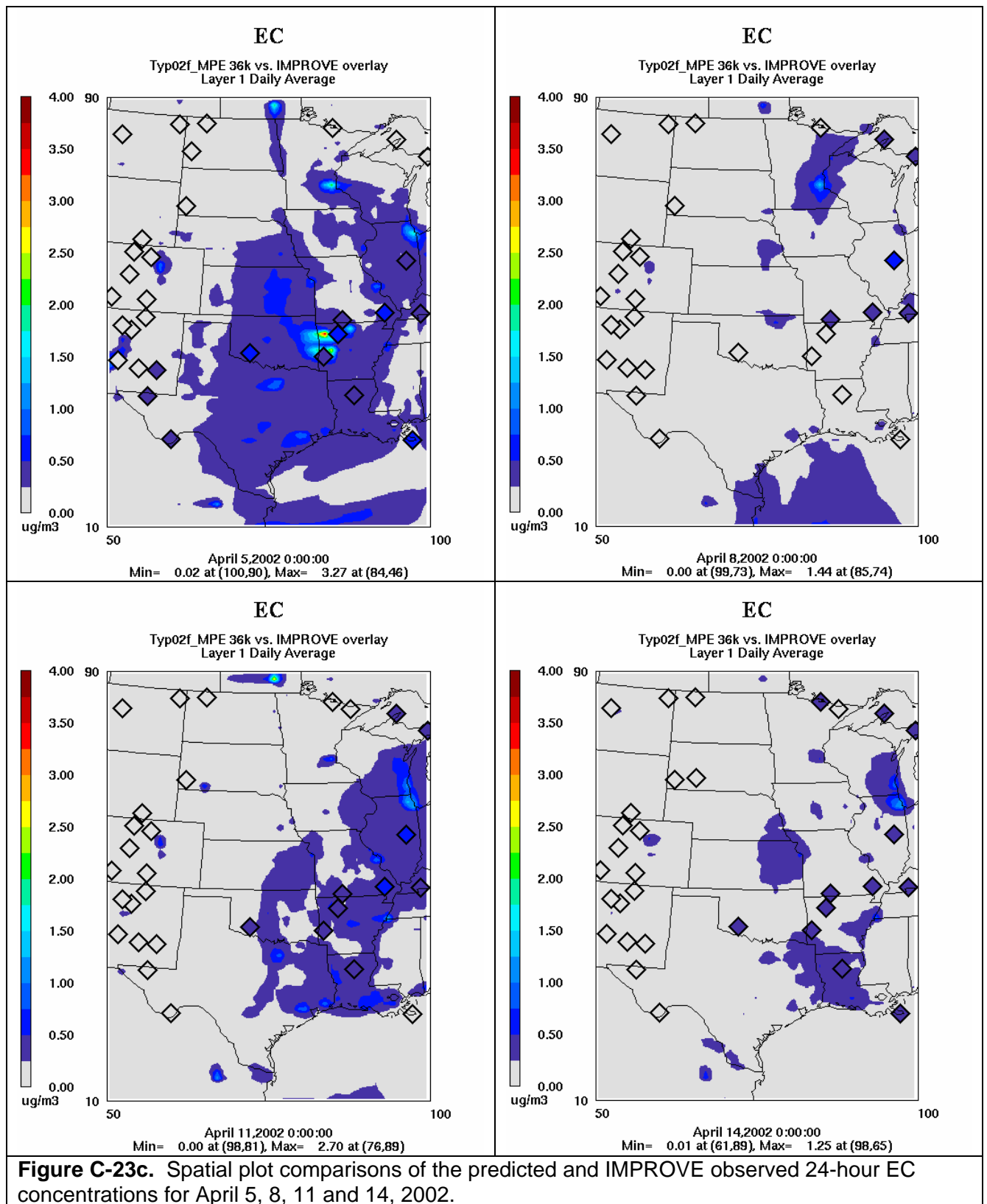


Figure C-23b. Time series of predicted and observed 24-hour elemental carbon (EC) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.3.3 EC in July 2002

July EC performance is similar to the other months with near zero bias across the STN sites and an underestimation bias across the IMPROVE sites (Figure C-24). Again the model and observations agree that EC is low in July and not a significant component of visibility impairment.

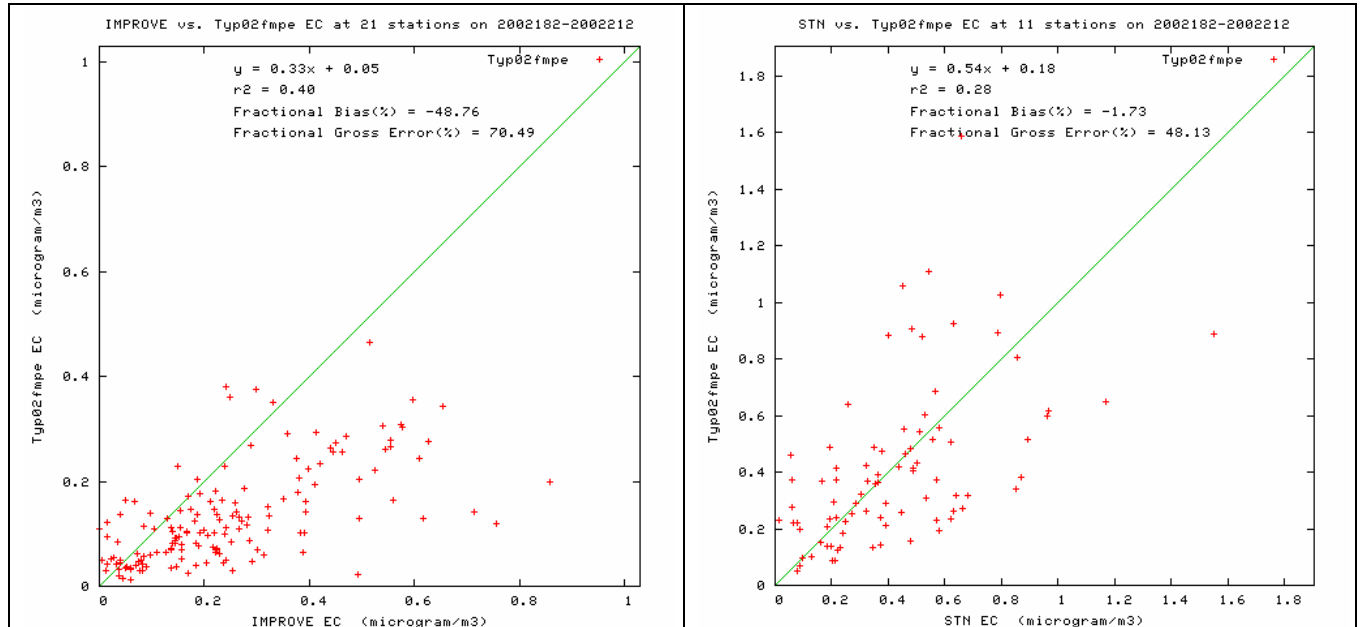
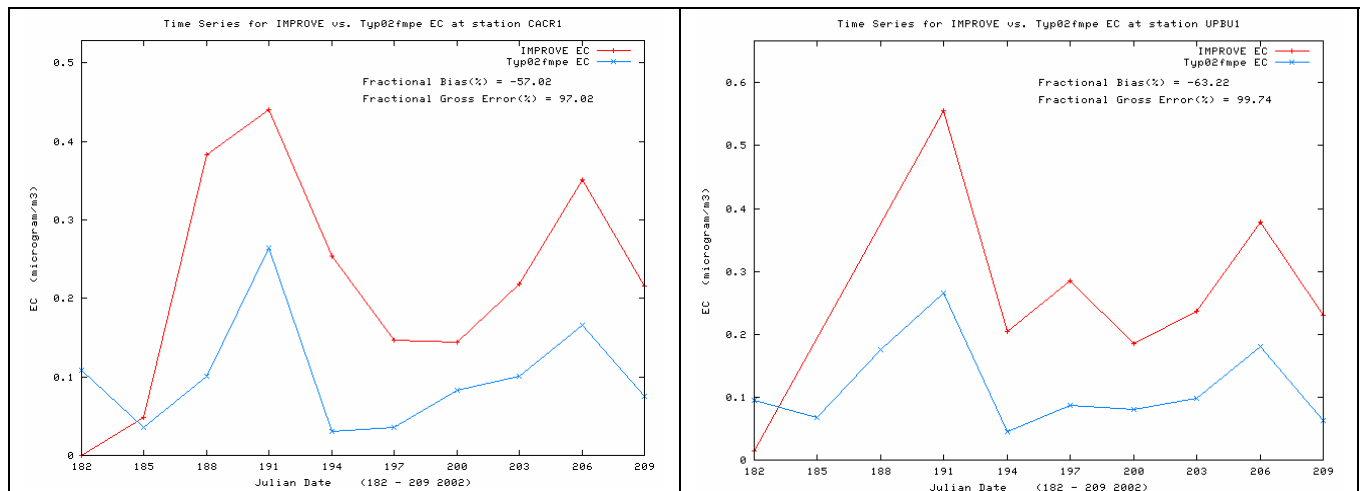
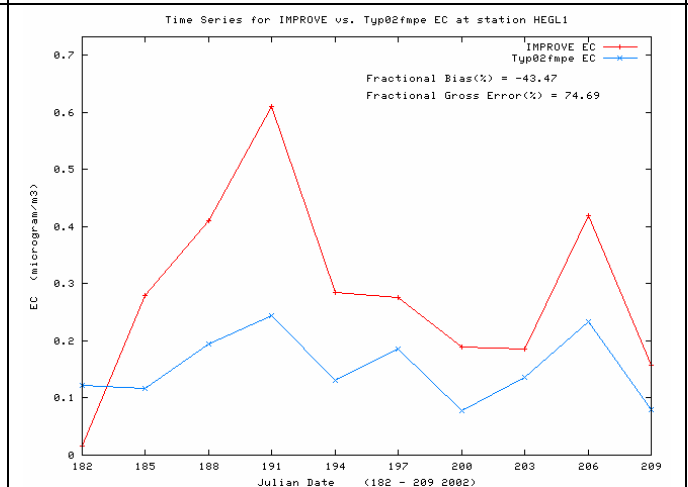
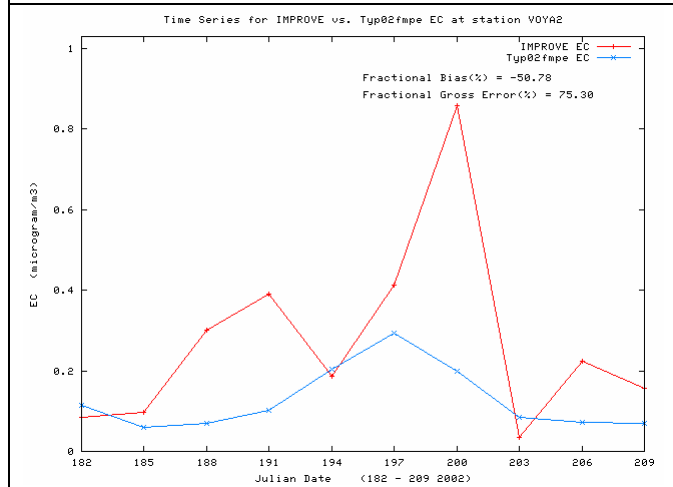
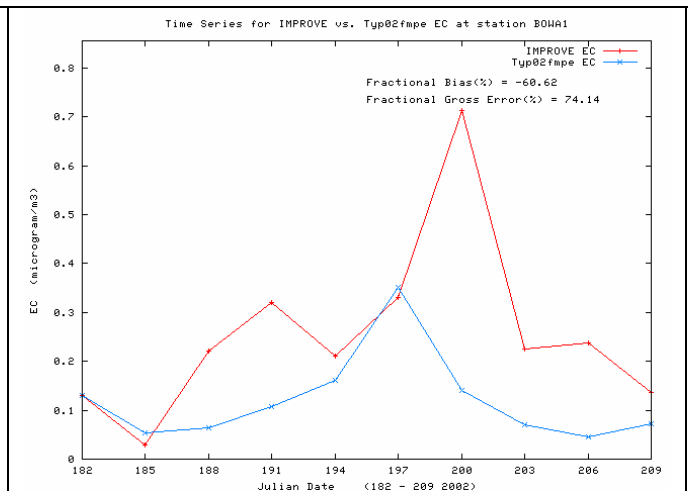
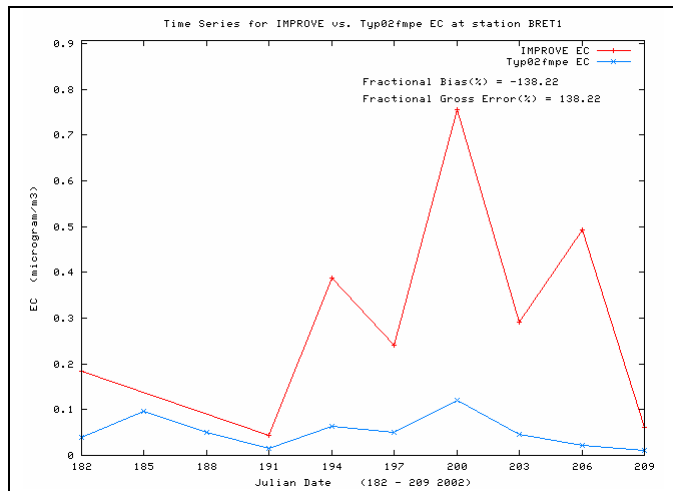
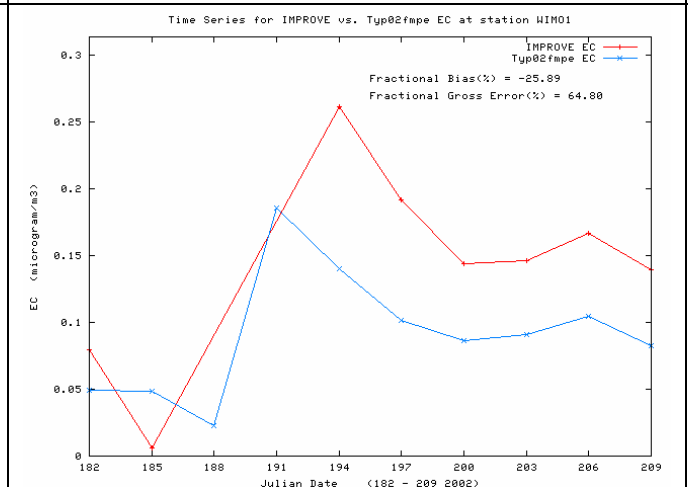


Figure C-24a. Scatter plots of predicted and observed elemental carbon (EC) concentrations for July 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.





No Data for Mingo (MING)



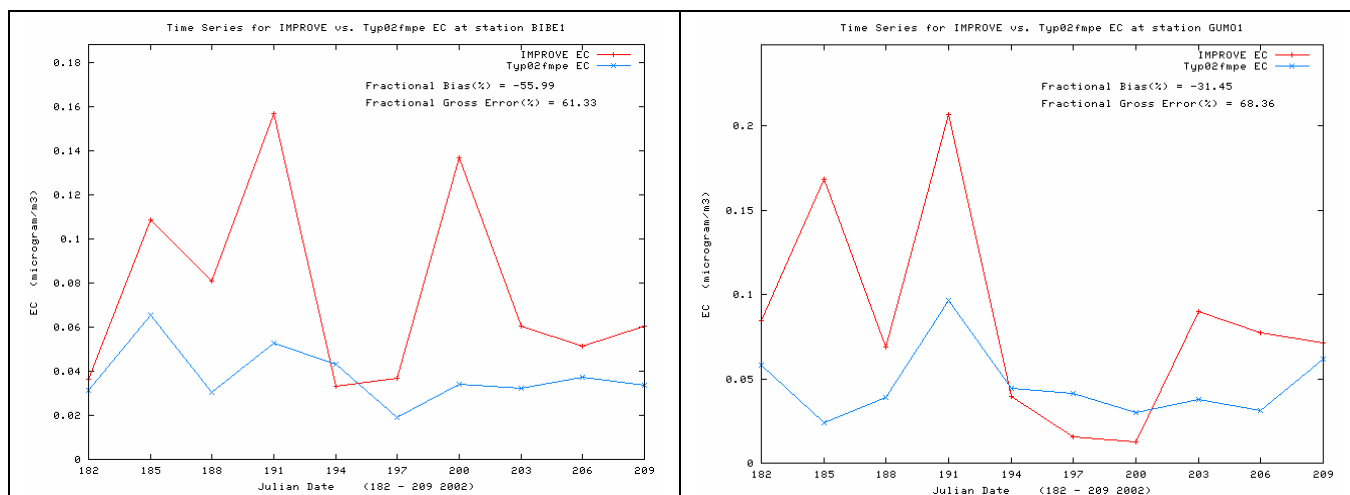


Figure C-24b. Time series of predicted and observed 24-hour elemental carbon (EC) concentrations at CENRAP IMPROVE CLASS I AREA sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

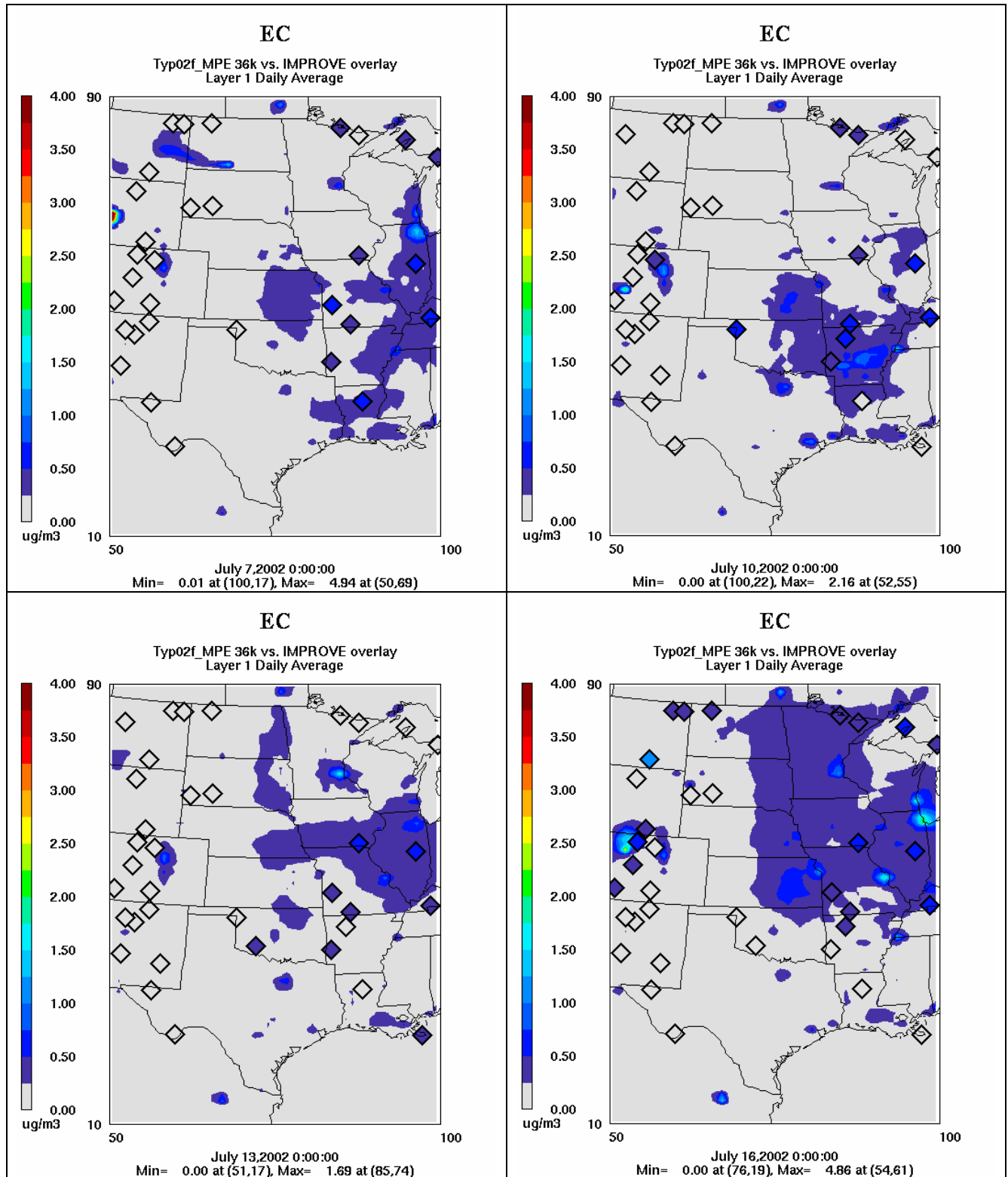


Figure C-24c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour EC concentrations for July 7, 10, 13 and 16, 2002.

C.3.4.4 EC in October 2002

EC performance is improved at the IMPROVE sites in October with lower bias (9%) than the previous months where an under-prediction tendency was seen (Figure C-25a). EC bias is also fairly low at the STN sites with errors across both networks of approximately 50%. Although there is a systematic underestimation of EC at BRET, the agreement between the predicted and observed October time series (Figure C-25b) is remarkable at several sites (e.g., CACR, UPBU, VOYA and HEGL).

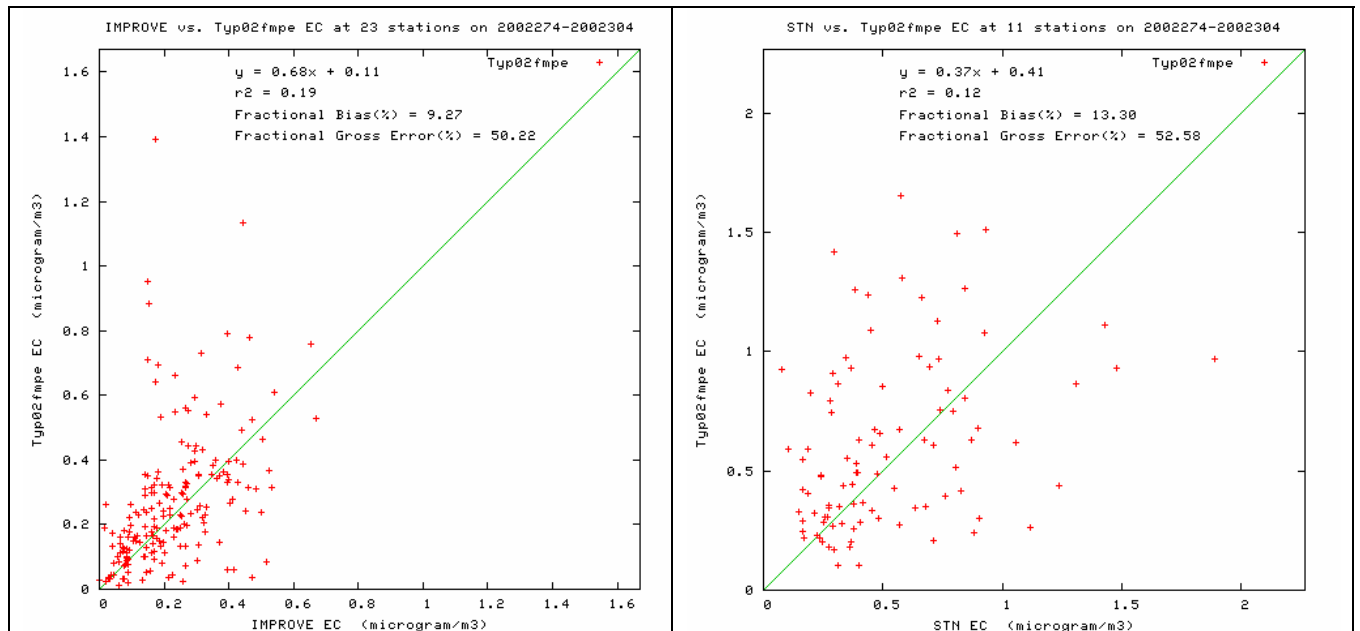
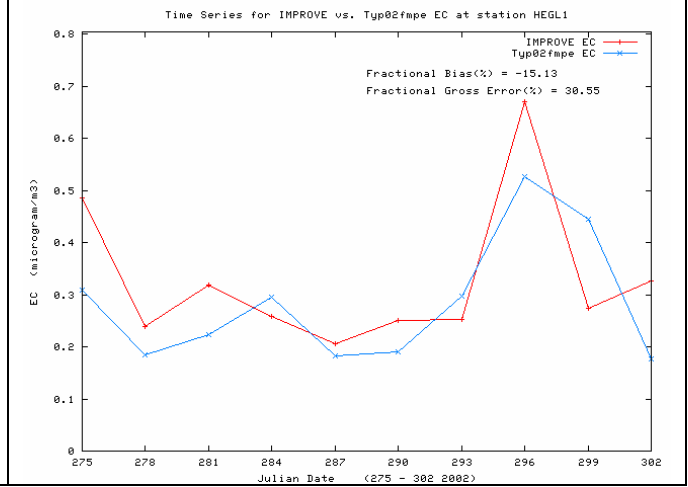
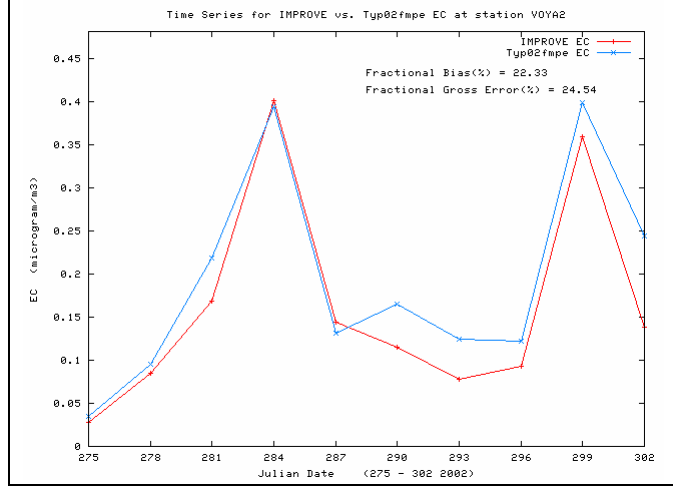
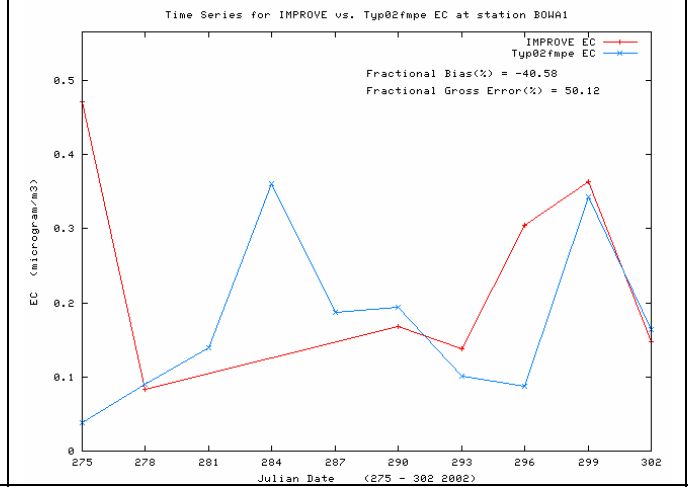
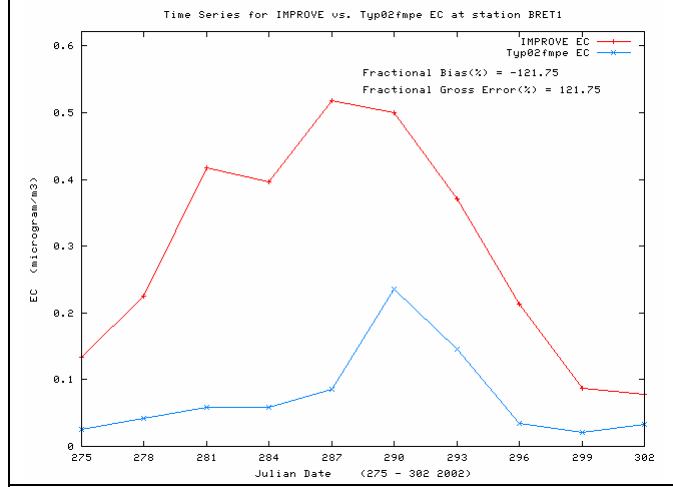
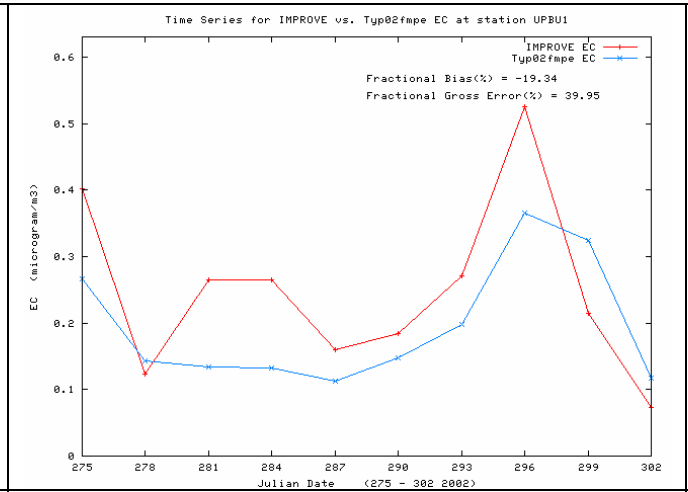
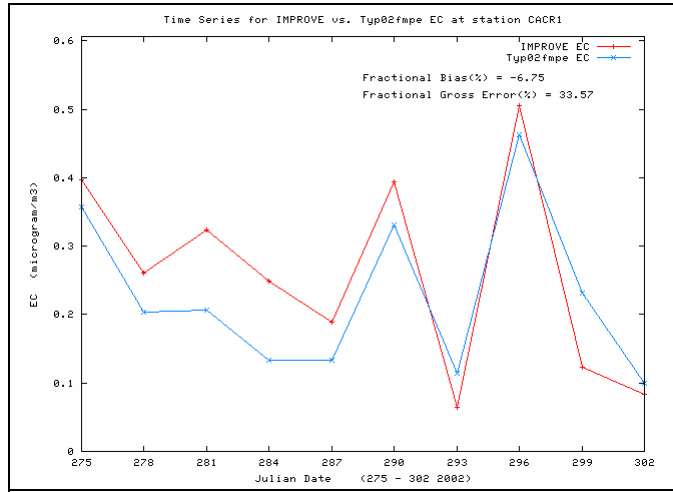


Figure C-25a. Scatter plots of predicted and observed elemental carbon (EC) concentrations for October 2002 and sites in the CENRAP region using IMPROVE (left) and STN (right) monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



No Data for Mingo (MING)

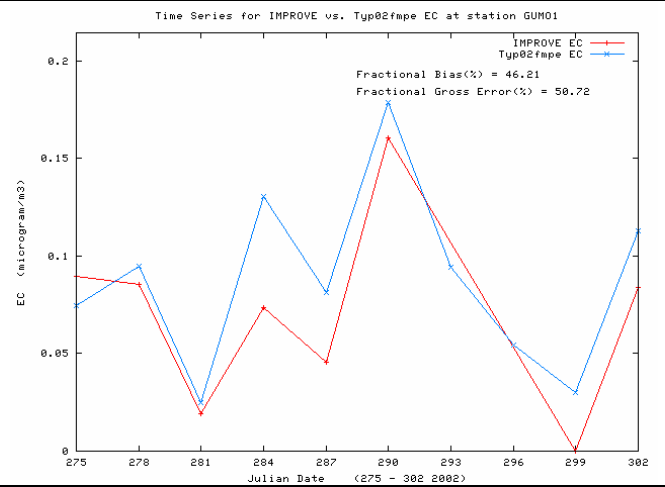
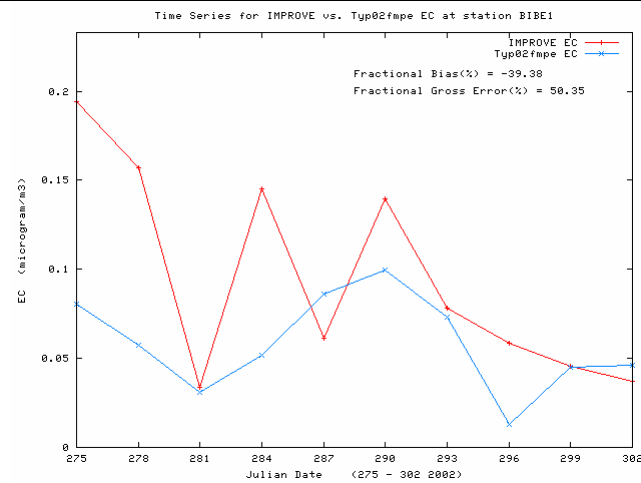
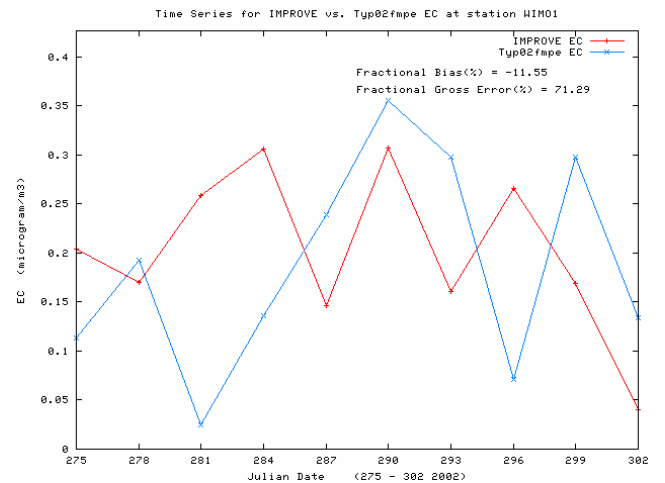
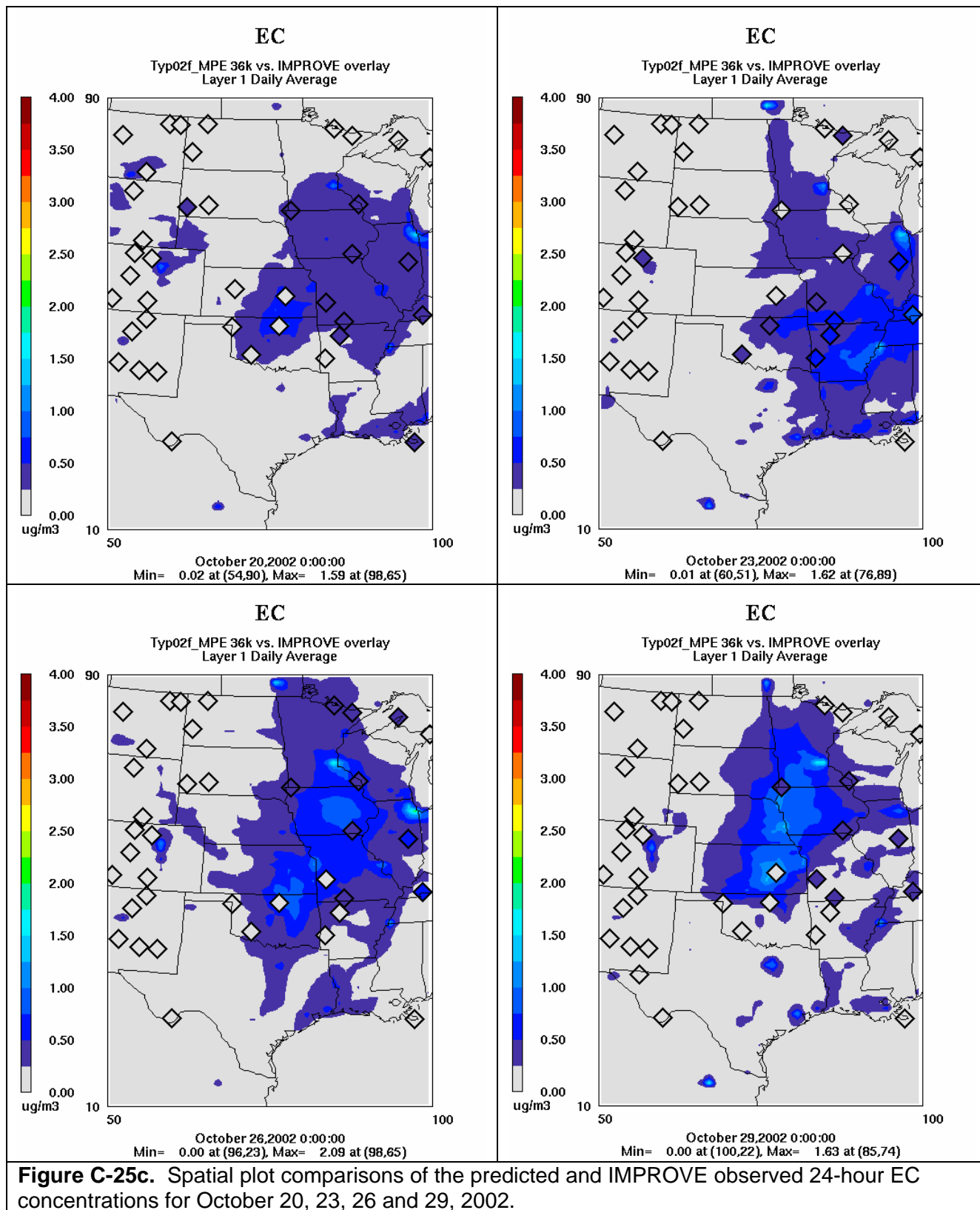


Figure C-25b. Time series of predicted and observed 24-hour elemental carbon (EC) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.4.5 EC Monthly Bias and Error

The monthly average bias and error for EC across the IMPROVE and STN monitors in the CENRAP region are shown in Figure C-26. The STN network exhibits low bias year round, whereas the IMPROVE monitoring network exhibits a large under-prediction bias in the summer months (-40% to -60%) and much lower EC bias in the winter. The errors in the IMPROVE summer EC performance are also quite high (60% to 80%), whereas during the winter the IMPROVE errors are in the 40% to 50% range which is also where the STN errors reside year round.

The Bugle Plot puts the EC performance in context (Figure C-27). The low EC concentrations put the IMPROVE EC performance in the horn of the Bugle Plot so that it achieves the proposed PM performance goal for all months of the year.

CENRAP Typ02f_MPE

EC

IMPROVE STN

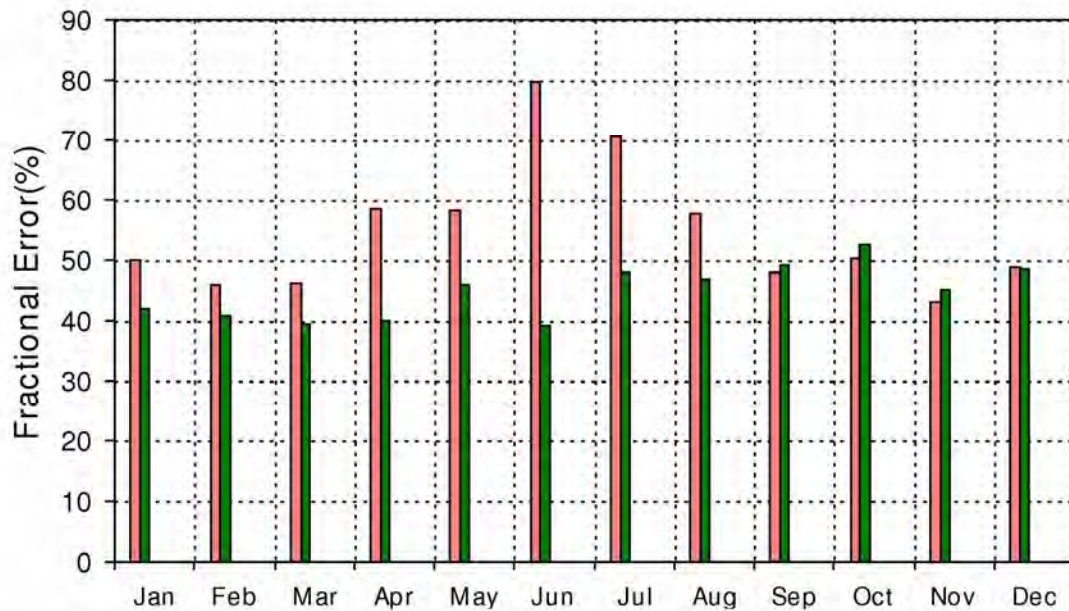
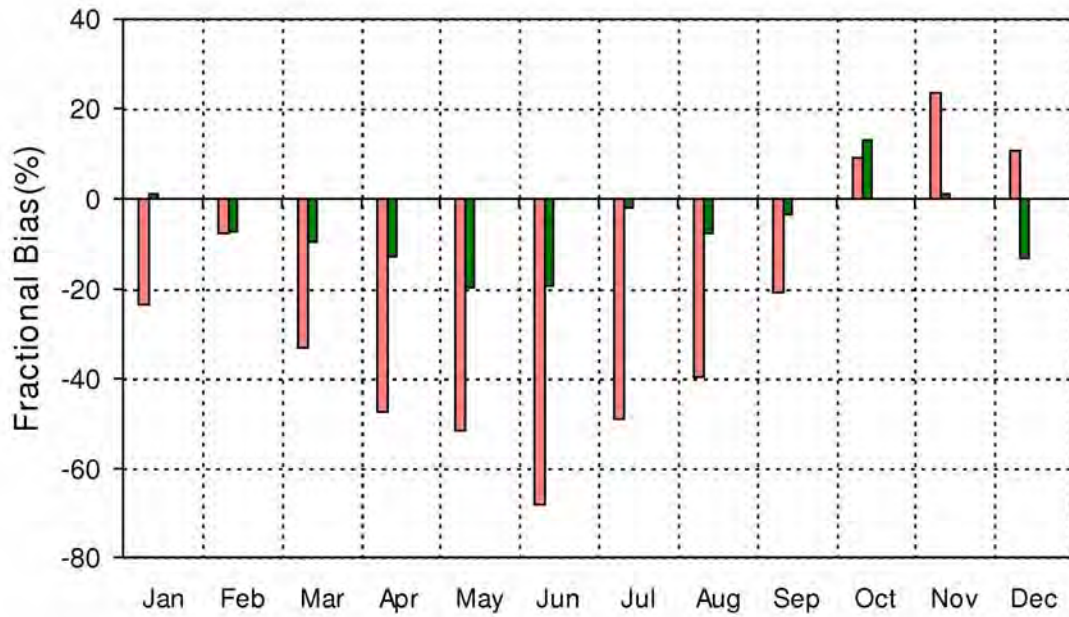


Figure C-26. Monthly EC fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE and STN monitoring sites in the CENRAP region.

CENRAP Typ02f_MPE 36k Bugle Plot

EC

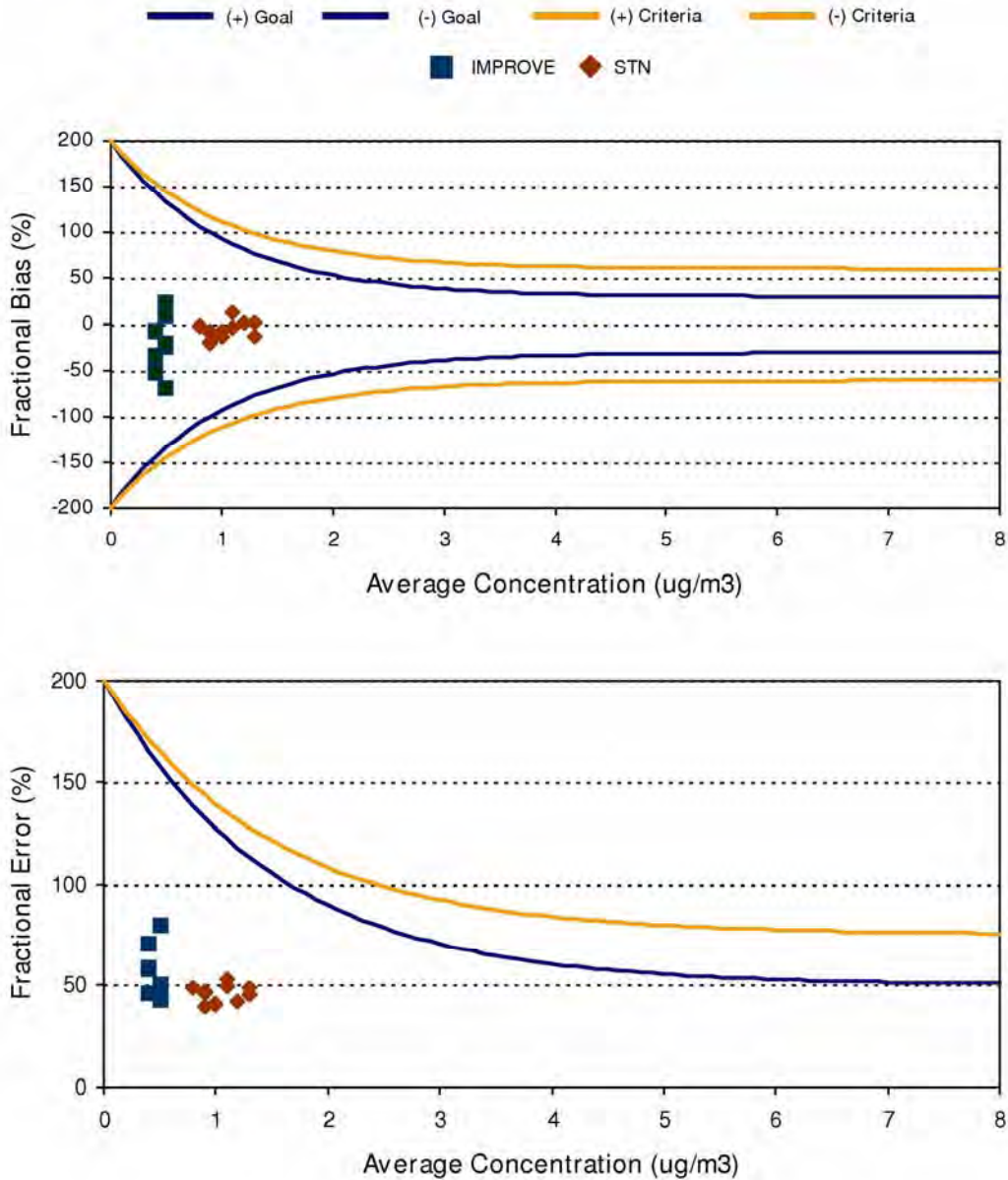


Figure C-27. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for EC and IMPROVE and STN monitoring sites in the CENRAP region.

C.3.5 Other PM_{2.5} (Soil) Monthly Model Performance

There are also model-measurement incommensurability problems with the other PM_{2.5} (Soil) species. Whereas the IMPROVE Soil species is built up from measure elements, the modeled other PM_{2.5} concentrations are based on emissions speciation profiles that likely include other species besides just elements. Soil is only collected at the IMPROVE monitors.

C.3.5.1 Soil in January 2002

The model greatly overestimates the Soil species at IMPORVE sites in January (Figure C-28a). The fractional bias exceeds 100% with errors of almost 130%. With the possible exception of the two Texas sites, the model Soil overestimation bias occurs across all of the CENRAP Class I areas in January (Figure C-28b). The model also does a poor job in reproducing the spatial variability of the observed Soil with a general overestimation tendency except at GUMO where it fails to reproduce the high Soil events.

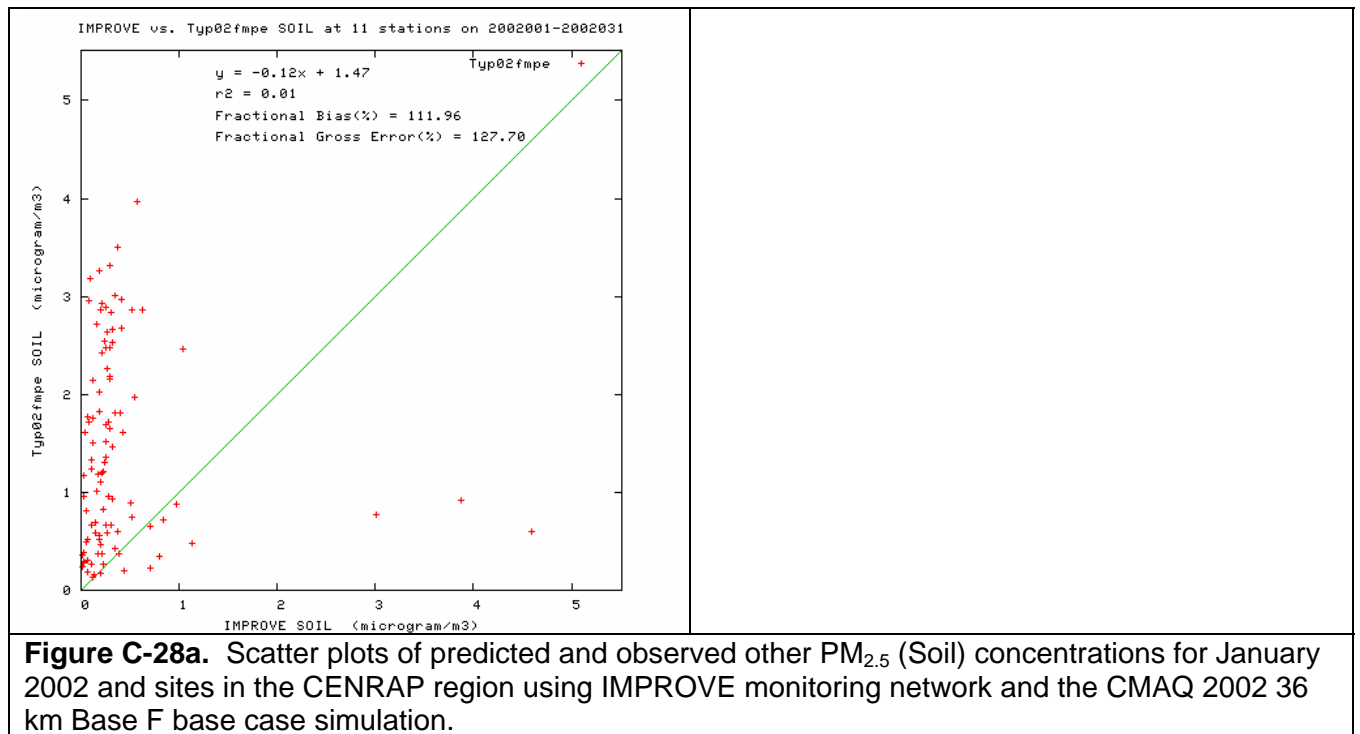
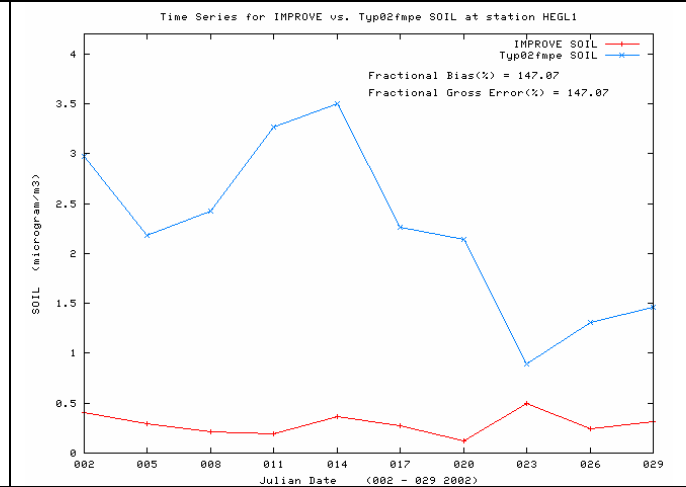
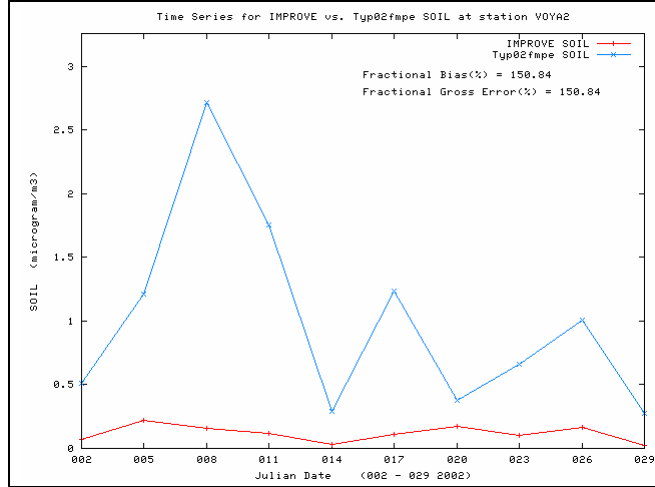
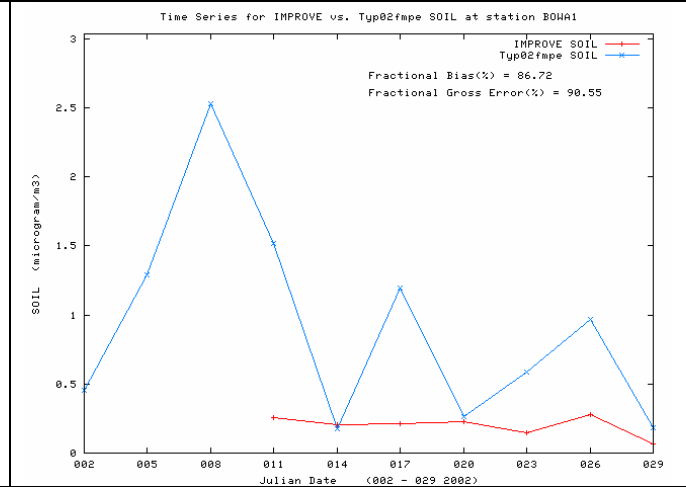
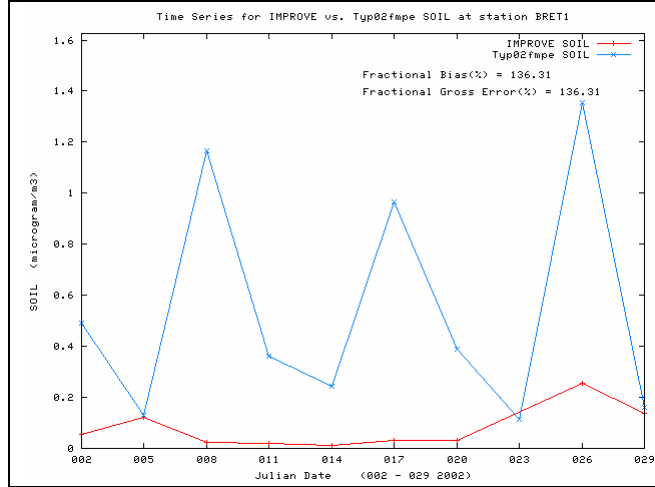
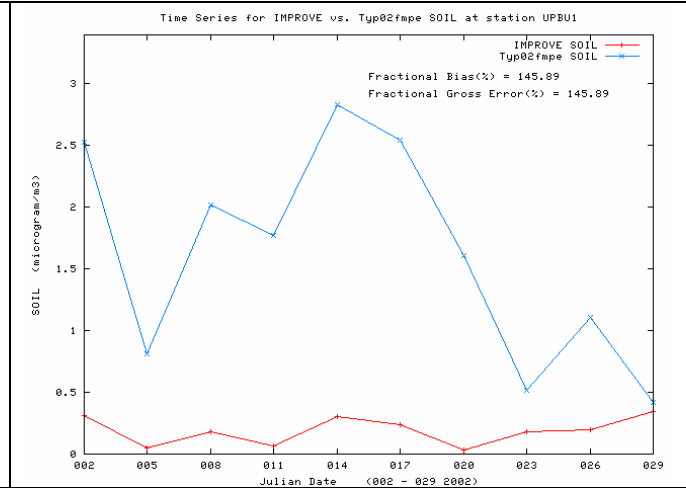
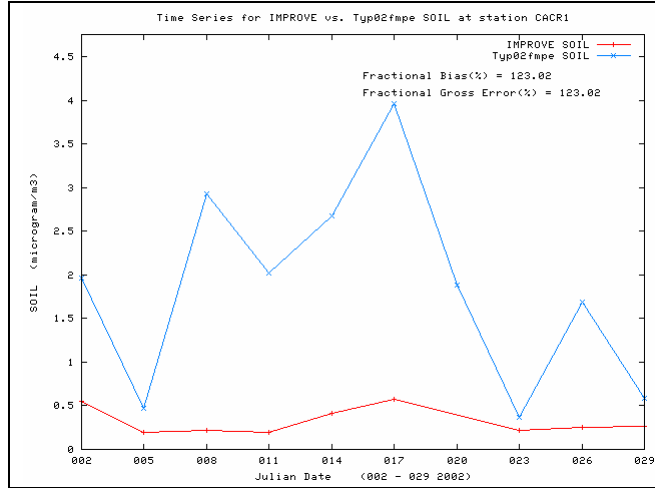


Figure C-28a. Scatter plots of predicted and observed other PM_{2.5} (Soil) concentrations for January 2002 and sites in the CENRAP region using IMPROVE monitoring network and the CMAQ 2002 36 km Base F base case simulation.



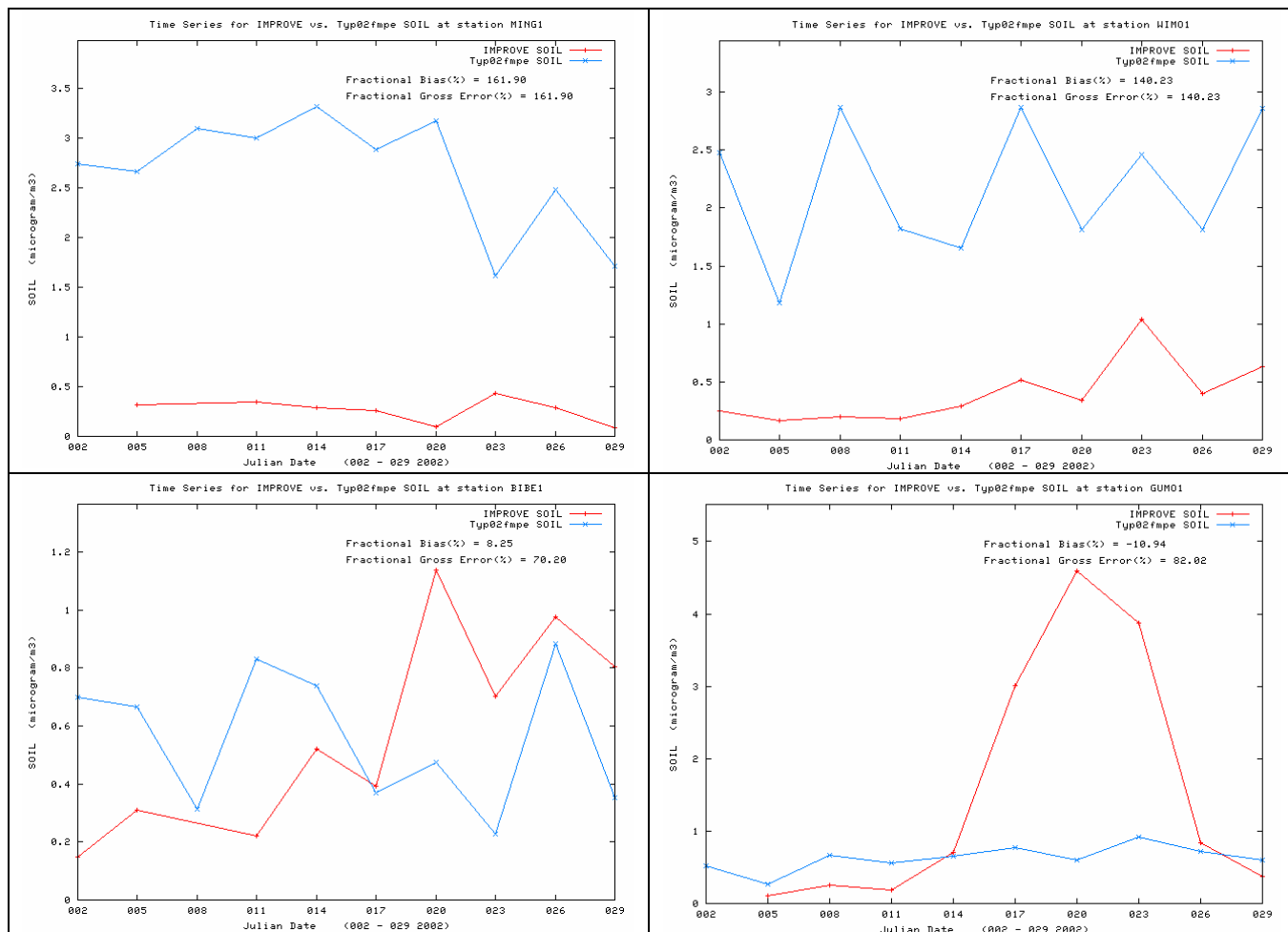
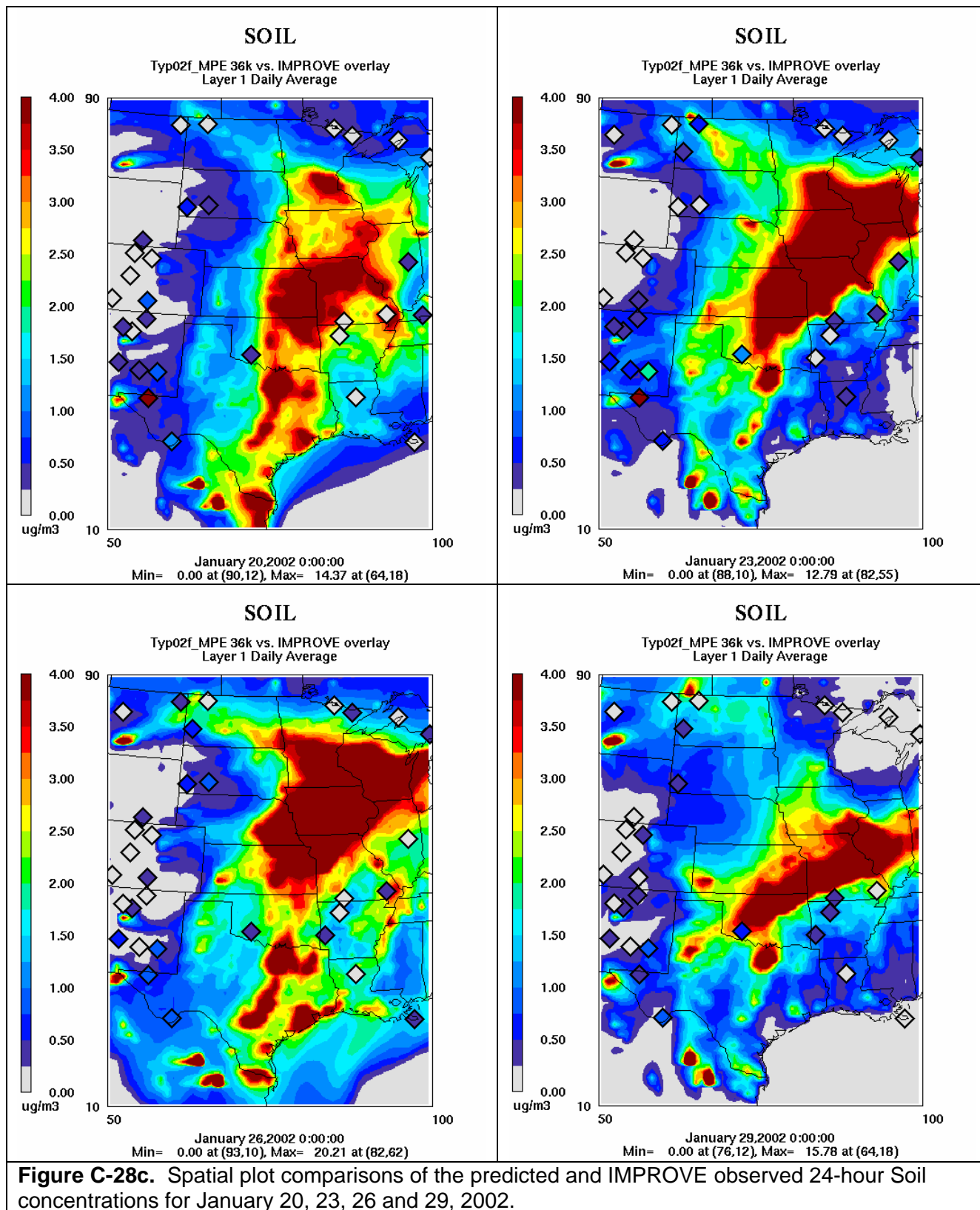


Figure C-28b. Time series of predicted and observed 24-hour other PM_{2.5} (Soil) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.5.2 Soil in April 2002

The model does a better job in reproducing the overall magnitude of the Soil measurements in April with a bias of 13% (Figure C-29a). But it exhibits little skill with lots of scatter and an error of 81%.

The model is generally exhibiting a lot more day-to-day variability than observed with the observed daily time series much flatter than the modeled values (Figure C-29b). The modeled and observed spatial variability in Soil on April 5, 8, 11 and 14 are shown in Figure C-29c. Although the model exhibits large day-to-day variability, the observations do not reflect what the model predicts.

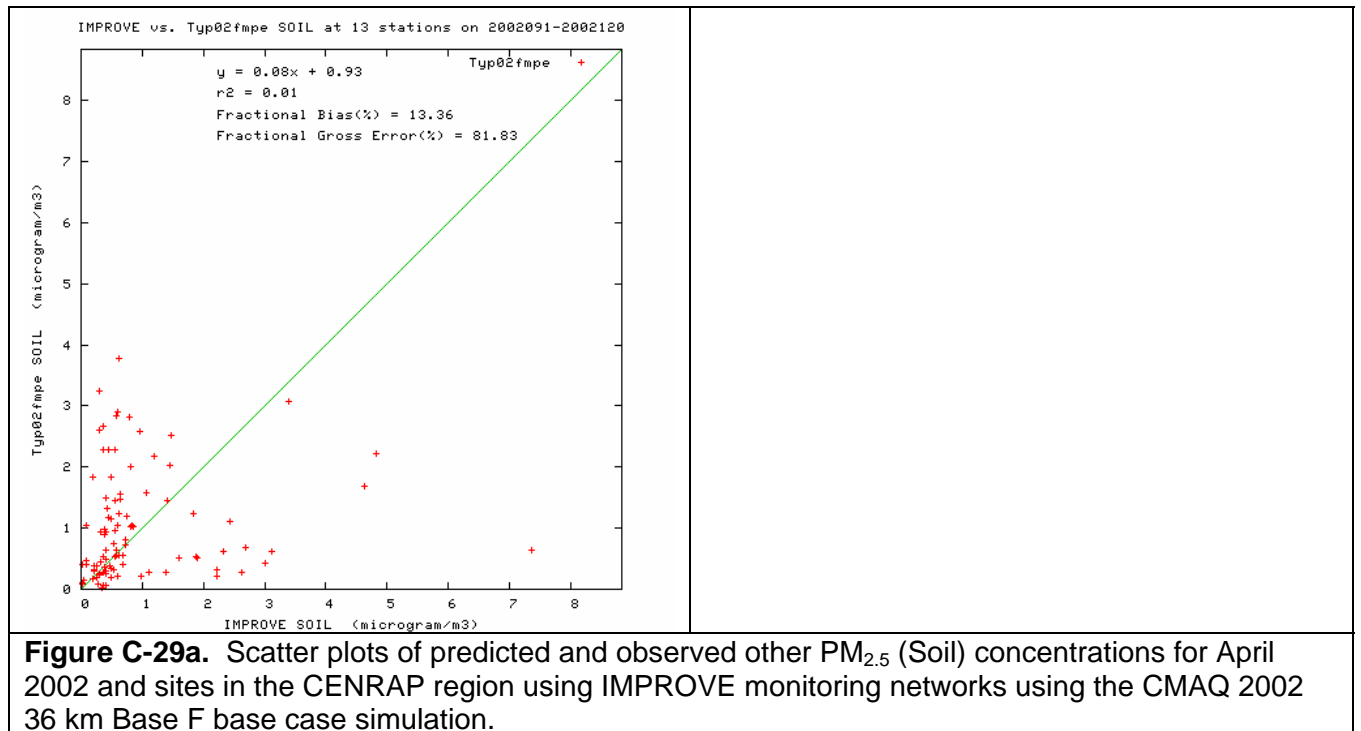
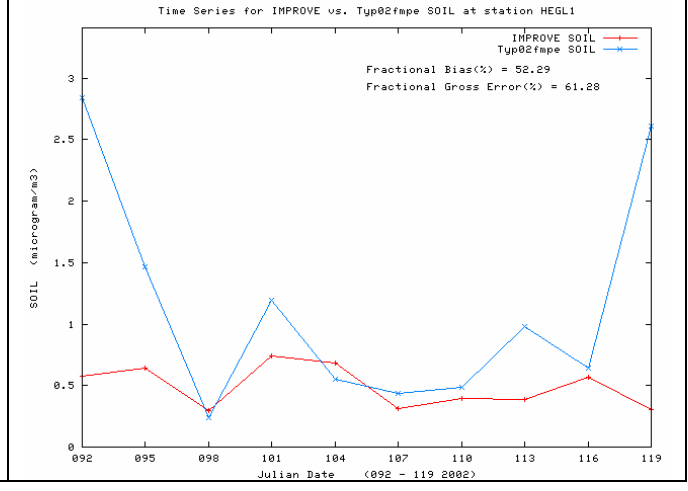
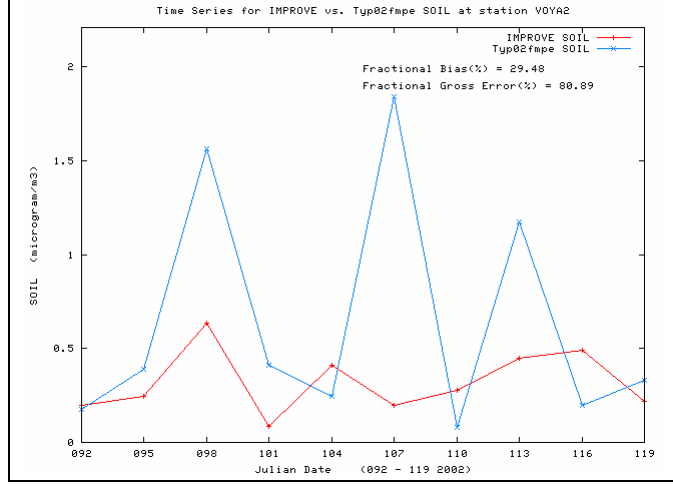
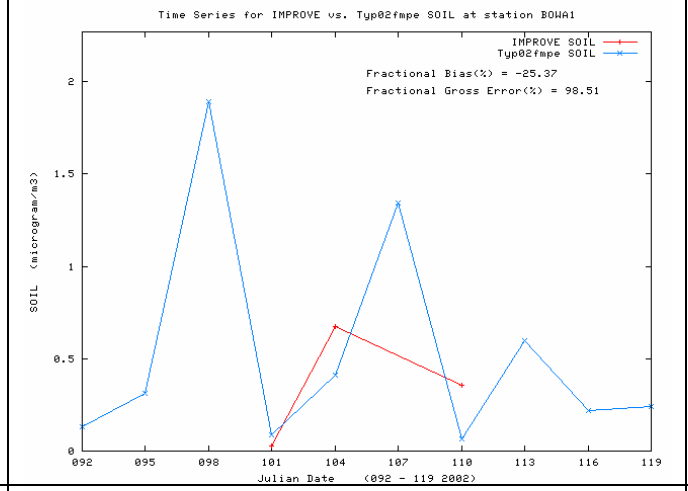
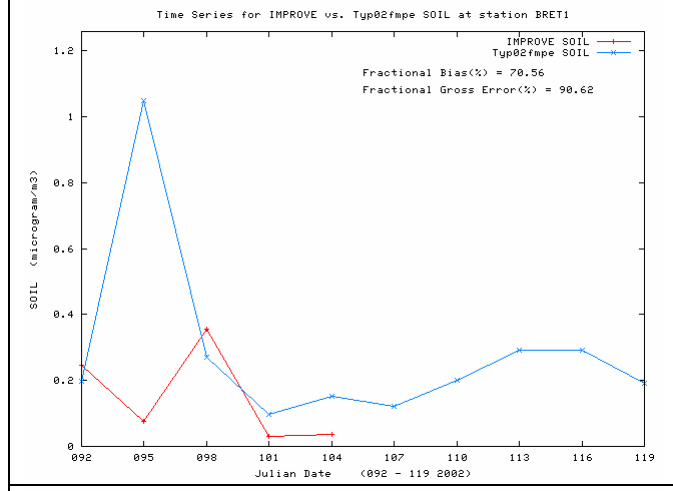
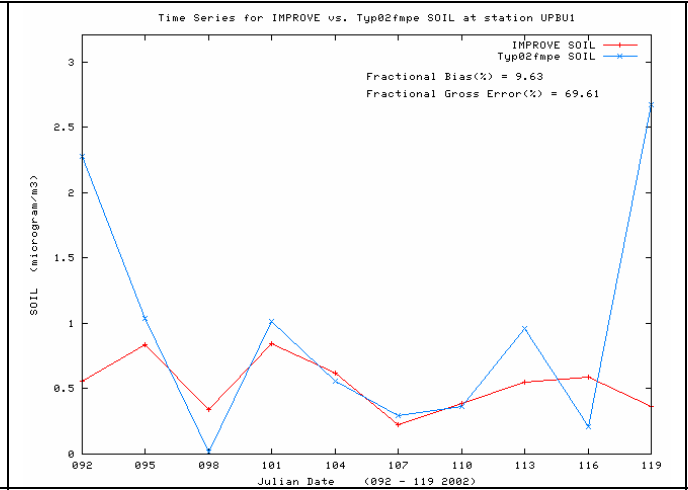
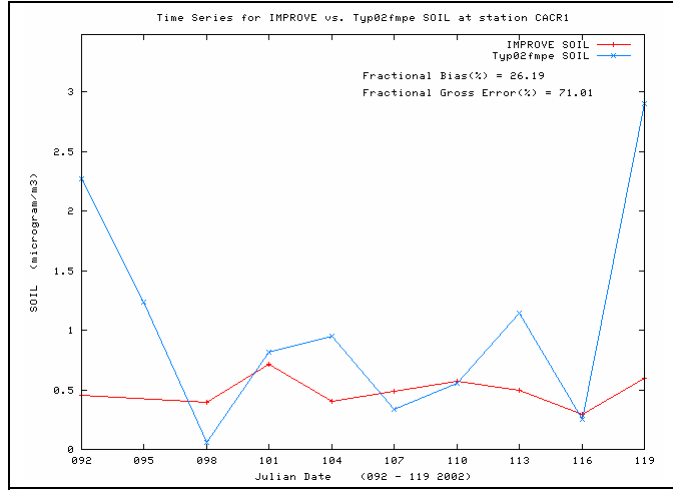


Figure C-29a. Scatter plots of predicted and observed other PM_{2.5} (Soil) concentrations for April 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



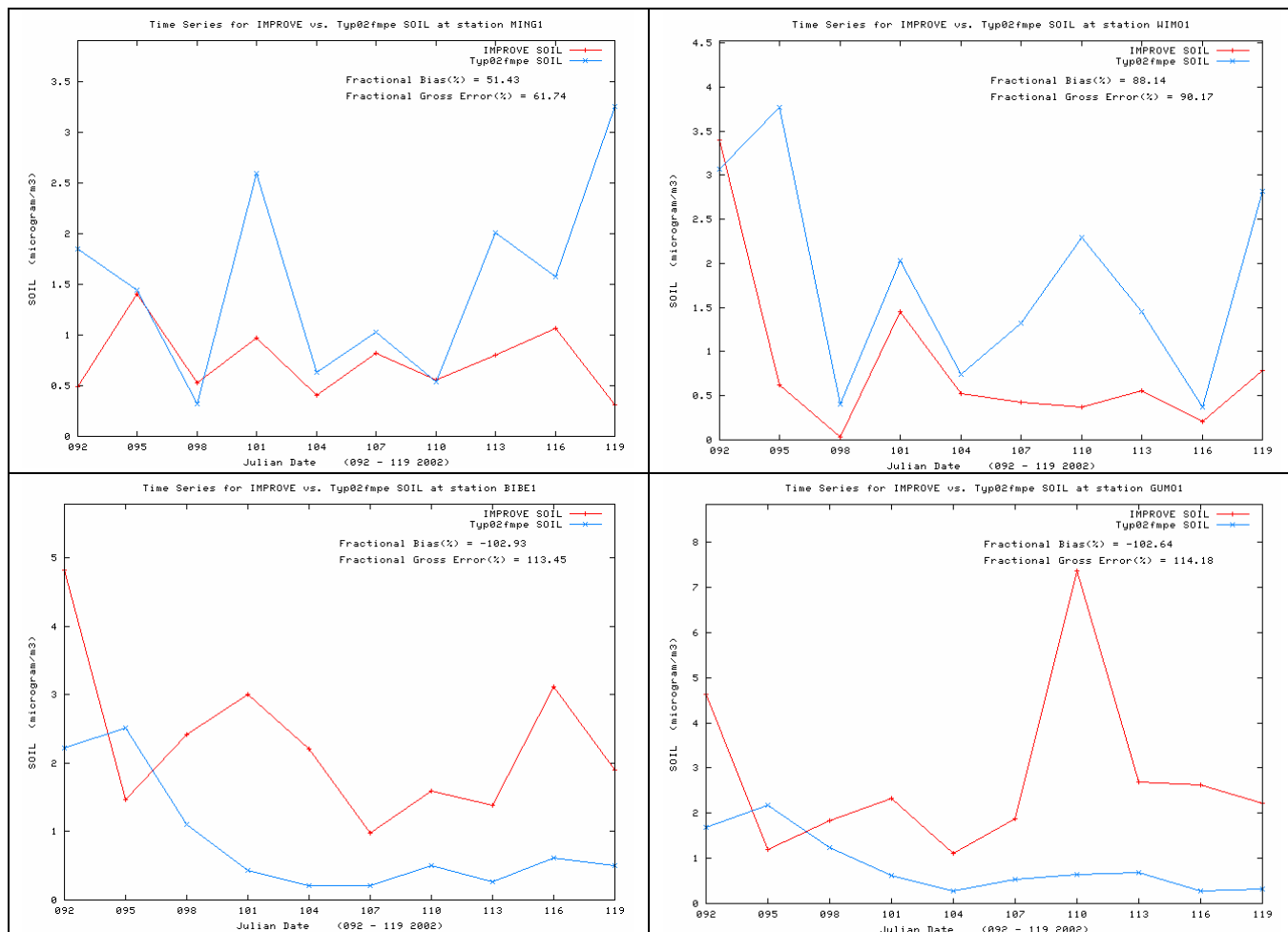
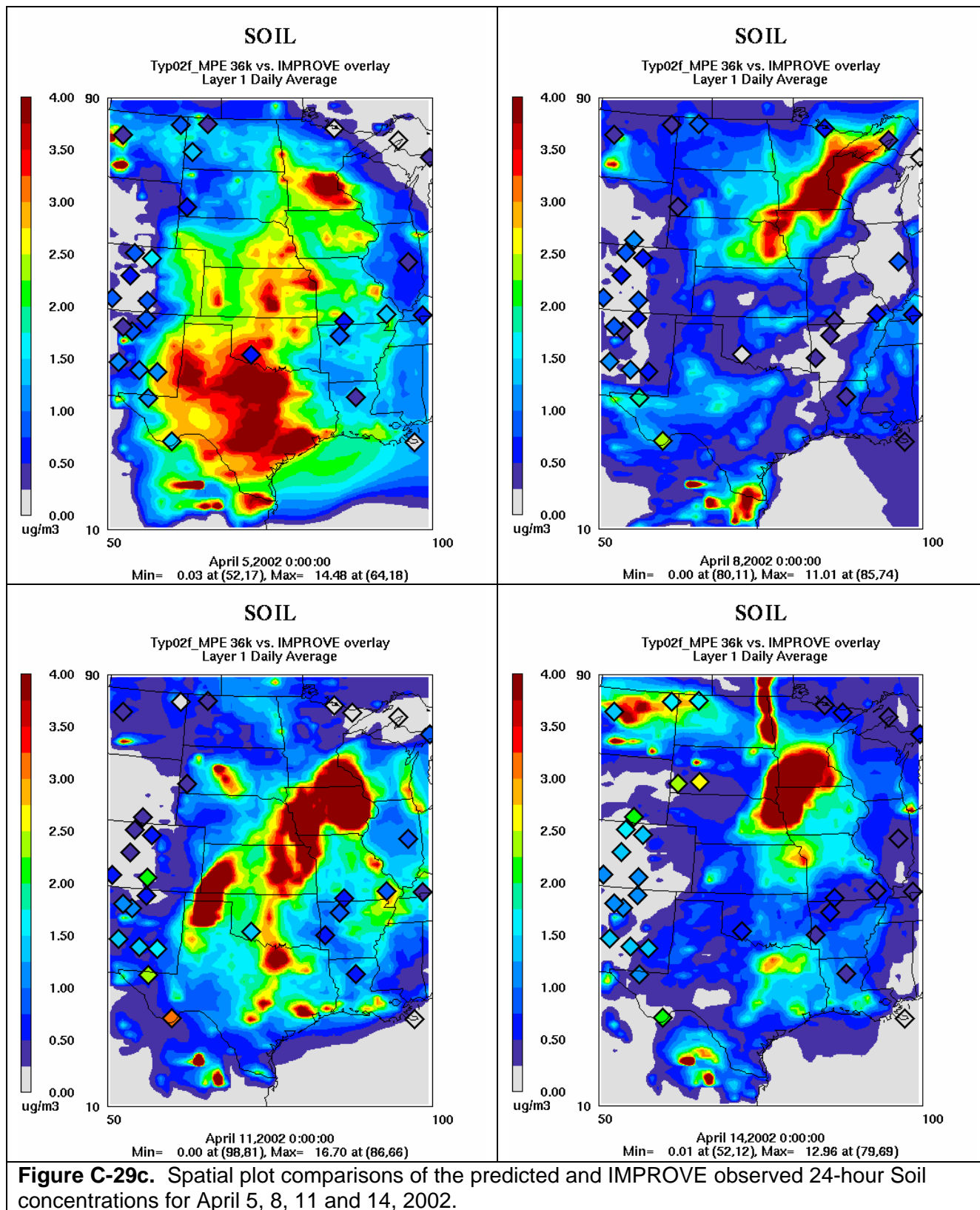


Figure C-29b. Time series of predicted and observed 24-hour other PM_{2.5} (Soil) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.5.3 Soil in July 2002

The -50% Soil under-prediction bias seen in July appears to be driven to several high Soil measurements (Figure C-30a). An observed high Soil event took place on July 1 (Julian Day 182) across the Arkansas and Missouri Class I areas that all observed Soil values in excess of $15 \mu\text{g}/\text{m}^3$. This event was not captured by the model. With the exception of a systematic Soil underestimation bias at the two Texas sites and missing these high Soil events, the model generally reproduces the magnitudes of the Soil observations in July.

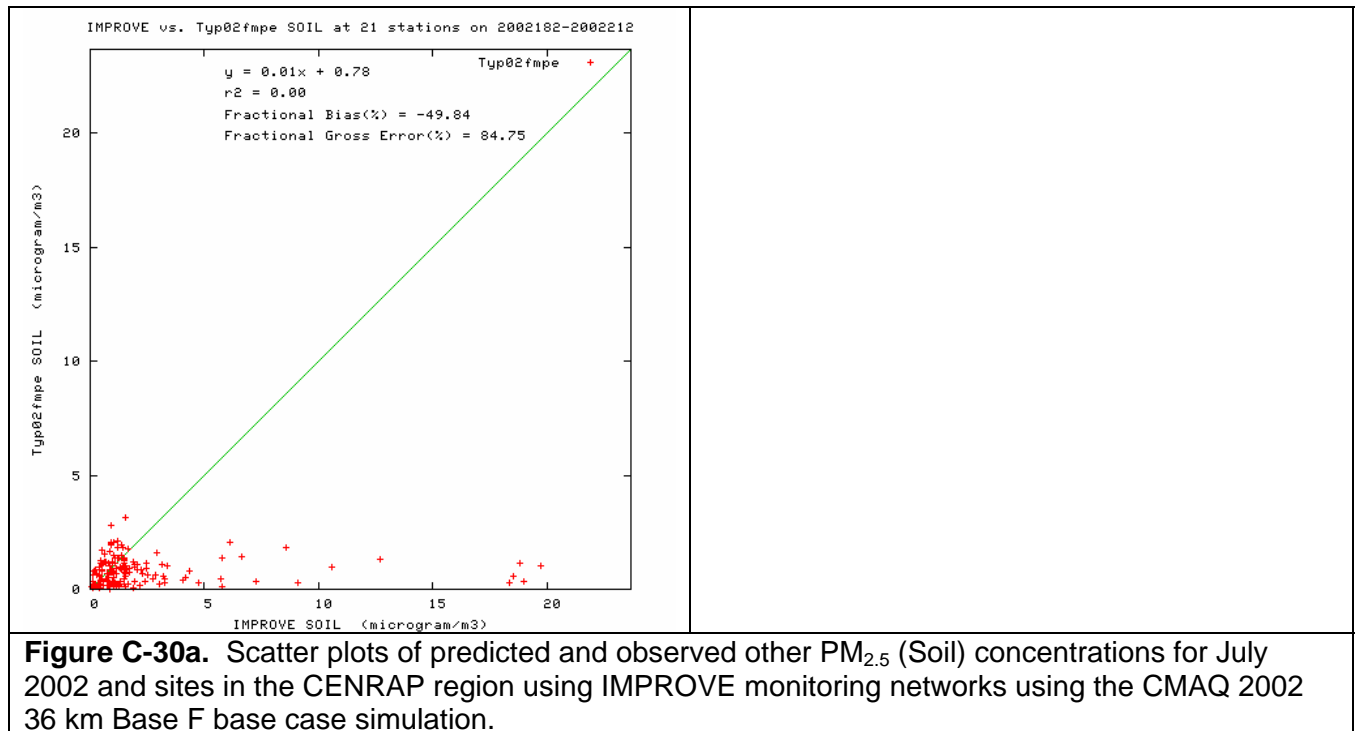
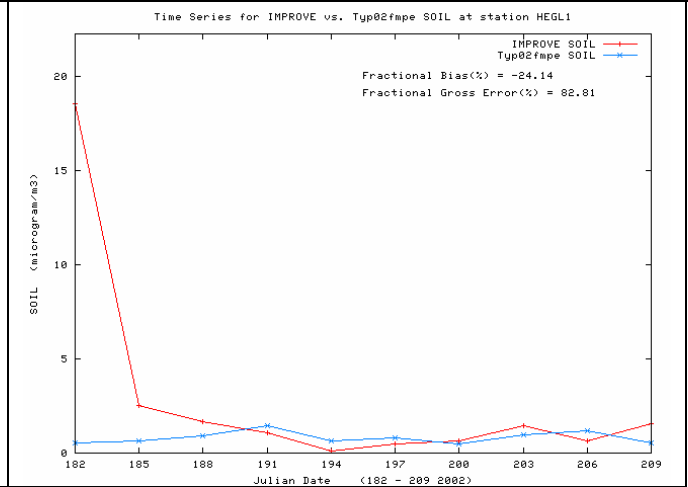
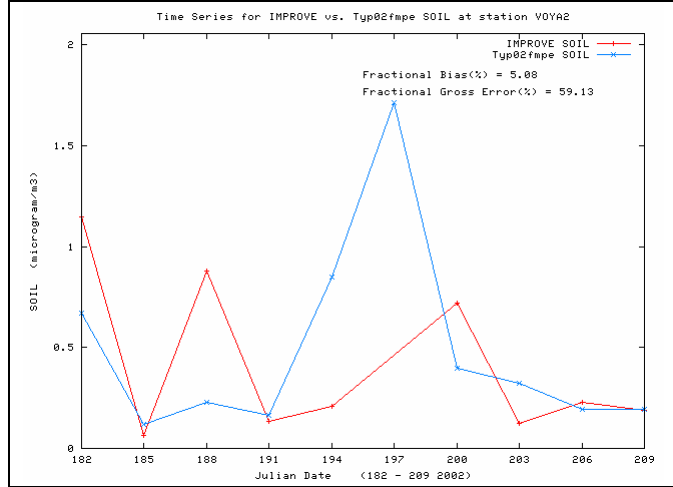
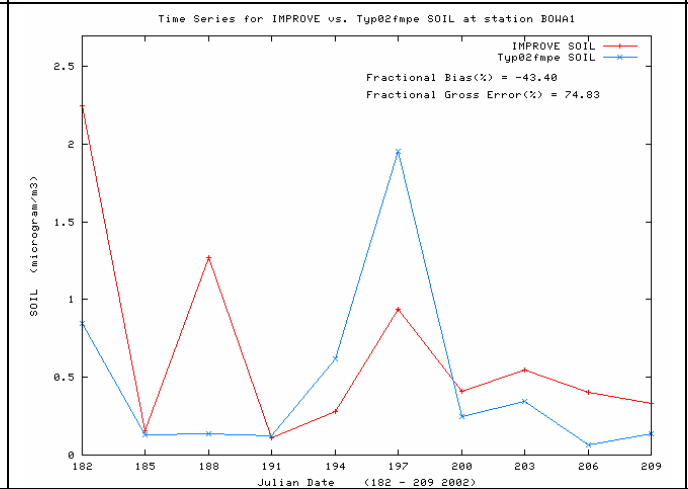
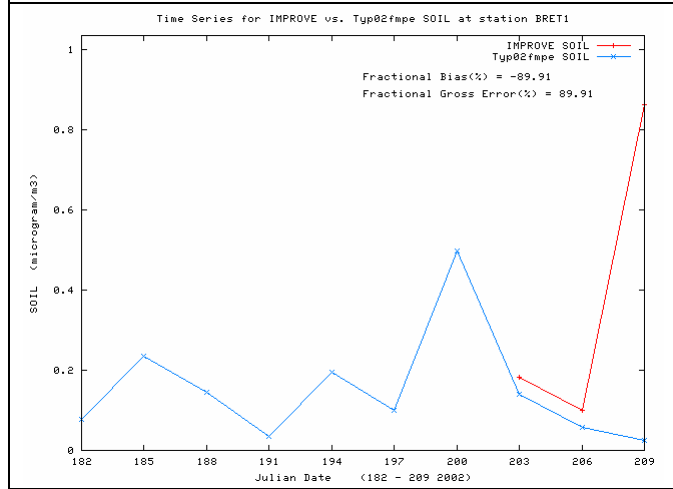
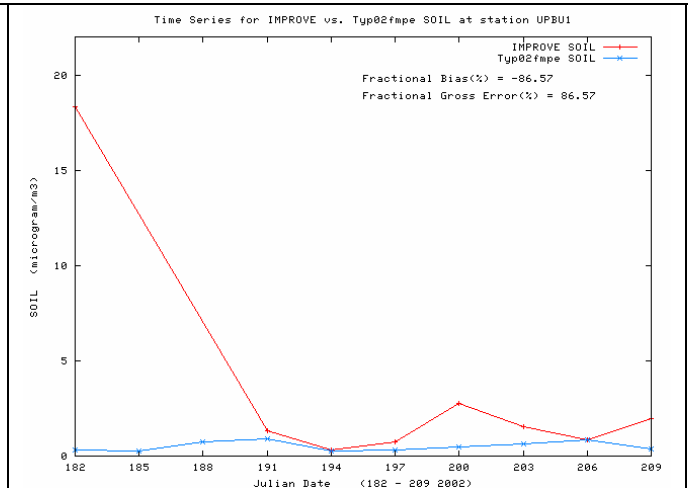
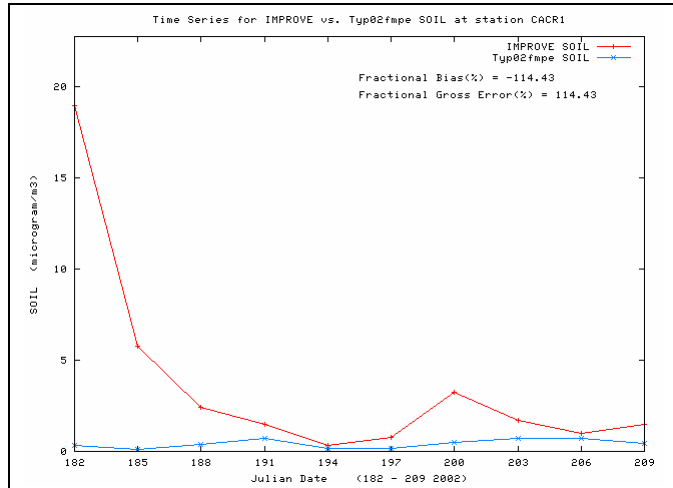


Figure C-30a. Scatter plots of predicted and observed other $\text{PM}_{2.5}$ (Soil) concentrations for July 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



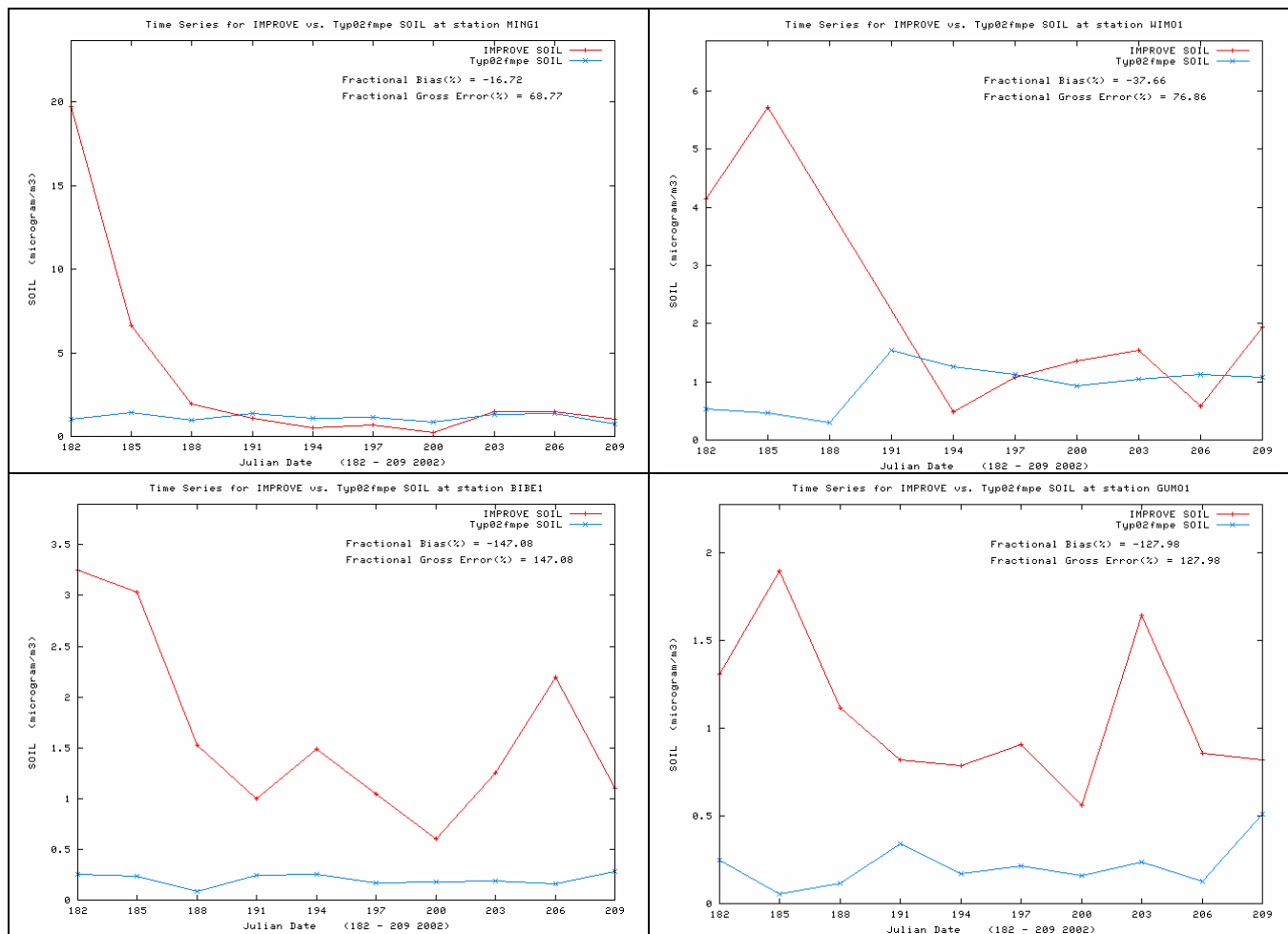


Figure C-30b. Time series of predicted and observed 24-hour other PM_{2.5} (Soil) concentrations at CENRAP IMPROVE sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.

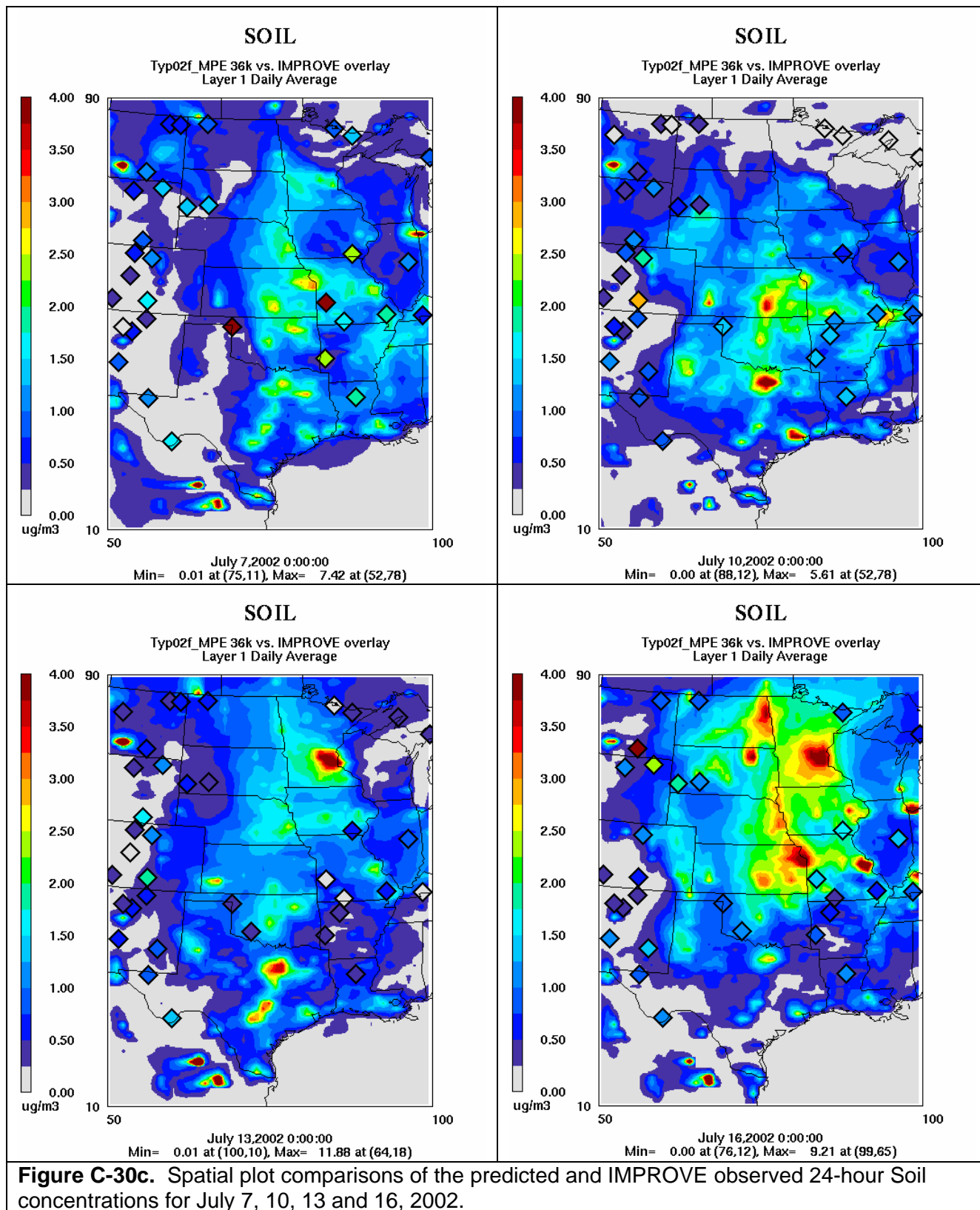


Figure C-30c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour Soil concentrations for July 7, 10, 13 and 16, 2002.

C.3.5.4 Soil in October 2002

The nearly systematic Soil over-prediction bias seen in January returns in October (Figure C-31a). Except for the two Texas sites, BRET and BOWA, the model overstates the observed Soil during all days of October at the other monitoring sites (Figure C-31b). The model is predicting elevated Soil concentrations in the OK-KS-MO-IA area that is not reflected in the measurements (Figure C-31c).

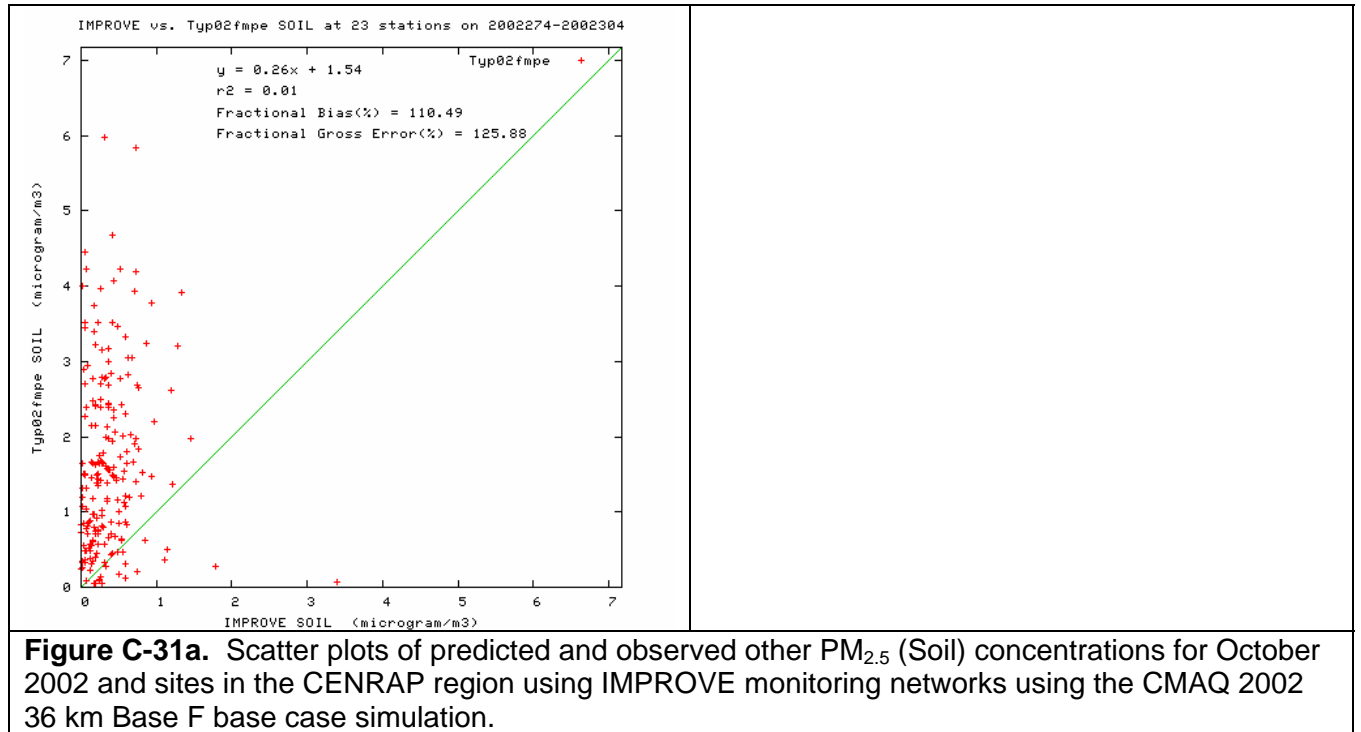
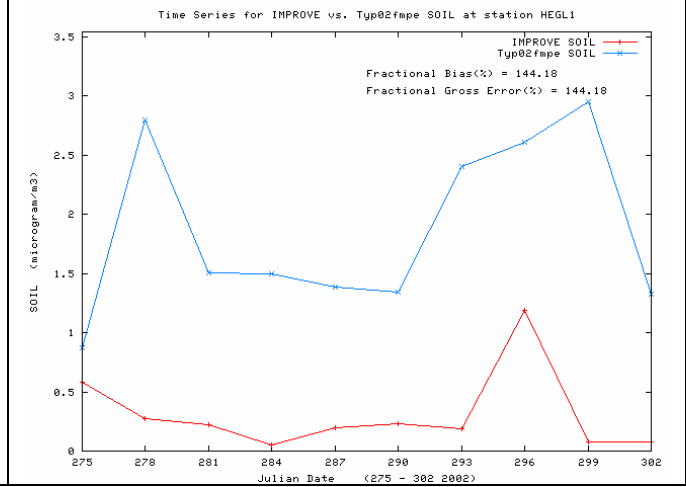
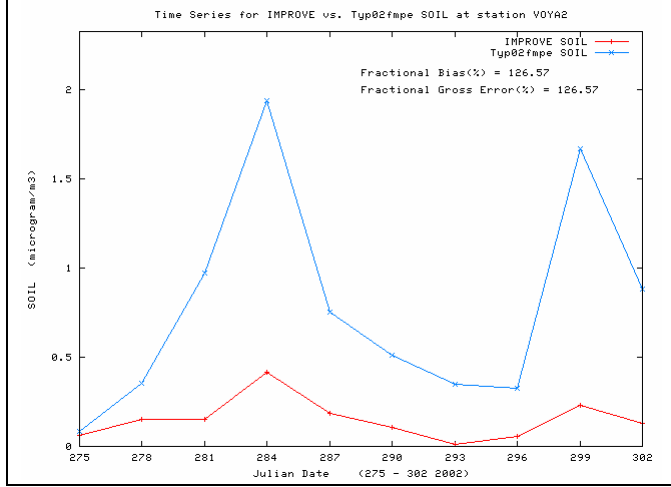
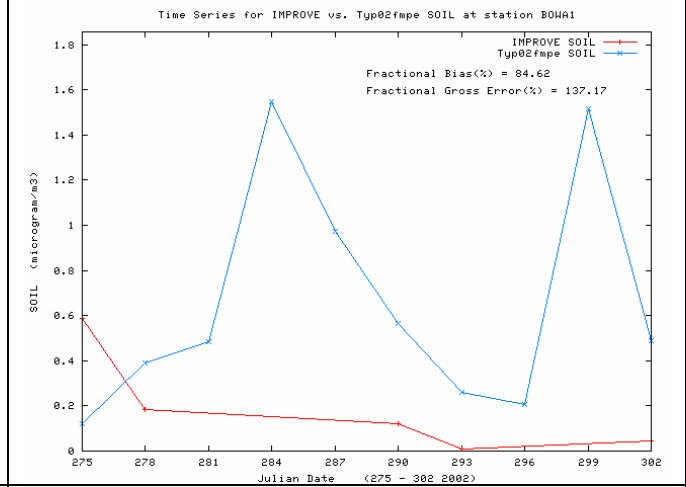
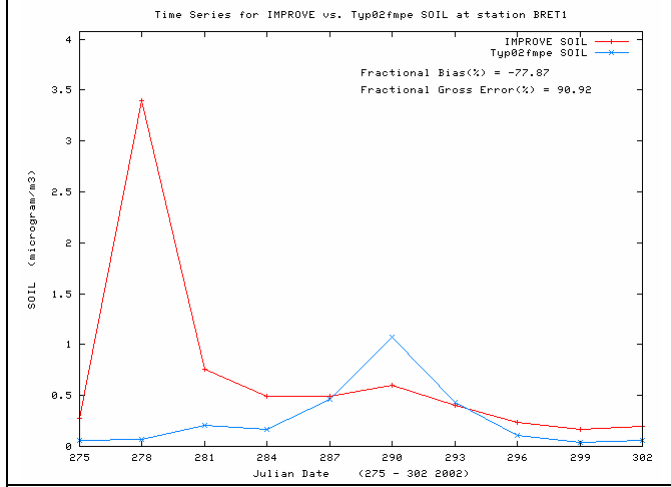
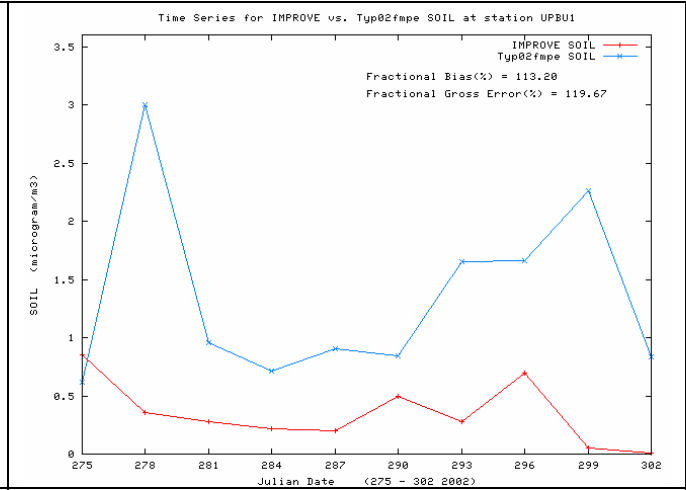
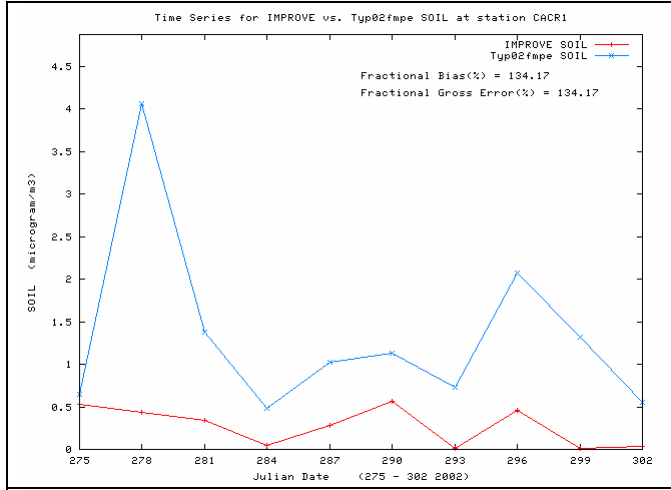


Figure C-31a. Scatter plots of predicted and observed other PM_{2.5} (Soil) concentrations for October 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



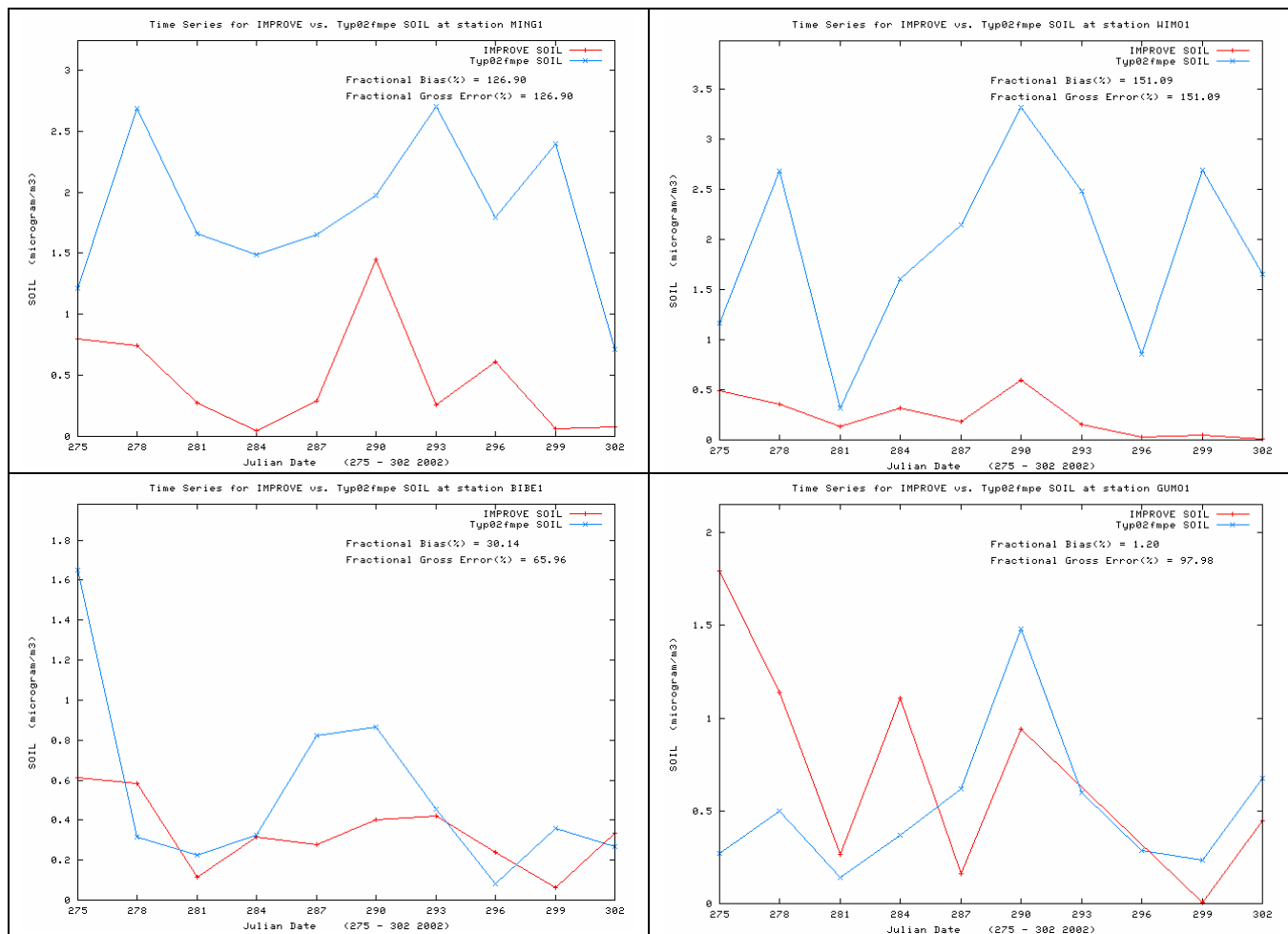


Figure C-31b. Time series of predicted and observed 24-hour other PM_{2.5} (Soil) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.

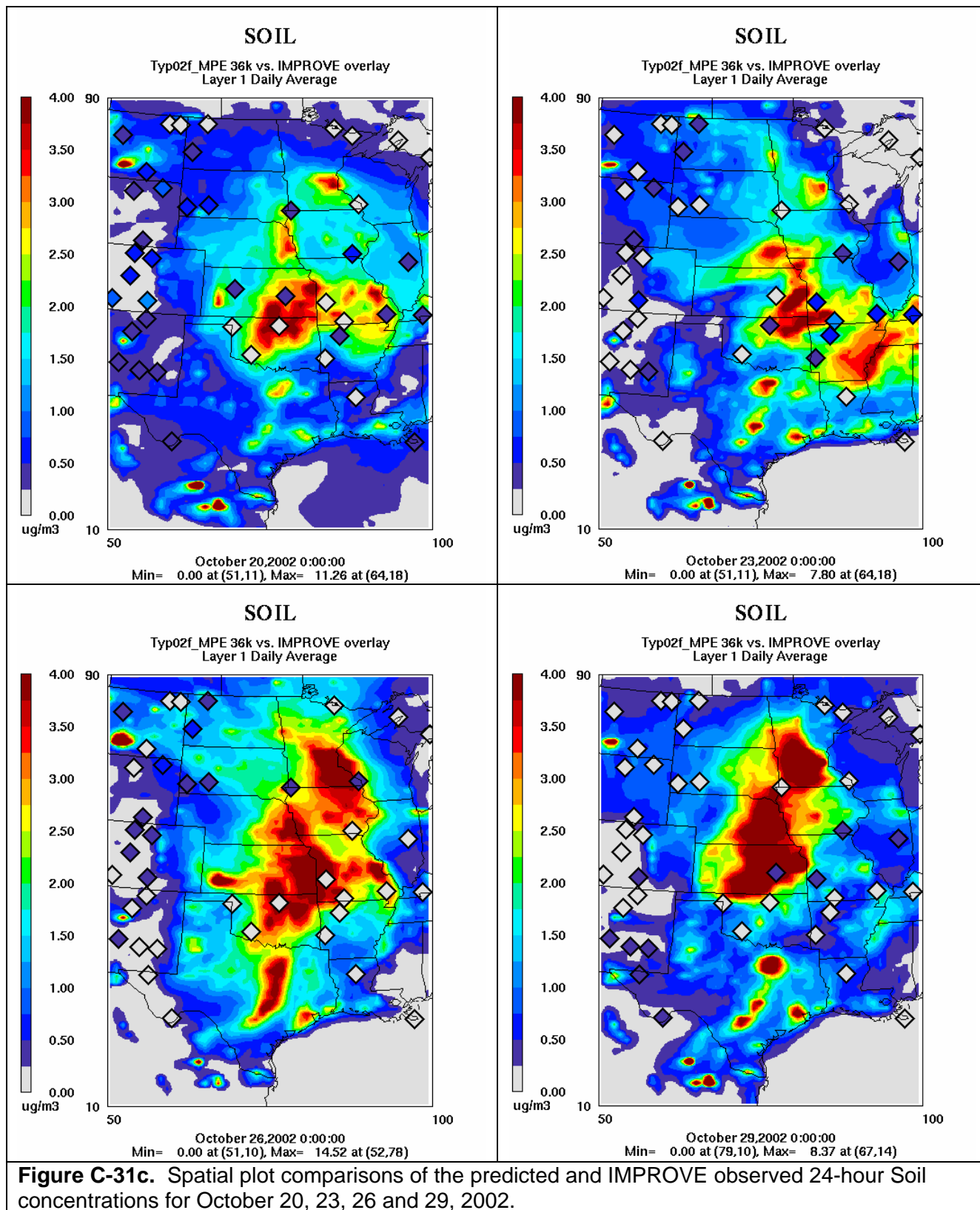


Figure C-31c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour Soil concentrations for October 20, 23, 26 and 29, 2002.

C.3.5.5 Soil Monthly Bias and Error

Figure C-32 displays the monthly variation in the Soil bias and error. During the winter months the model exhibits a very large (> 100%) overestimation bias with large errors as well. With the exception of July, in the summer the model bias is a slight over-prediction but generally less than 20% with errors of 60% to 80%. The Bugle Plot indicates that the summer Soil performance achieves the PM performance goal, a few months in the Spring/Fall period fall between the performance goal and criteria and the winter Soil performance exceeds the model performance criteria by a far margin. Thus, the Soil performance is a cause for concern.

CENRAP Typ02f_MPE

SOIL

IMPROVE

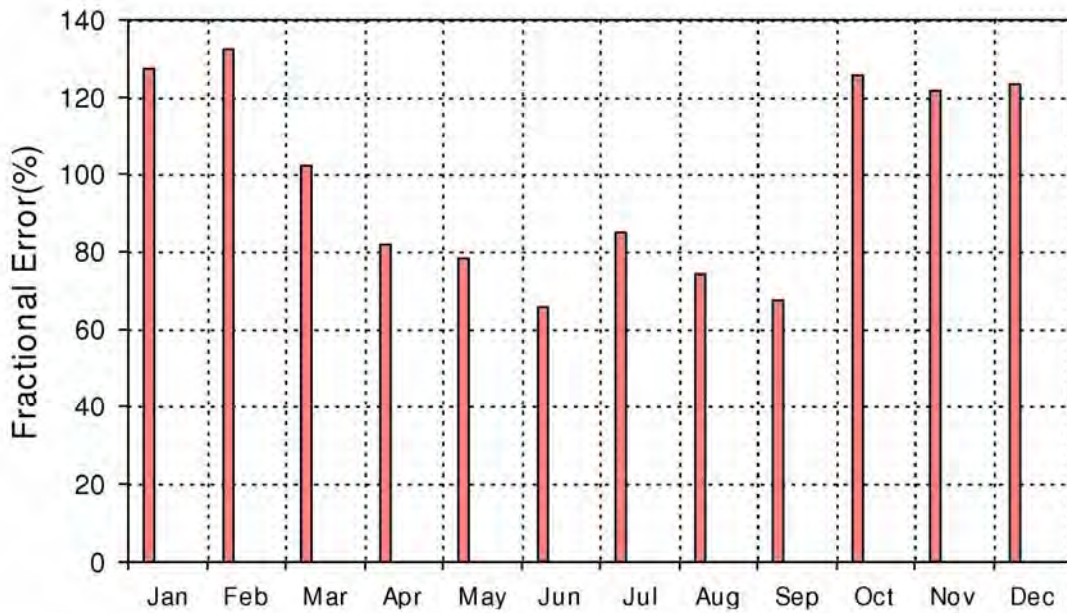
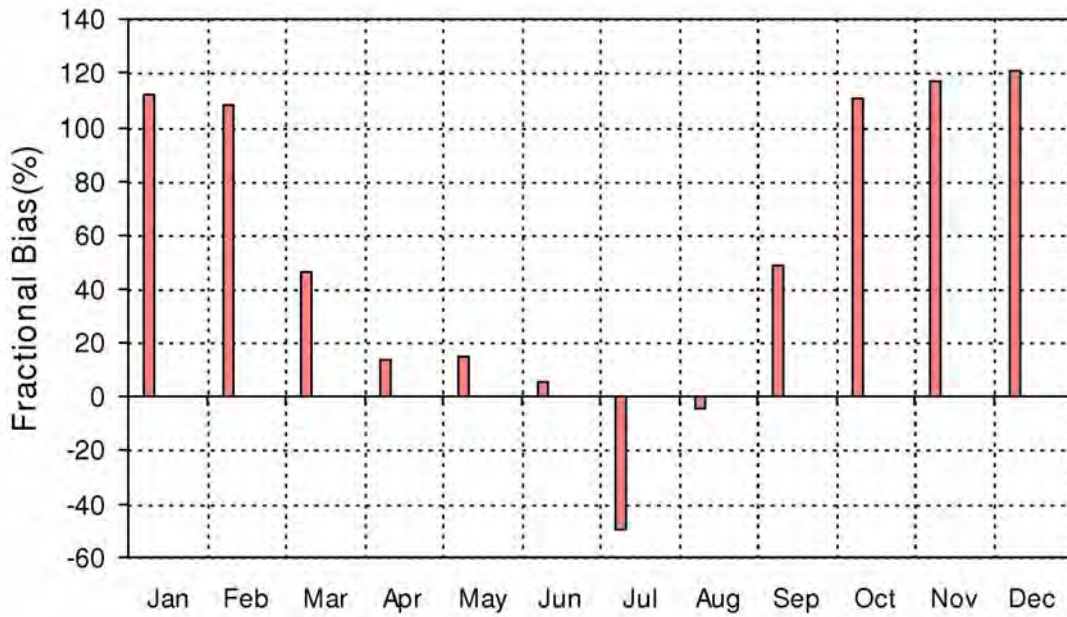


Figure C-32. Monthly Soil fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE, STN and CASTNet monitoring sites in the CENRAP region.

CENRAP Typ02f_MPE 36k Bugle Plot

SOIL

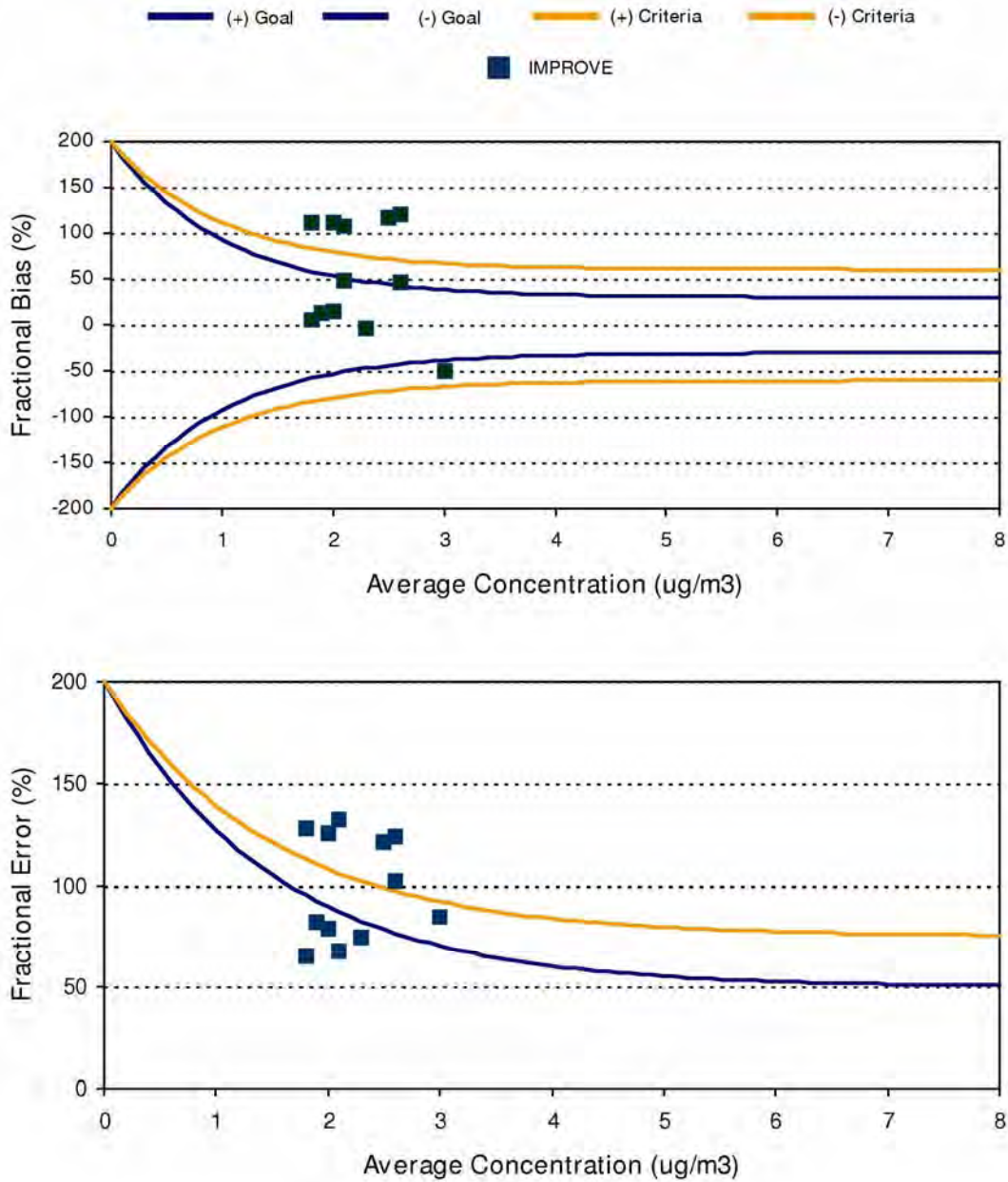


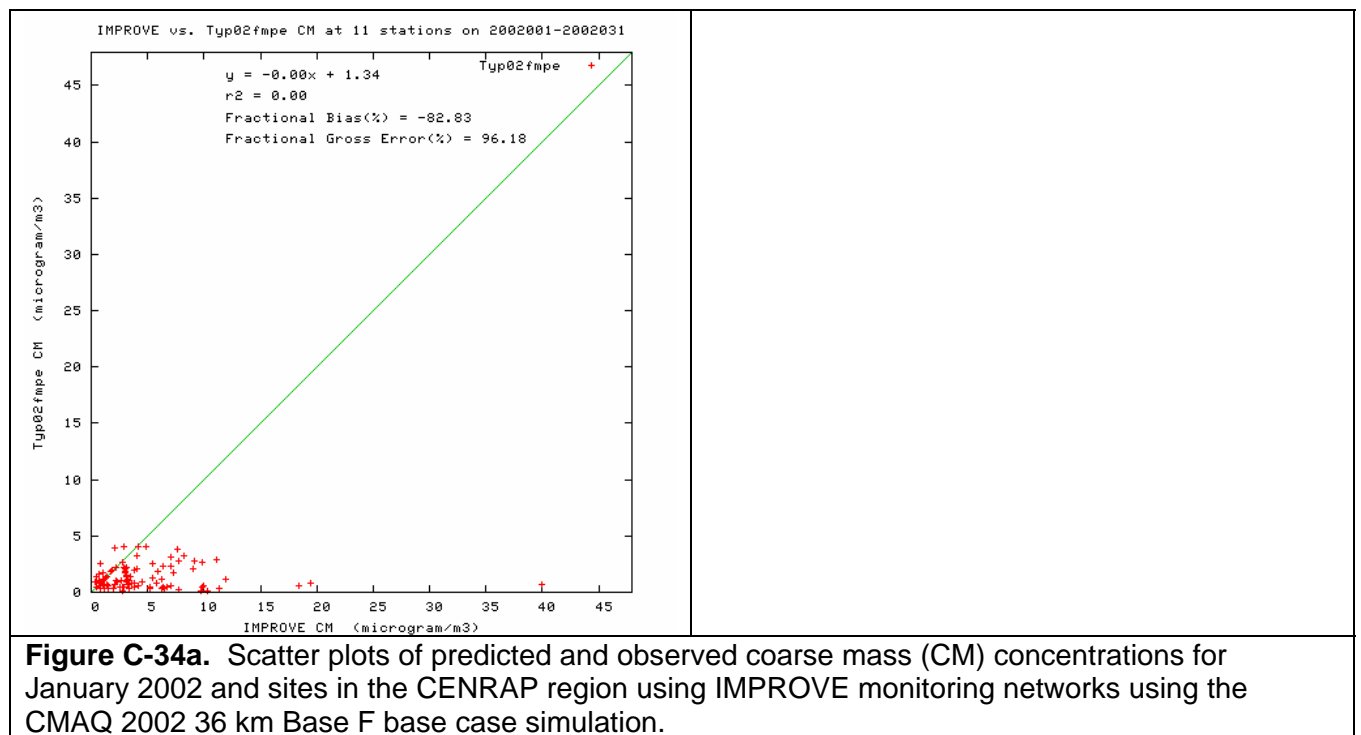
Figure C-33. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for Soil and IMPROVE monitoring sites in the CENRAP region.

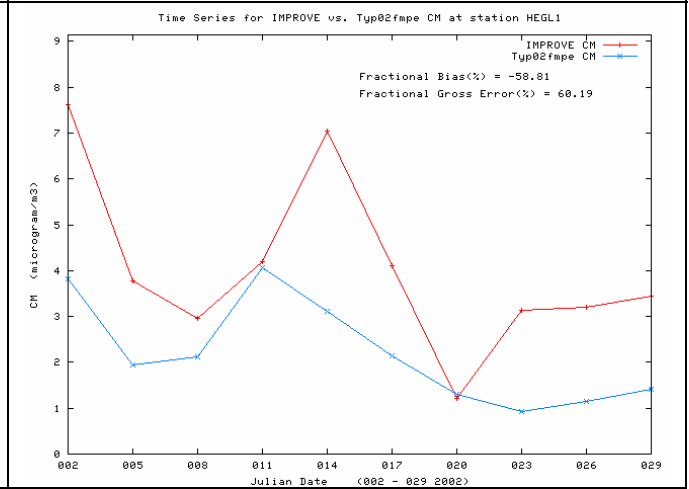
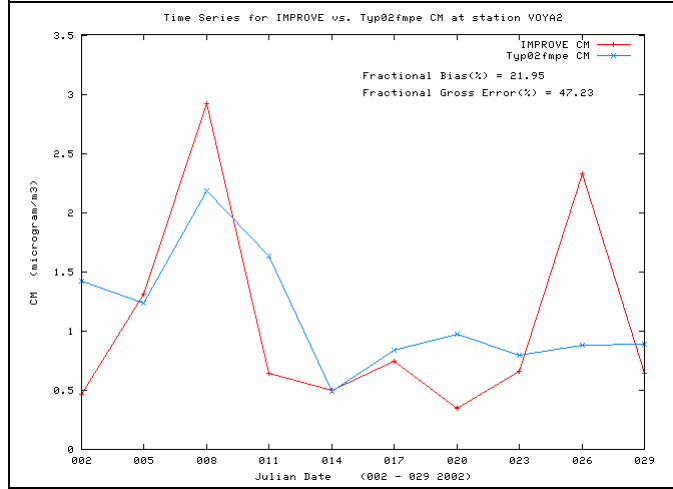
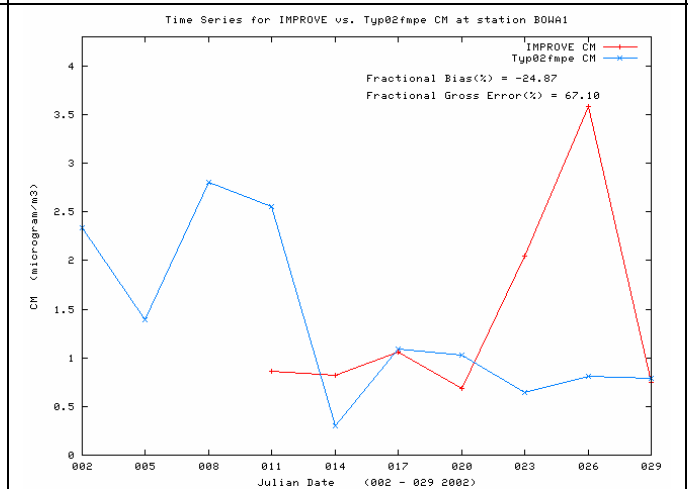
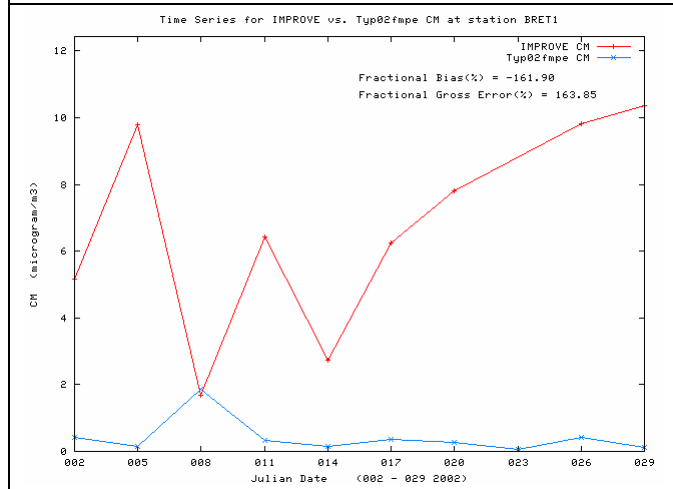
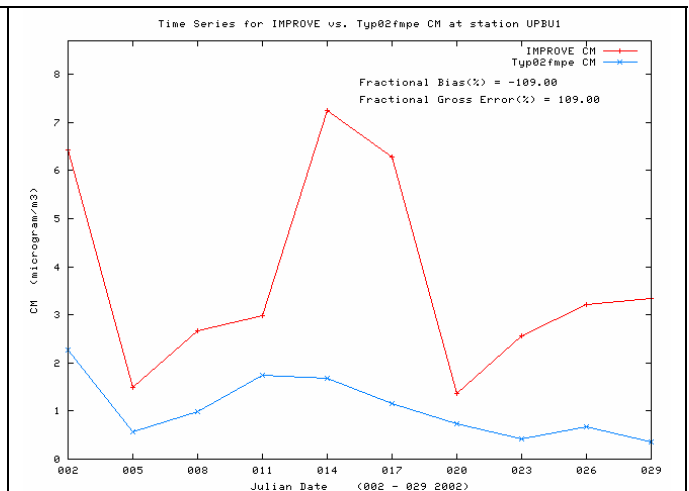
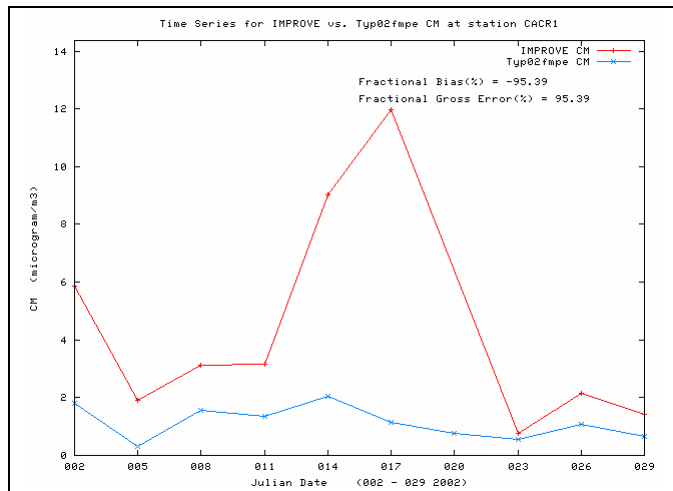
C.3.6 Coarse Mass (CM) Monthly Model Performance

The IMPROVE coarse mass (CM) measurement is taken as the difference between the PM_{10} and $PM_{2.5}$ mass measurement. Any SO_4 or NO_3 in the coarse mode will be in the CM measurement. The model, on the other hand, only includes primary CM. Any coarse SO_4 or NO_3 will be in the SO_4 and NO_3 modeled species.

C.3.6.1 CM in January 2002

The model underestimates the observed CM in January with a fractional bias of -83% (Figure C-34a). Although the model appears to reproduce CM at some sites (e.g., VOYA) at the two Texas sites the bias is approximately -150% (Figure C-34b). The observed spatial distribution of CM in January is not reproduced by the model at all (Figure C-34c). Whereas the observations indicate high CM concentrations in the west Texas-New Mexico area, the model estimates elevated CM in northeast Texas, through Oklahoma, Kansas, Iowa and into southern Minnesota. Although the CM measurements at WIMO in this area are also elevated, the rest of the high modeled CM values fall between the IMPROVE monitors so can not be verified or refuted by the measurements.





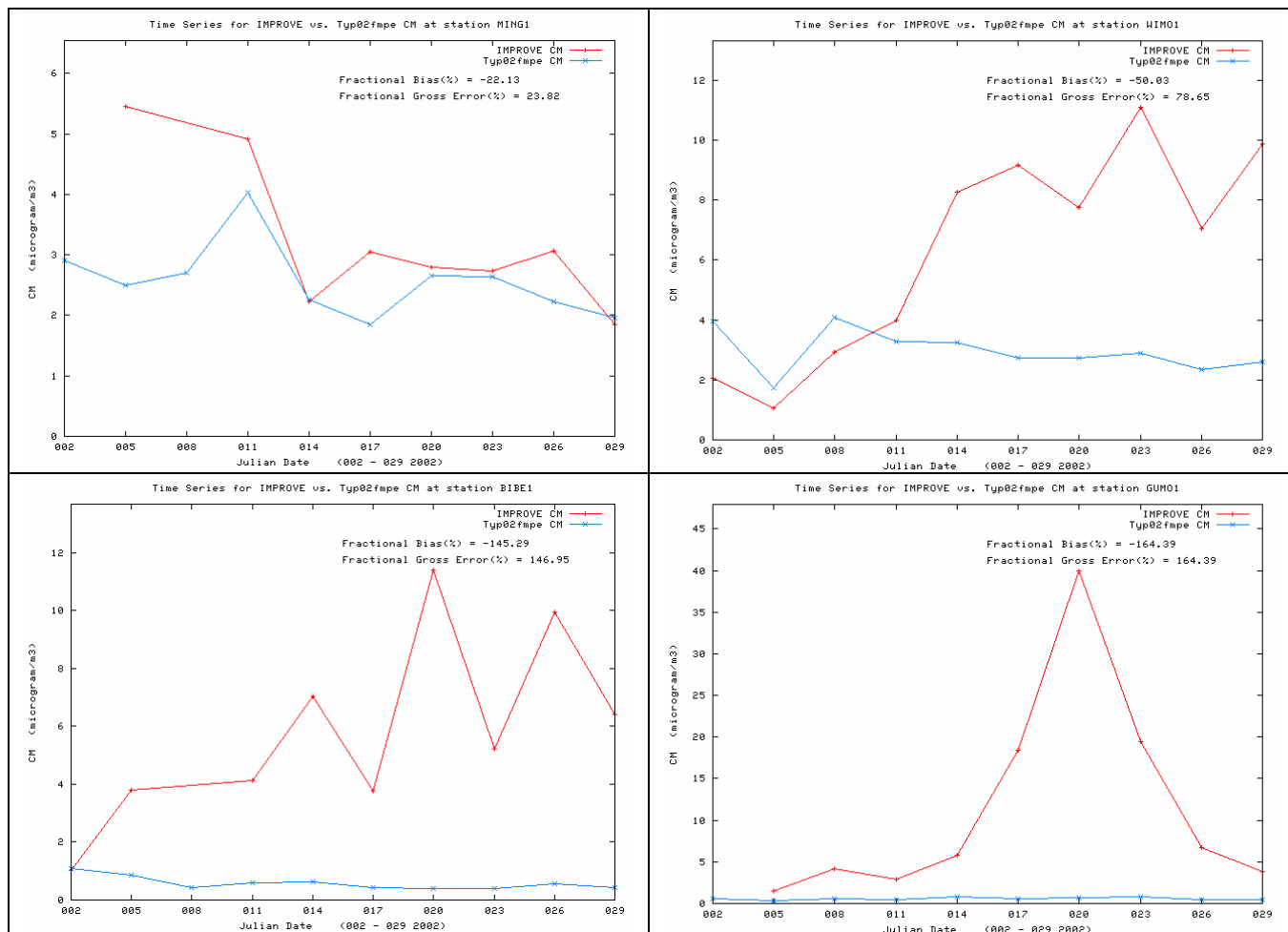
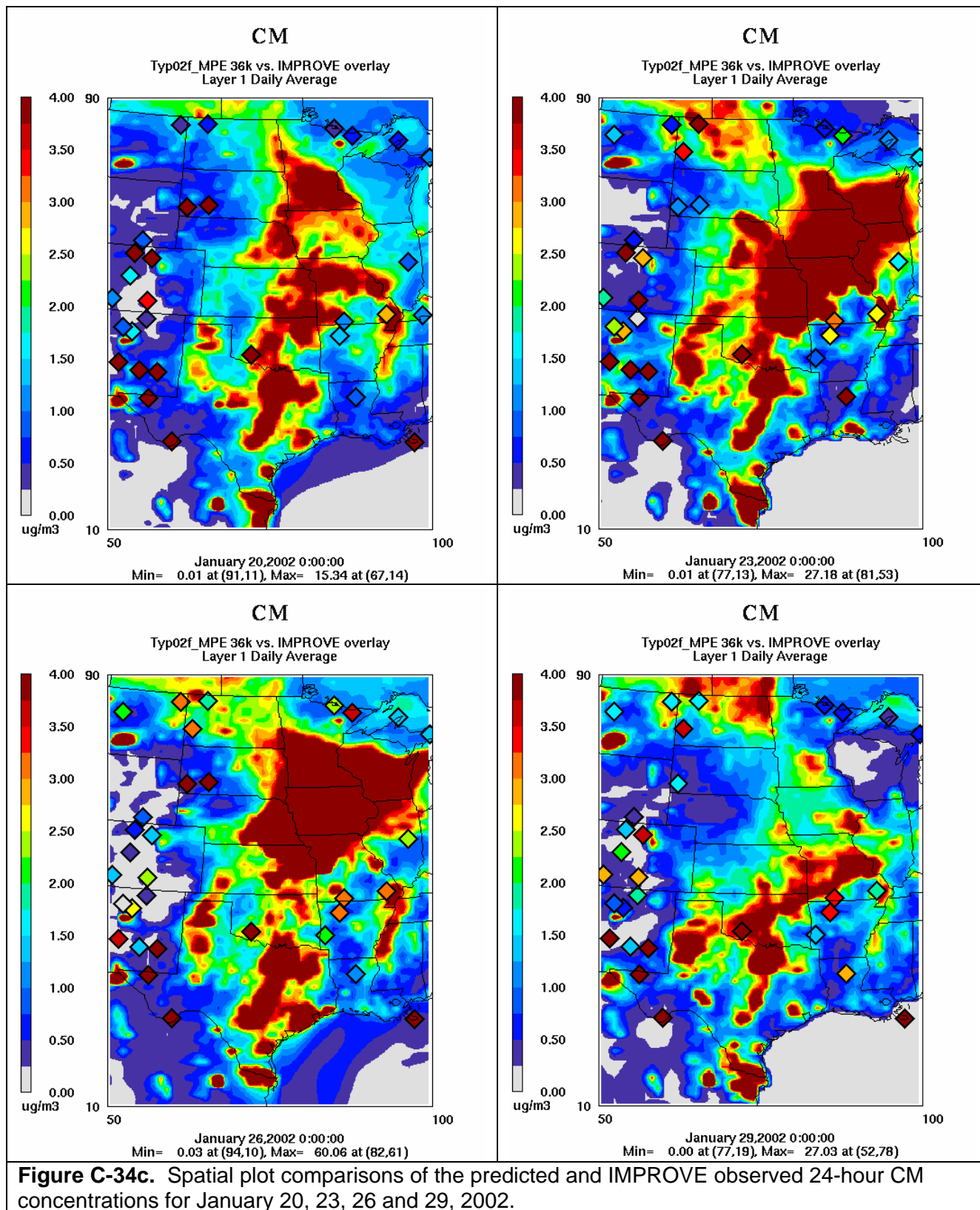


Figure C-34b. Time series of predicted and observed 24-hour coarse mass (CM) concentrations at CENRAP IMPROVE CLASS I AREA sites in January 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.6.2 CM in April 2002

The CM underestimation bias is even greater in April (-137%) and occurs at all IMPROVE sites (Figure C-35).

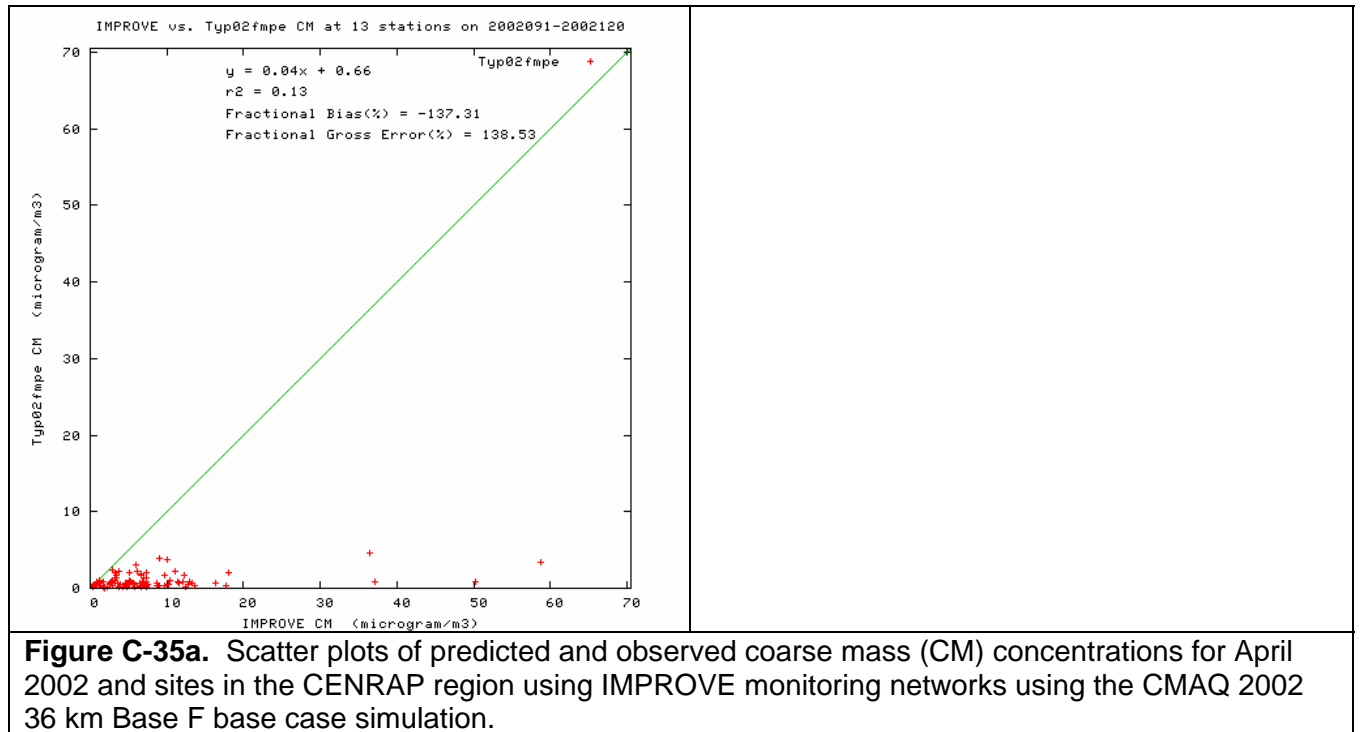
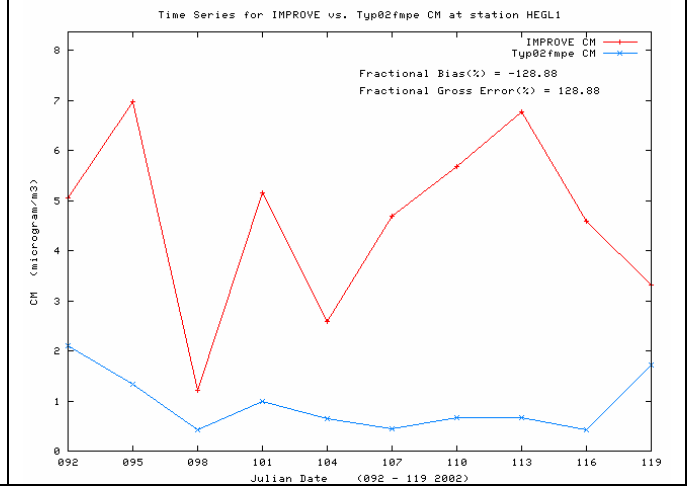
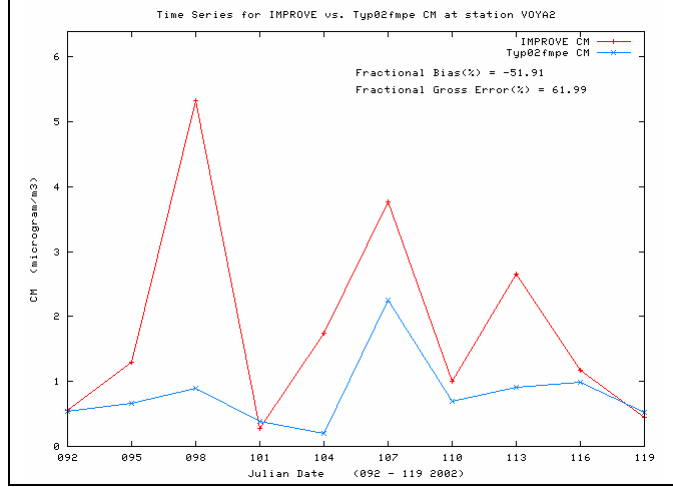
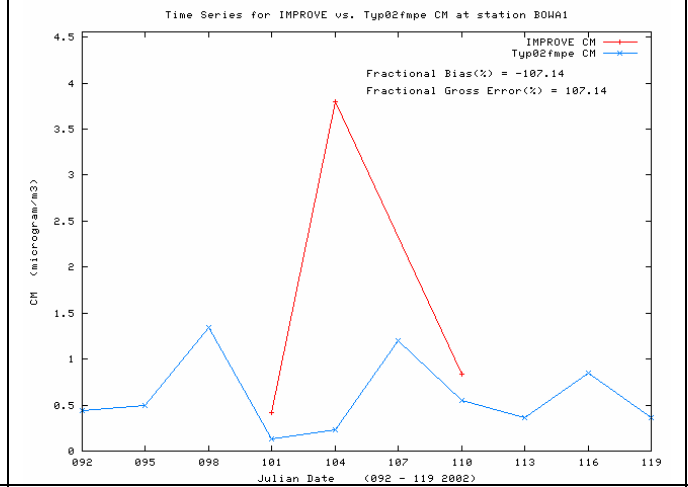
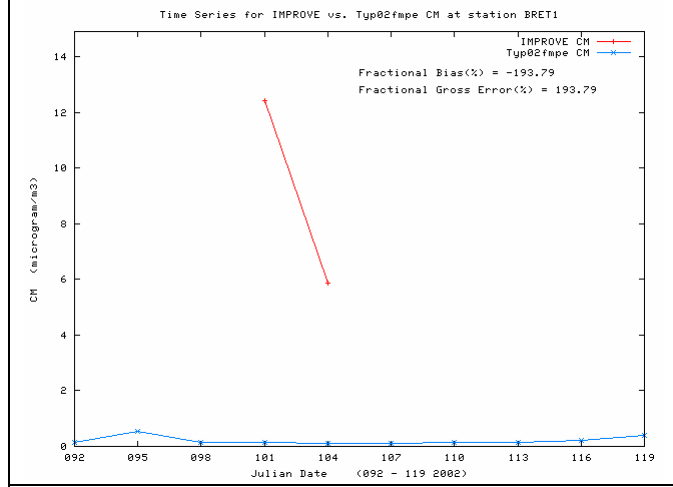
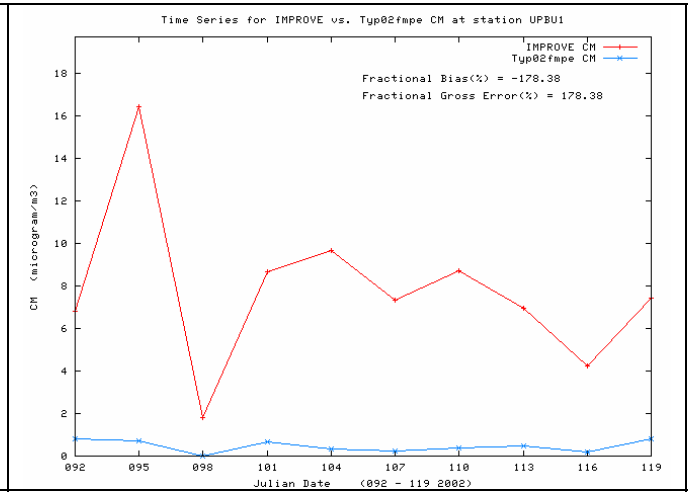
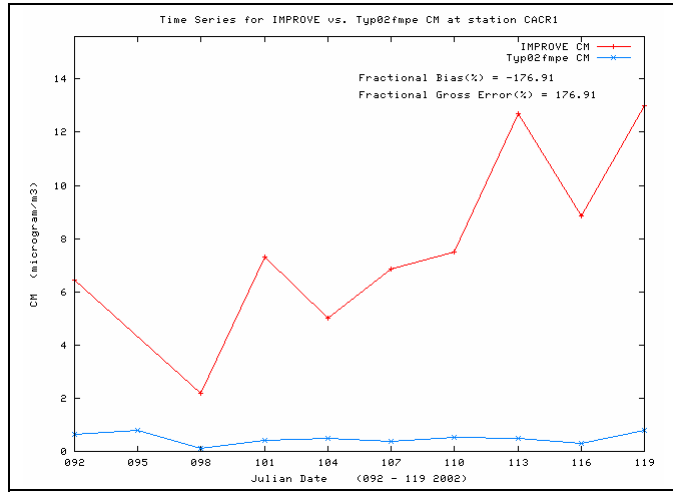


Figure C-35a. Scatter plots of predicted and observed coarse mass (CM) concentrations for April 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



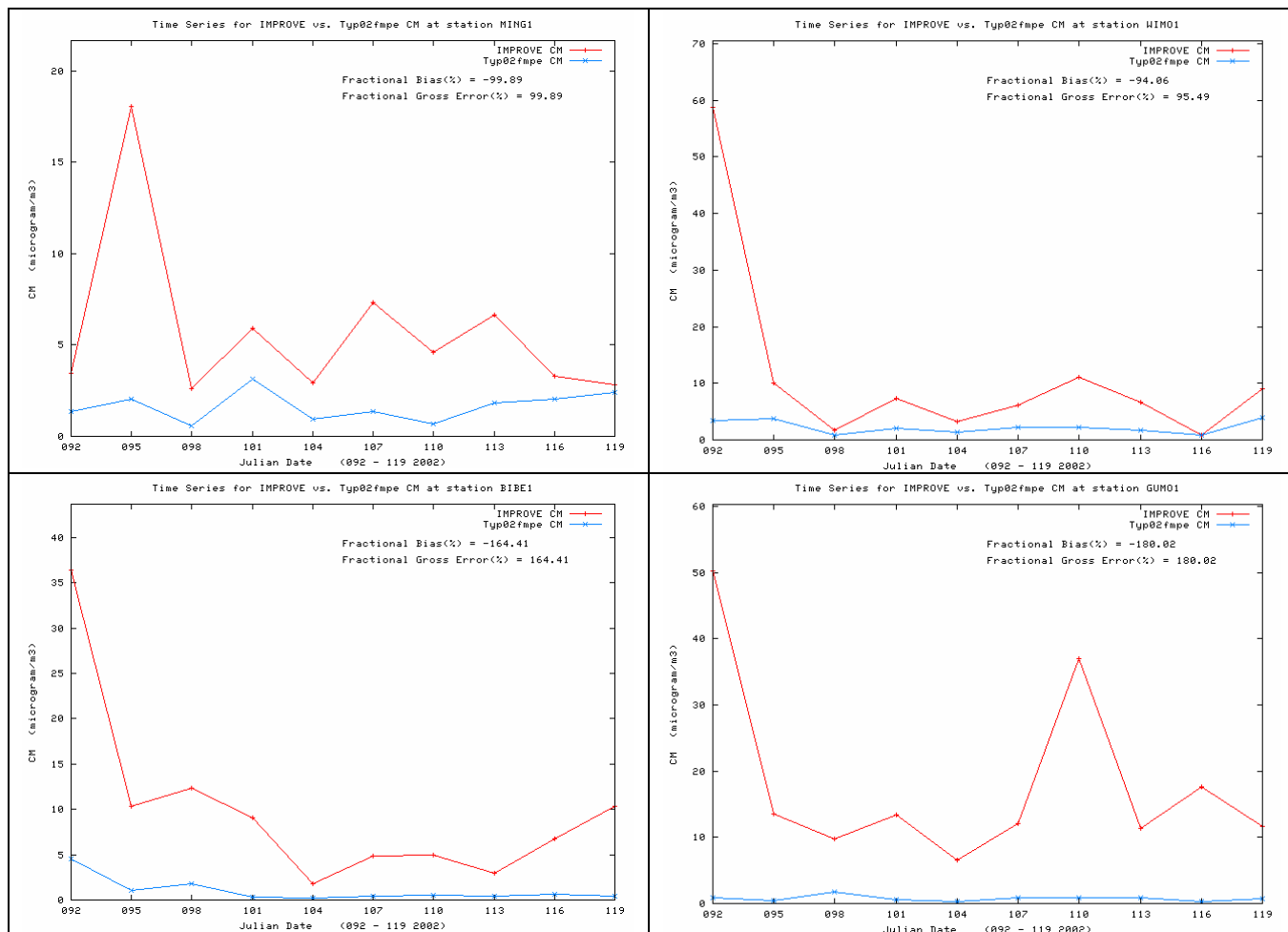


Figure C-35b. Time series of predicted and observed 24-hour coarse mass (CM) concentrations at CENRAP IMPROVE CLASS I AREA sites in April 2002 for CMAQ 2002 36 km Base F base case simulation.

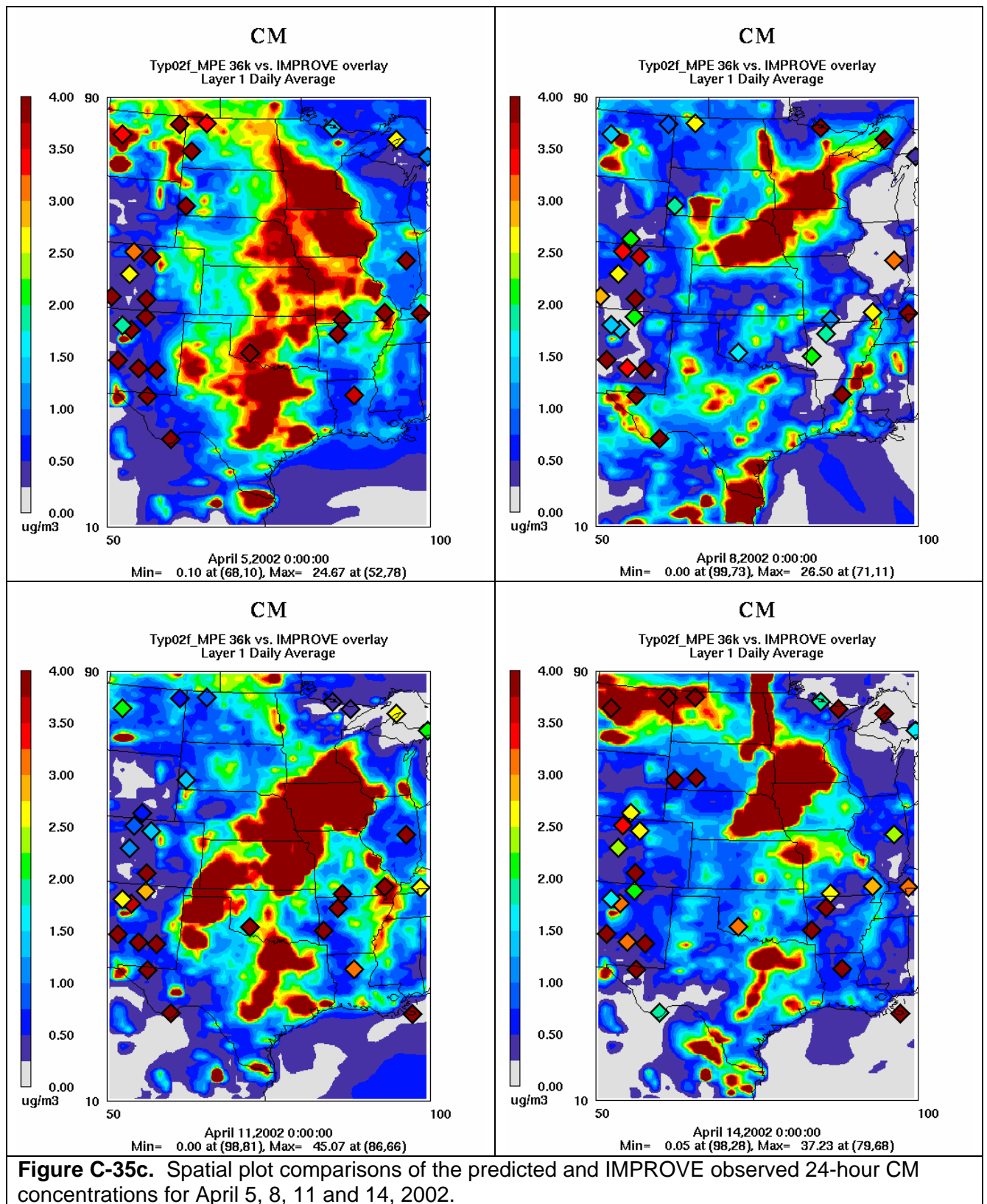


Figure C-35c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour CM concentrations for April 5, 8, 11 and 14, 2002.

C.3.6.3 CM in July 2002

CM performance in July is also very poor with a fractional bias value of -160% (Figure C-36).

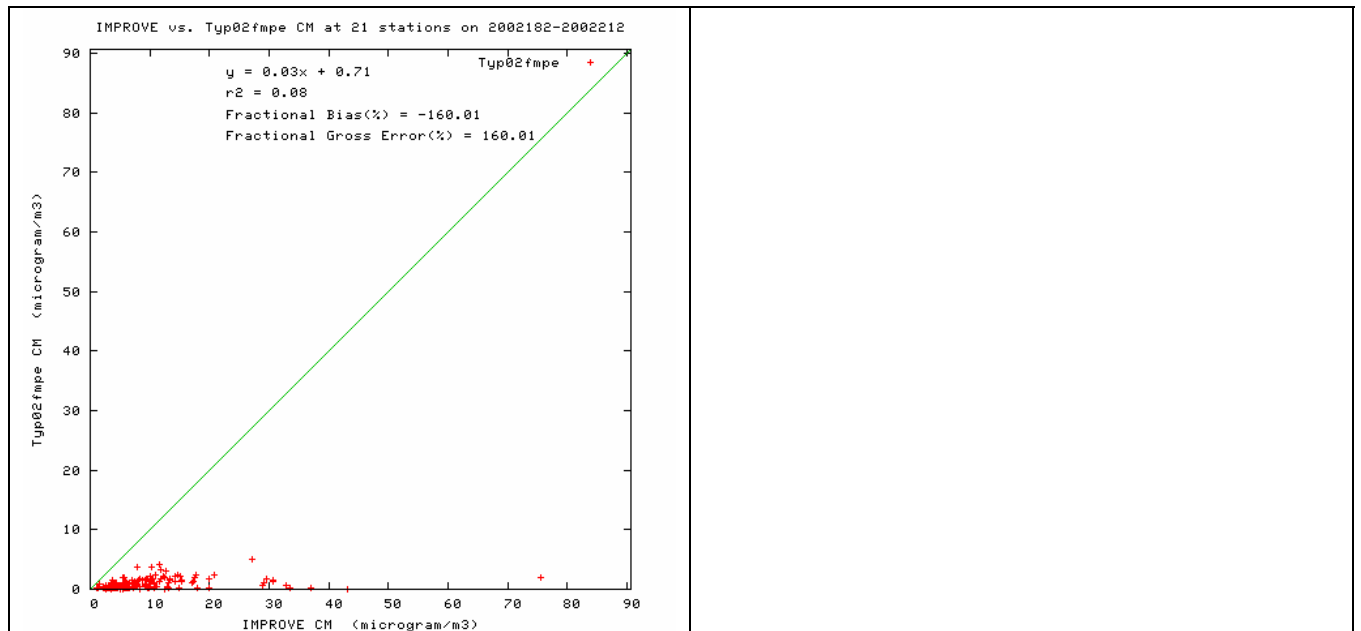
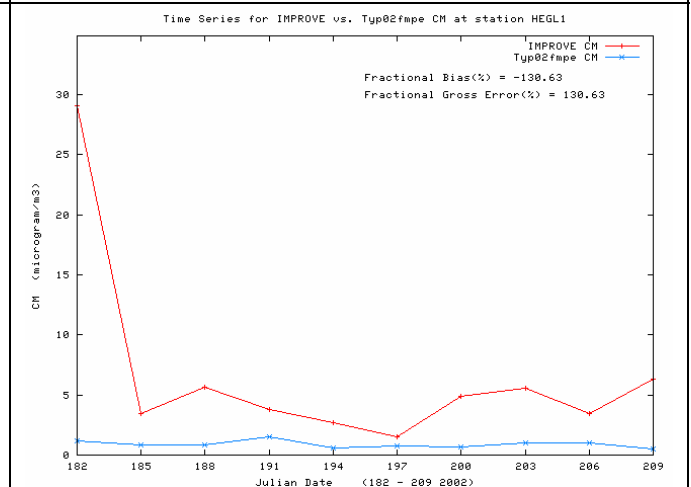
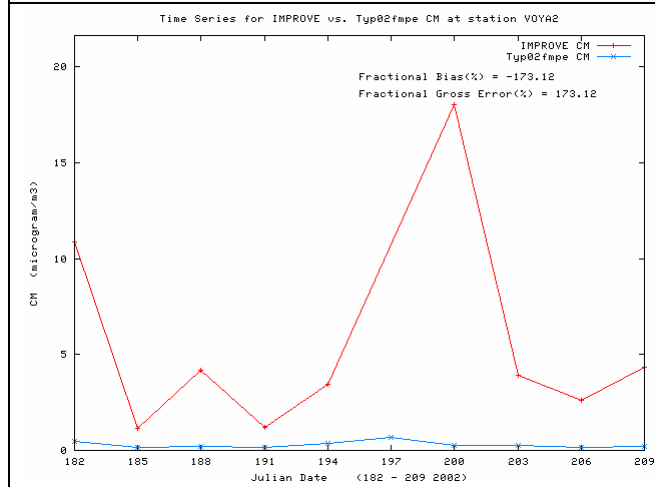
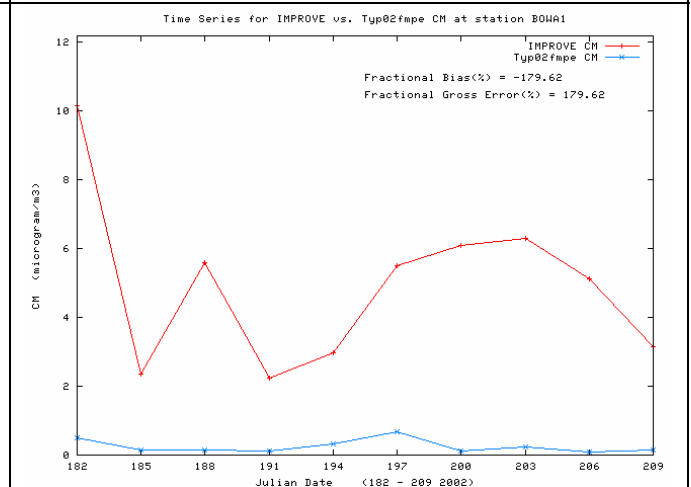
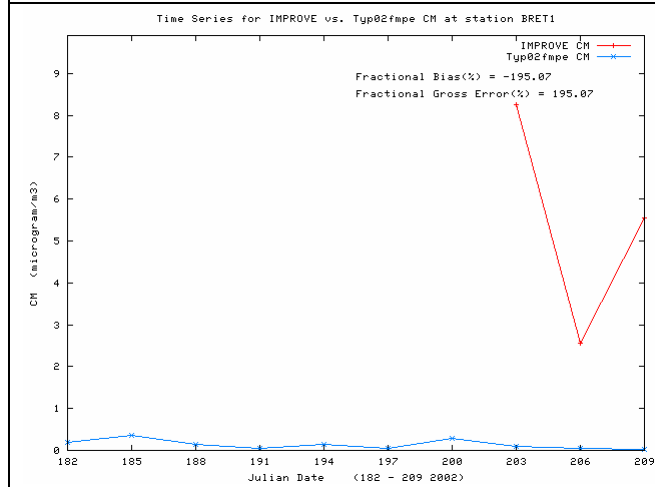
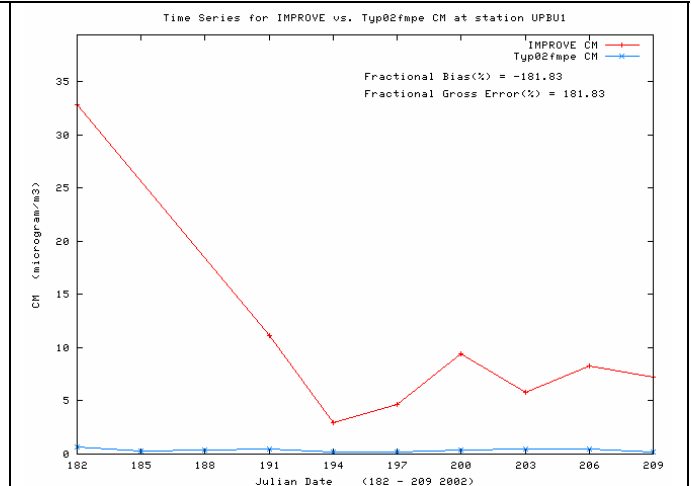
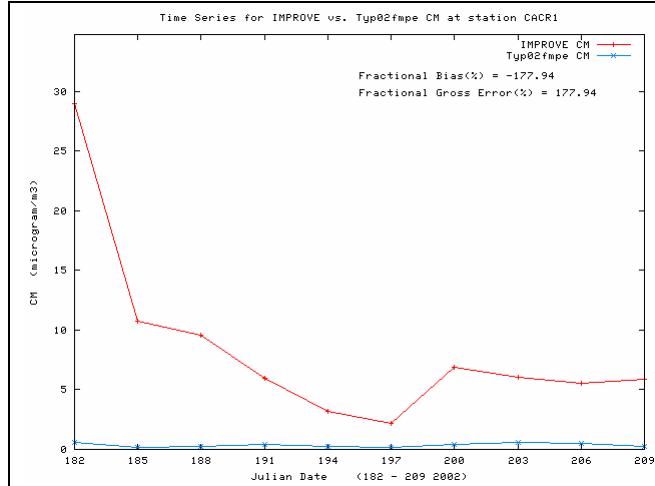


Figure C-36a. Scatter plots of predicted and observed coarse mass (CM) concentrations for July 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



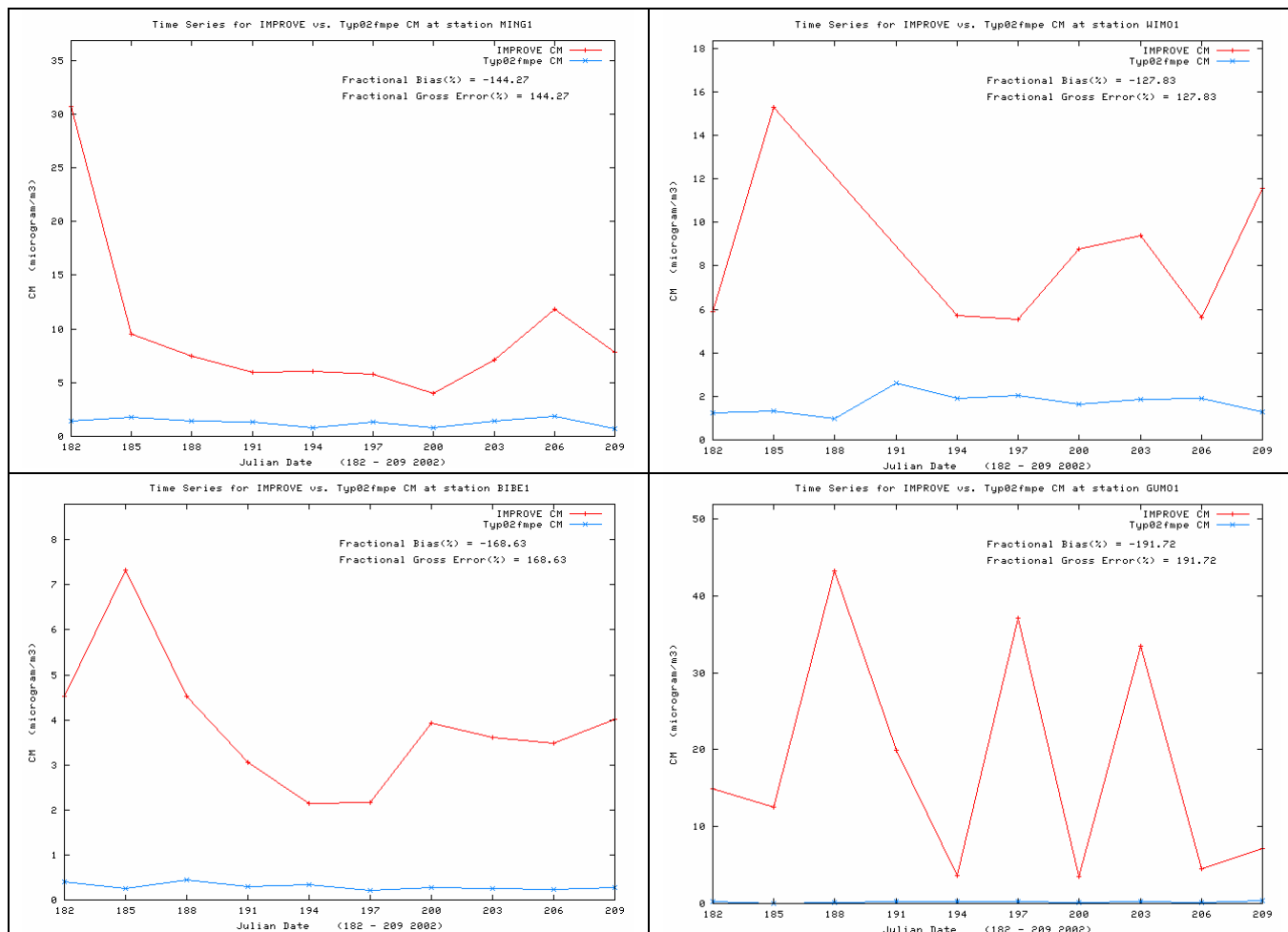
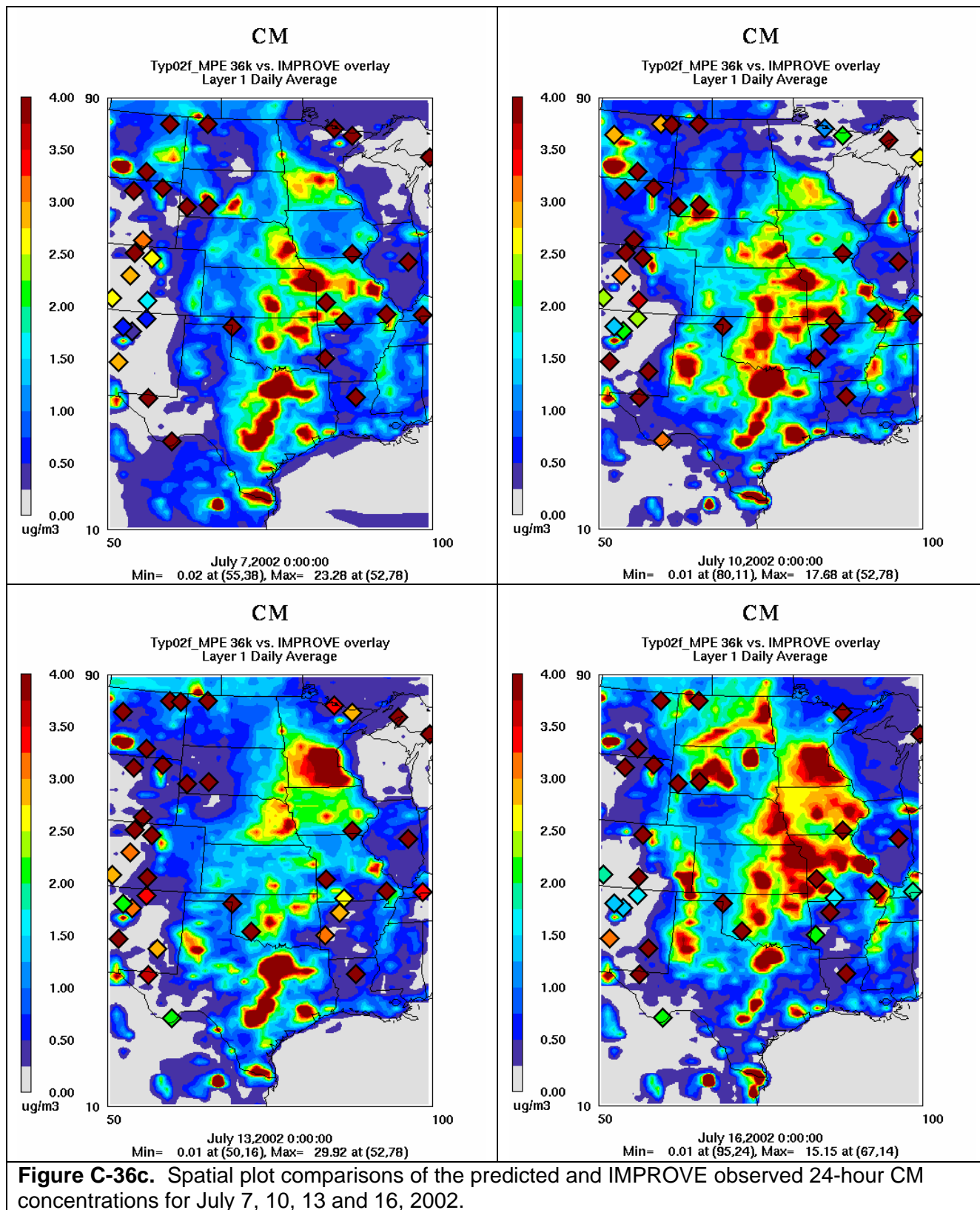


Figure C-36b. Time series of predicted and observed 24-hour coarse mass (CM) concentrations at CENRAP IMPROVE CLASS I AREA sites in July 2002 for CMAQ 2002 36 km Base F base case simulation.



C.3.6.4 CM in October 2002

CM is also underestimated in October, although the overestimation bias (-72%) is not as great as seen in July (Figure C-37).

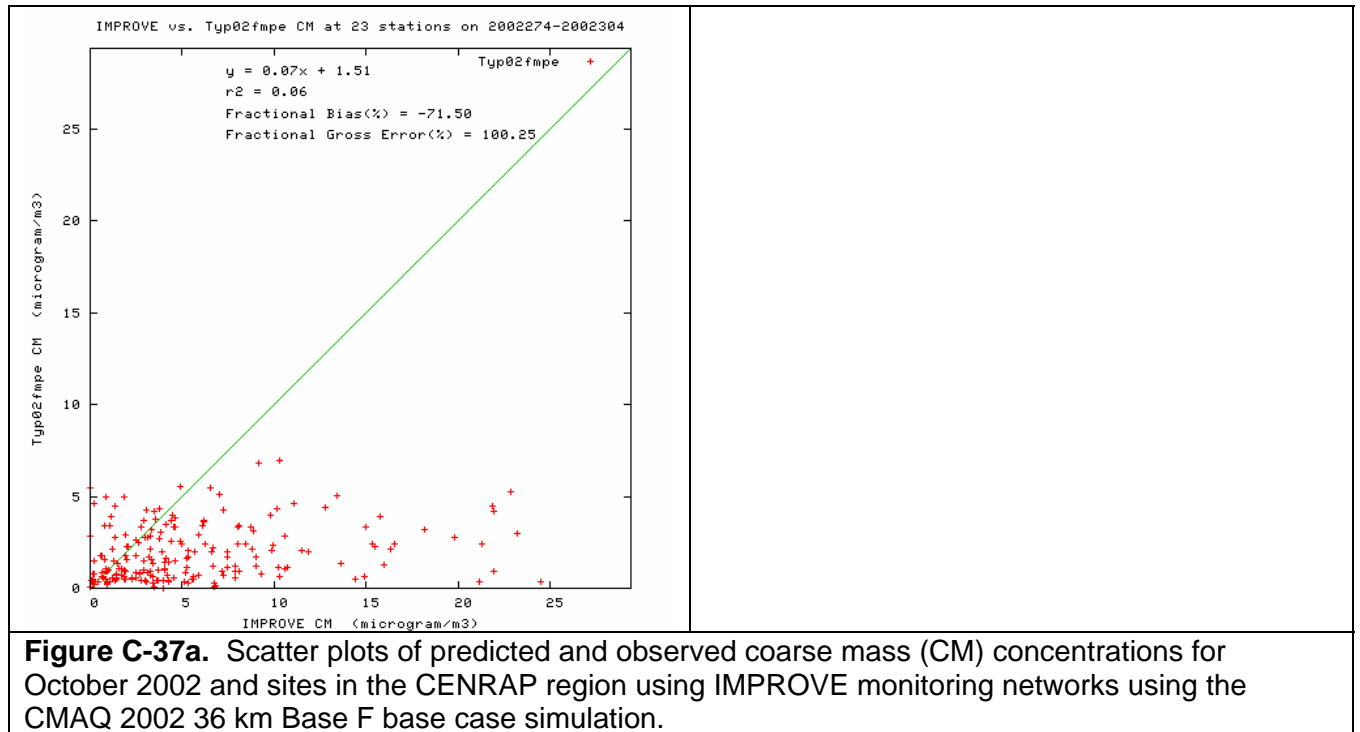
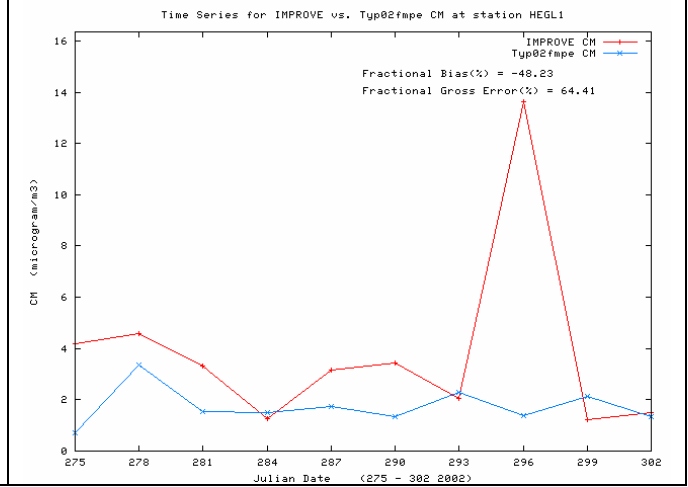
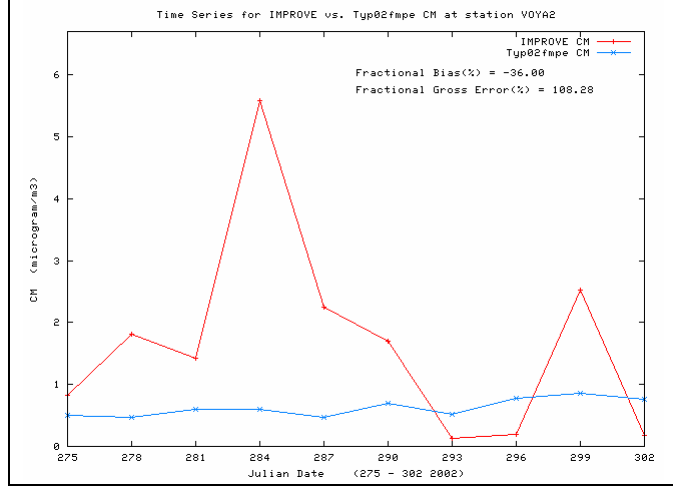
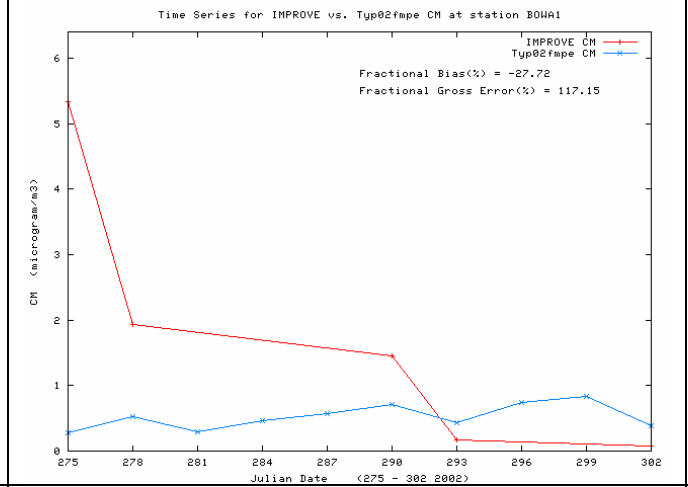
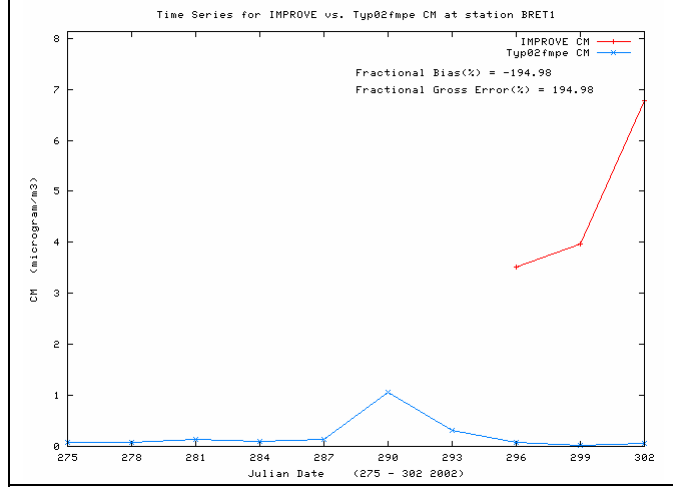
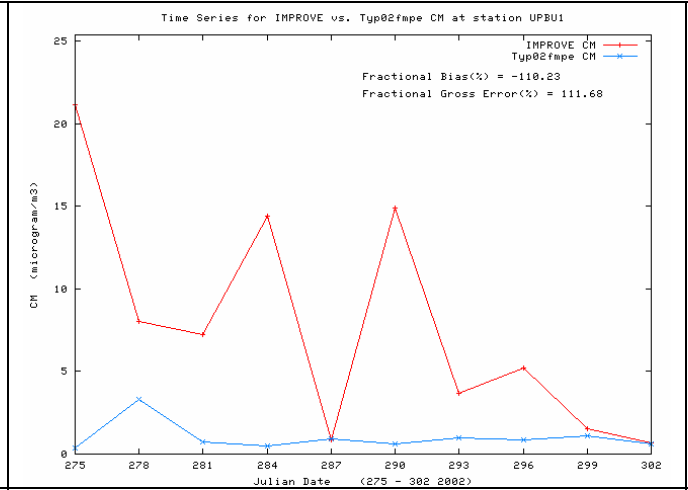
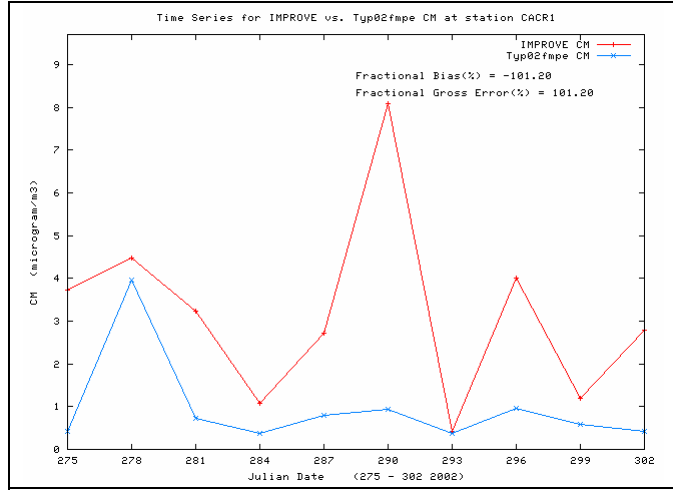


Figure C-37a. Scatter plots of predicted and observed coarse mass (CM) concentrations for October 2002 and sites in the CENRAP region using IMPROVE monitoring networks using the CMAQ 2002 36 km Base F base case simulation.



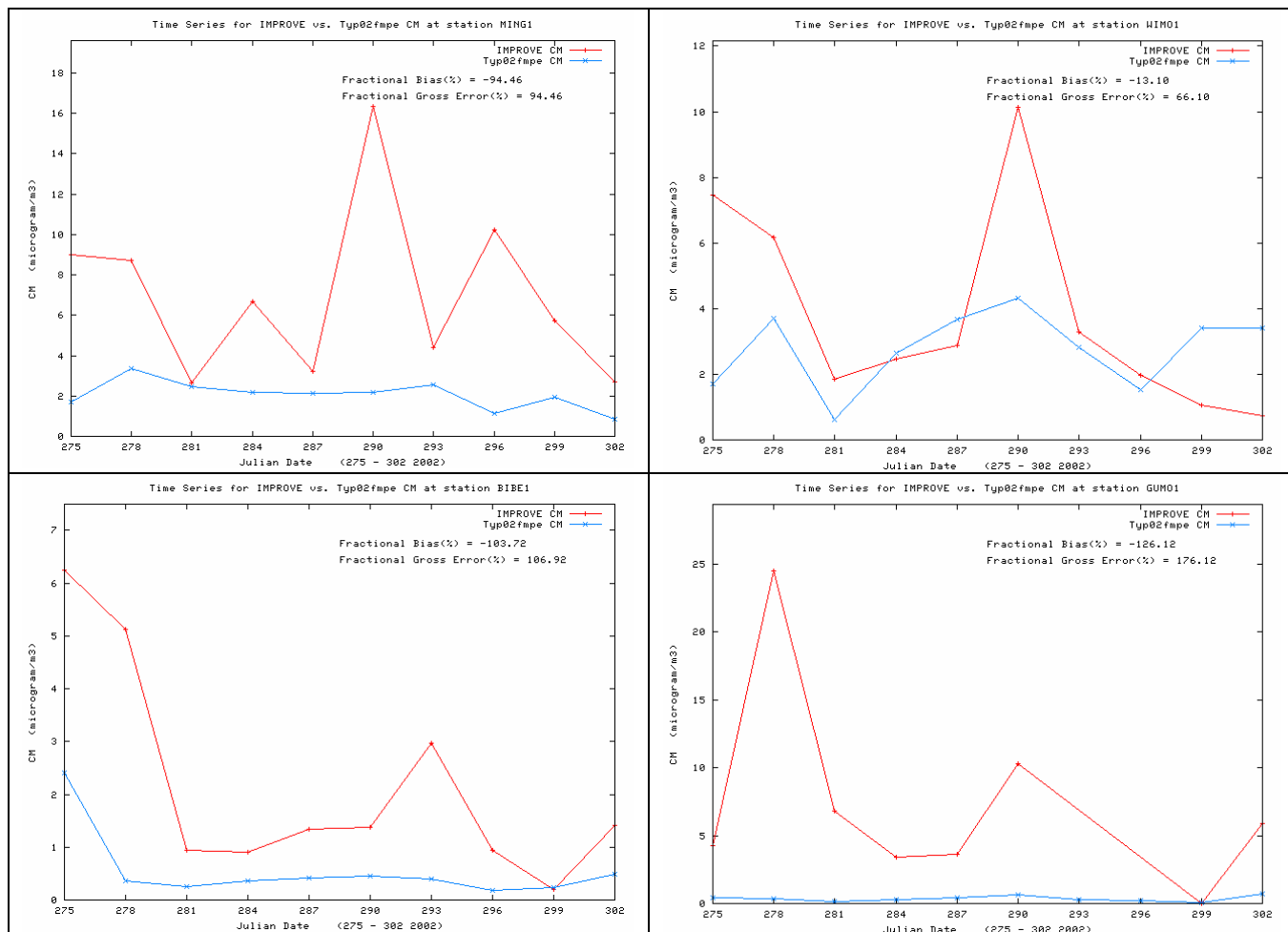


Figure C-37b. Time series of predicted and observed 24-hour coarse mass (CM) concentrations at CENRAP IMPROVE CLASS I AREA sites in October 2002 for CMAQ 2002 36 km Base F base case simulation.

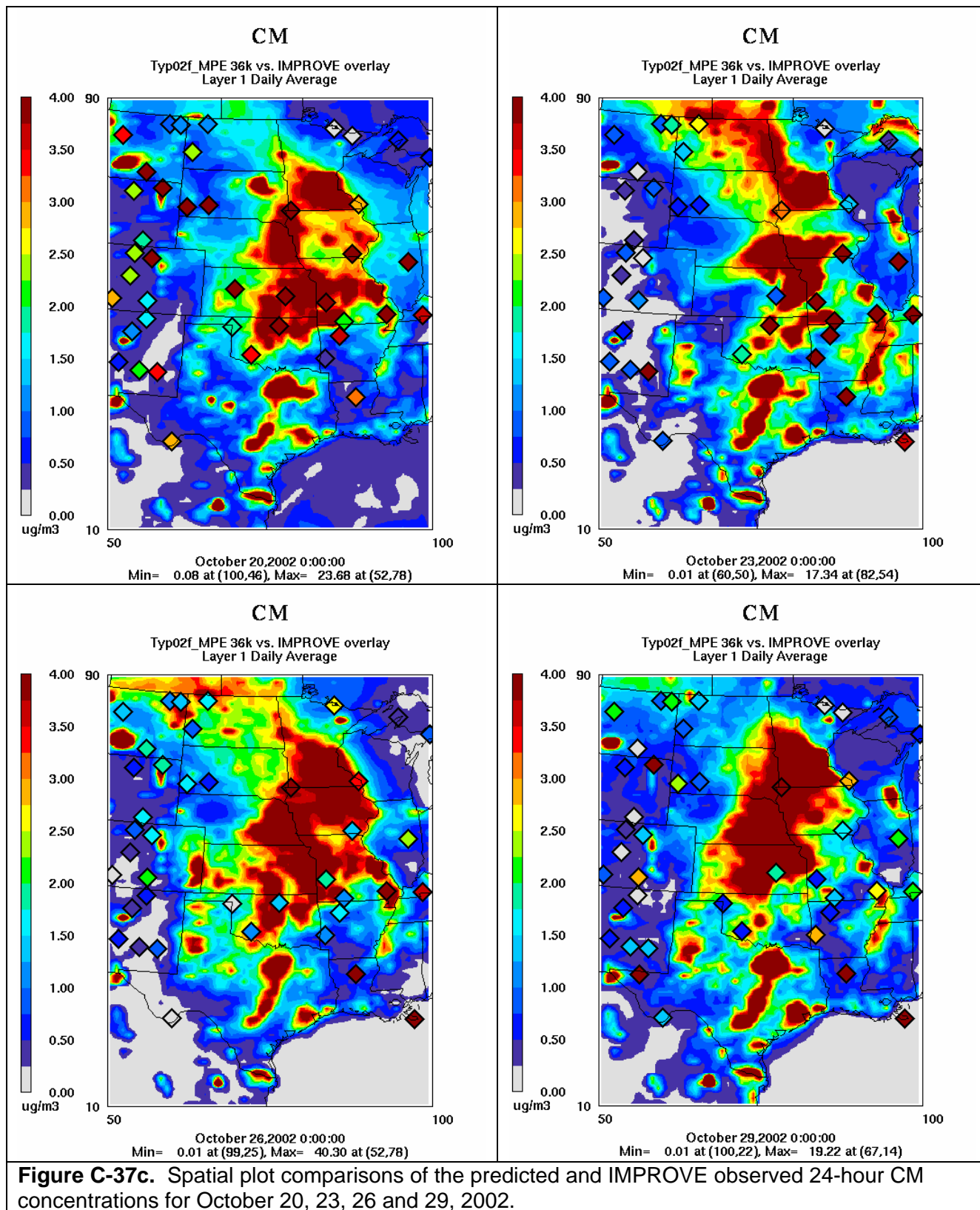


Figure C-37c. Spatial plot comparisons of the predicted and IMPROVE observed 24-hour CM concentrations for October 20, 23, 26 and 29, 2002.

C.3.6.5 CM Monthly Bias and Error

The monthly average fractional bias and error values for CM are shown in Figure C-38. In the winter the under-prediction bias is typically in the -60% to -80% range. In the late Spring and Summer the under-prediction bias ranges from -120% to -160%. As this under-prediction bias is nearly systematic, then the errors are the same magnitude as the bias.

The Bugle Plots clearly show that the CM model performance is a problem. The monthly bias exceeds both the performance goal and criteria for almost every month of the year. The error criteria are also exceeded for all months of the year.

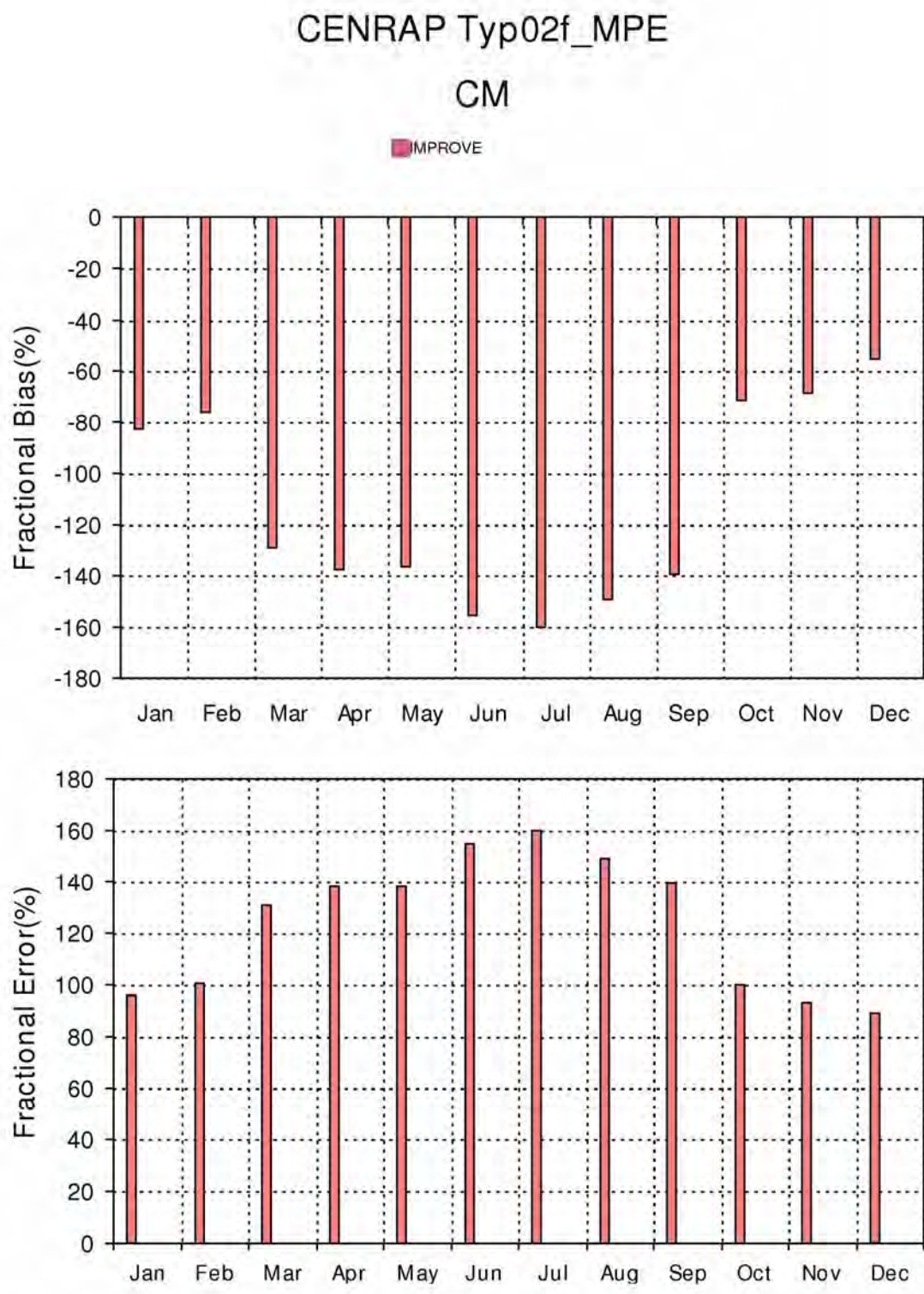


Figure C-38. Monthly CM fractional bias (top) and fractional gross error (bottom) statistical measures for IMPROVE monitoring sites in the CENRAP region.

CENRAP Typ02f_MPE 36k Bugle Plot

CM

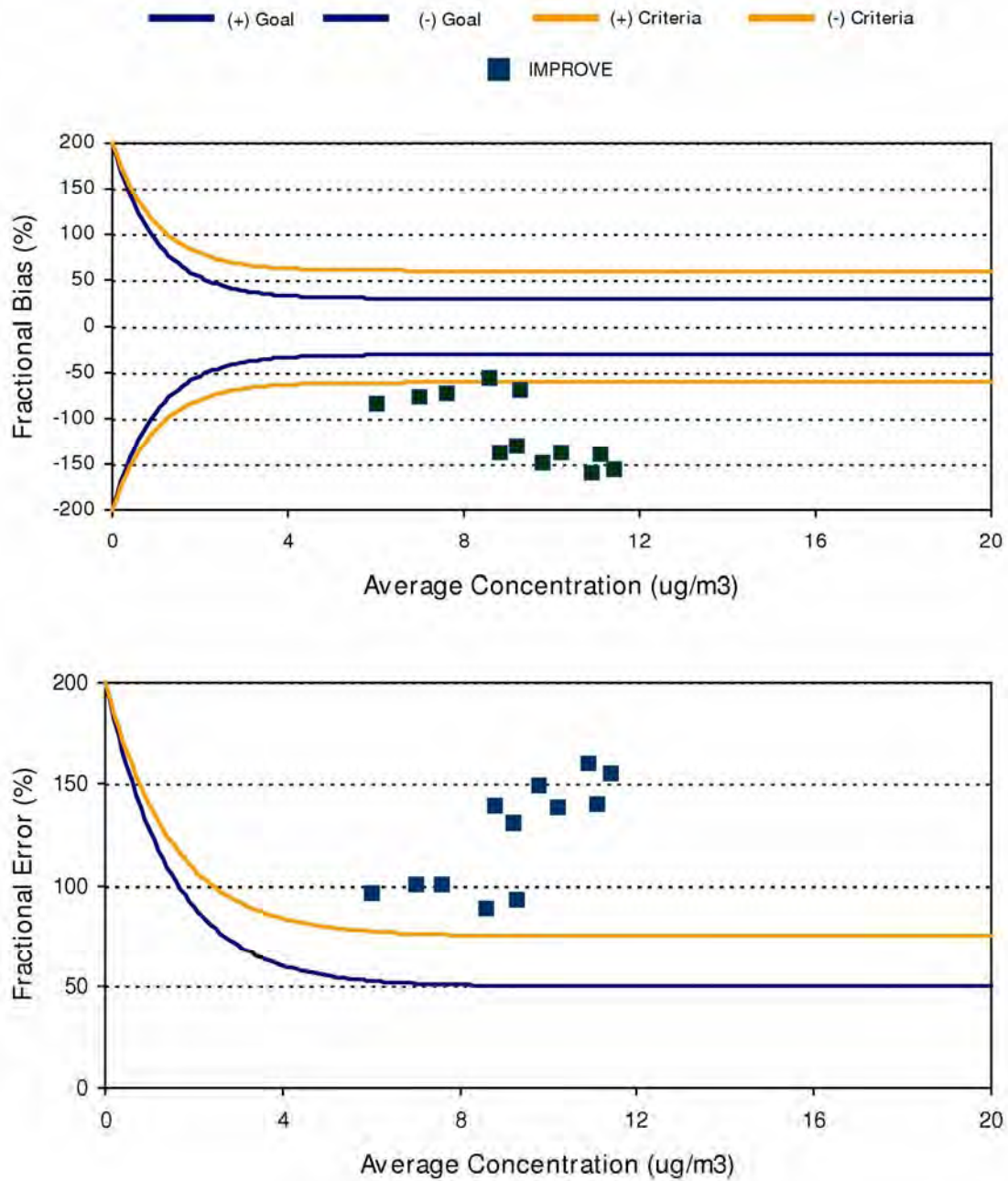


Figure C-39. Bugle Plots of monthly fractional bias (top) and fractional gross error (bottom) and comparisons with model performance goals and criteria for CM and IMPROVE monitoring sites in the CENRAP region.

C.4 Diagnostic Model Evaluation for Gas-Phase and Precursor Species

The CASTNet and AQS networks also measure gas-phase species that are PM precursor or related species. The diagnostic evaluation of the 2002 36 km Base F CMAQ base case simulation for these compounds and the four seasonal months presented previously is provided below.

The CASTNet network measures weekly average samples of SO₂, SO₄, NO₂, HNO₃, NO₃ and NH₄. The AQS network collects hourly measurements of SO₂, NO₂, O₃ and CO. A comparison of the SO₂ and SO₄ performance provides insight into whether the SO₄ formation rate may be too slow or fast. For example, if SO₄ is underestimated and SO₂ is overestimated that may indicate too slow chemical conversion rate. Analyzing the performance for SO₄, HNO₃, NO₃, Total NO₃ and NH₄ provides insight into the equilibrium of these species. For example, if Total NO₃ performs well but HNO₃ and NO₃ do not, then there may be issues associated with the partitioning between the gaseous and particle phases of nitrate.

C.4.1 Diagnostic Model Performance in January 2002

In January, SO₂ is overstated across both the CASTNet and AQS sites with fractional bias values of 38% (Figure C-40) and 31% (Figure C-41), respectively. SO₄ is understated by -34% across the CASTNet monitors (Figure C-40) and -12% and -13% for the IMPROVE and STN networks (Figure C-4a). As noted previously, wet SO₄ deposition is also overstated in January (+40%, Figure C-4a). Given that SO₂ emissions are well characterized, these results suggest that the January SO₄ underestimation may be partly due to understated transformation rates of SO₂ to SO₄ and overstated wet SO₄ deposition.

Total NO₃ is overestimated by 35% on average across the CASTNet sites in the CENRAP region in January (Figure C-40). HNO₃ is underestimated (-34%) and particle NO₃ is overestimated (+61%) suggesting there are gas/particle equilibrium issues. An analysis of the time series of the four CASTNet stations reveals that NO₃, HNO₃ and NH₄ performance is actually very reasonable at the west Texas and the HNO₃ underestimation and NO₃ overestimation bias is coming from the east Kansas, central Arkansas and northern Minnesota CASTNet sites. One potential contributor for this performance problem is overstated NH₃ emissions. However the overstated Total NO₃ suggests that the model estimated NO_x oxidation rate may be too high in January.

The SO₂, NO₂, O₃ and CO performance across the AQS sites in January is shown in Figure C-41. The AQS monitoring network is primarily an urban-oriented network so it is not surprising that the model is underestimating concentrations of primary emissions like NO₂ (-5%) and particularly CO (-67%) when a 36 km grid is used. Ozone is also underestimated on average, especially the maximum values above 60 ppb.

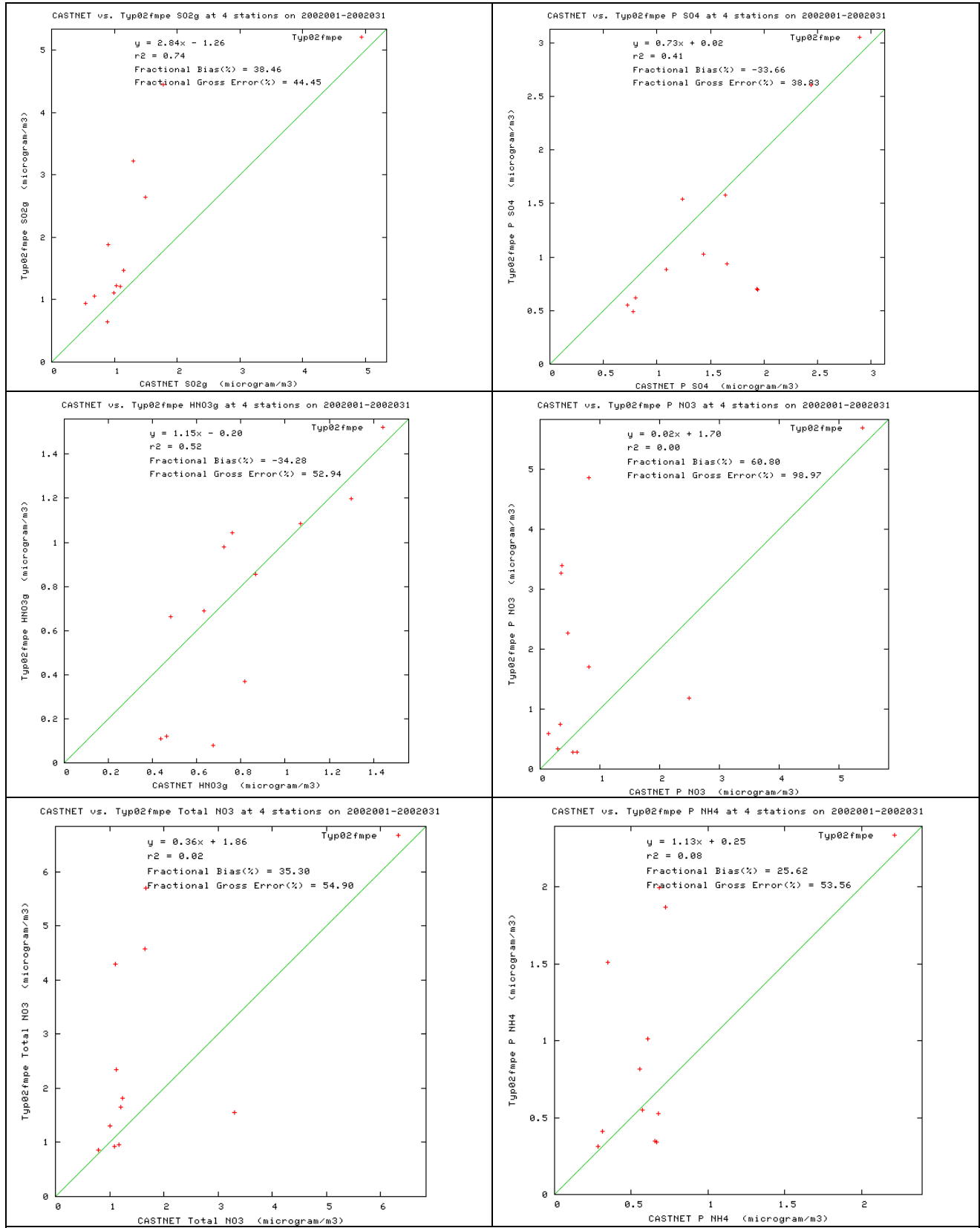


Figure C-40. January 2002 performance at CENRAP CASTNet sites for SO2 (top left), SO4 (top right), HNO3 (middle left), NO3 (middle right), Ttotal NO3 (bottom left) and NH4 (bottom right).

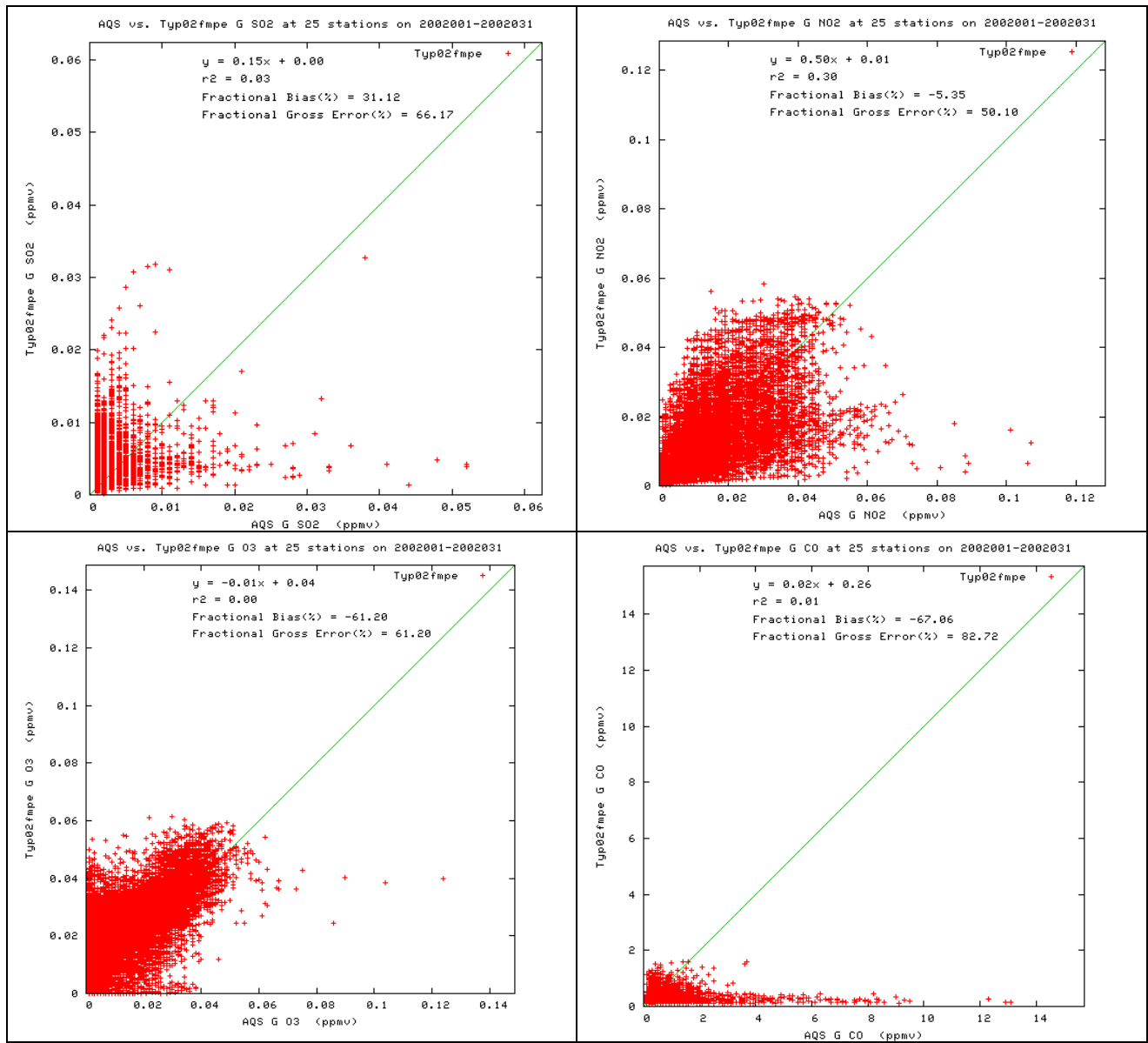


Figure C-41. January 2002 performance at CENRAP AQS sites for SO2 (top left), NO2 (top right), O3 (bottom left) and CO (bottom right).

C.4.2 Diagnostic Model Performance In April

In April there is an average SO₂ overestimation bias across the CASTNet (+15%) and underestimation bias across the AQS (-10%) networks (Figures C-42 and C-43). SO₄ is underestimated across all networks by -30% to -58% (Figure C-5a). The wet SO₄ deposition bias is near zero. Both SO₂ and SO₄ are underestimated at the west Texas CASTNet monitor in April suggesting SO₂ emissions in Mexico are likely understated.

The HNO₃ performance in April is interesting with almost perfect agreement except for 5 modeled-observed comparisons that drives the average under-prediction bias of -29%. On Julian Day 102 there is high HNO₃ at the MN, KS and OK CASTNet sites that is not captured by the model. Given that HNO₃, NO₃ and Total NO₃ are all underestimated by about the same amount (-30%), then part of the underestimation bias is likely due to too slow oxidation of NO_x.

There is a lot of scatter in the NO₂ and O₃ performance that is more or less centered on the 1:1 line of perfect agreement with bias values of -8% and -21%, respectively (Figure C-43). CO is underestimated by -72% with the model unable to predict CO concentrations above 1 µg/m³ due to the use of the coarse 36 km grid spacing. Mobile sources produce a vast majority of the CO emissions so AQS monitors for CO compliance are located near roadways, which are not simulated well using a 36 km grid.

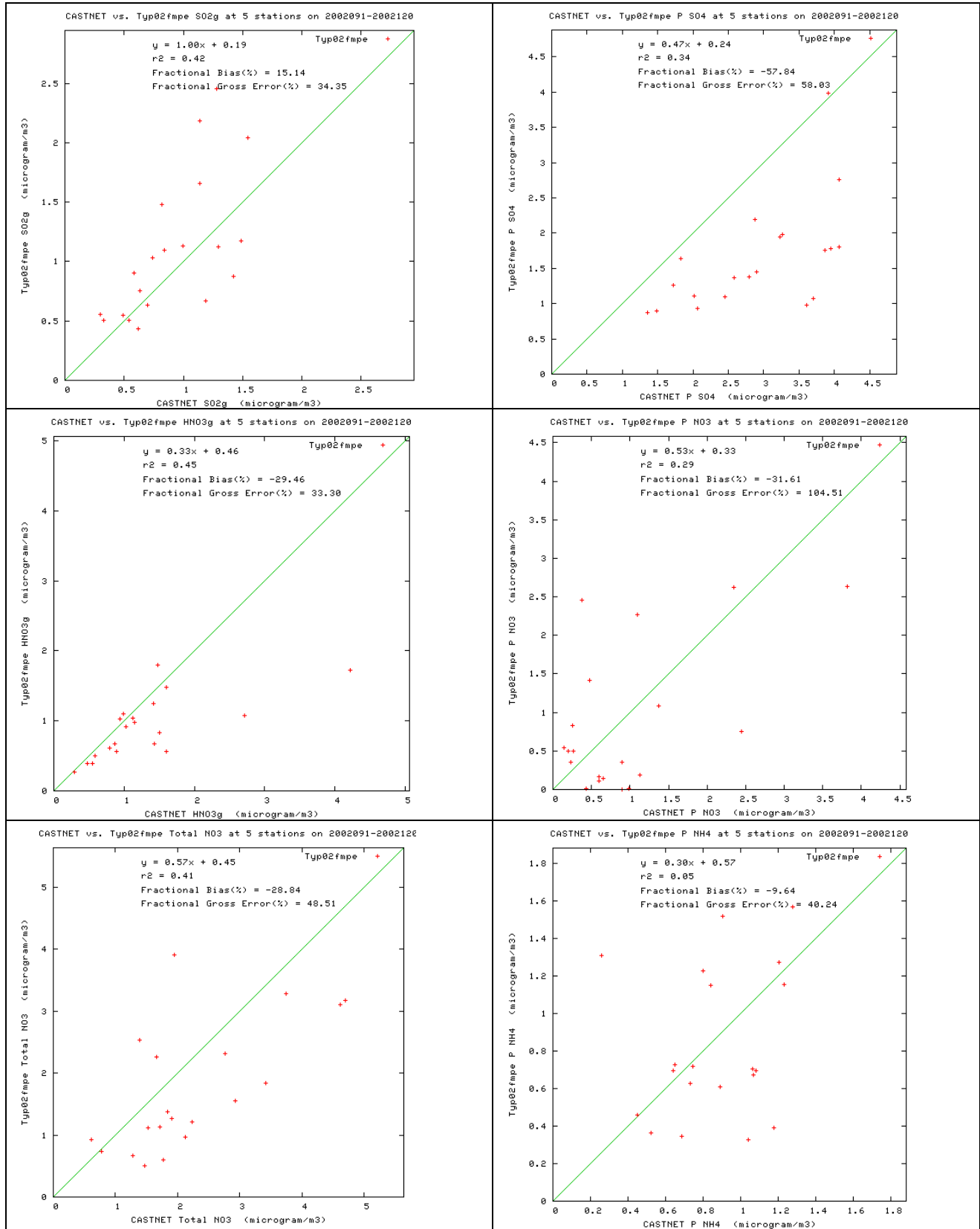
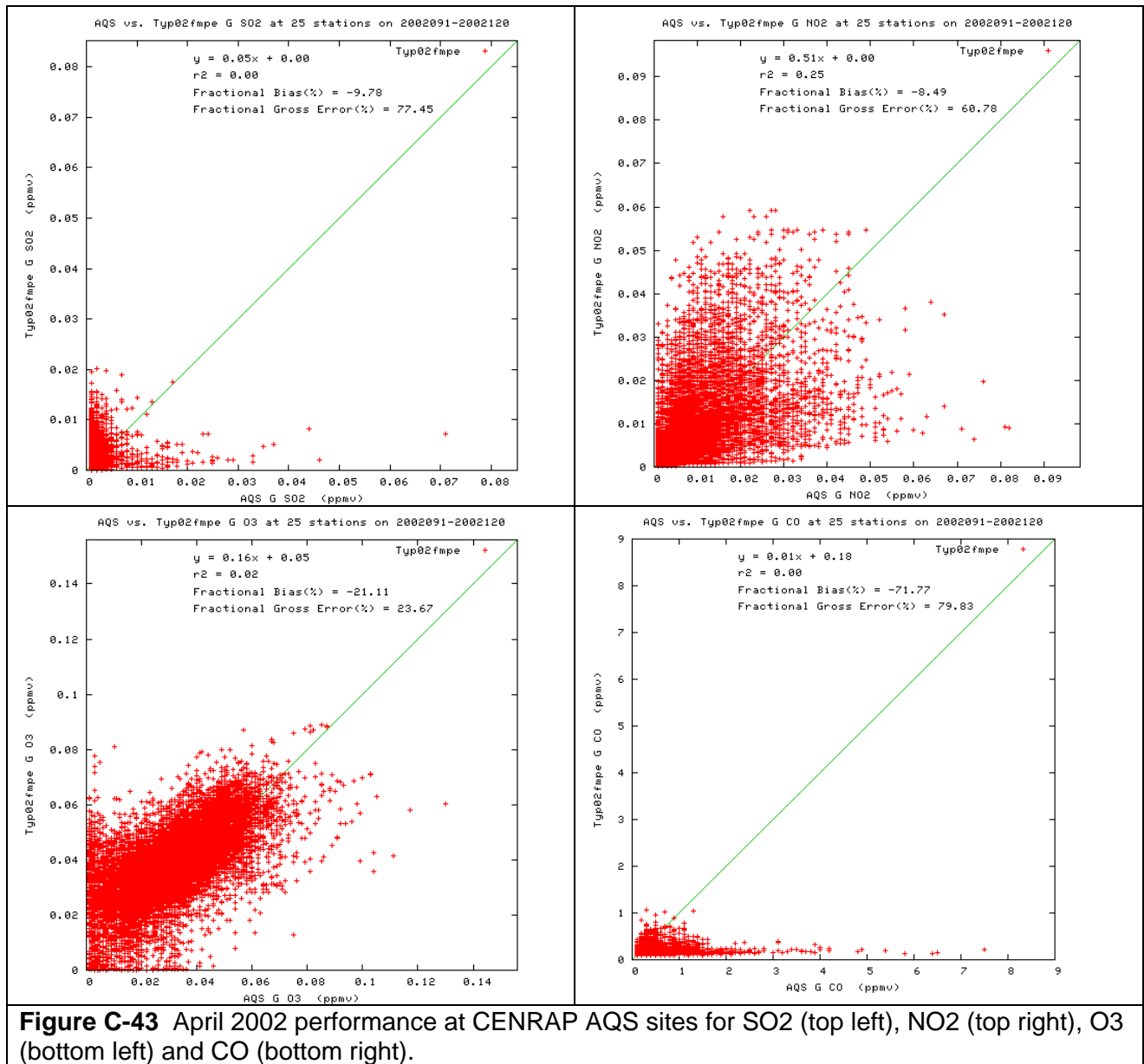


Figure C-42 April 2002 performance at CENRAP CASTNet sites for SO2 (top left), SO4 (top right), HNO3 (middle left), NO3 (middle right), Total NO3 (bottom left) and NH4 (bottom right).



C.4.3 Diagnostic Model Performance In July

In July SO₂ is slightly underestimated across the CASTNet (-5%) and AQS (-12%) networks (Figures C-44 and C-45) and SO₄ is more significantly underestimated across all networks (-22% to -53%, Figure C-6a). Since wet SO₄ is also underestimated it is unclear the reasons for why all sulfur species are underestimated.

The nitrate species are also all underestimated with the Total NO₃ bias (-56%) being between the HNO₃ bias (-35%) and NO₃ bias (-115%). The modeled NO₃ values are all near zero with little correlation with the observations, whereas the observed HNO₃ and Total NO₃ is tracked well with correlation coefficients of 0.74 and 0.76. These results suggest that the July NO₃ model performance problem is partly due to insufficient formation of Total NO₃ and mainly due to too little incorrect partitioning of the Total NO₃ into the particle NO₃.

Again there is lots of scatter in the AQS NO₂ scatter plot for July (Figure C-45) resulting in a low bias (0%) but high error (65%). Ozone performance also exhibits a low bias (-15%) and error (20%), but the model is incapable of simulating ozone above 100 ppb. Although CO performance in July is better than the previous months, it still has a large underestimation bias (-82%).

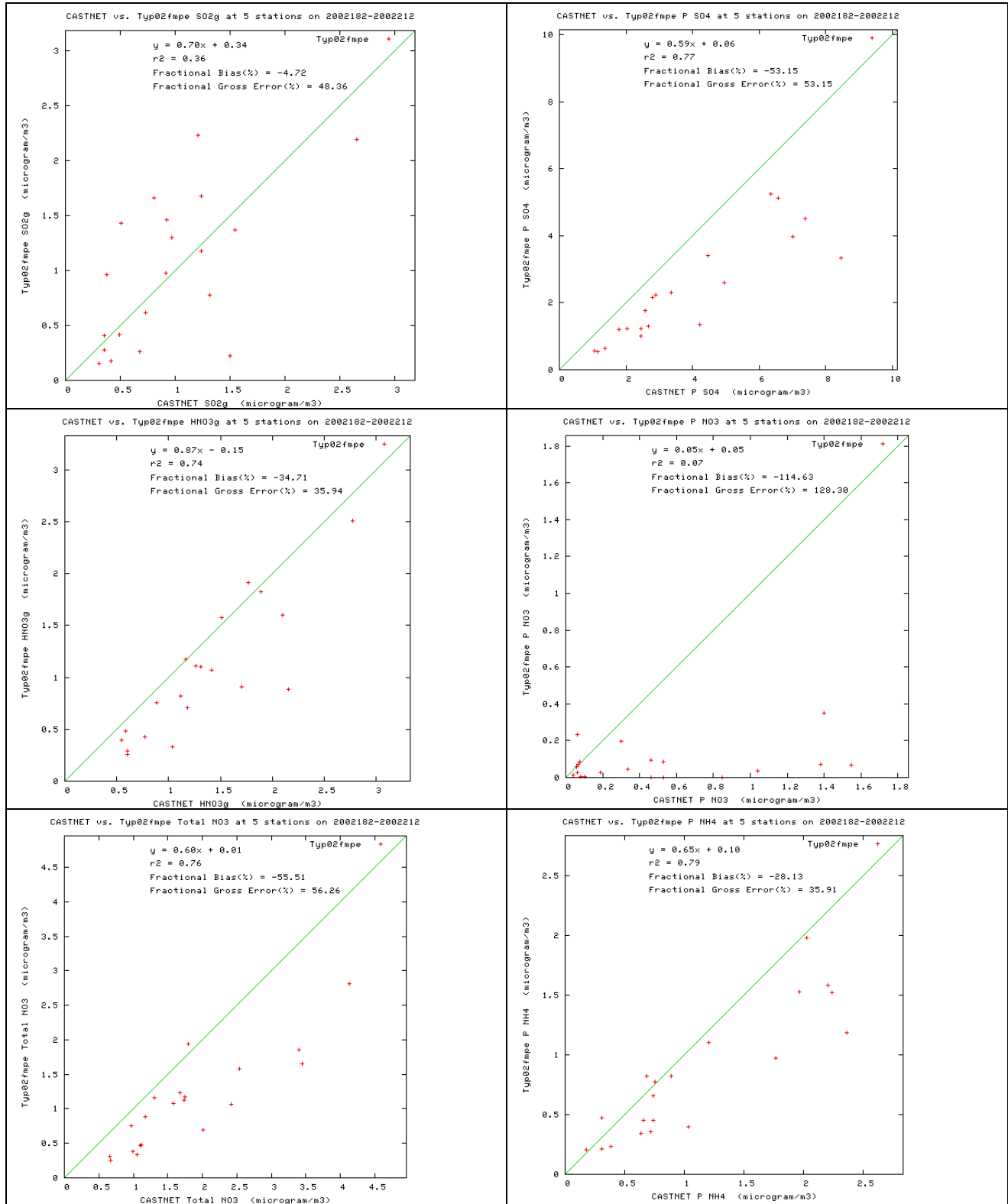


Figure C-44 July 2002 performance at CENRAP CASTNet sites for SO2 (top left), SO4 (top right), HNO3 (middle left), NO3 (middle right), Total NO3 (bottom left) and NH4 (bottom right).

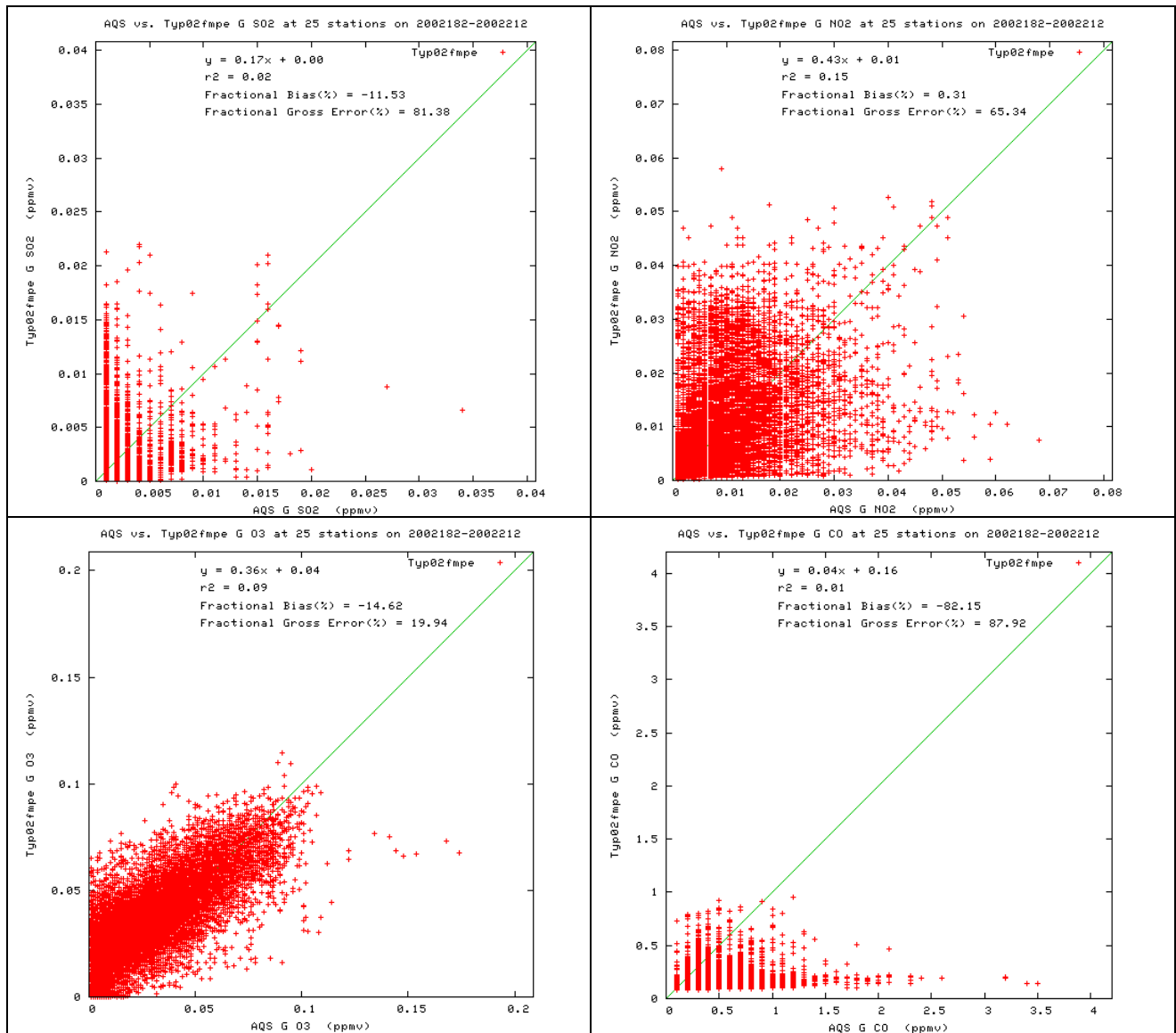


Figure C-45 July 2002 performance at CENRAP AQS sites for SO2 (top left), NO2 (top right), O3 (bottom left) and CO (bottom right).

C.4.4 Diagnostic Model Performance In October

SO₂ is overstated in October across the CASTNet (+28%) and AQS (+33%) sites (Figures C-46 and C-47). Although SO₄ is understated across the CASTNet sites (-24%), the bias across the IMPROVE (-6%) and STN (0%) sites are near zero (Figure C-7a).

Performance for HNO₃ is fairly good with a low bias (+12%) and error (30%). But NO₃ is overstated (+34%) leading to an overstatement of Total NO₃ (+37%). The overstatement of NO₃ leads to an overstatement of NH₄ as well (Figure C-46)

As seen in the other months, NO₂ exhibits a lot of scatter resulting in a low correlation (0.22) and high error (61%) but low bias (12%). The model tends to under-predict the high and over-predict the low O₃ observations resulting in a -29% bias and low correlation coefficient. CO is also under-predicted (-76%) for the reasons discussed previously.

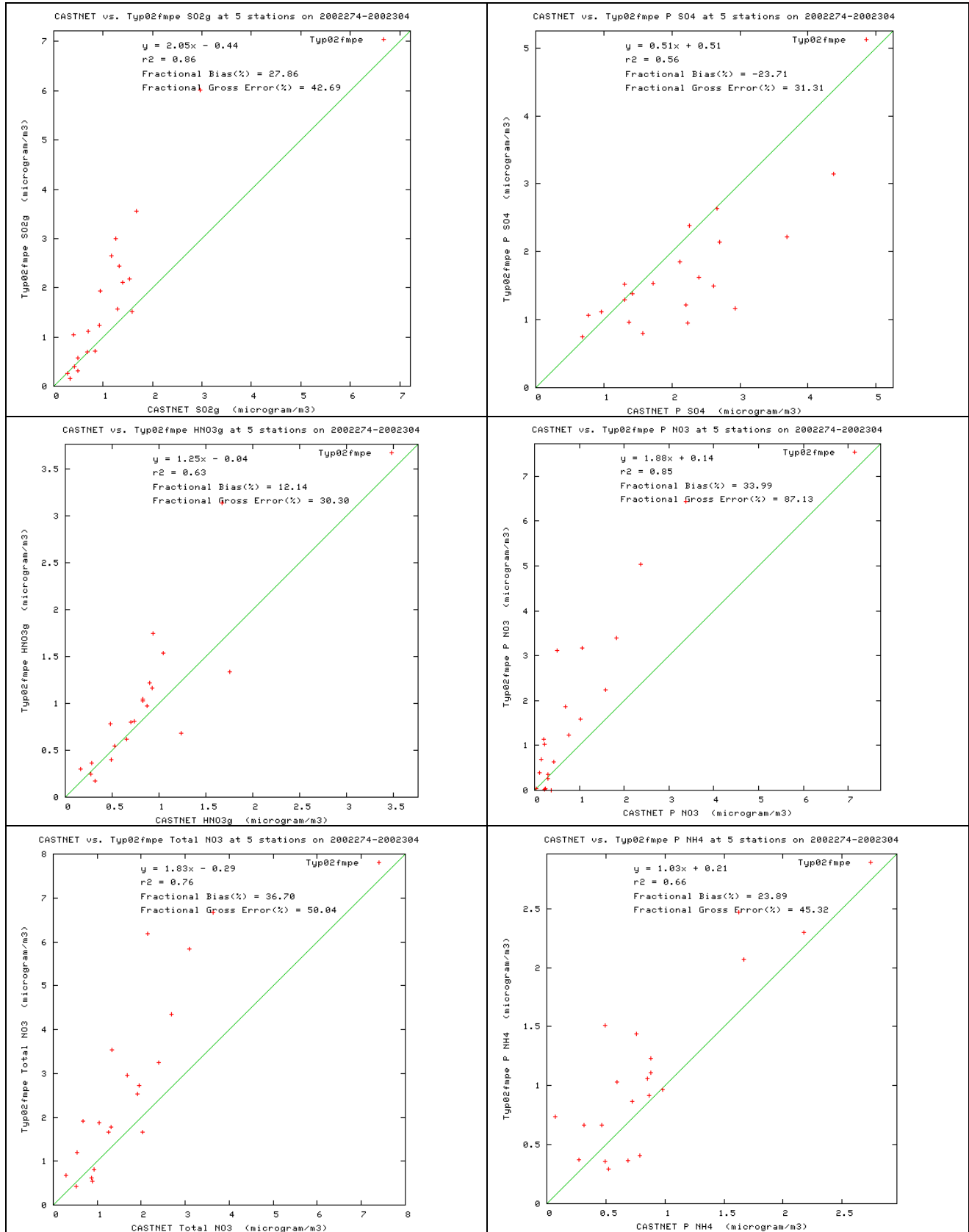


Figure C-46 October 2002 performance at CENRAP CASTNet sites for SO₂ (top left), SO₄ (top right), HNO₃ (middle left), NO₃ (middle right), Total NO₃ (bottom left) and NH₄ (bottom right).

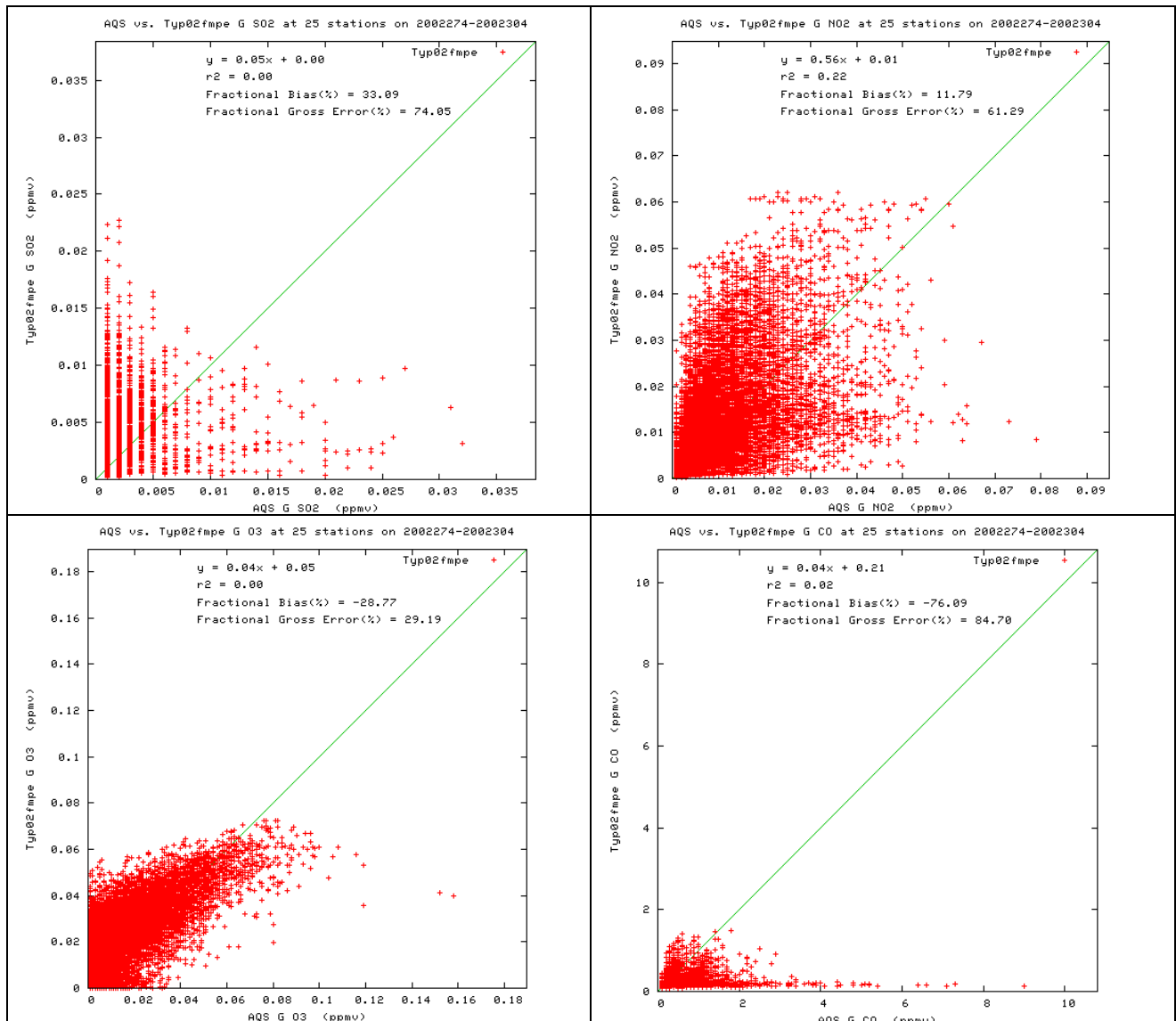


Figure C-47 October 2002 performance at CENRAP AQS sites for SO2 (top left), NO2 (top right), O3 (bottom left) and CO (bottom right).

C.5 Evaluation at Class I Areas for the Worst and Best 20 Percent Days

In this section, and in section C.5 of Appendix C, we present the results of the model performance evaluation at each of the CENRAP Class I areas for the worst and best 20 percent days. Performance on these days is critical since they are the days used in the 2018 visibility projections discussed in Chapter 4. For each Class I area we compared the predicted and observed total extinction (these figures are in Chapter 3) and PM species-specific extinction for the worst and best 20 percent days in 2002.

C.5.1 Caney Creek (CACR) Arkansas

The ability of the CMAQ model to estimate visibility extinction at the CACR Class I area on the 2002 worst and best 20 percent days is provide in Figures 3-9 and C-48. On most of the worst 20 percent days at CACR total extinction is dominated by SO₄ extinction with some extinction due to OMC. On four of the worst 20 percent days extinction is dominated by NO₃. The average extinction across the worst 20 percent days is underestimated by -33% (Figure 3-9), which is primarily due to a -51% underestimation of SO₄ extinction combined with a 6% overestimation of NO₃ extinction (Figure C-48). Performance for OMC extinction at CACR on the worst 20 percent days is pretty good with a -20% bias and 36% error, EC extinction is systematically underestimated, Soil extinction has low bias (-19%) but lots of scatter and high error (74%), while CM extinction is greatly underestimated (bias of -153%).

On the best 20 percent days at CACR the observed extinction ranges from 20 to 40 Mm⁻¹, whereas then modeled extinction has a much larger range from 15 to 120 Mm⁻¹. Much of the modeled overestimation of total extinction on the best 20% days (+44% bias) is due to NO₃ overestimation (+94% bias).

C.5.2 Upper Buffalo (UOBU) Arkansas

Model performance at the UPBU Class I area for the worst and best 20 percent days is shown in Figures 3-10 and C-49. On most of the worst 20 percent days at UPBU visibility impairment is dominated by SO₄, although there are also two high NO₃ days. The model underestimates the average of the total extinction on the worst 20 percent days at UPBU by -40% (Figure 3-10), which is due to an underestimation of extinction due to SO₄, OMC and CM by, respectively, -46%, -33% and -179%.

On the best 20 percent days at UPBU, the model performs reasonably well with a low bias (2%) and error (42%). But again the model has a much wider range in extinction values across the best 20 percent days (15 to 120 Mm⁻¹) than observed (20 to 45 Mm⁻¹). There are five days in which the modeled NO₃ over-prediction is quite severe and when those days are removed the range in the modeled and observed extinction on the best 20 percent days is quite similar, although the model gets much cleaner on the very cleanest modeled days.

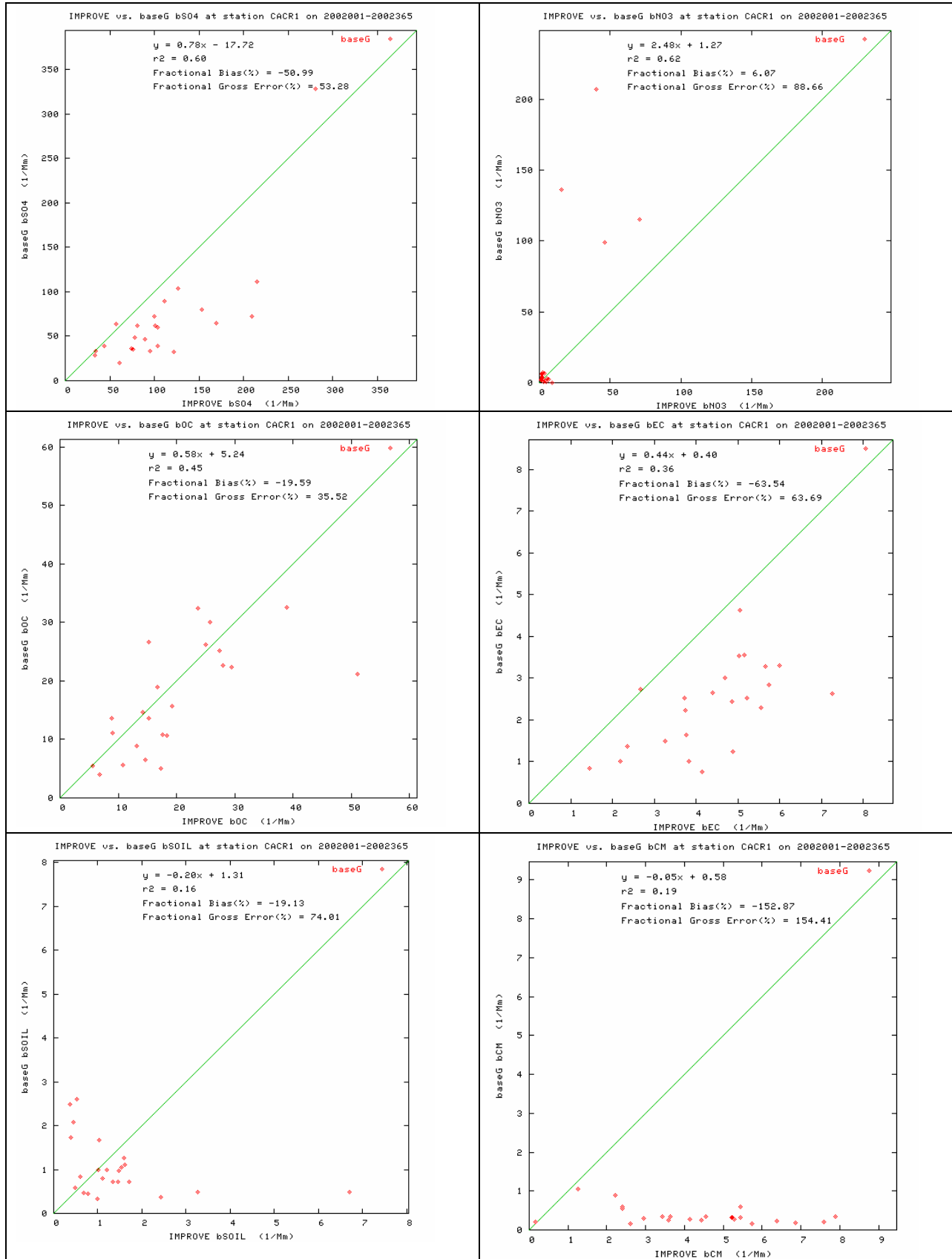


Figure C-48. PM species extinction model performance at Caney Creek (CACR) for the worst 20 percent days during 2002.

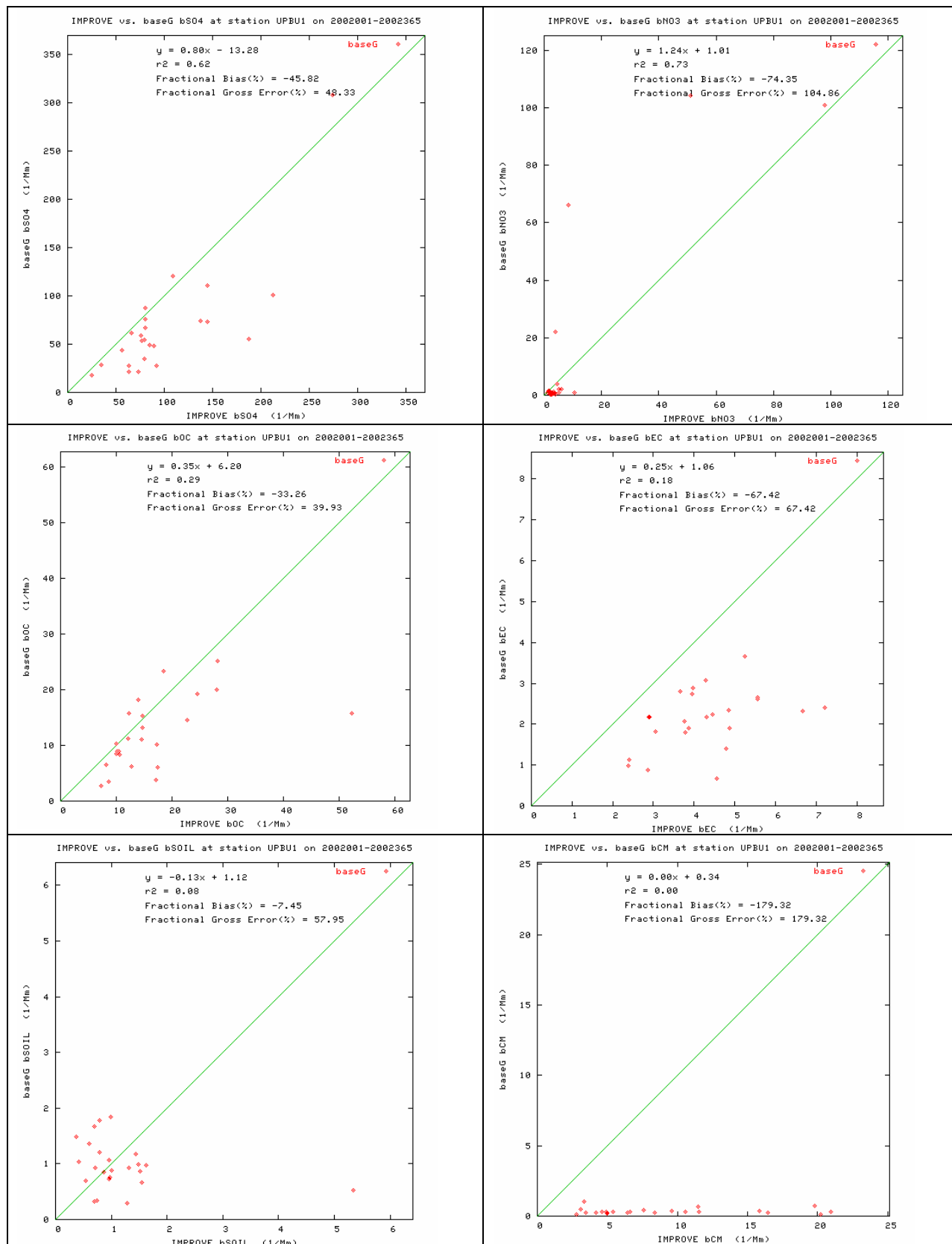


Figure C-49. PM species extinction model performance at Upper Buffalo (UPBU) for the worst 20 percent days during 2002.

C.5.3 Breton Island (BRET), Louisiana

The observed total extinction on the worst 20 percent days at Breton Island is underestimated by -71% (Figure 3-11), which is due to an underestimation of each component of extinction (Figure C-50) by from -50% to -70% (SO₄, OMC and Soil) to over -100% (EC and CM). The observed extinction on the worst 20 percent days ranges from 90 to 170 Mm⁻¹, whereas the modeled values drop down to as low as approximately 15 Mm⁻¹. On the best 20 percent days the range of the observed and modeled extinction is similarly (roughly 10 to 50 Mm⁻¹) that results in a reasonably low bias (-22%), but there is little agreement on which days are higher or lower resulting in a lot of scatter and high error (54%).

C.5.4 Boundary Waters (BOWA), Minnesota

There are three types of days during the worst 20 percent days at BOWA, SO₄ days, OMC days and NO₃ days (Figure 3-12). The two high OMC days are likely fire impact events that the model captures to some extent on one day and not on the other. On the five high (> 20 Mm⁻¹) NO₃ extinction days the model predicts the observed extinction well on three days and overestimates by a factor of 3-4 on the other two high NO₃ days. SO₄ in underestimate by -43% on average across the worst 20 percent days at BOWA.

With the exception of two days, the model reproduces the total extinction for the best 20 percent days at BOWA quite well with a bias and error value of +14% and 22% (Figure 3-12). Without these two days, the modeled and observed extinction both range between 15 and 25 Mm⁻¹.

C.5.5 Voyageurs (VOYA) Minnesota

VOYA is also characterized by SO₄, NO₃ and OMC days (Figure 3-13). Julian Days 179 and 200 are high OMC days that were also high OMC days at BOWA again indicating impacts from fires in the area that is not fully captured by the model. SO₄ and NO₃ extinction is fairly good and, without the fire days, OMC performance looks good as well (Figure C-52). On the best 20 percent days there is one day the modeled extinction is much higher than observed and a few others that are somewhat higher, but for most of the best 20 percent days the modeled extinction is comparable to the observed values.

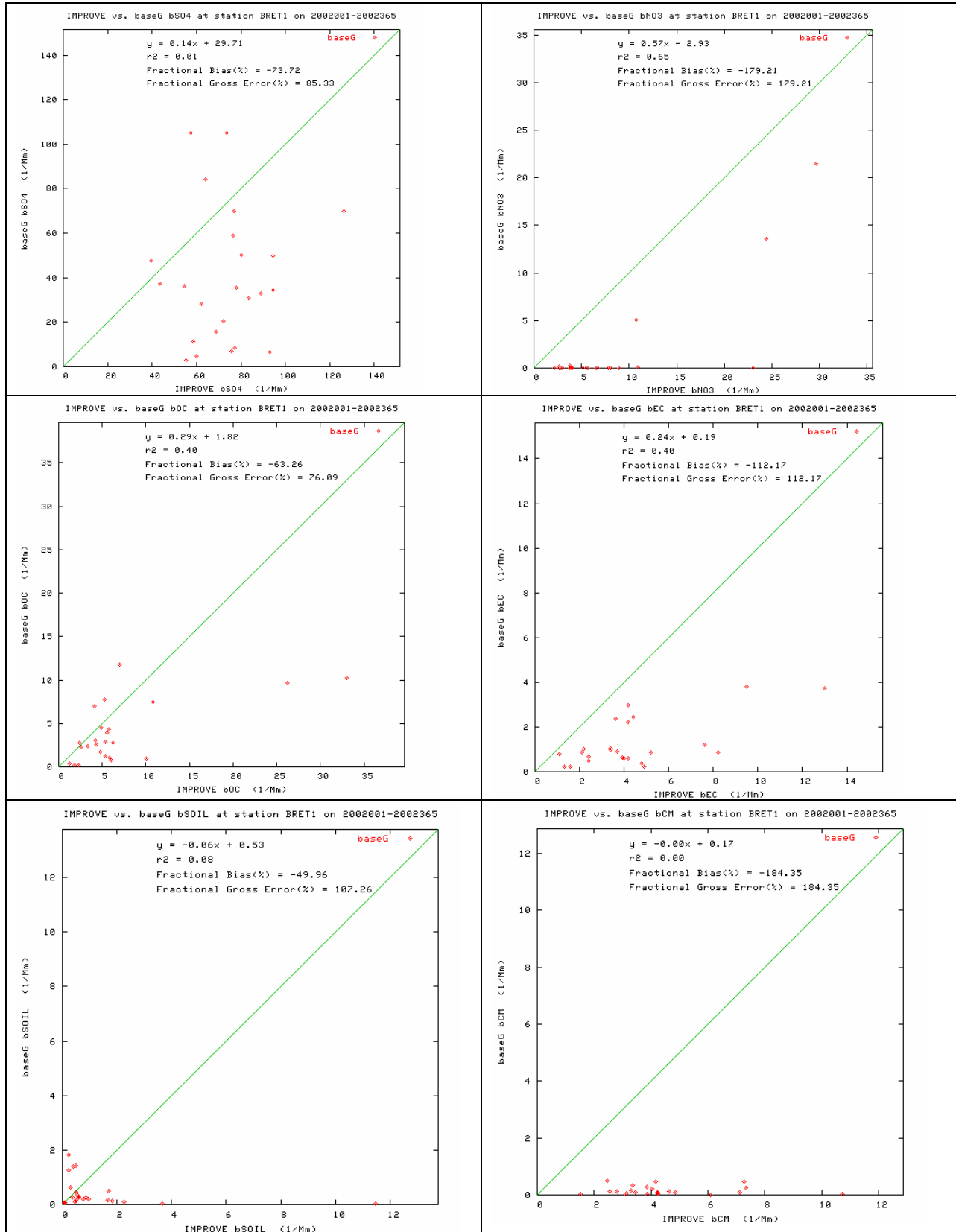


Figure C-50. PM species extinction model performance at Breton Island (BRET) for the worst 20 percent days during 2002.

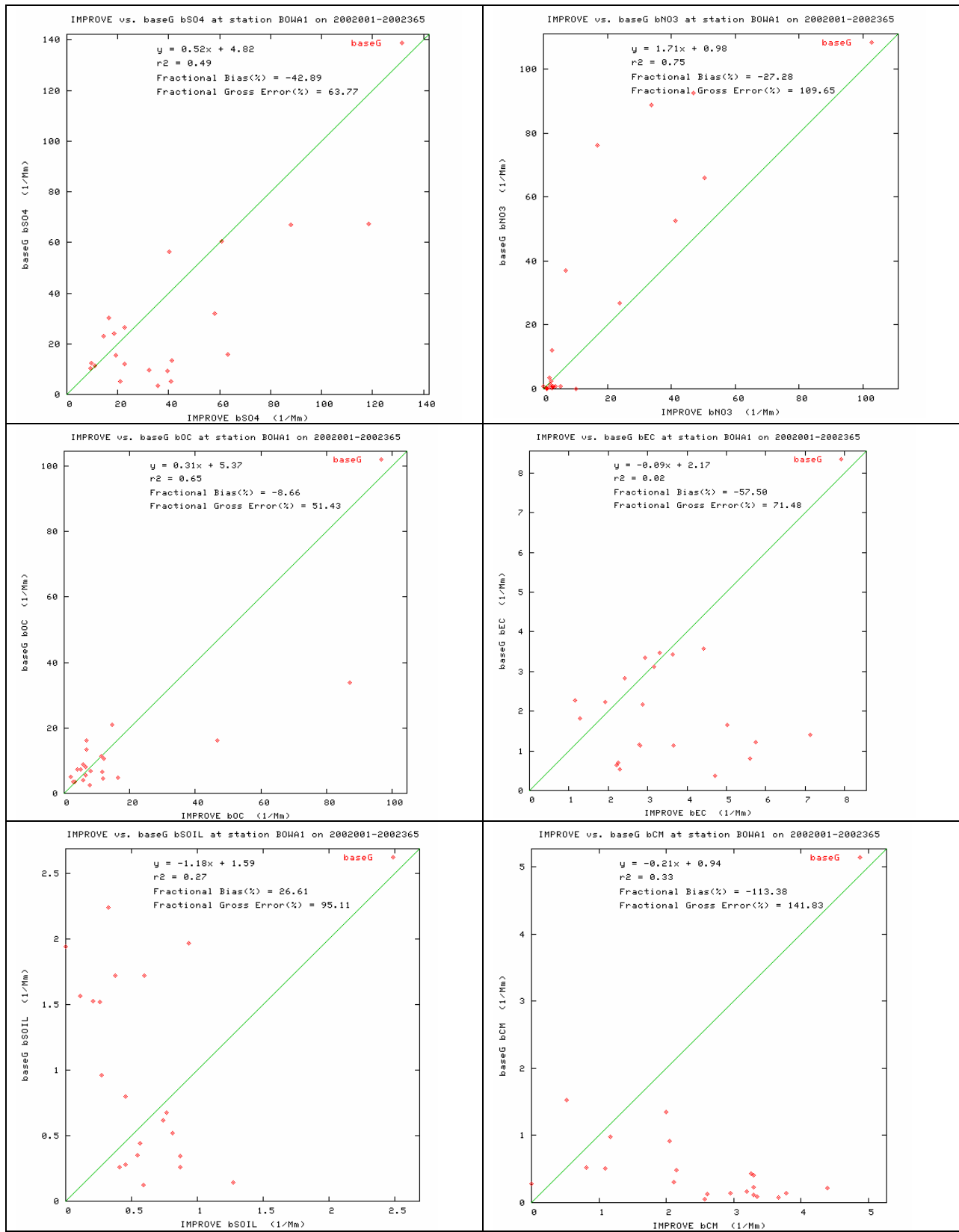


Figure C-51. PM species extinction model performance at Boundary Waters (BOWA) for the worst 20 percent days during 2002.

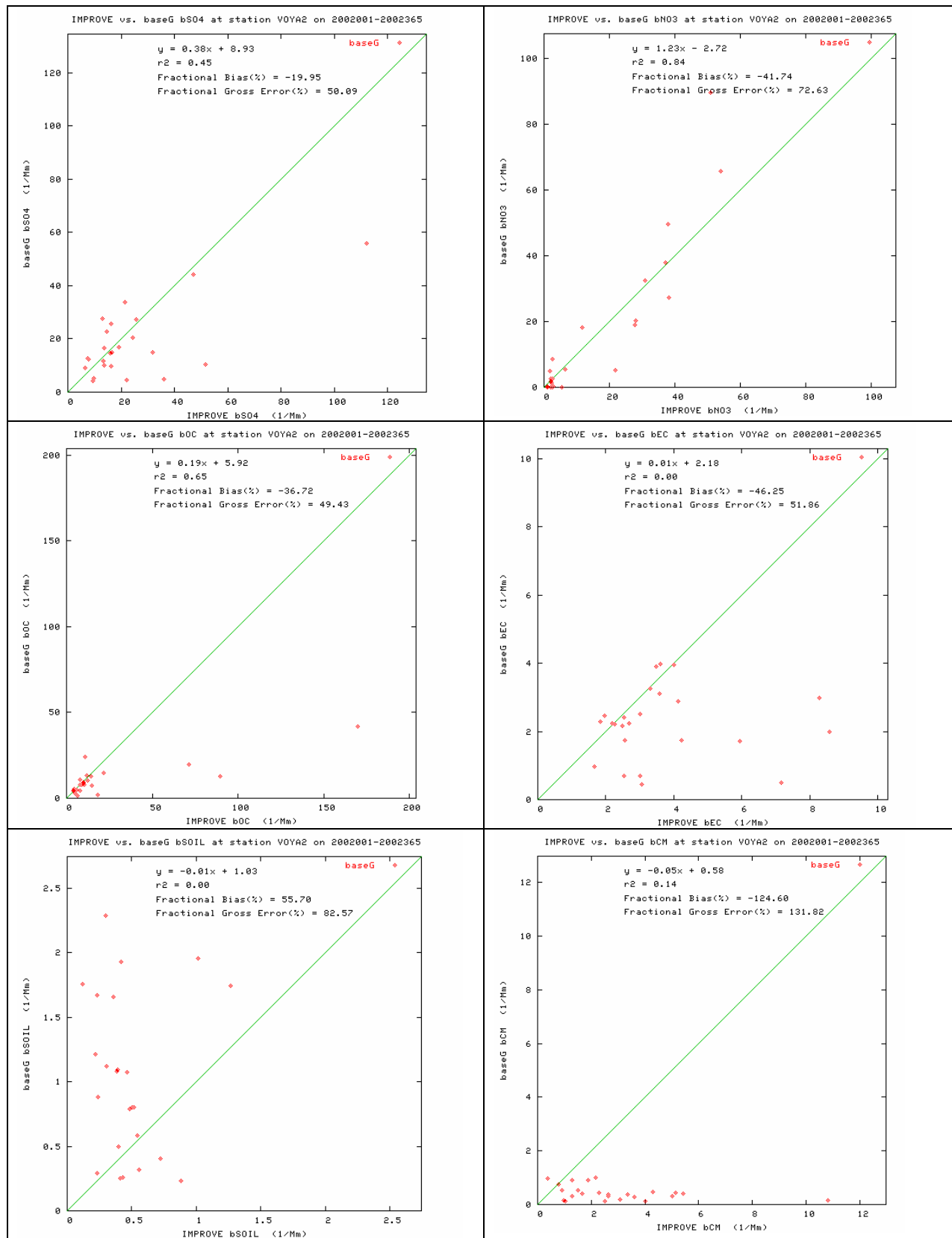


Figure C-52. PM species extinction model performance at Voyageurs (VOYA) for the worst 20 percent days during 2002.

C.5.6 Hercules Glade (HEGL) Missouri

On most of the worst 20 percent days at HEGL the observed extinction ranges from 120 to 220 Mm^{-1} whereas model extinction ranging from 50 to 170 Mm^{-1} (Figure 3-14). However, there is one extreme day with extinction approaching 400 Mm^{-1} that the model does a very good job in replicating. Over all the days there is a modest underestimation bias in SO_4 (-39%) and OMC (-39%) extinction, larger underestimation bias in EC (-62%) and CM (-118%) extinction and overestimation bias in Soil (+30%) extinction (Figure C-53).

On the best 20 percent days there is one day where the model overstates the observed extinction by approximately a factor of four and a handful of other days that the model overstates the extinction by a factor of 2 or so, but most of the days both the model and observed extinction sites are around 40 Mm^{-1} plus or minus about 10 Mm^{-1} . On the best 20 percent days when the observed extinction is overstated it is due to overstatement of the NO_3 .

C.5.7 Mingo (MING) Missouri

The worst 20 percent days at Ming are mainly high SO_4 days with a few high NO_3 days that the model reproduces reasonably well resulting in low bias (+10%) and error (38%) for total extinction (Figure 3-15). The PM species specific performance is fairly good with low bias for SO_4 (+4%), good agreement with NO_3 on high NO_3 days except for one day, low OMC (+23%) and EC (+3%) bias and larger bias in EC (+37%) and CM (-105%) extinction (Figure C-54).

For the best 20 percent days, there is one day the model is way too high due to overstated NO_3 extinction and a few other days the model overstates the observed extinction that is usually due to overrated NO_3 , but on most of the best 20 percent days the modeled extinction is comparable to the observed values. This results in low bias (+12%) and error (36%) for total extinction at MING for the best 20 percent days.

C.5.8 Wichita Mountains (WIMO), Oklahoma

With the exception of an over-prediction on day 344 due to NO_3 , observed total extinction on the worst 20 percent days at WIMO is understated with a bias of -42% (Figure 3-16) that is primarily due to an underestimation of extinction due to SO_4 (-48%) and OMC (-69%) (Figure C-55).

CMAQ total extinction performance for the average of the best 20 percent days at WIMO is characterized by an overestimation bias (+21%) on most days that is primarily due to NO_3 over-prediction on several days. Again the modeled range of extinction on the best 20 percent days (12-60 Mm^{-1}) is much greater than observed (20-35 Mm^{-1}).

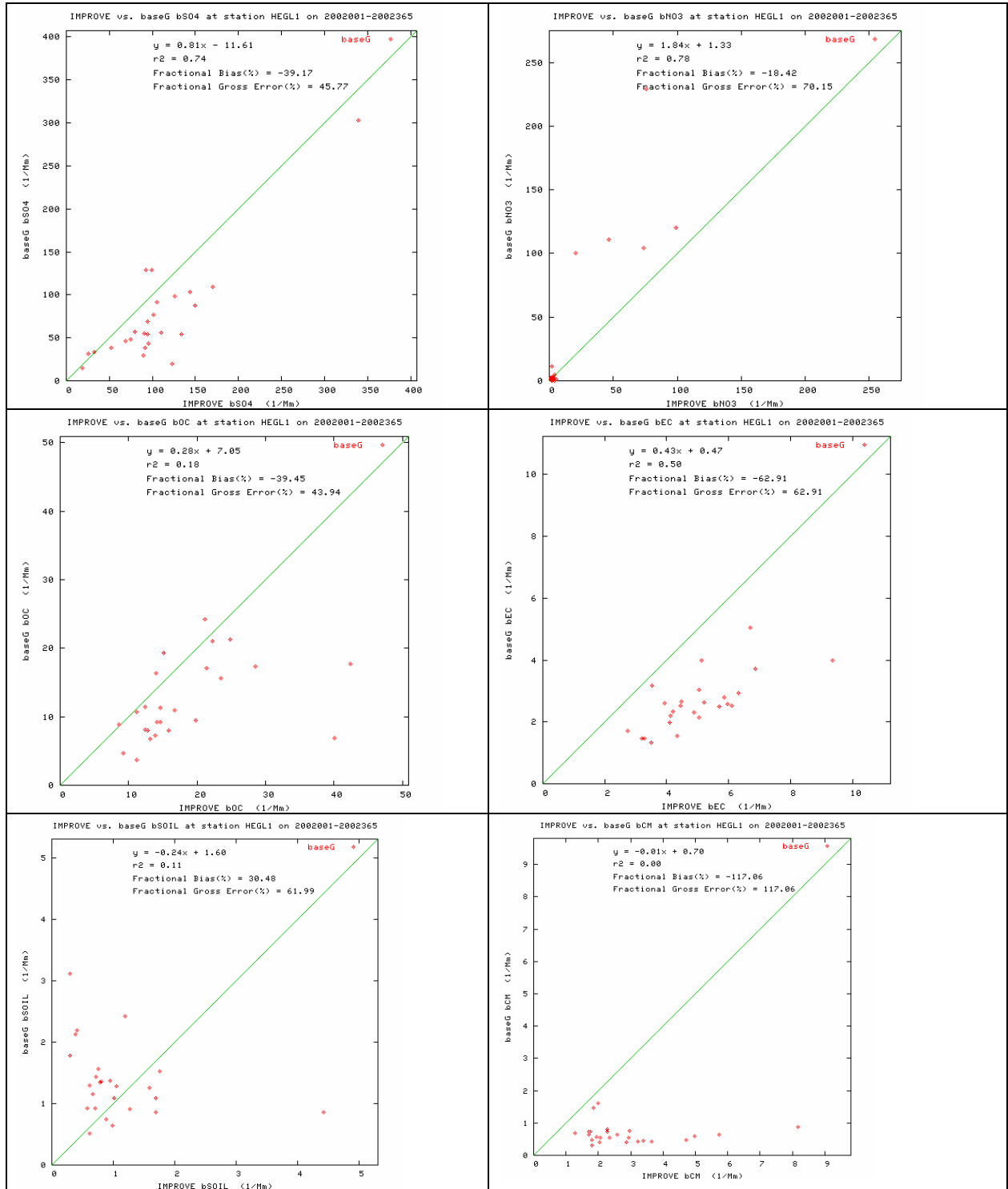


Figure C-53. PM species extinction model performance at Hercules Glade (HEGL) for the worst 20 percent days during 2002.

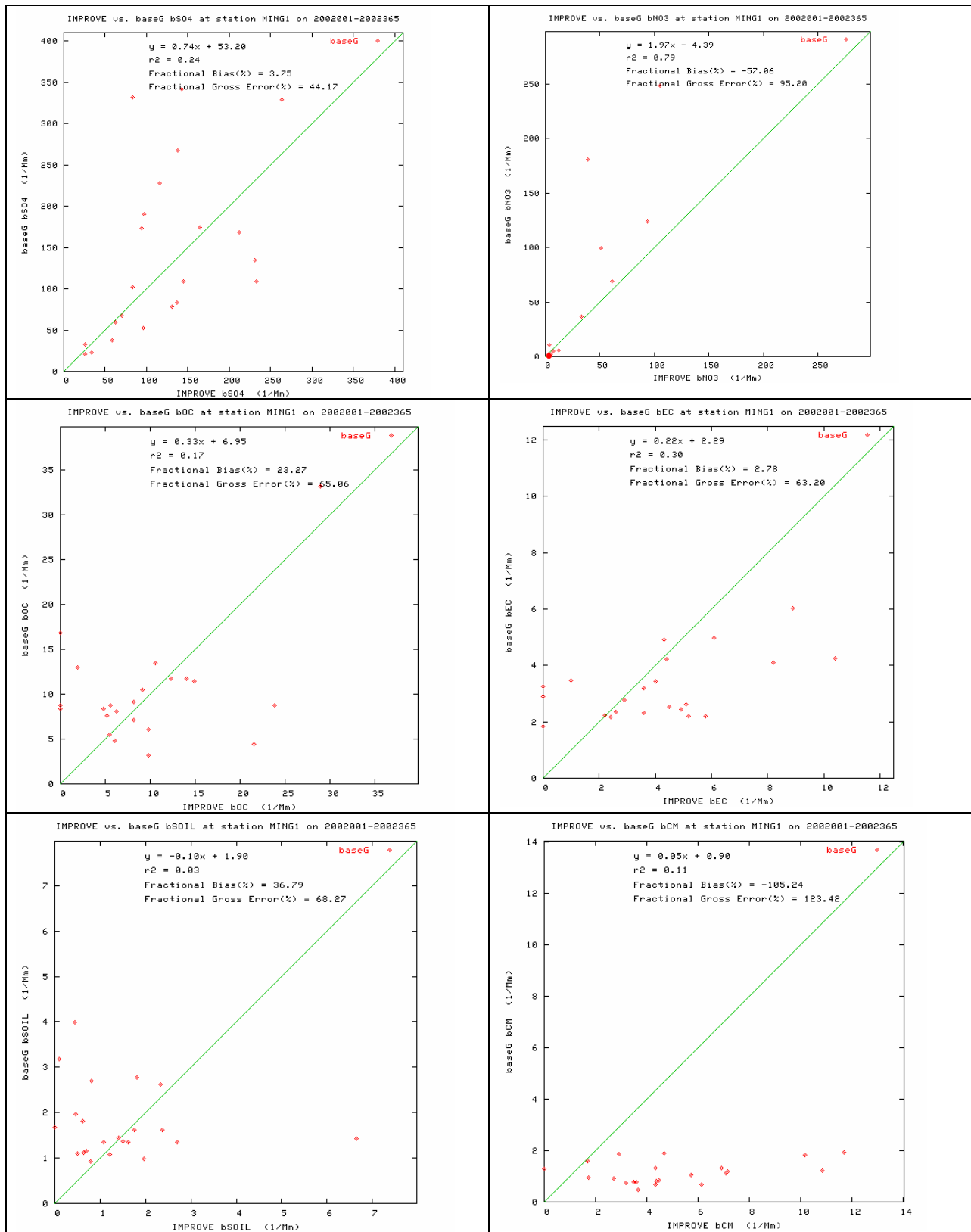


Figure C-54. PM species extinction model performance at Mingo (MING) for the worst 20 percent days during 2002.

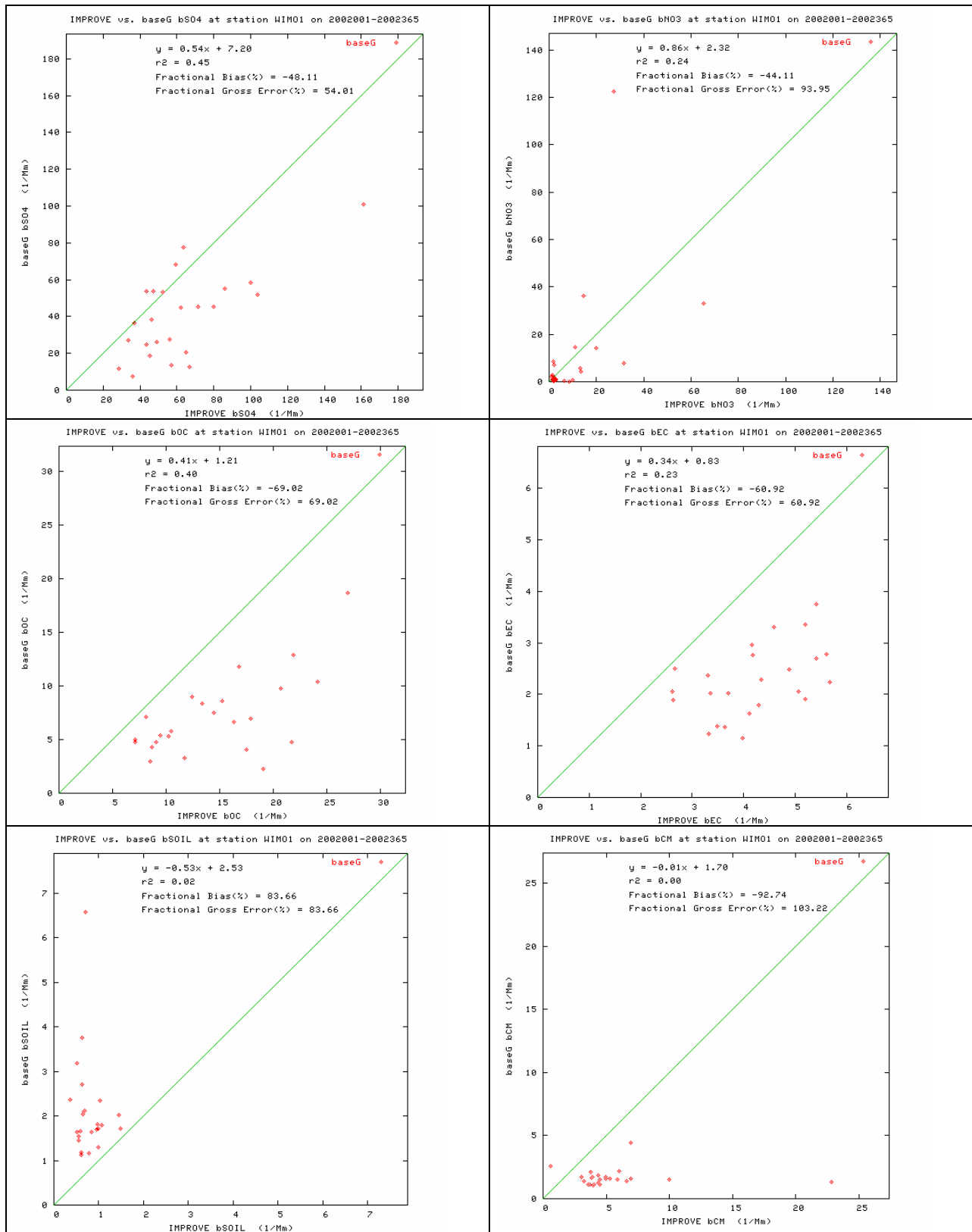


Figure C-55. PM species extinction model performance at Wichita Mountains (WIMO) for the worst 20 percent days during 2002.

C.5.9 Big Bend (BIBE) Texas

The observed extinction on the worst 20 percent days at BIBE is under-predicted on almost every day resulting in a fractional bias value of -72% (Figure 3-17). Every component of extinction is underestimated on average for the worst 20 percent days (Figure C-56) with the underestimation bias ranging from -24% (OMC) to -162% (CM). SO₄ extinction, that typically represents the largest component of the total extinction is understated by -94%.

The model does a better job in predicting the total extinction at BIBE for the best 20 percent days with average fractional bias and error values of +13% and 19% (Figure 3-17). With the exception of one day that the observed extinction is overestimated by approximately a factor of 2, the modeled and observed extinction on the best 20 percent days at BIBE are both within 12 to 25 Mm⁻¹. However, there are some mismatches with the components of extinction with the model estimating much lower contributions due to Soil and CM.

C.5.10 Guadalupe Mountains (GUMO) Texas

Most of the worst 30 percent days at GUMO are dust days with high Soil and CM that is not at all captured by the model (Figure 3-18). Extinction due to Soil and CM on the worst 20 percent days is underestimated by -105% and -191%, respectively (Figure C-57). Better performance is seen on the best 20 percent days with bias and error for total extinction of 8% and 21%, but the model still understates Soil and CM.

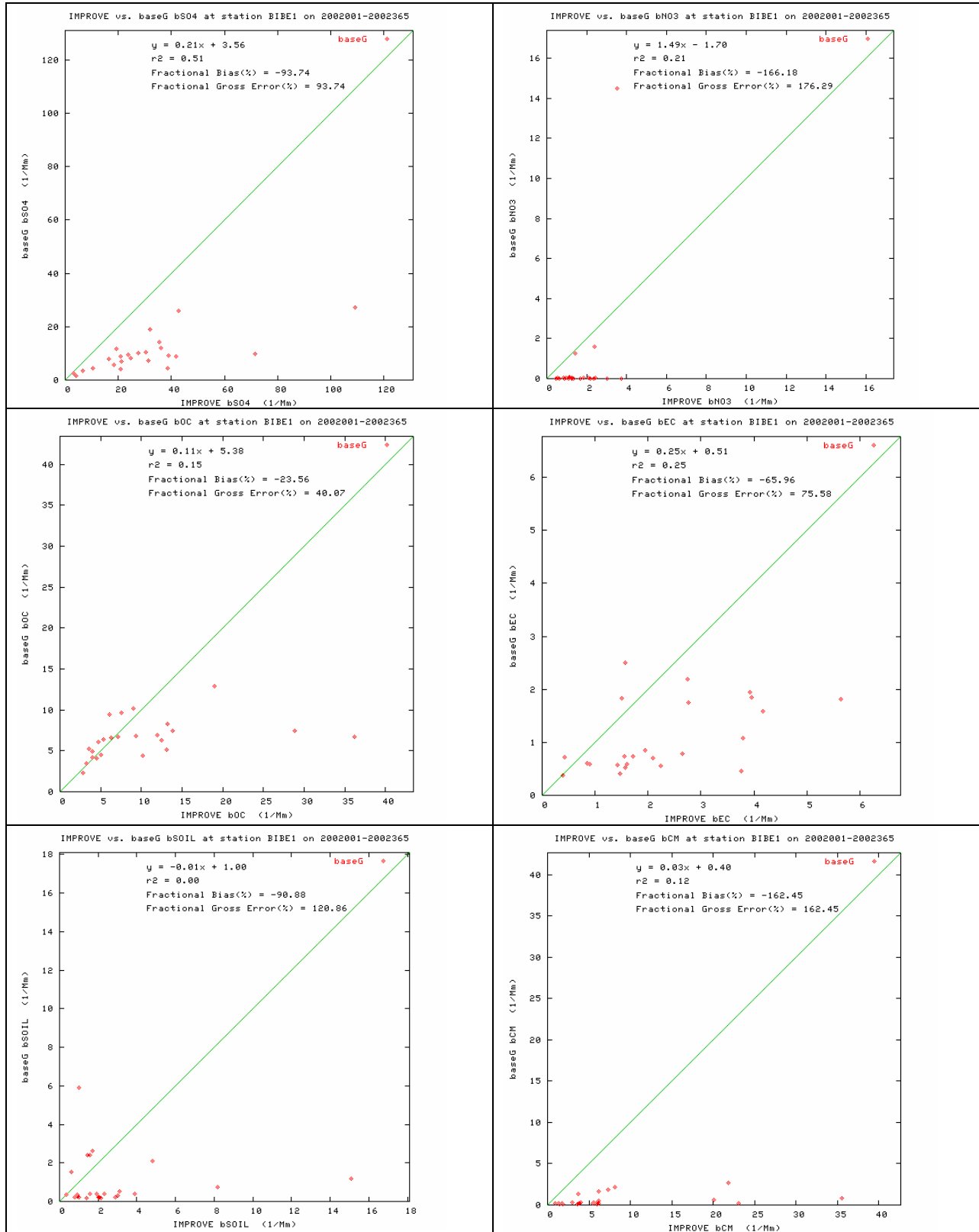


Figure C-56. PM species extinction model performance at Big Bend (BIBE) for the worst 20 percent days during 2002.

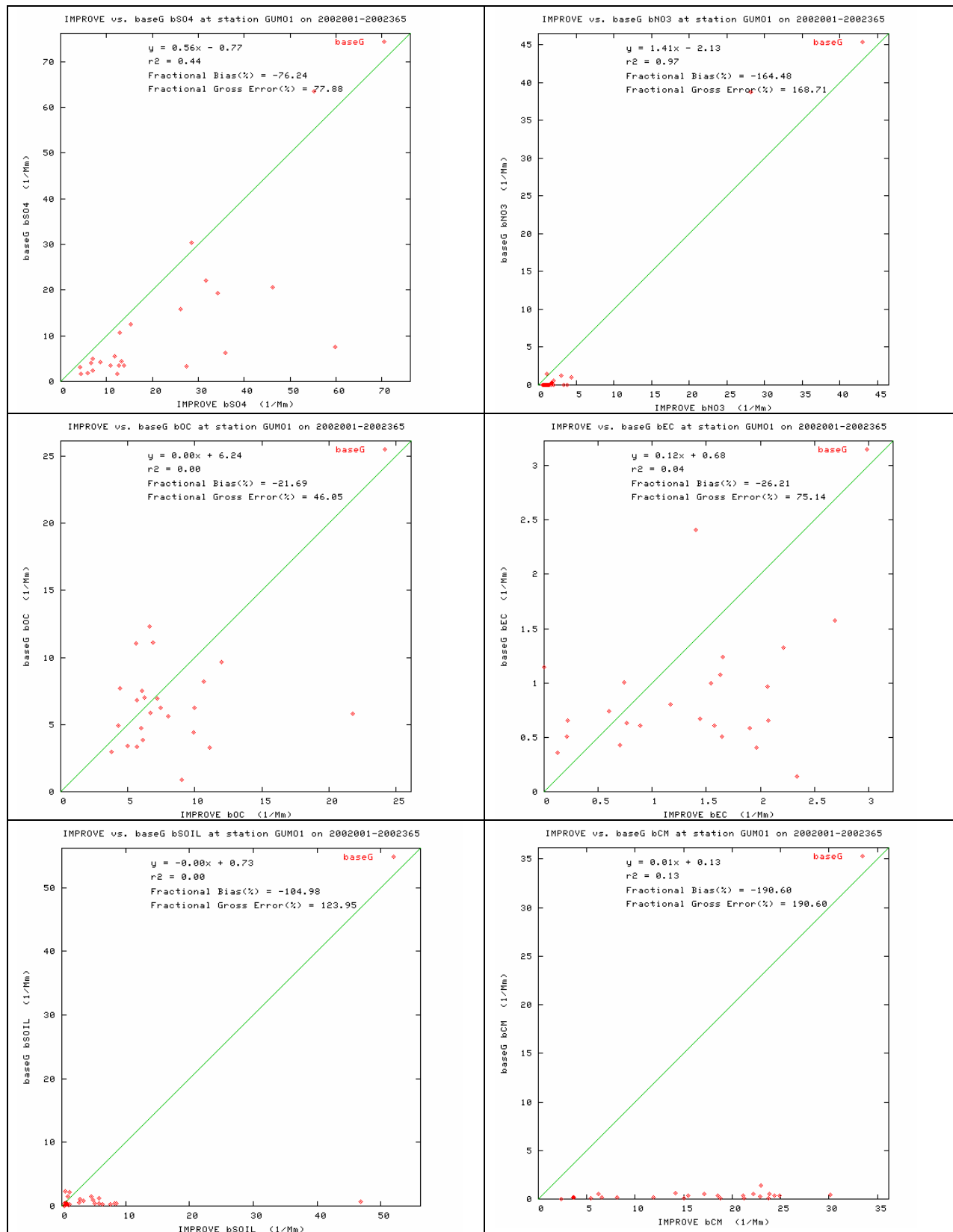


Figure C-57. PM species extinction model performance at Guadalupe Mountains (GUMO) for the worst 20 percent days during 2002.

C.6 Model Performance Evaluation Conclusions

The model performance evaluation reveals that the model is performing best for SO₄, OMC and EC. Soil performance is mixed with winter overestimation bias but lower bias but high error in the summer. CM performance is poor year round. The operational evaluation reveals that SO₄ performance usually achieves the PM model performance goal and always achieves the model performance criteria, although it does have an underestimation bias that is greatest in the summer. NO₃ performance is characterized by a winter overestimation bias with an even greater summer underestimation bias. However, the summer underestimation bias occurs when NO₃ is very low and it is not an important component of the observed or predicted PM and visibility impairment. Performance for OMC meets the model performance goal year round at the IMPROVE sites, but is characterized by an underestimation bias at the more urban STN sites. EC exhibits very low bias at the STN sites and a summer underestimation bias at the IMPROVE sites, but meets the model performance goal throughout the year. Soil has a winter overestimation bias that exceeds the model performance goal and criteria raising questions whether the model should be used for this species. Finally, CM performance is extremely poor with an under-prediction bias that exceeds the performance goal and criteria. We suspect that much of the CM concentrations measured at the IMPROVE sites is due to highly localized emissions that can not be simulated with 36 km regional modeling.

Performance for the worst 20 percent days at the CENRAP Class I areas is generally characterized by an underestimation bias. Performance at the BRET, BIBE and GUMO Class I areas for the worst 20 percent days is particularly suspect and care should be taken in the interpretation of the visibility projections at these three Class I areas.

The CMAQ 2002 36 km model appears to be working well enough to reliably make future-year projections for changes in SO₄, NO₃, EC and OMC at the rural Class I areas. Performance for Soil and especially CM is suspect enough that care should be taken in interpreting these modeling results. The model evaluation focused on the model's ability to predict the components of light extinction mainly at the Class I areas. Additional analysis would have to be undertaken to examine the model's ability to treat ozone and fine particulate to address 8-hour ozone and PM_{2.5} attainment issues.

APPENDIX D

2018 Visibility Projections for CENRAP Class I Areas Using 2002 Typical and 2018 Base Case Base G Emission Scenario CMAQ Results and EPA Default Projection Method and Comparison with 2018 Uniform Rate of Progress (URP) Glidepaths

- Figure D-1: Caney Creek Wilderness Area (CACR), Arkansas
- Figure D-2: Upper Buffalo Wilderness Area (UPBU), Arkansas
- Figure D-3: Breton Island Wilderness Area (BRET), Louisiana
- Figure D-4: Boundary Waters Canoe Area Wilderness Area (BOWA), Minnesota
- Figure D-5: Voyageurs National Park (VOYA), Minnesota
- Figure D-6: Hercules Glade Wilderness Area (HEGL), Missouri
- Figure D-7: Mingo Wilderness Area (MING), Missouri
- Figure D-8: Wichita Mountains Wilderness Area (WIMO), Oklahoma
- Figure D-9: Big Bend National Park (BIBE), Texas
- Figure D-10: Guadalupe Mountains National Park (GUMO), Texas

Uniform Rate of Reasonable Progress Glide Path Caney Creek Wilderness - 20% Data Days

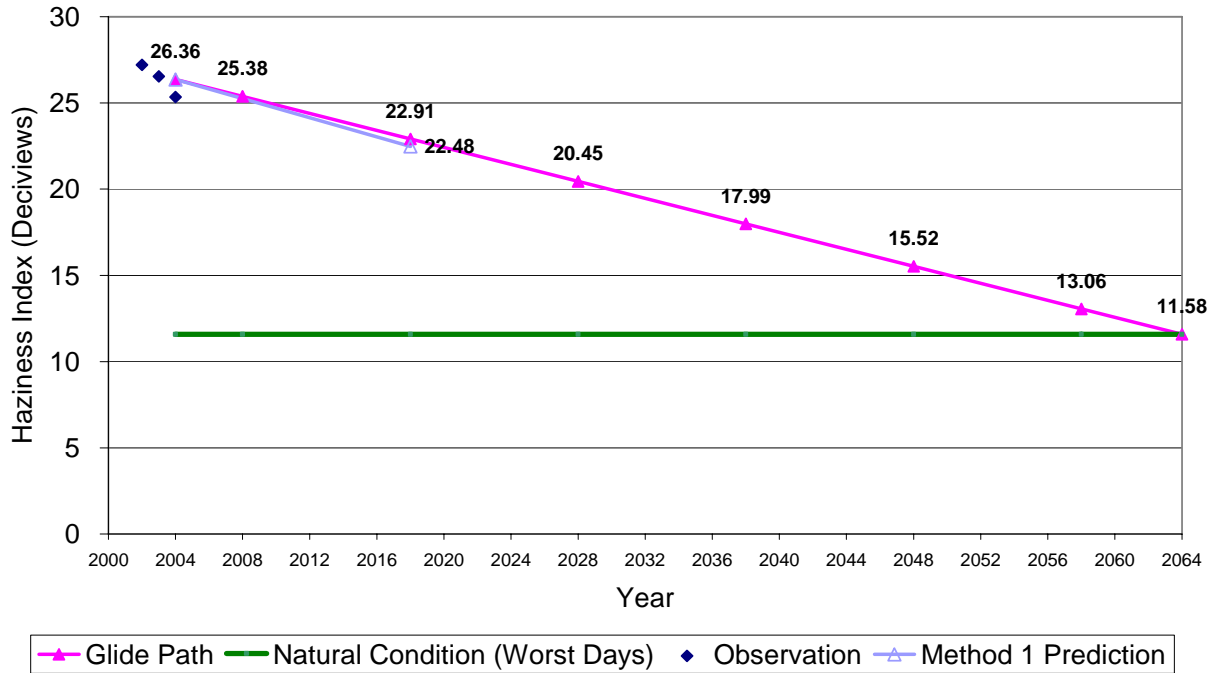


Figure D-1a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Caney Creek Wilderness - Best 20% Days

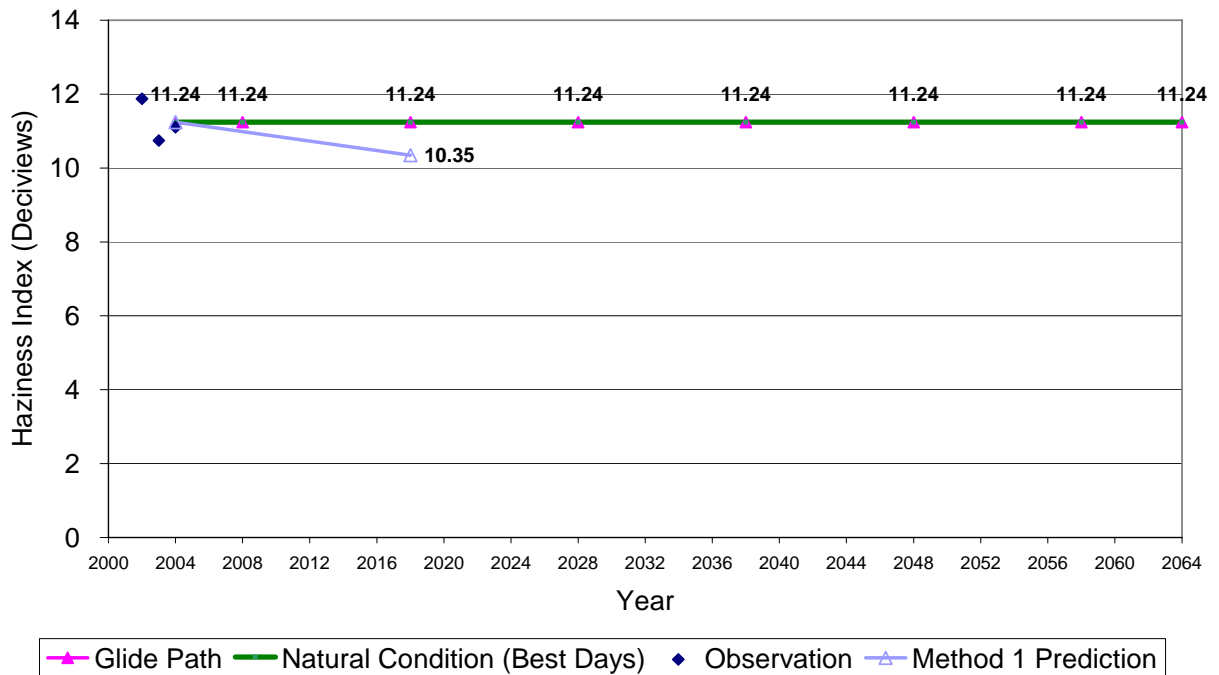


Figure D-1b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Caney Creek (CACR), Arkansas and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

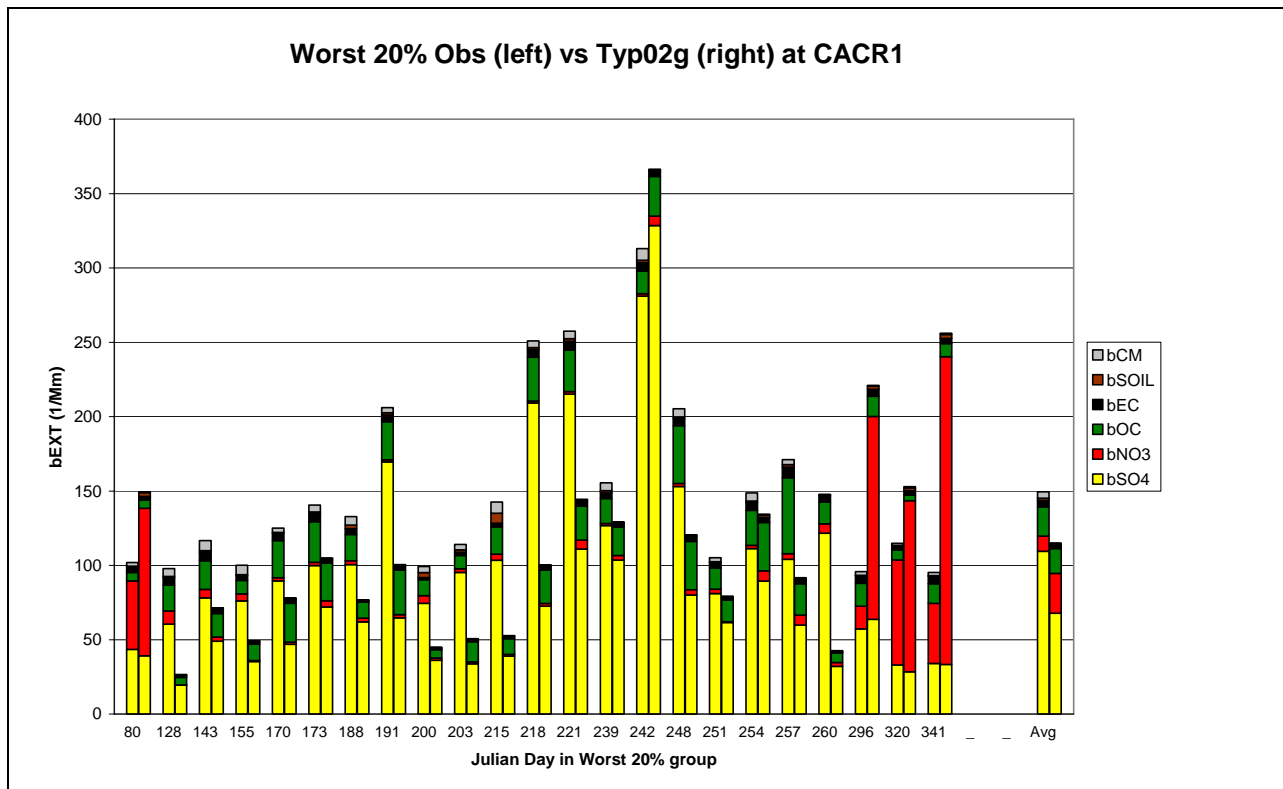


Figure D-1c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days in 2002.

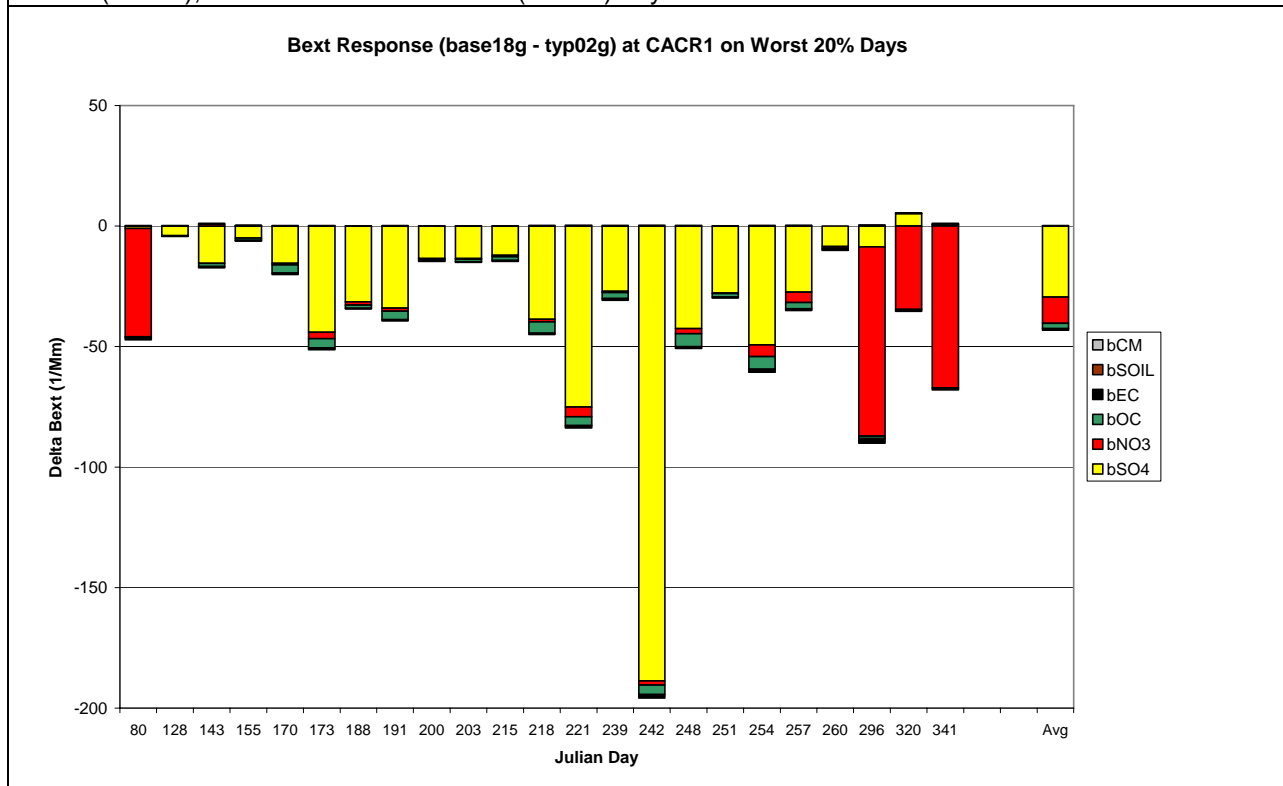


Figure D-1d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days in 2002.

Uniform Rate of Reasonable Progress Glide Path Upper Buffalo Wilderness - 20% Data Days

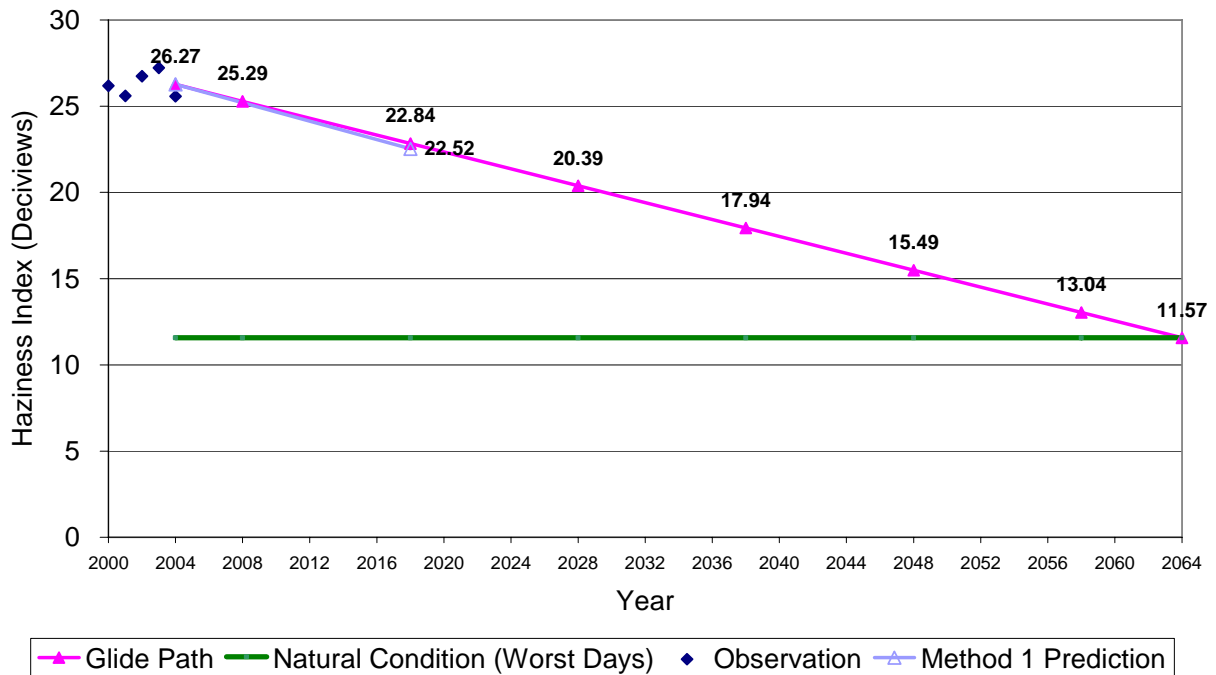


Figure D-2a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Upper Buffalo Wilderness - Best 20% Days

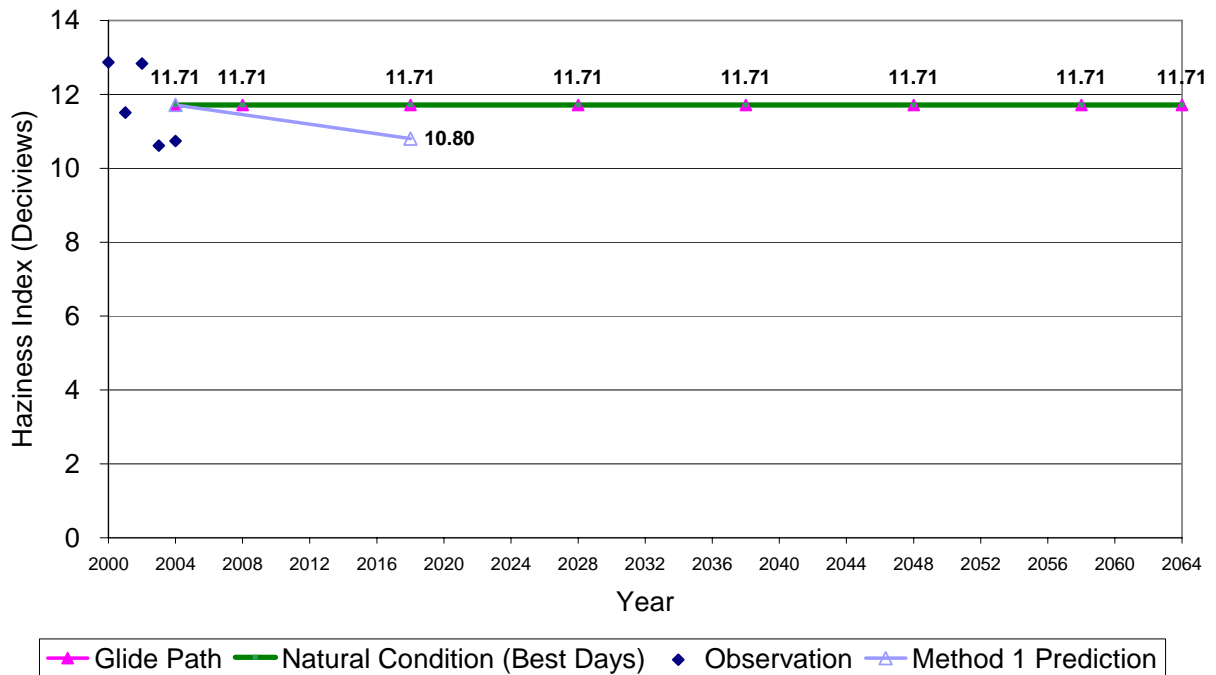


Figure D-2b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Upper Buffalo (UPBU), Arkansas and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

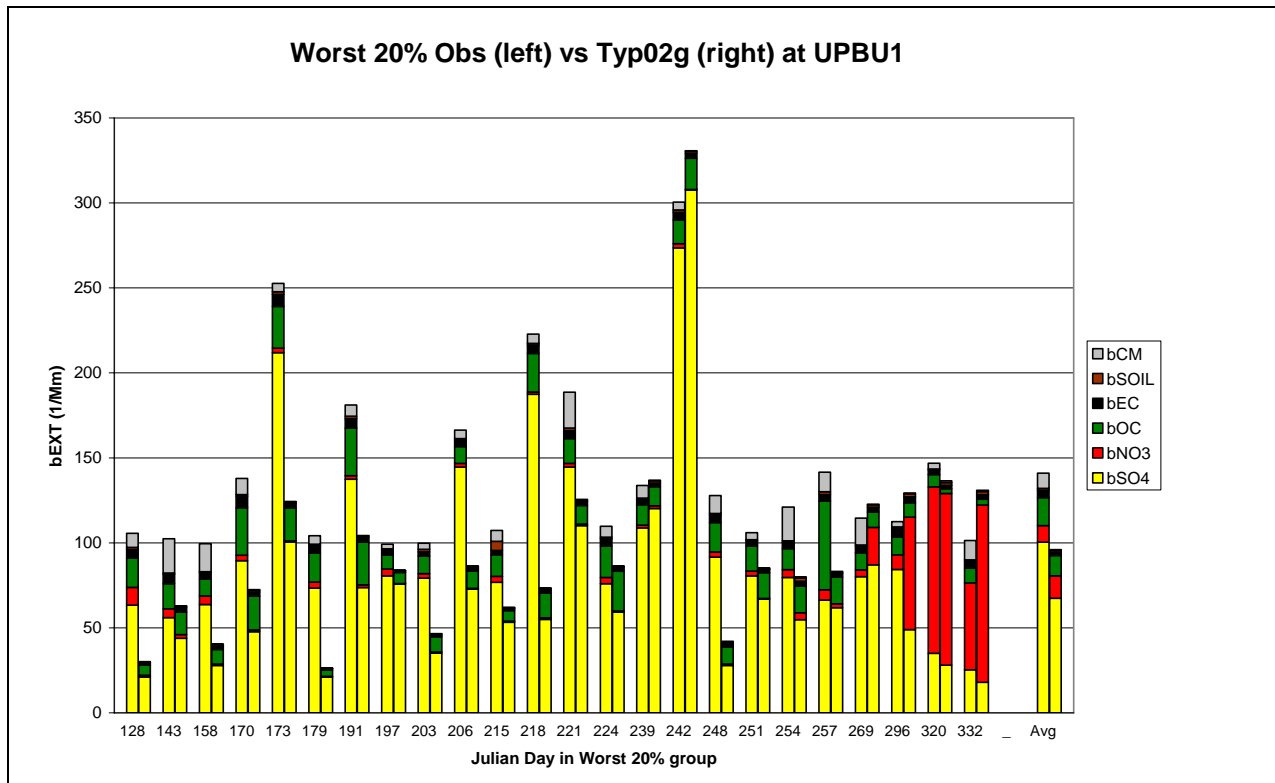


Figure D-2c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days in 2002.

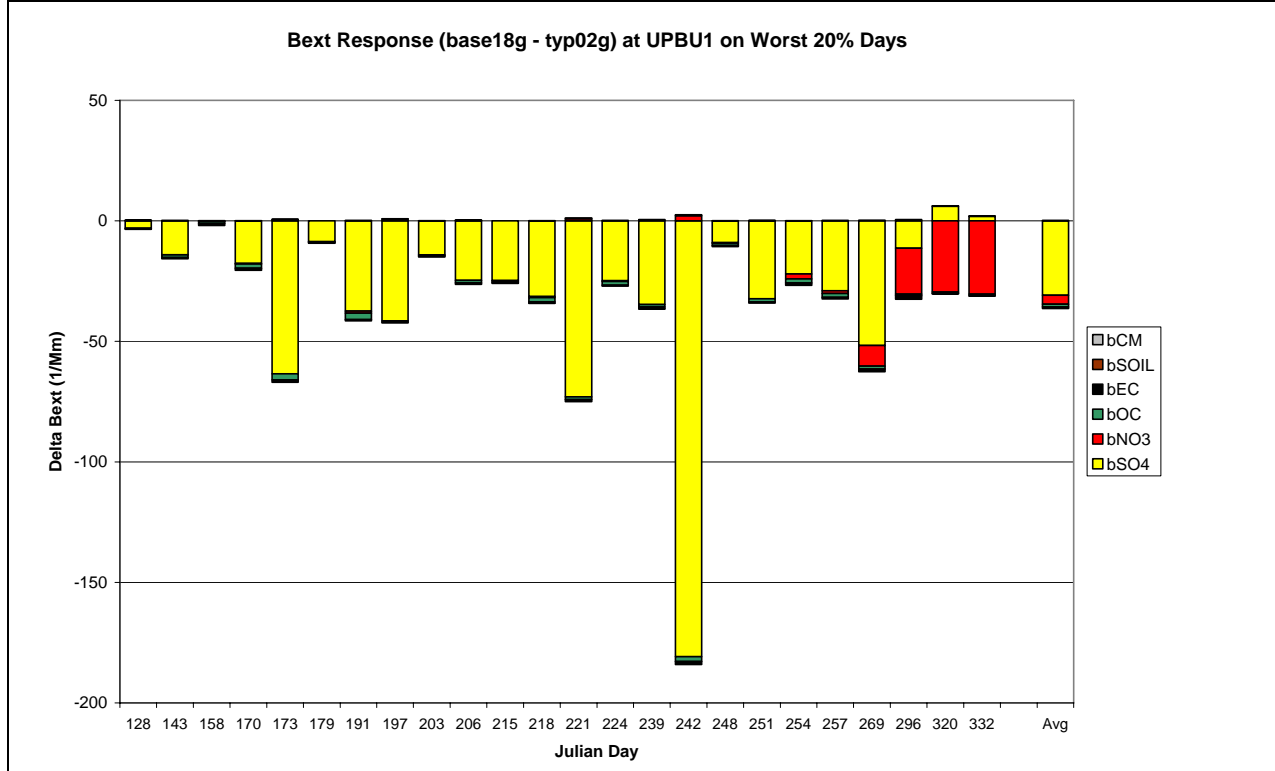


Figure D-2d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days in 2002.

Uniform Rate of Reasonable Progress Glide Path Breton - 20% Data Days

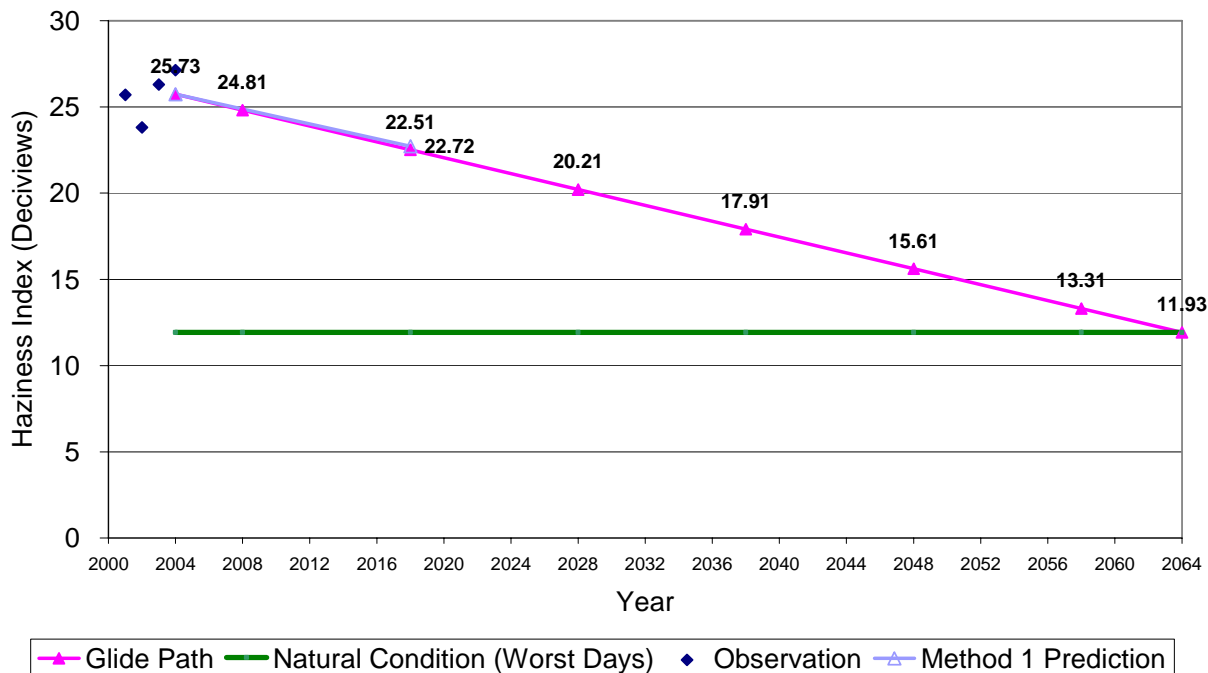


Figure D-3a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Breton - Best 20% Days

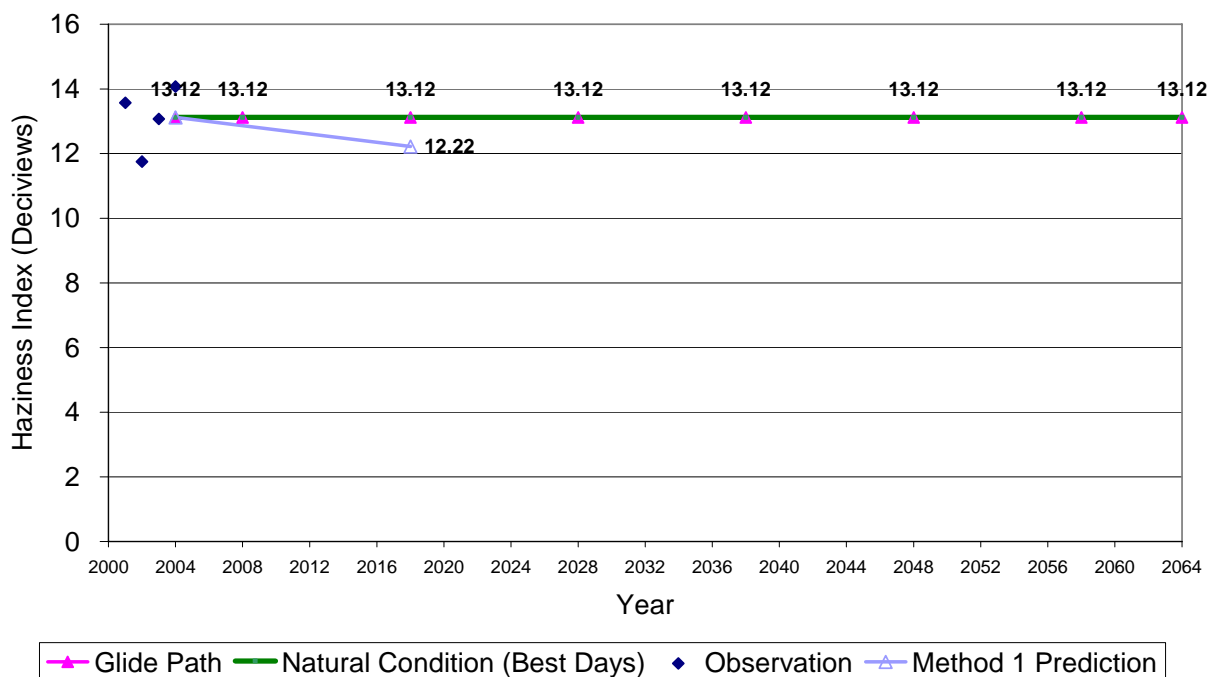


Figure D-3b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Breton Island (BRET), Louisiana and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

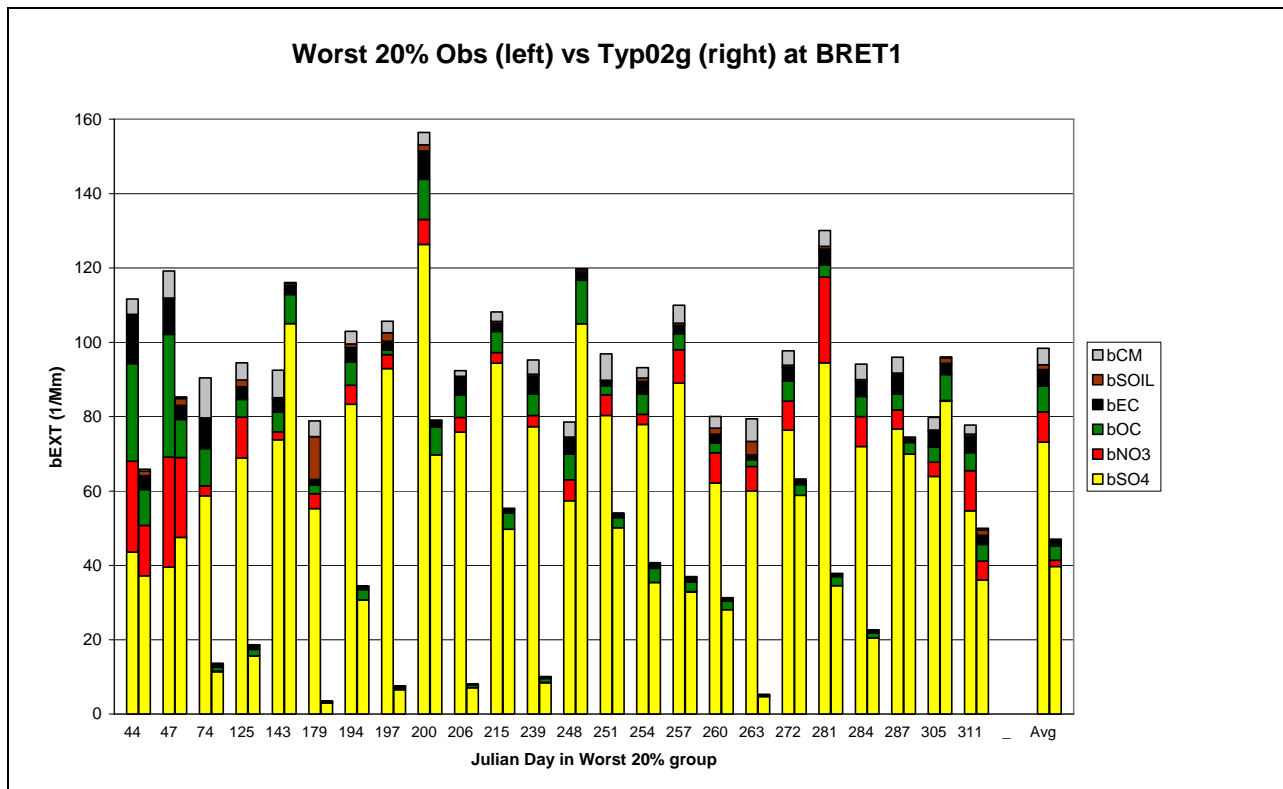


Figure D-3c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Breton Island (BRET), Louisiana and Worst 20% (W20%) days in 2002.

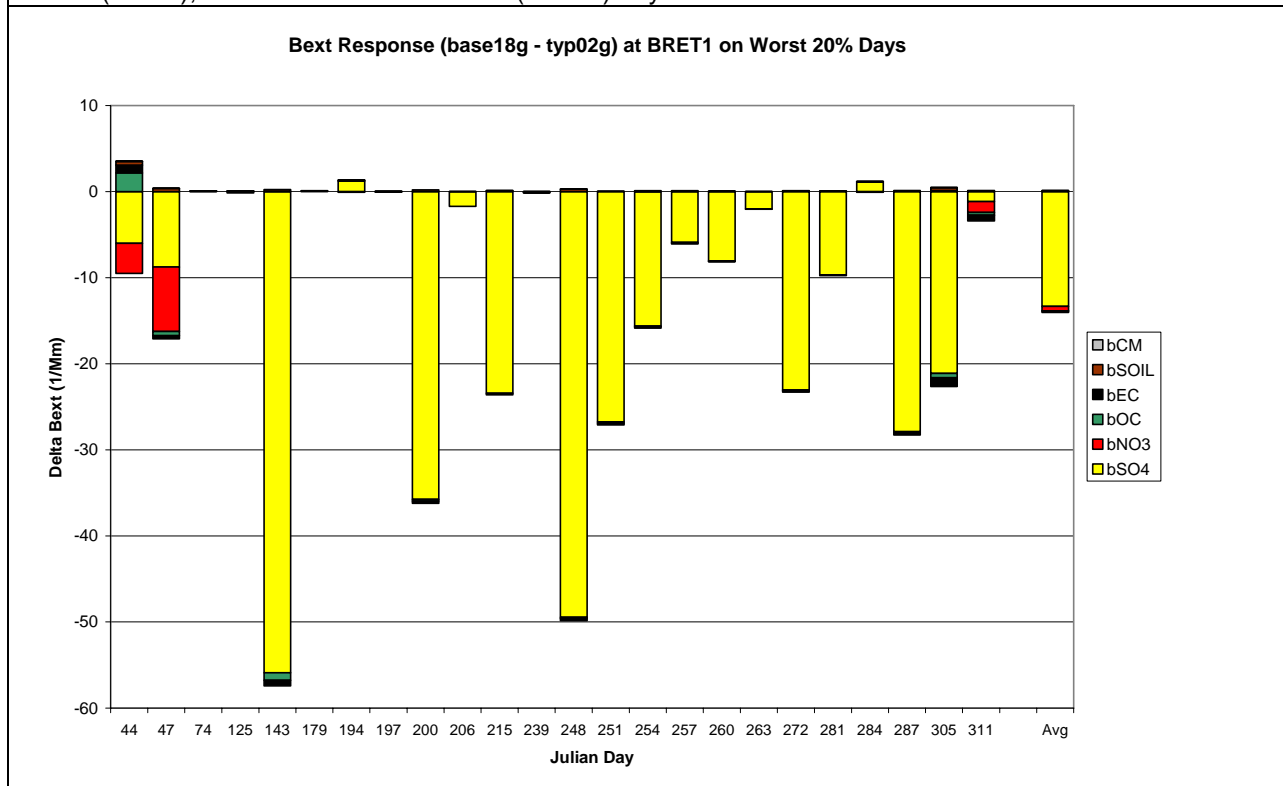


Figure D-3d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Breton Island (BRET), Louisiana and Worst 20% (W20%) days in 2002.

Uniform Rate of Reasonable Progress Glide Path Boundary Waters Canoe Area - 20% Data Days

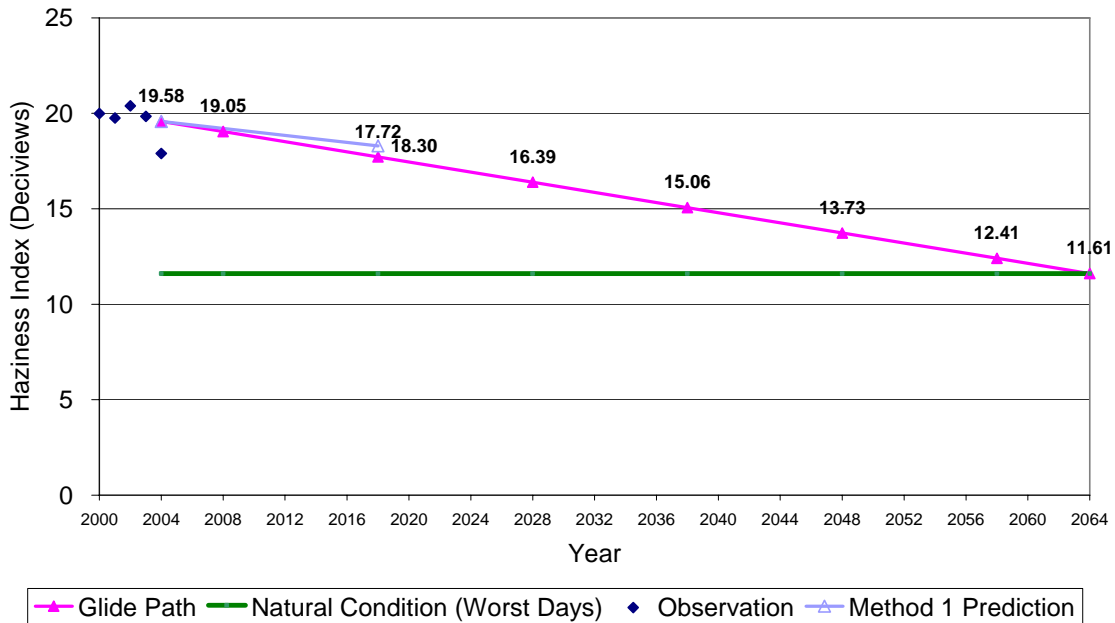


Figure D-4a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Boundary Waters Canoe Area - Best 20% Days

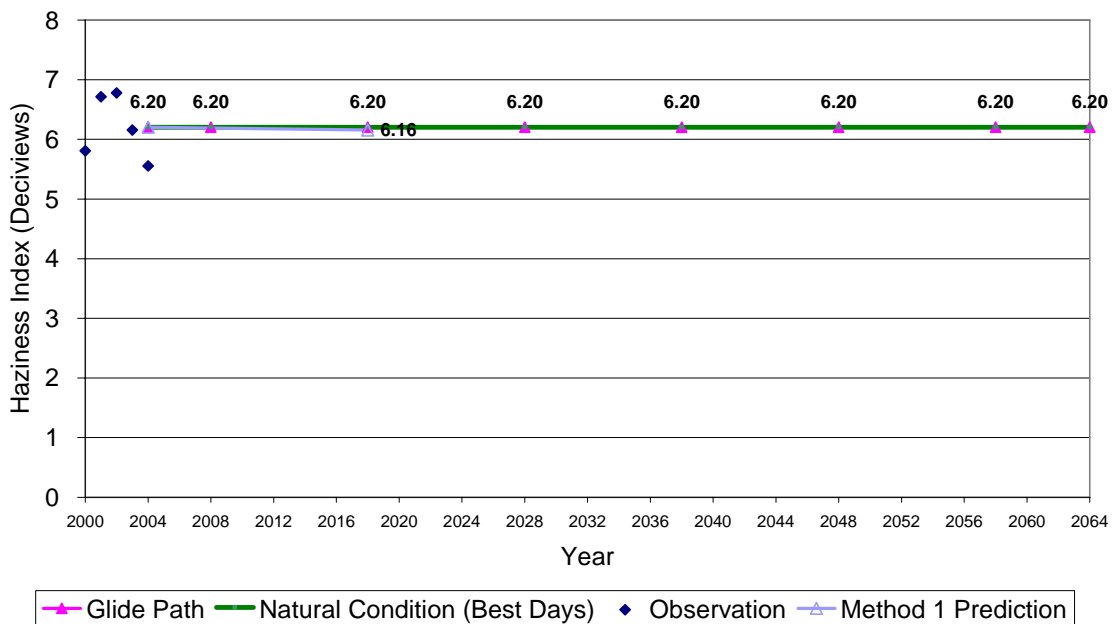


Figure D-4b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Boundary Waters (BOWA), Minnesota and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Worst 20% Obs (left) vs Typ02g (right) at BOWA1

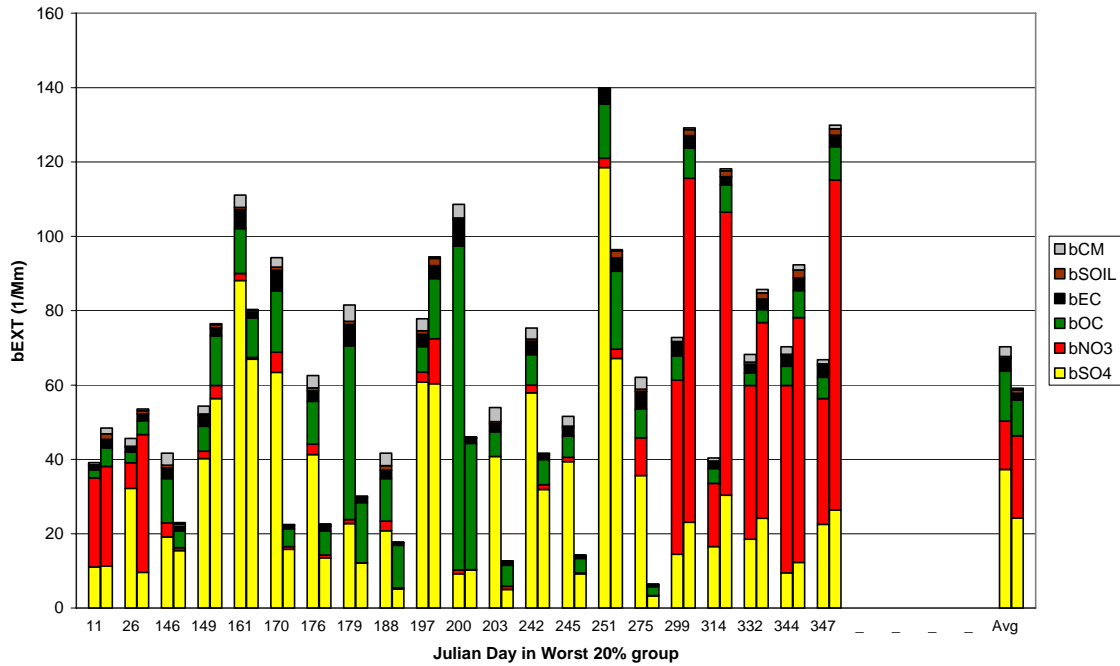


Figure D-4c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days in 2002.

Bext Response (base18g - typ02g) at BOWA1 on Worst 20% Days

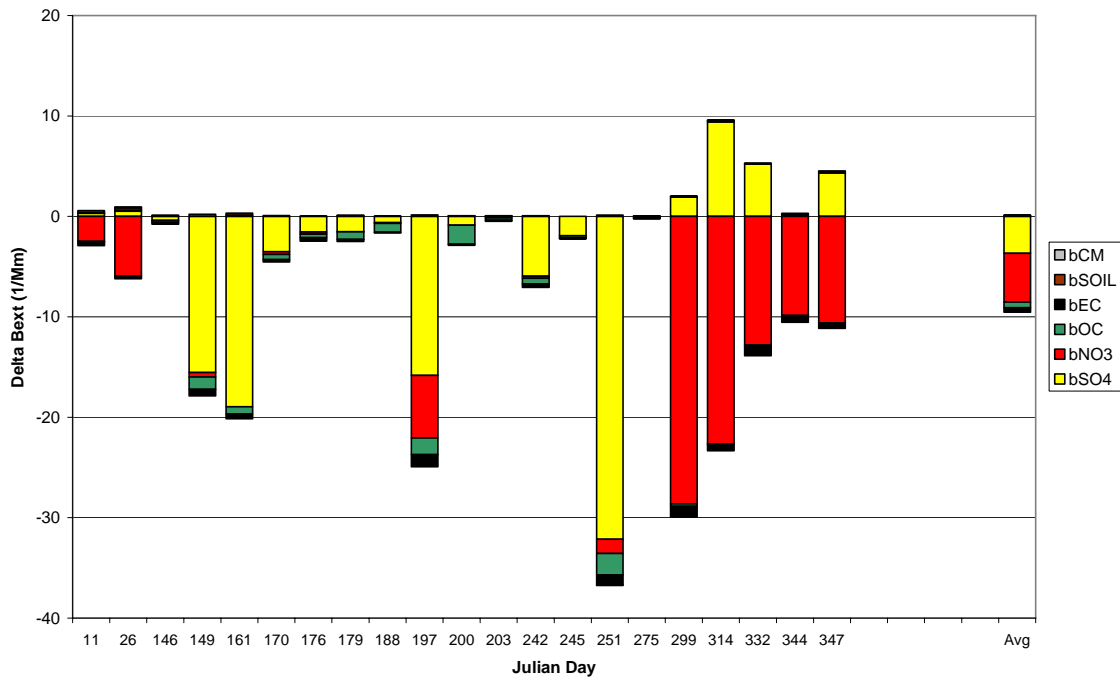


Figure D-4d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days in 2002.

Uniform Rate of Reasonable Progress Glide Path Voyageurs NP - 20% Data Days

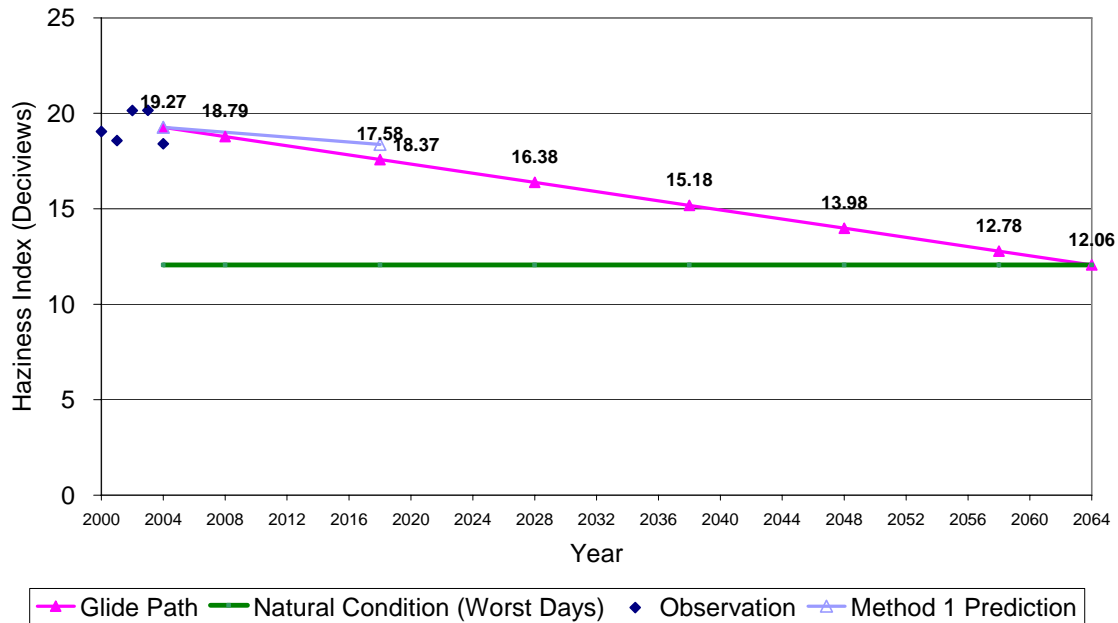


Figure D-5a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Voyageurs NP - Best 20% Days

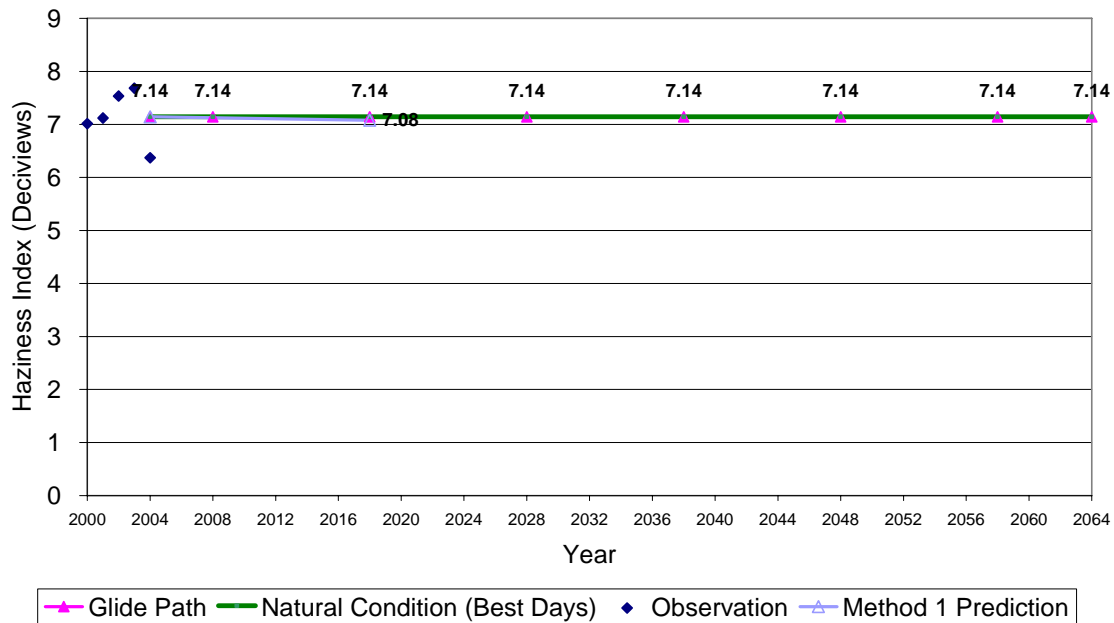


Figure D-5b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Voyageurs (VOYA), Minnesota and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

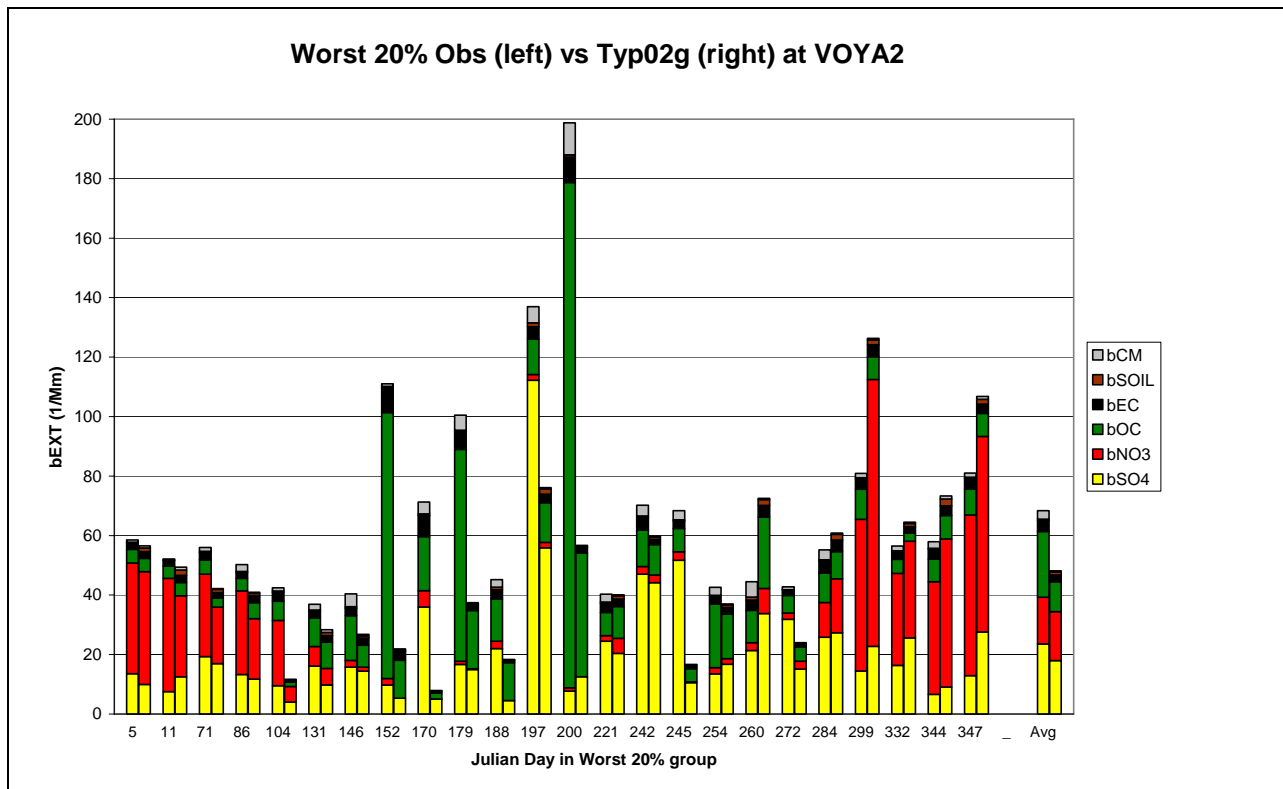


Figure D-5c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Voyagers (VOYA), Minnesota and Worst 20% (W20%) days in 2002.

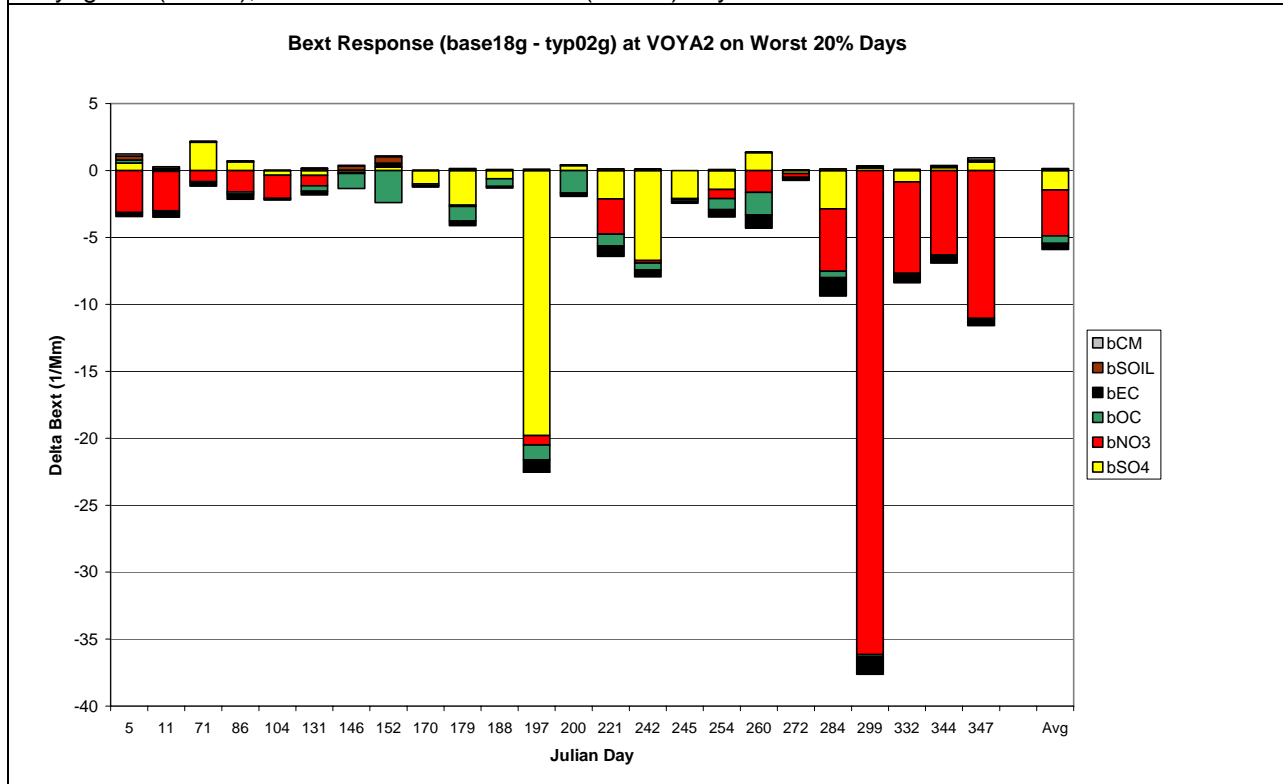


Figure D-5d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Voyagers (VOYA), Minnesota and Worst 20% (W20%) days in 2002.

Uniform Rate of Reasonable Progress Glide Path Hercules-Glades Wilderness - 20% Data Days

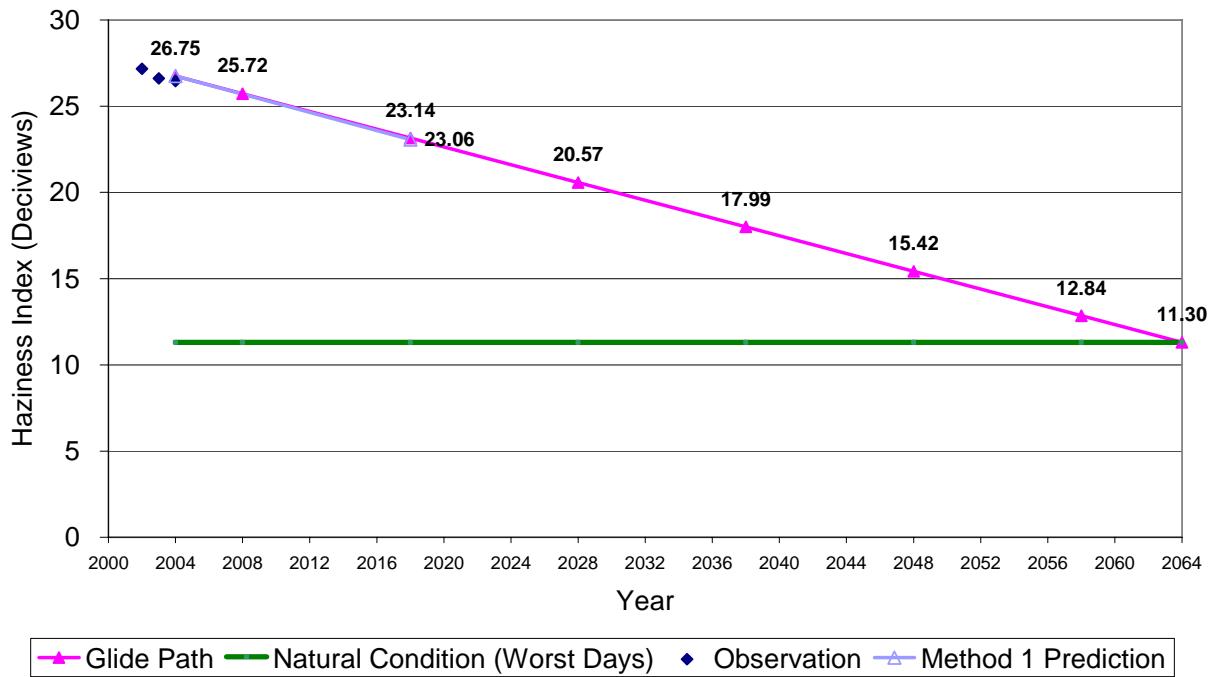


Figure D-6a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Hercules-Glades Wilderness - Best 20% Days

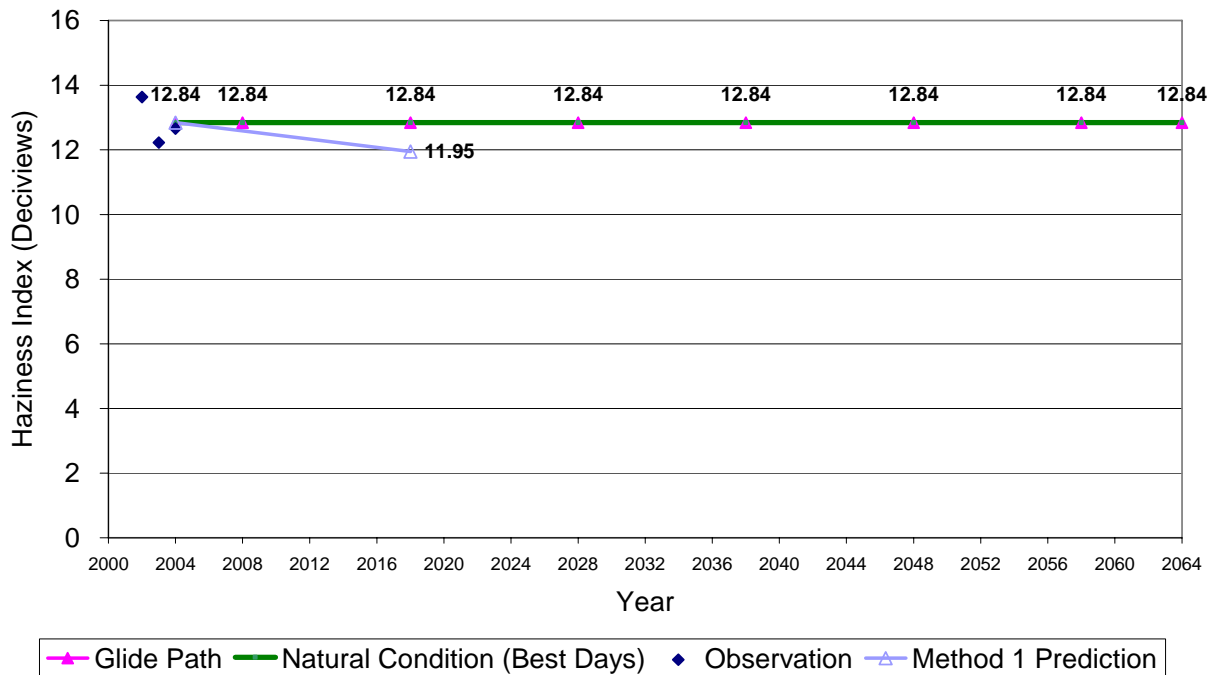


Figure D-6b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Hercules-Glade (HEGL), Missouri and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

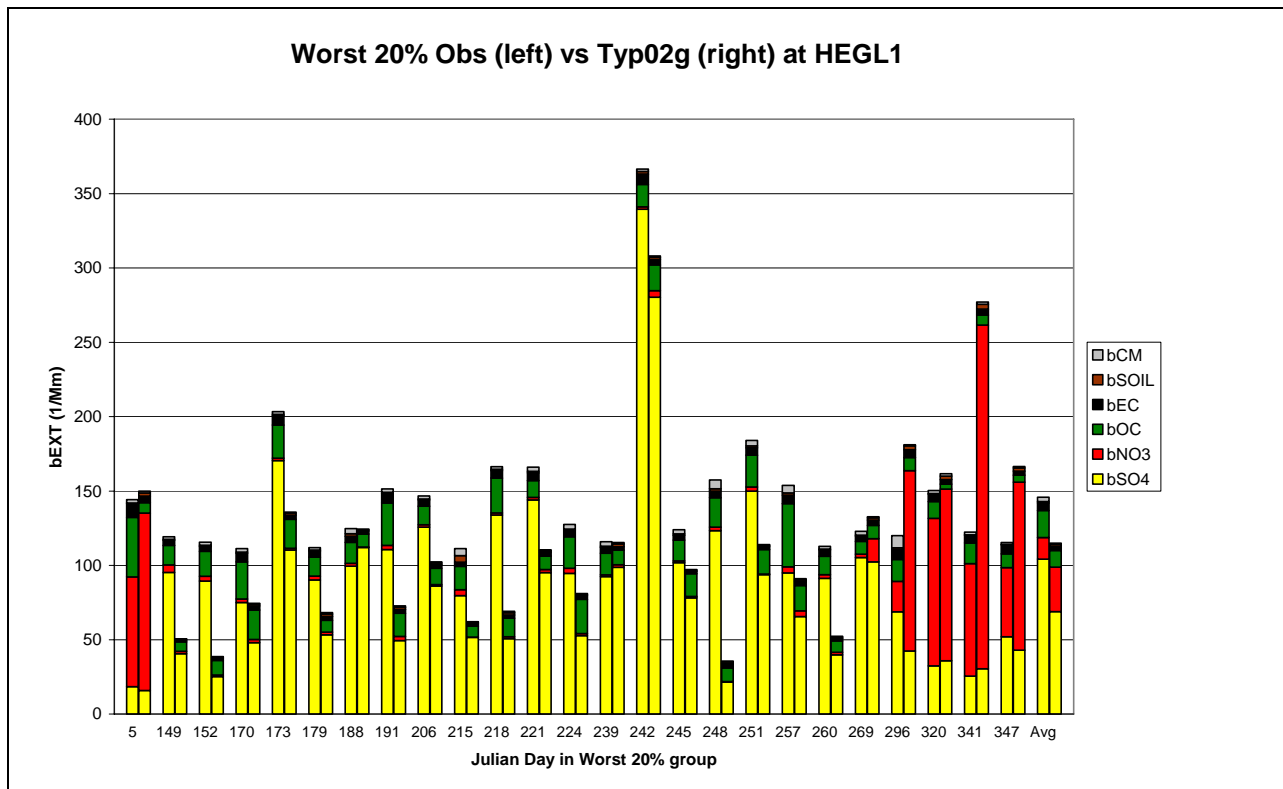


Figure D-6c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days in 2002.

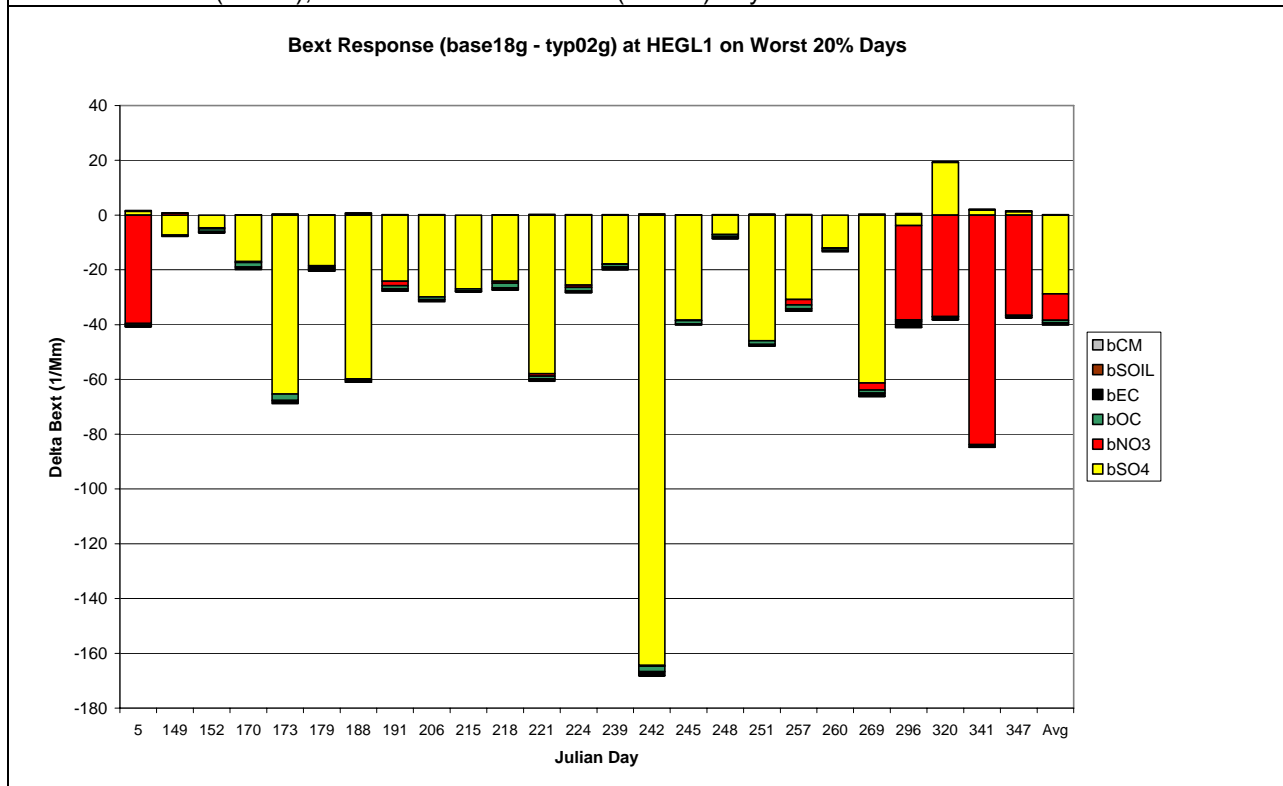


Figure D-6d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days in 2002.

Uniform Rate of Reasonable Progress Glide Path Mingo - 20% Data Days

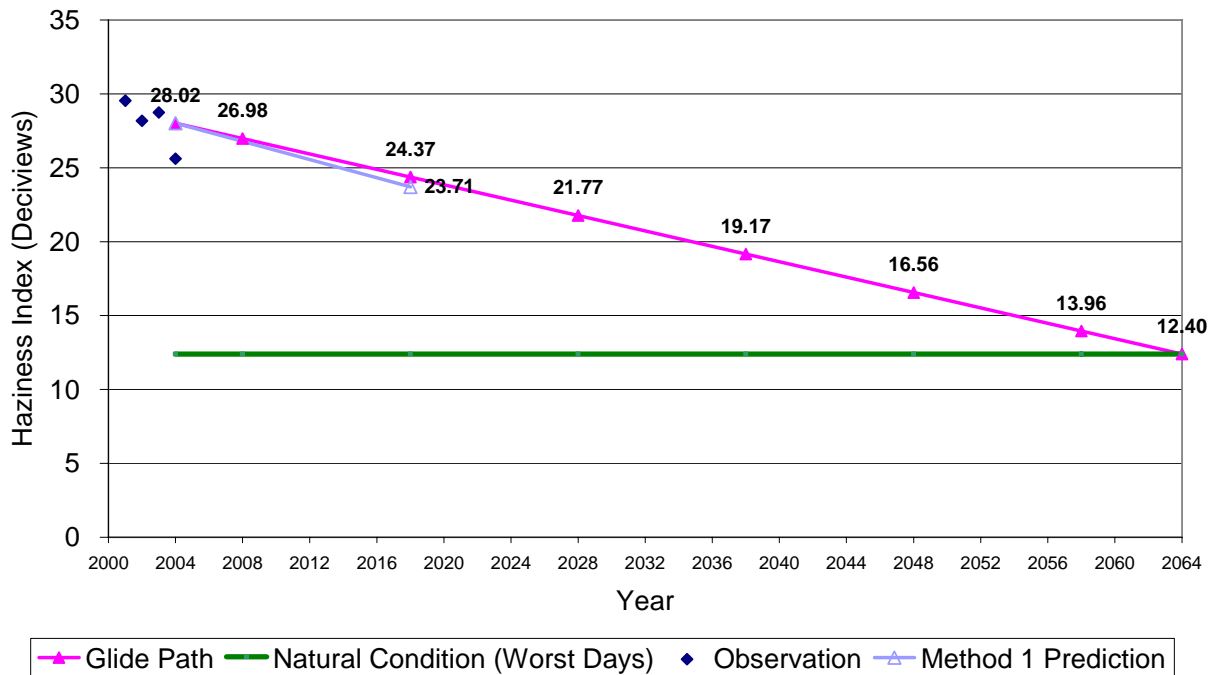


Figure D-7a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Mingo - Best 20% Days

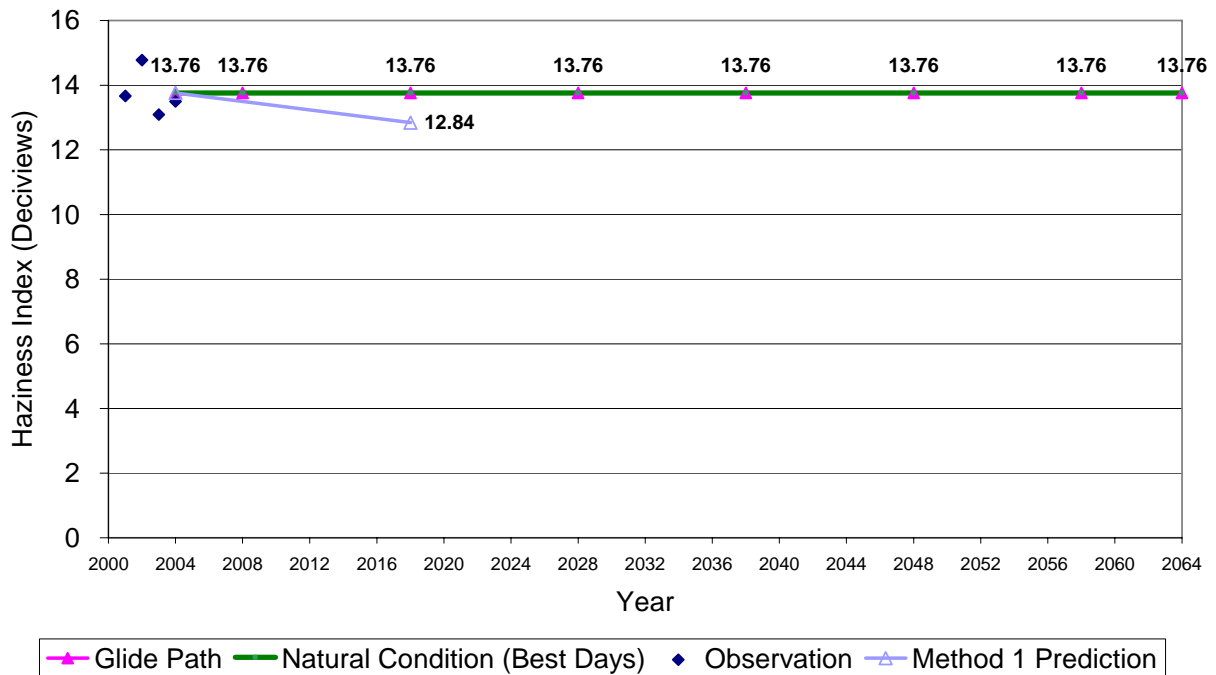


Figure D-7b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Mingo (MING), Missouri and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

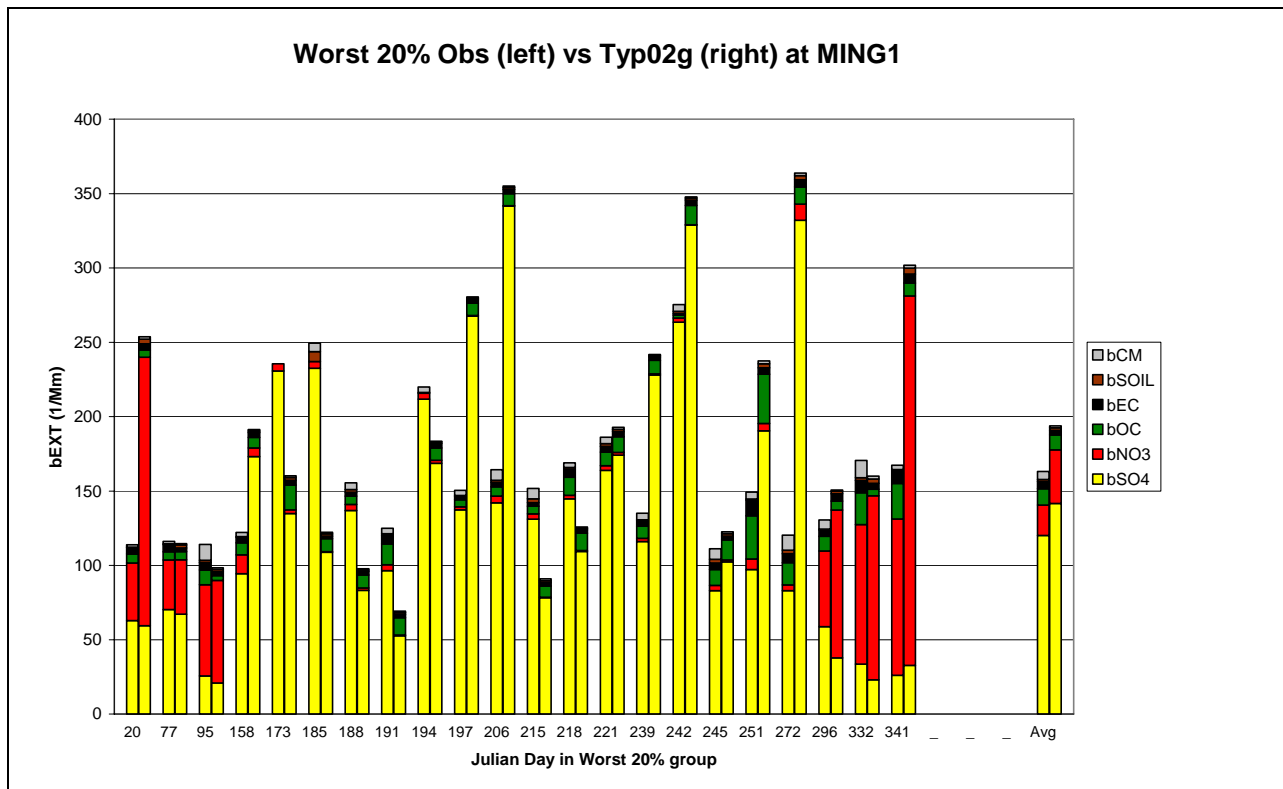


Figure D-7c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Mingo (MING), Missouri and Worst 20% (W20%) days in 2002.

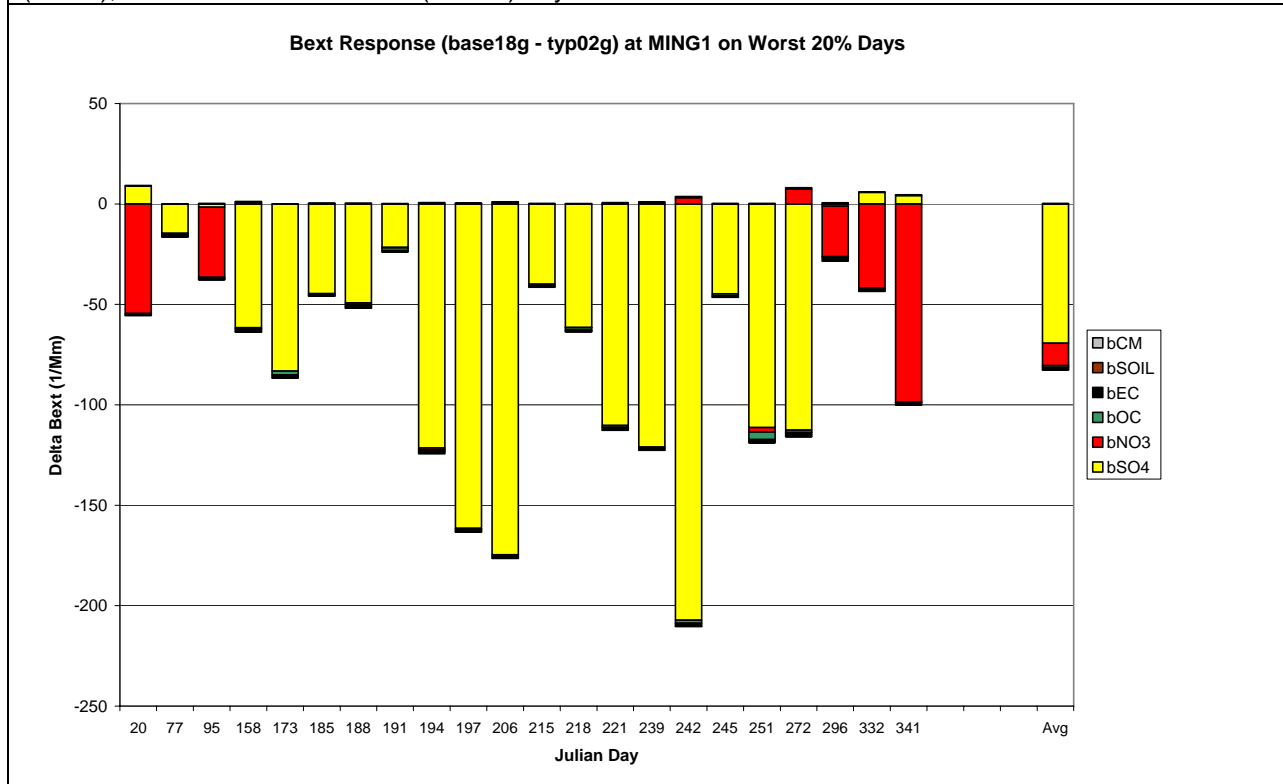


Figure D-7d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Mingo (MING), Missouri and Worst 20% (W20%) days in 2002.

Uniform Rate of Reasonable Progress Glide Path Wichita Mountains - 20% Data Days

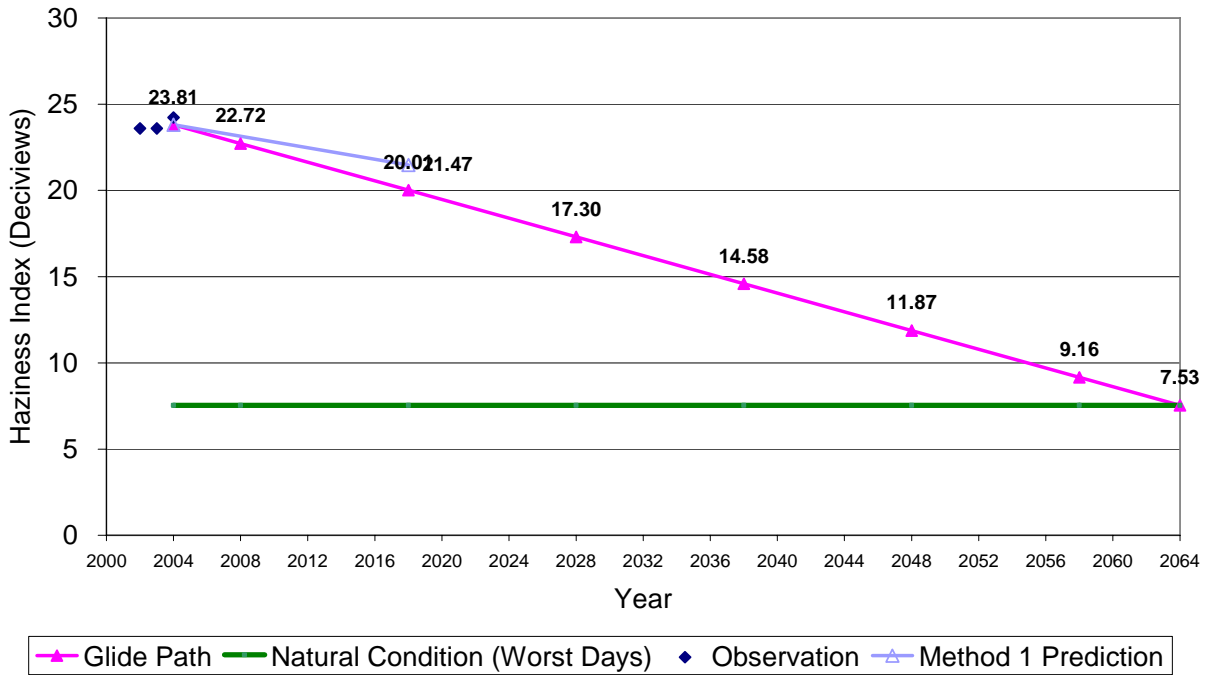


Figure D-8a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Wichita Mountains - Best 20% Days

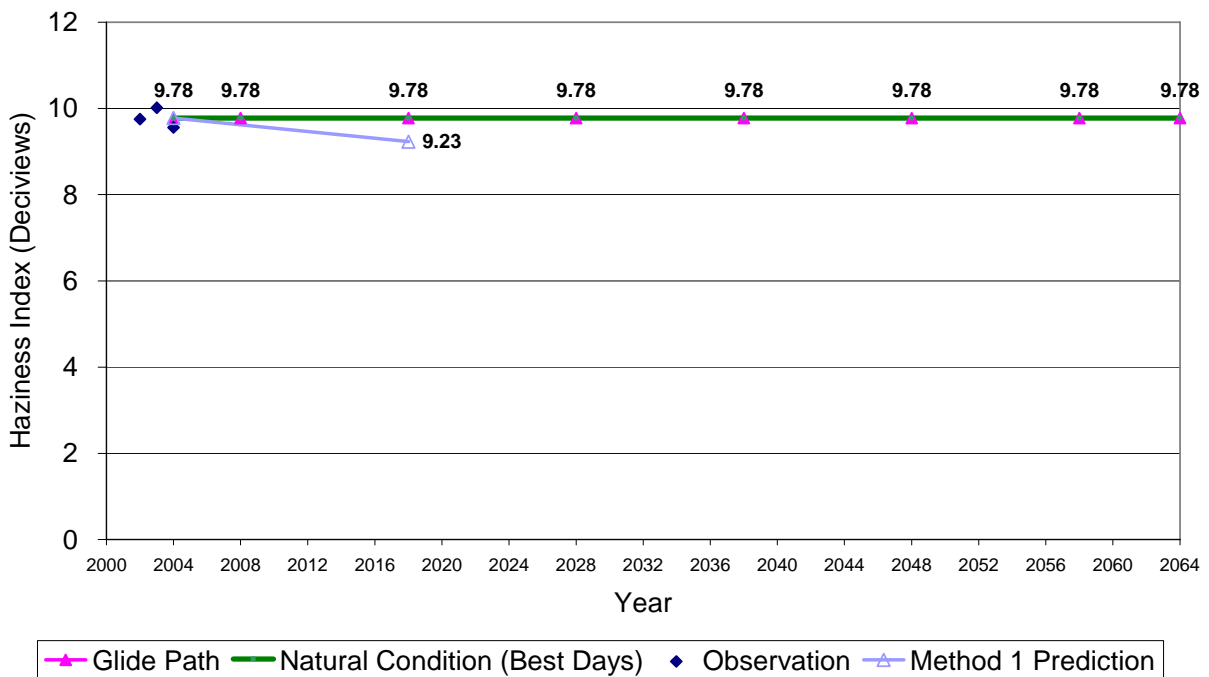


Figure D-8b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Wichita Mountains (WIMO), Oklahoma and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

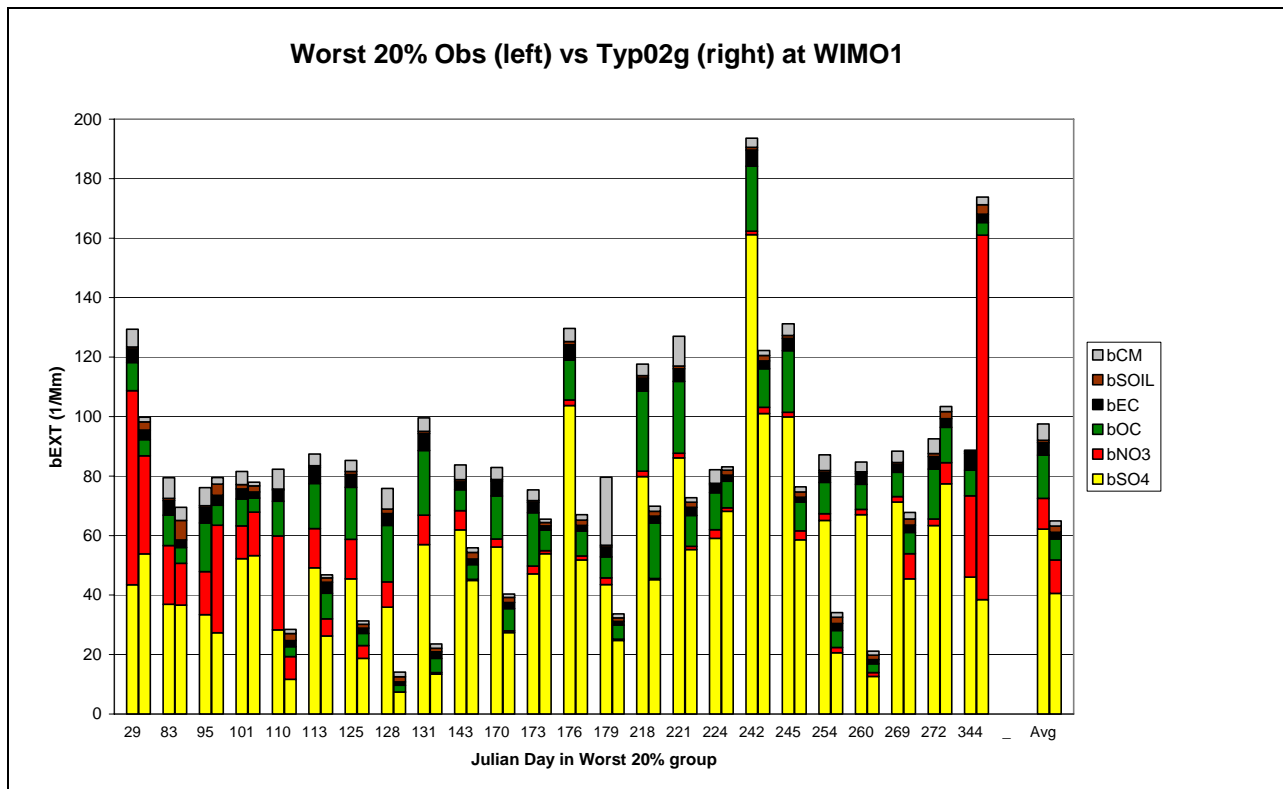


Figure D-8c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days in 2002.

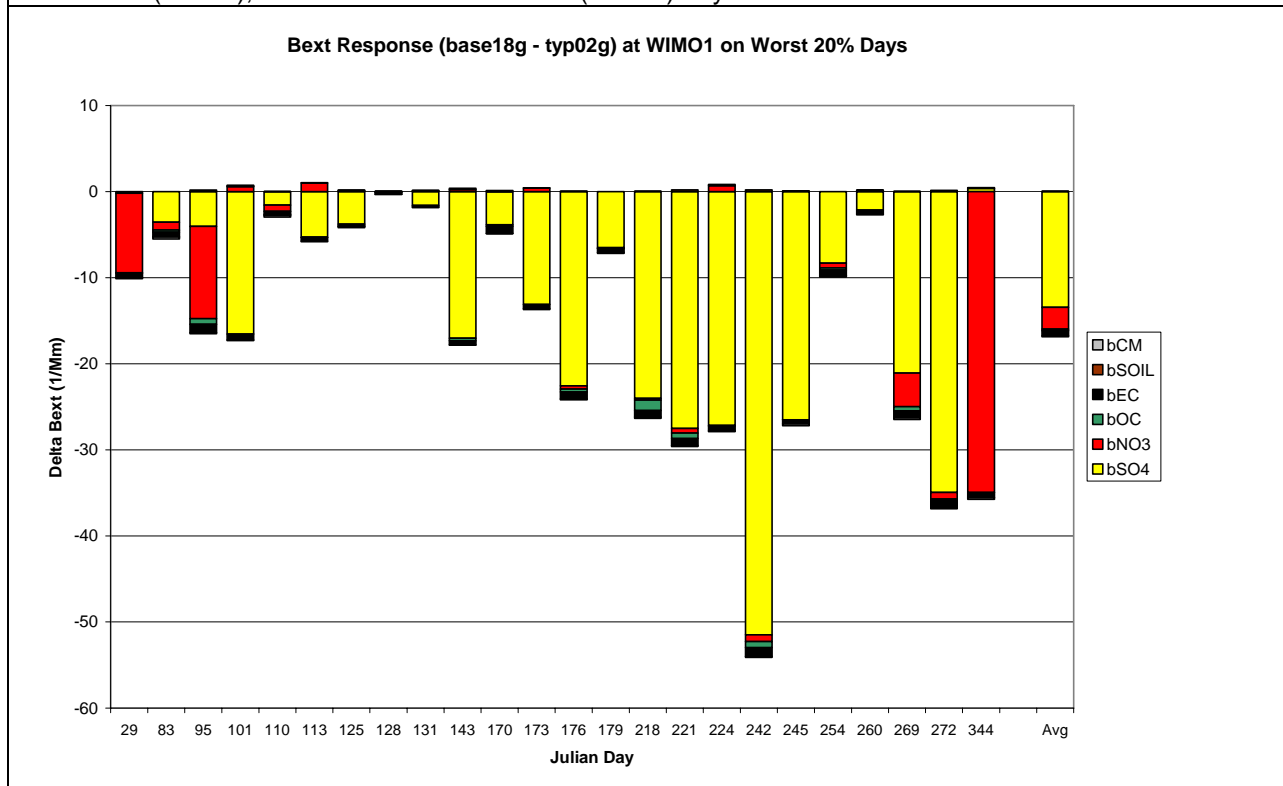


Figure D-8d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days in 2002.

Uniform Rate of Reasonable Progress Glide Path Big Bend NP - 20% Data Days

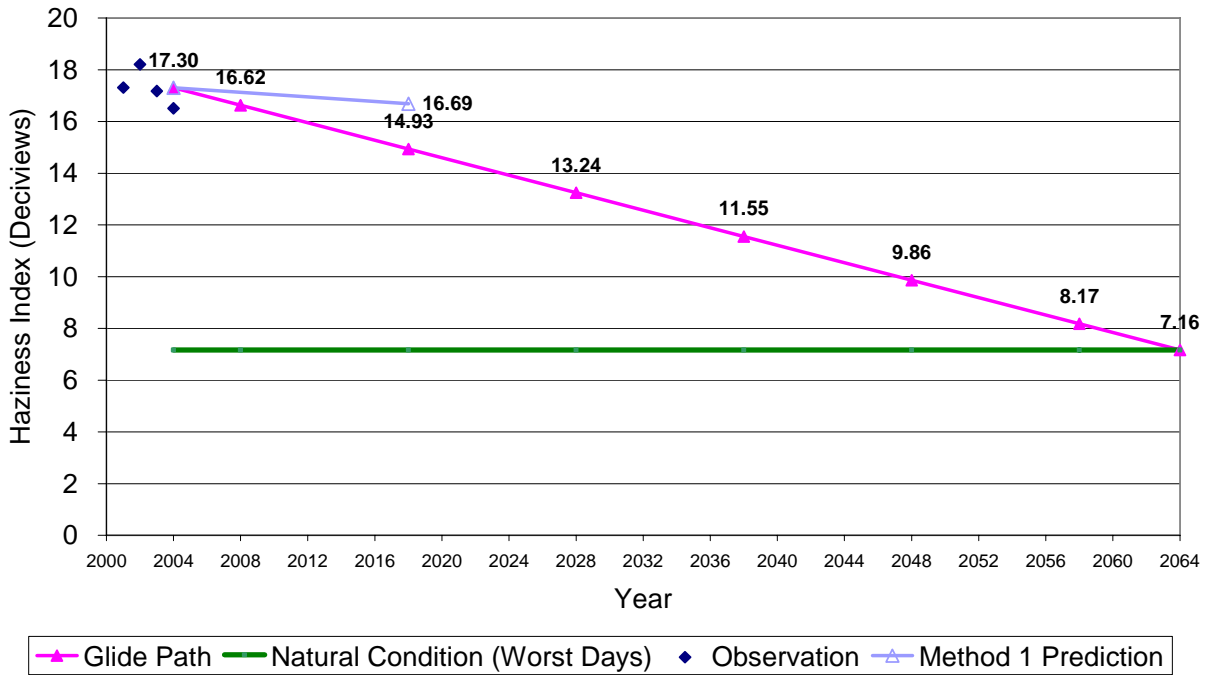


Figure D-9a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Big Bend NP - Best 20% Days

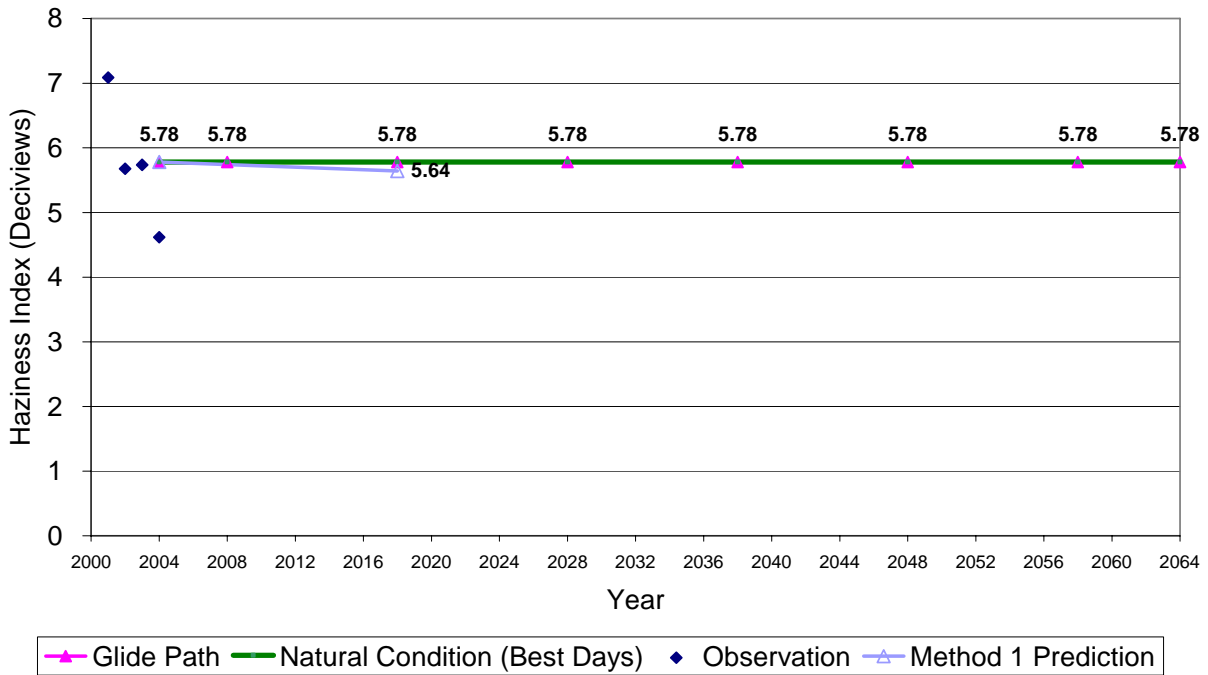


Figure D-9b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Big Bend (BIBE), Texas and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

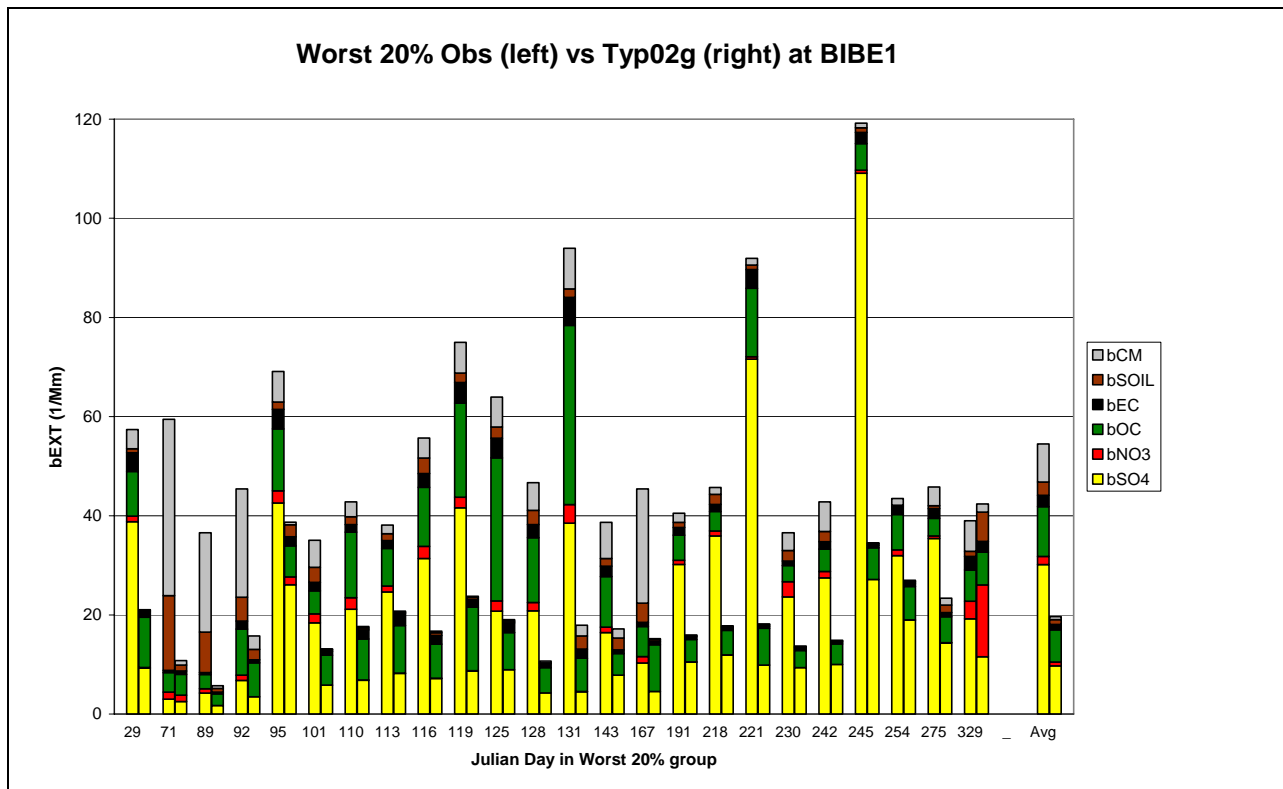


Figure D-9c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Big Bend (BIBE), Texas and Worst 20% (W20%) days in 2002.

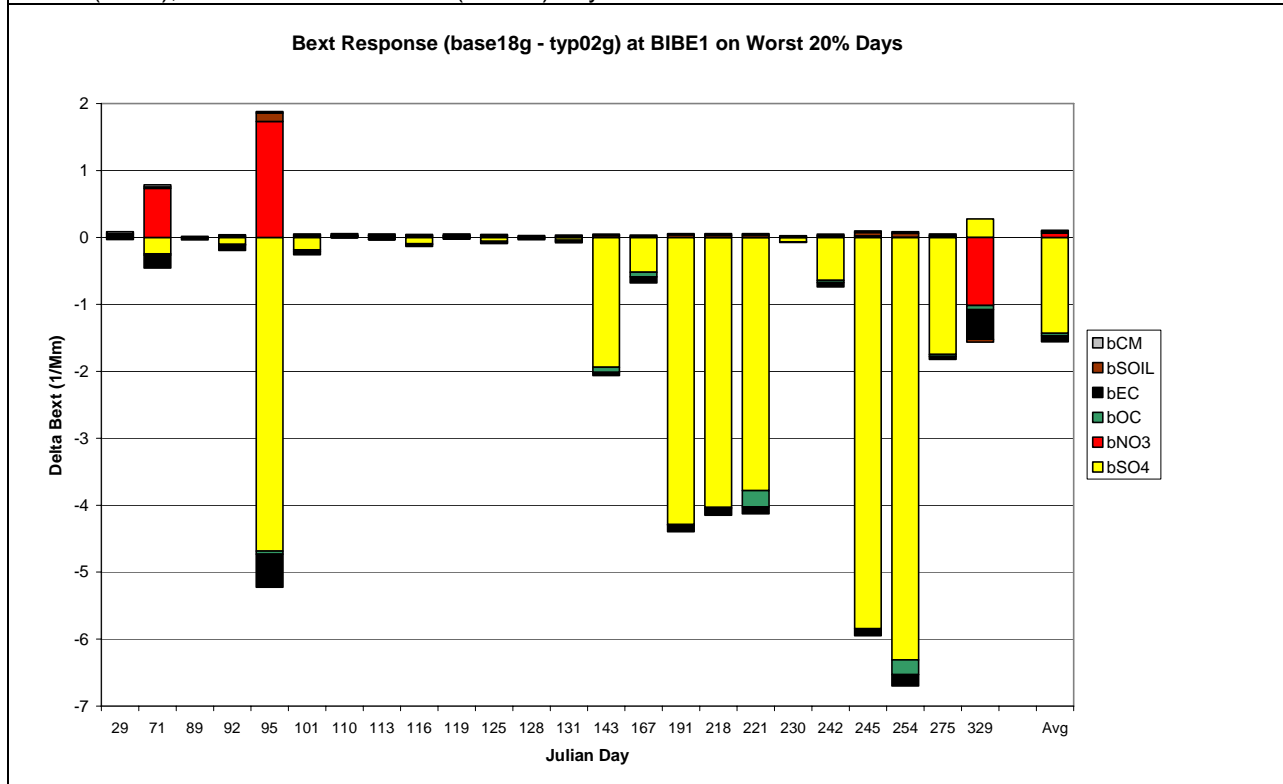


Figure D-9d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Big Bend (BIBE), Texas and Worst 20% (W20%) days in 2002.

Uniform Rate of Reasonable Progress Glide Path Guadalupe Mountains NP - 20% Data Days

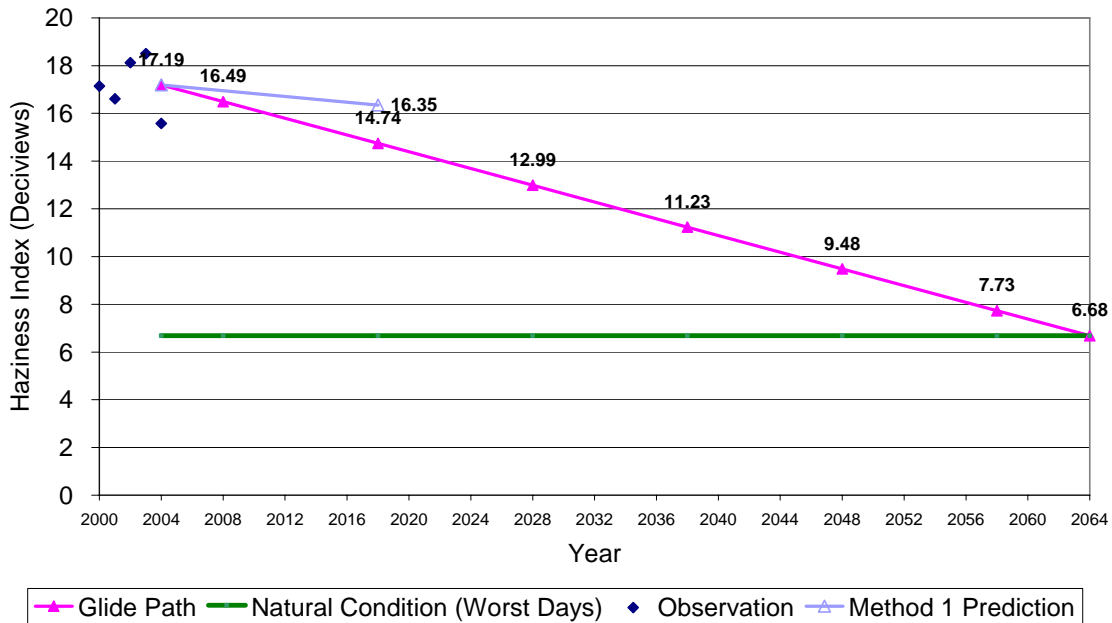


Figure D-10a. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Guadalupe Mountains NP - Best 20% Days

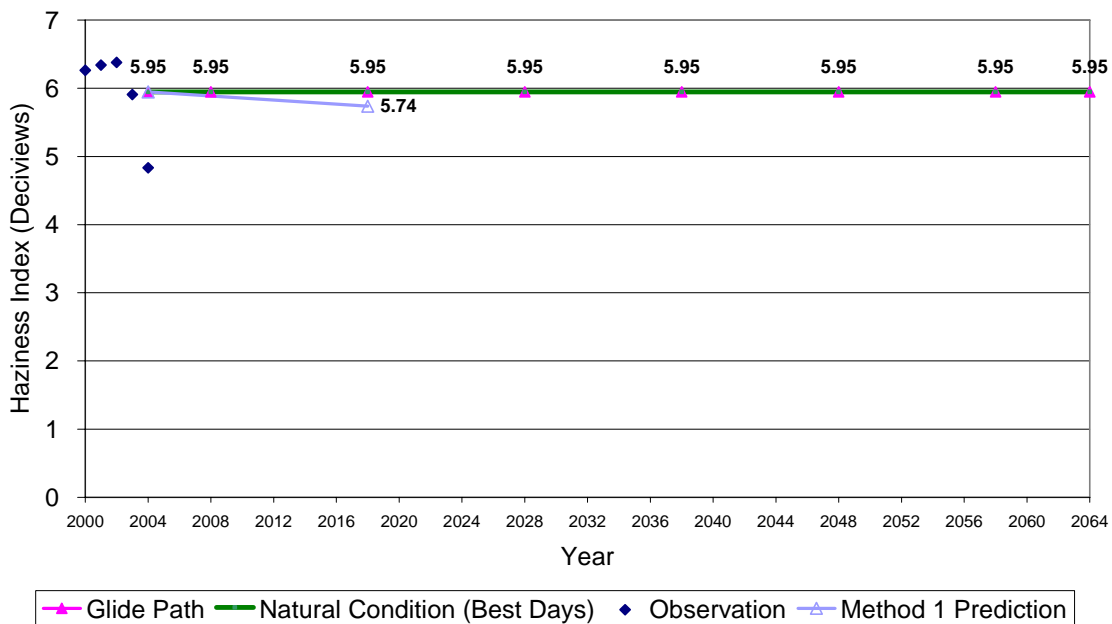


Figure D-10b. 2018 Visibility Projections and 2018 URP Glidepaths in deciview for Guadalupe Mountains (GUMO), Texas and Best 20% (B20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

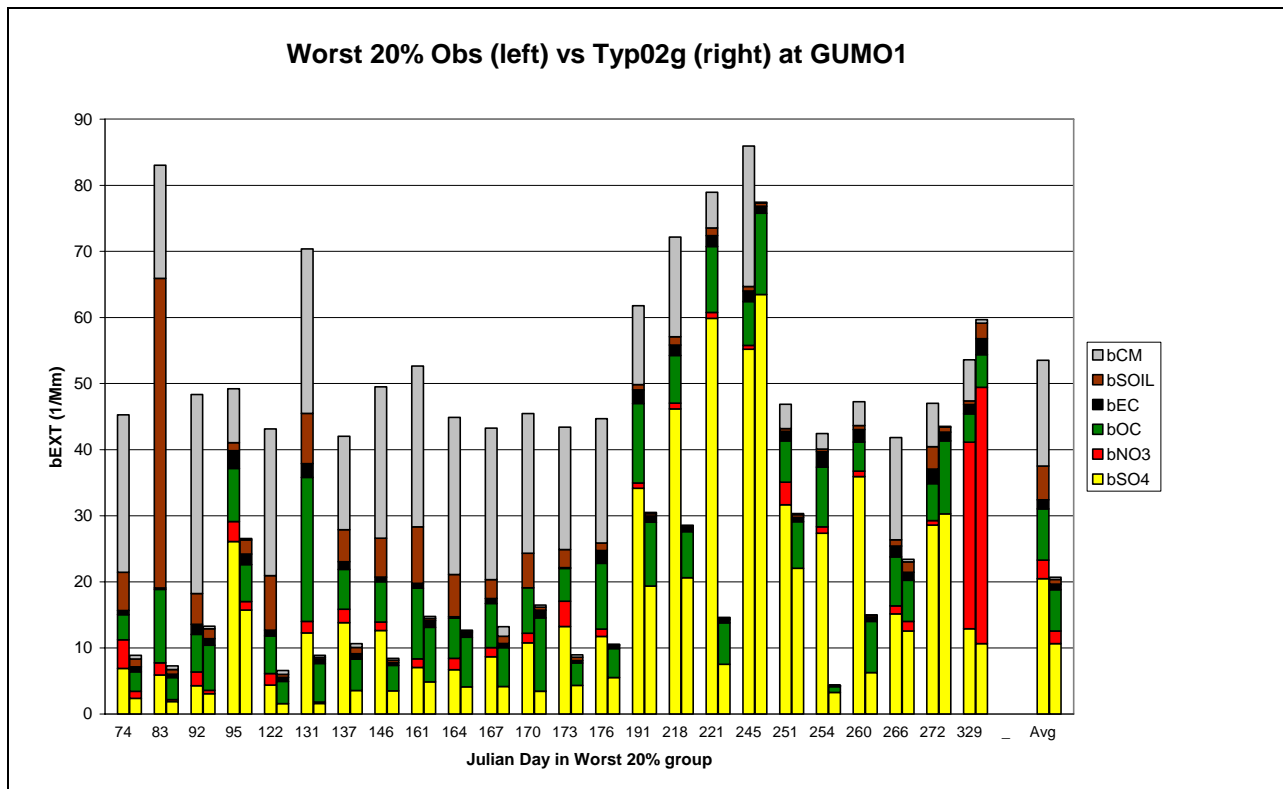


Figure D-10c. Comparison of observed (left) and 2002 Base G modeled (right) daily extinction for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days in 2002.

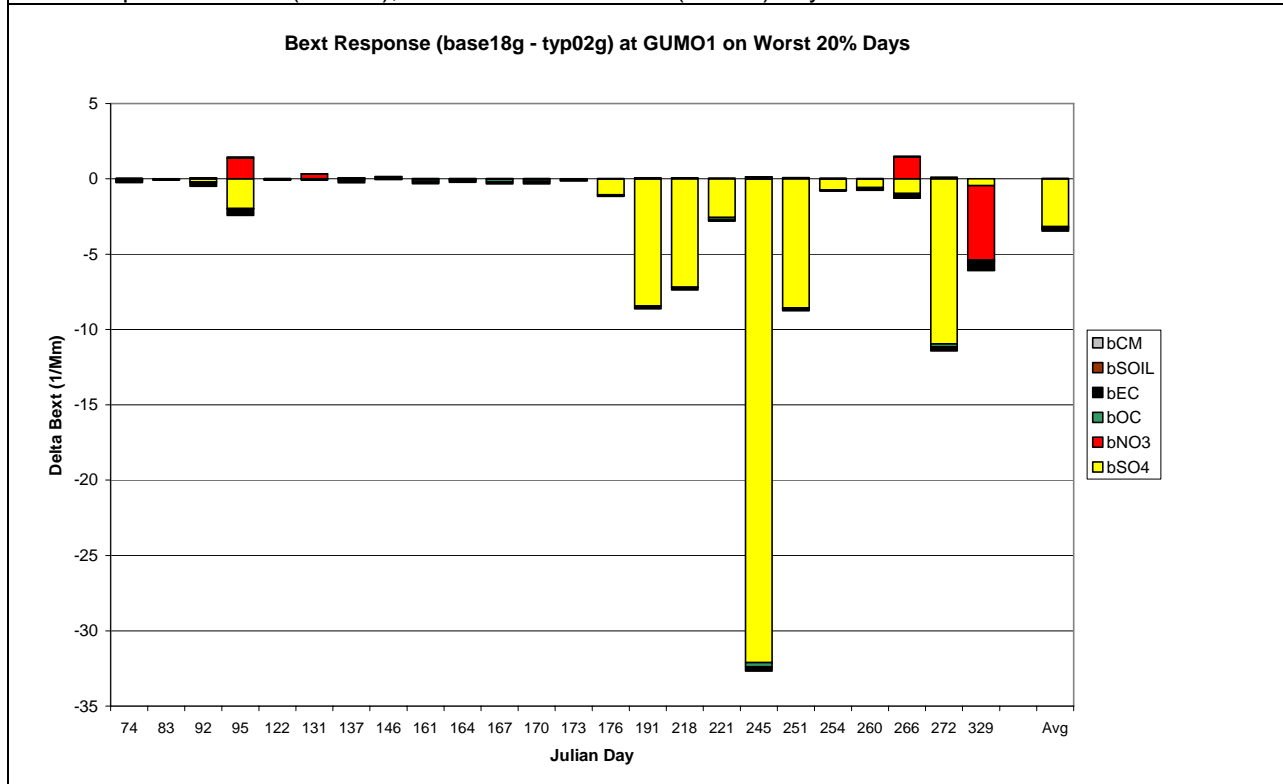


Figure D-10d. Differences in modeled 2002 and 2018 Base G CMAQ results (2018-2002) daily extinction for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days in 2002.

APPENDIX E

CAMx PM Source Apportionment Technology (PSAT) Extinction (Mm^{-1}) Contributions for the 2002 Worst and Best 20 Percent Days at CENRAP Class I Areas

- Figure E-1: Caney Creek Wilderness Area (CACR), Arkansas
- Figure E-2: Upper Buffalo Wilderness Area (UPBU), Arkansas
- Figure E-3: Breton Island Wilderness Area (BRET), Louisiana
- Figure E-4: Boundary Waters Canoe Area Wilderness Area (BOWA),
Minnesota
- Figure E-5: Voyageurs National Park (VOYA), Minnesota
- Figure E-6: Hercules Glade Wilderness Area (HEGL), Missouri
- Figure E-7: Mingo Wilderness Area (MING), Missouri
- Figure E-8: Wichita Mountains Wilderness Area (WIMO), Oklahoma
- Figure E-9: Big Bend National Park (BIBE), Texas
- Figure E-10: Guadalupe Mountains National Park (GUMO), Texas

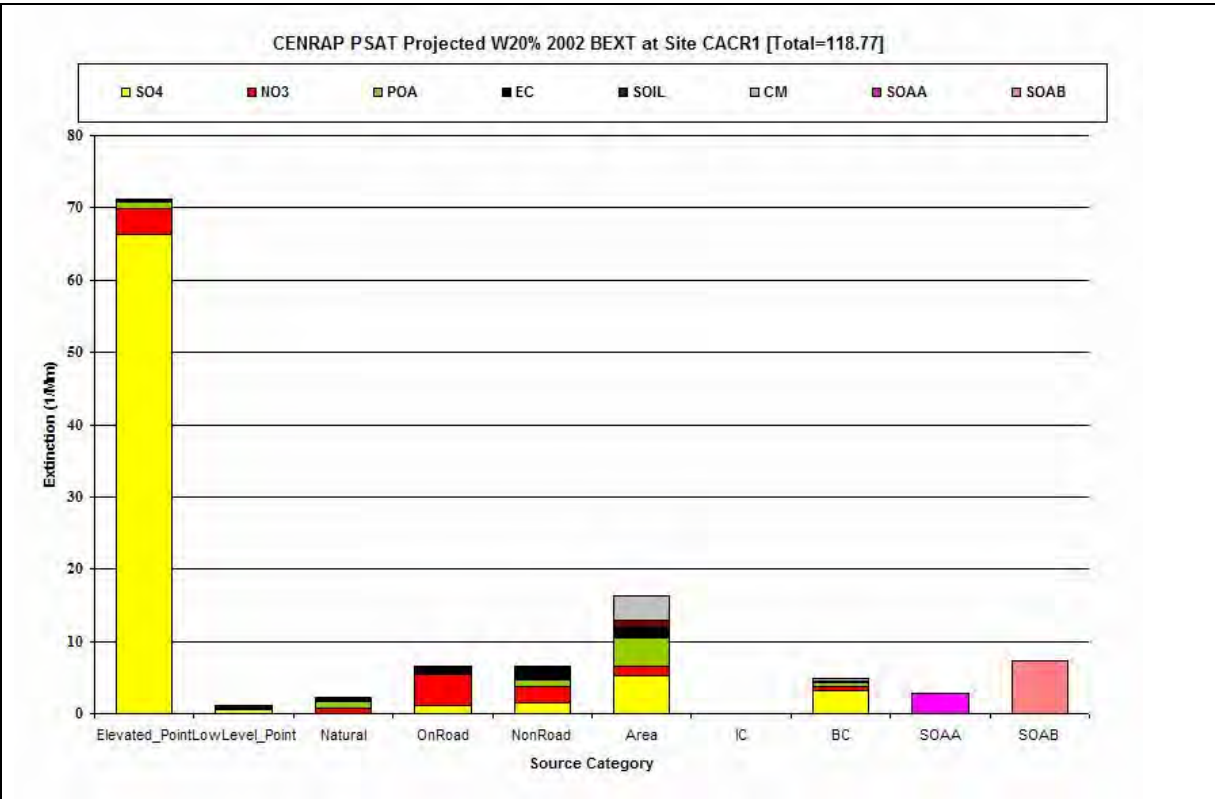


Figure E-1a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas.

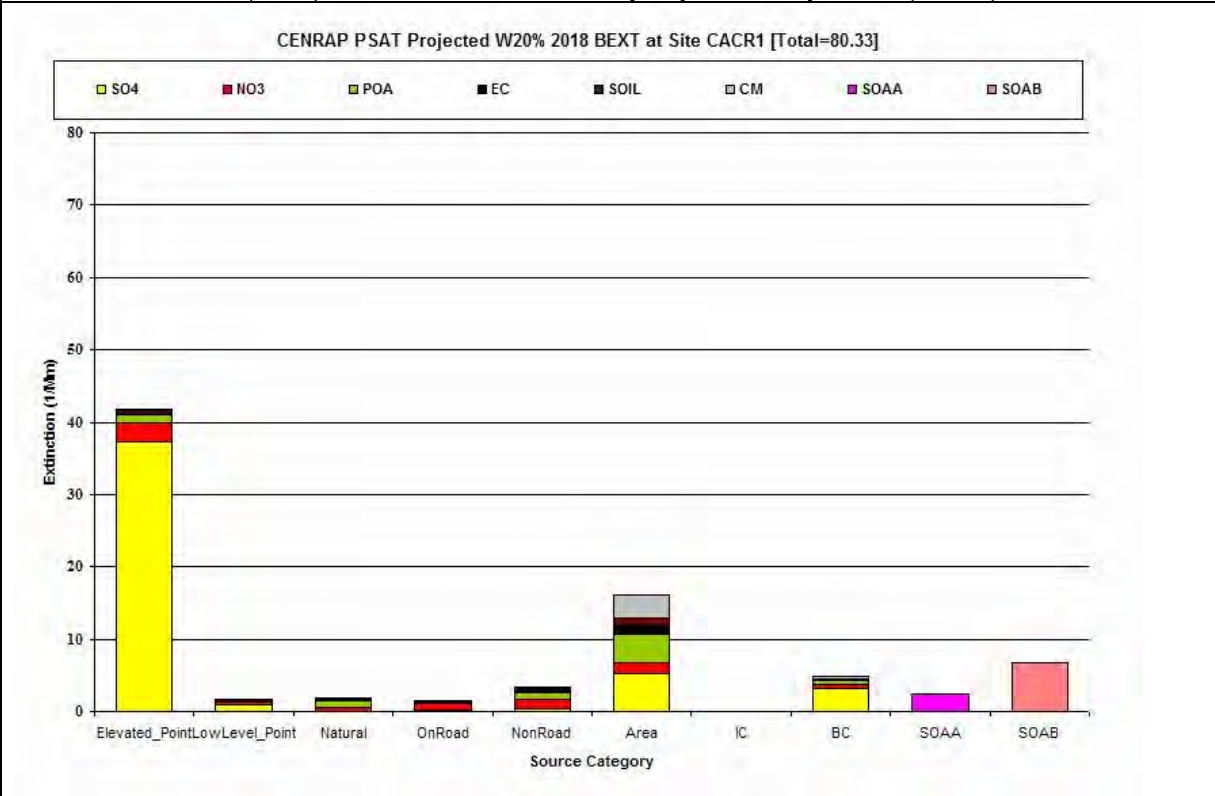


Figure E-1b. PSAT source category by PM species contributions to the average 2018 projected

extinction (Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas.

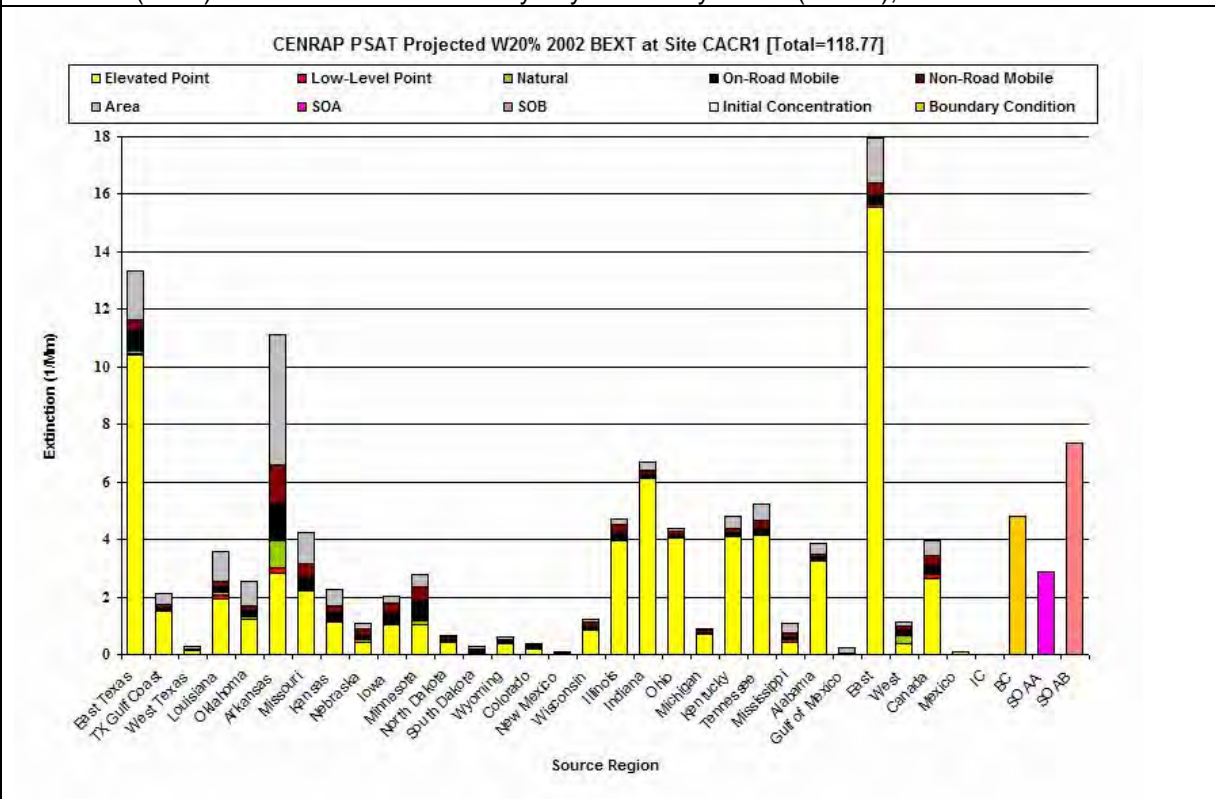


Figure E-1c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas.

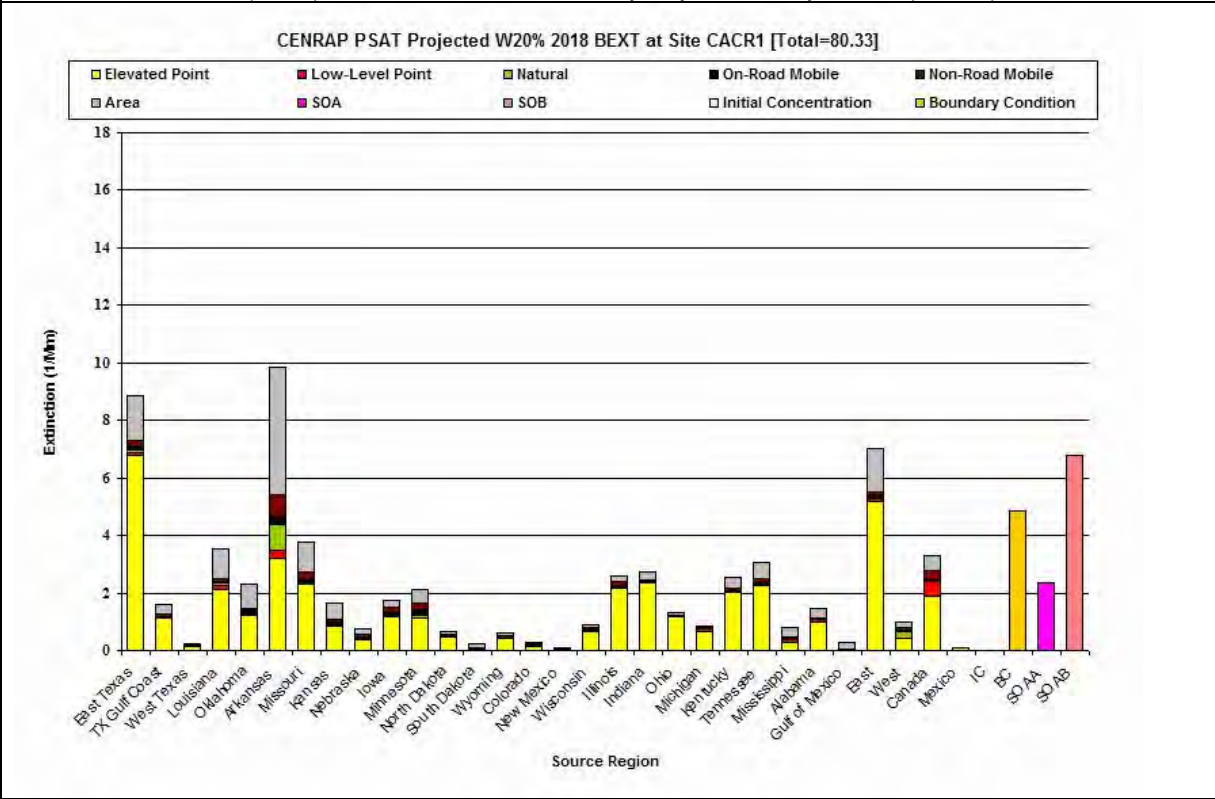


Figure E-1d. PSAT source region by source category contributions to the average 2018 extinction

(Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas.

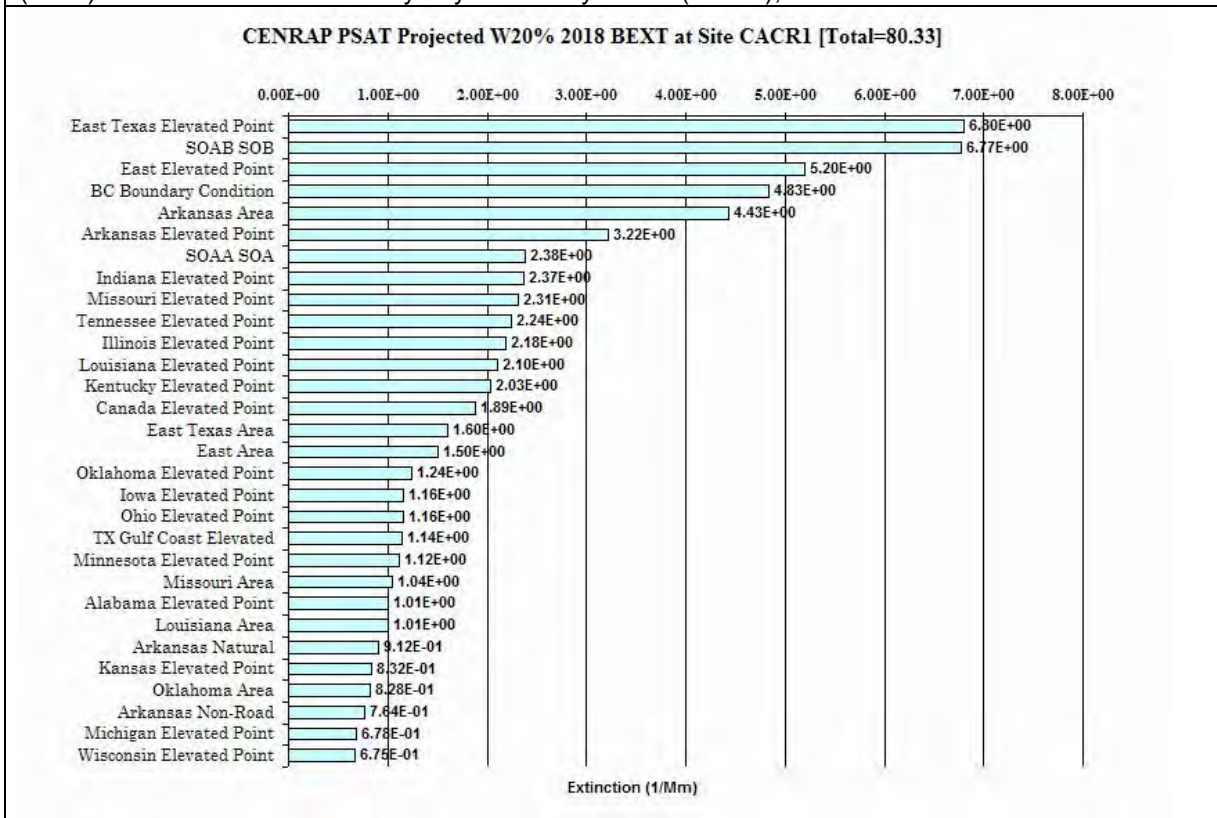


Figure E-1e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas

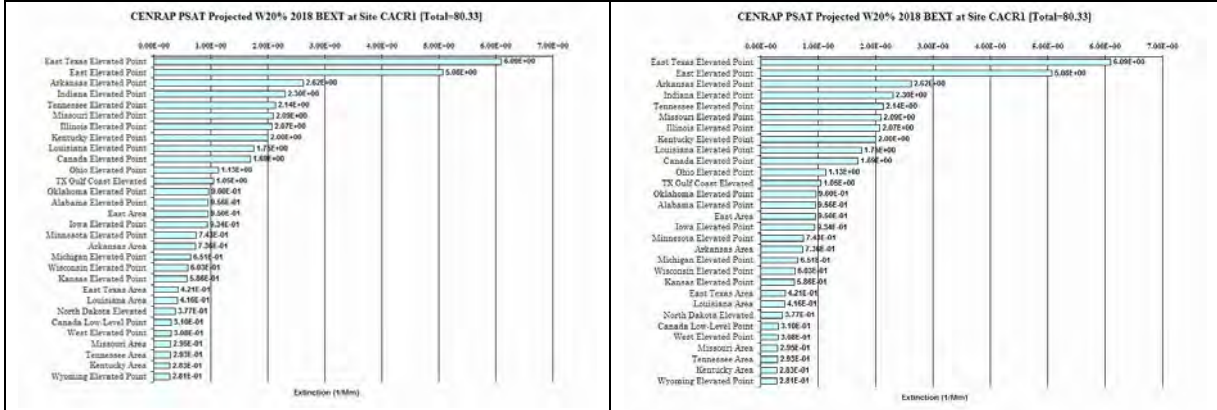


Figure E-1f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Caney Creek (CACR), Arkansas

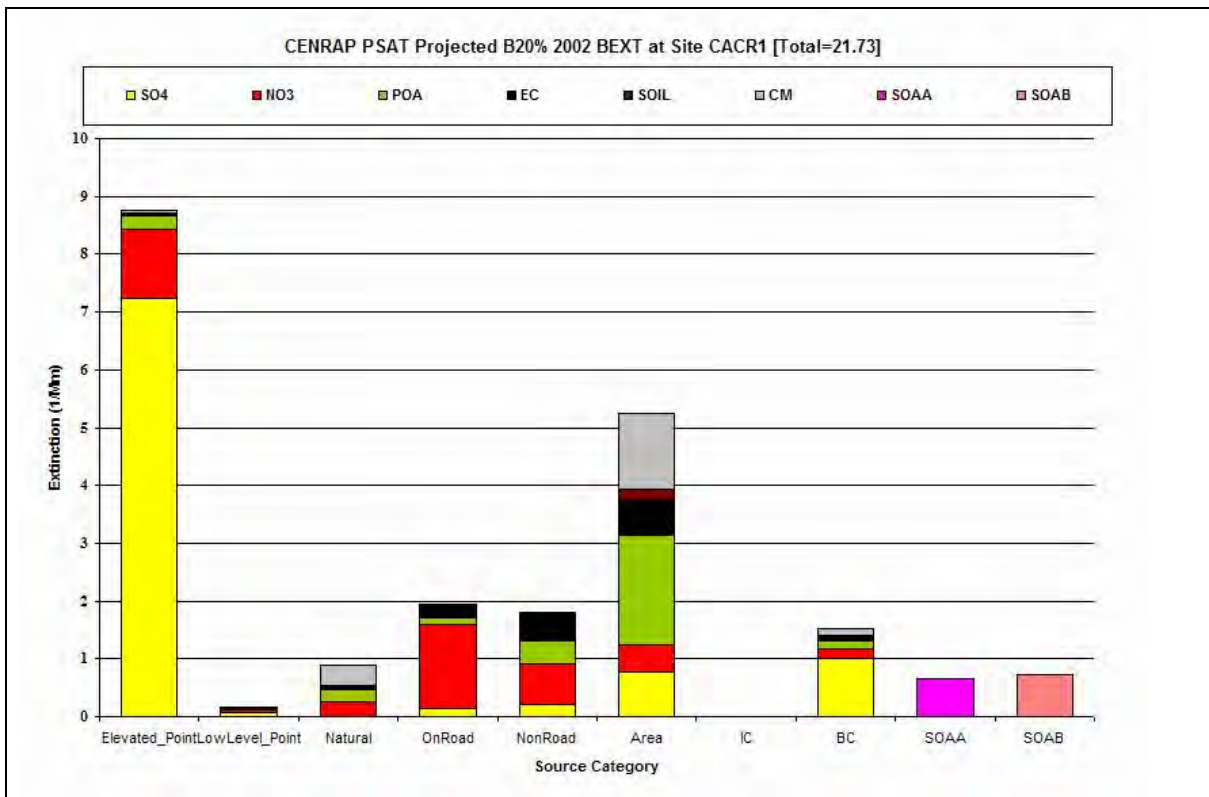


Figure E-1g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Caney Creek (CACR), Arkansas.

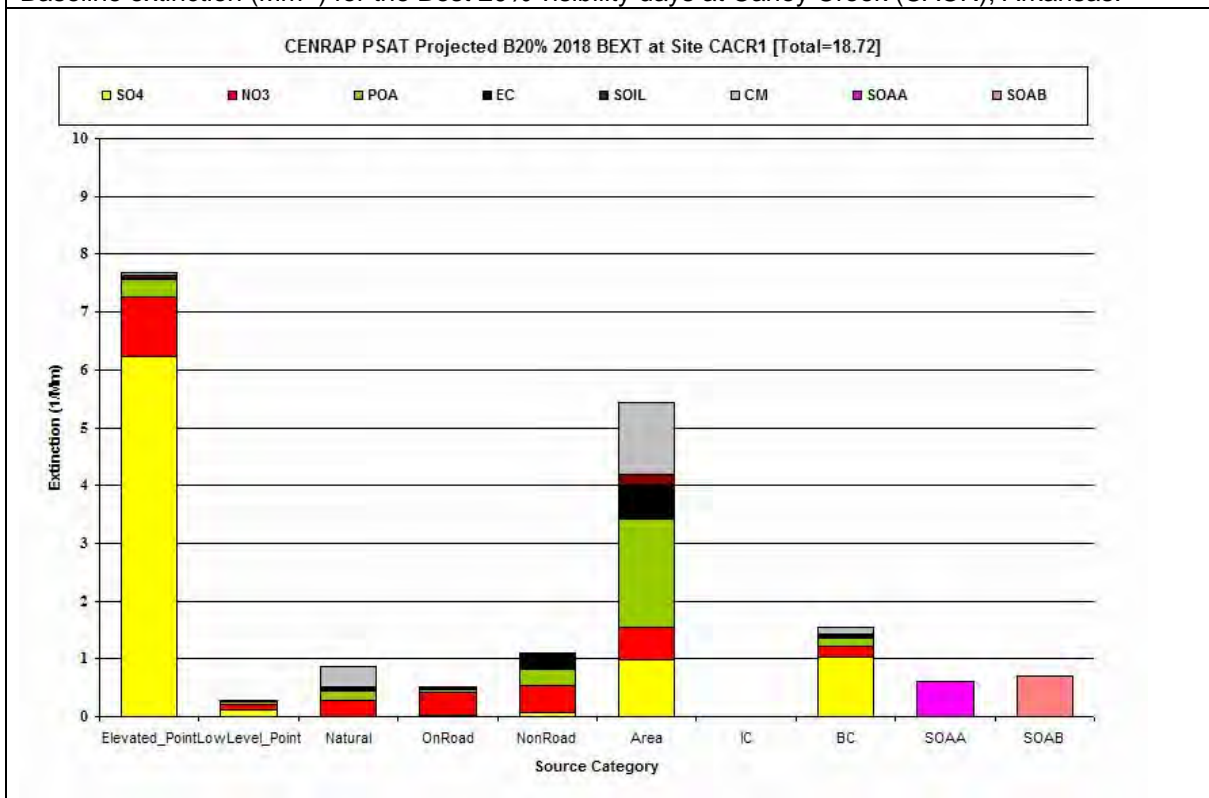


Figure E-1h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Caney Creek (CACR), Arkansas.

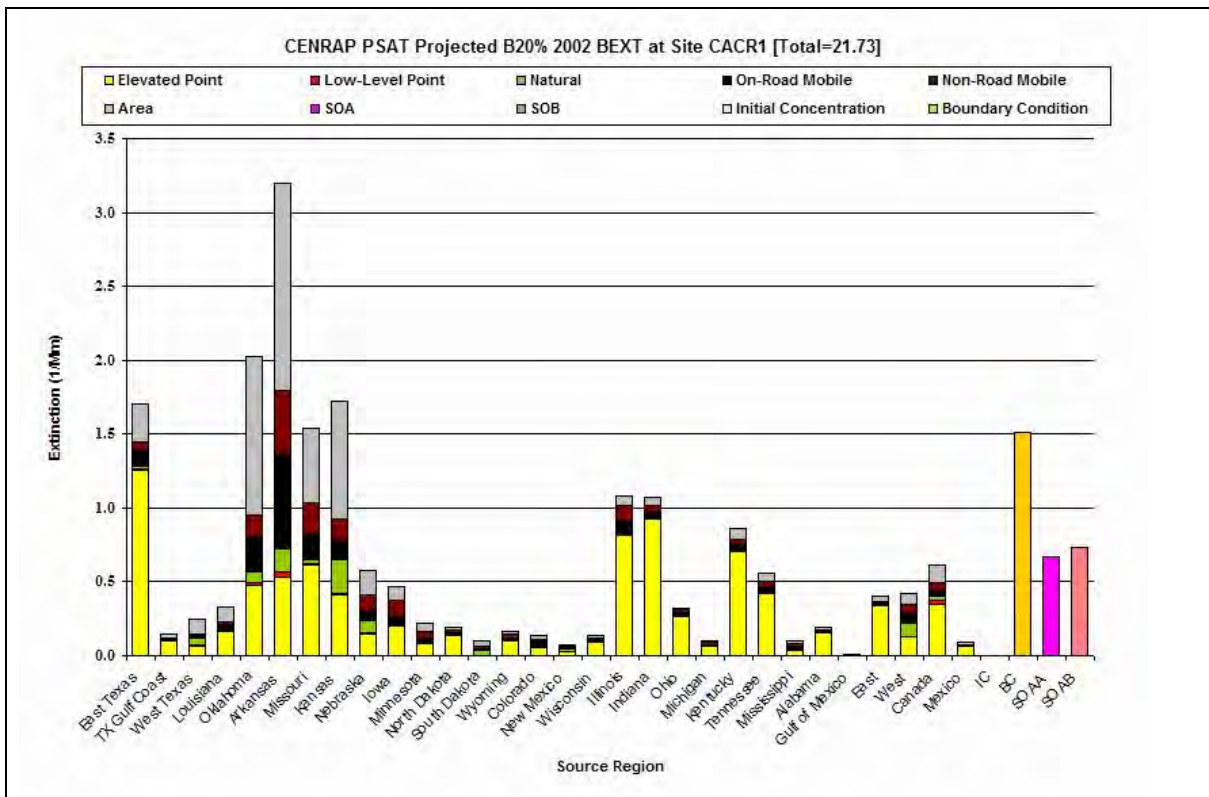


Figure E-1i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Caney Creek (CACR), Arkansas.

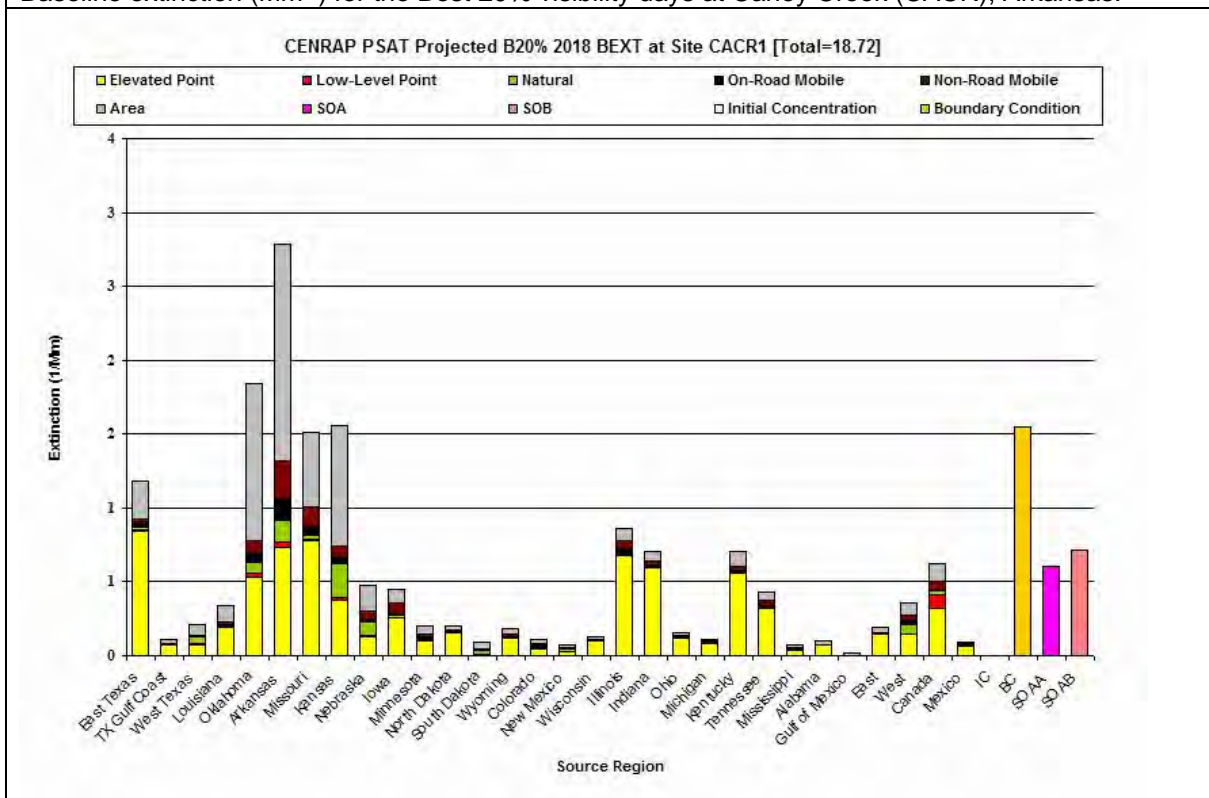


Figure E-1j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Caney Creek (CACR), Arkansas.

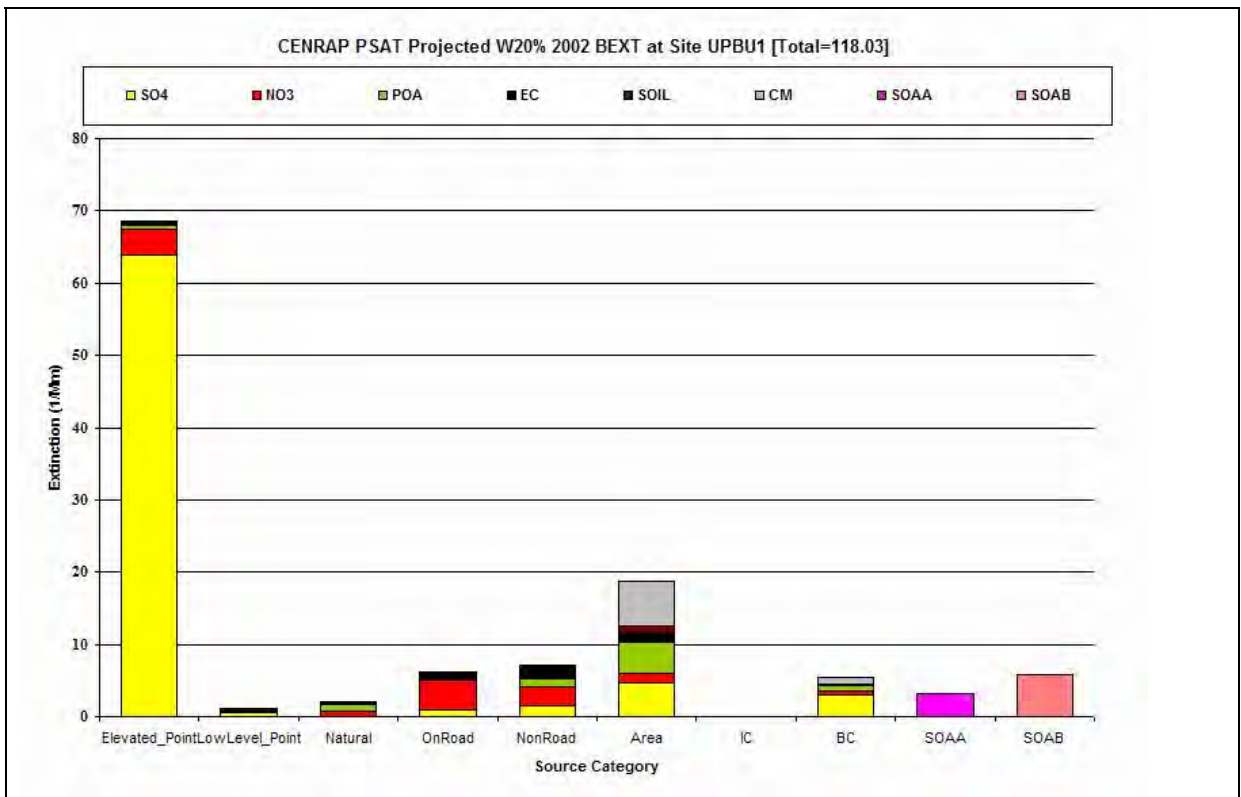


Figure E-2a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

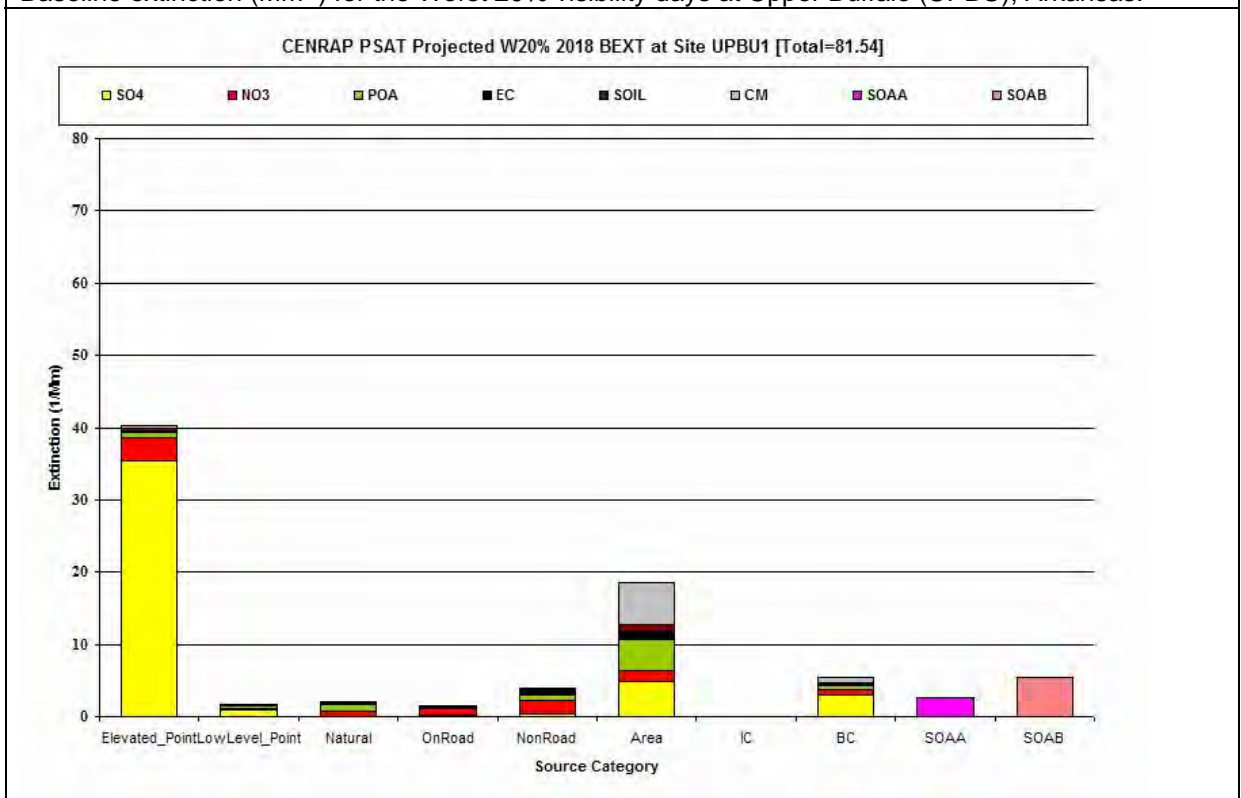


Figure E-2b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

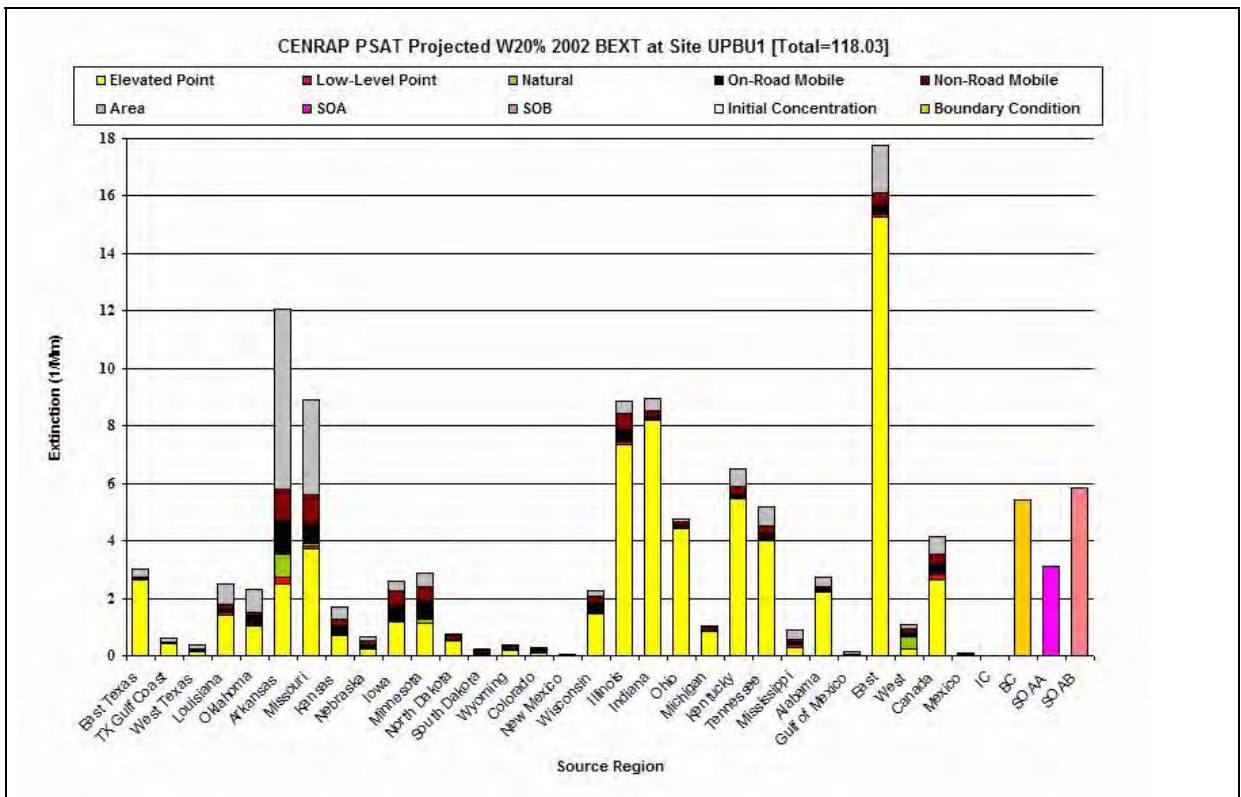


Figure E-2c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

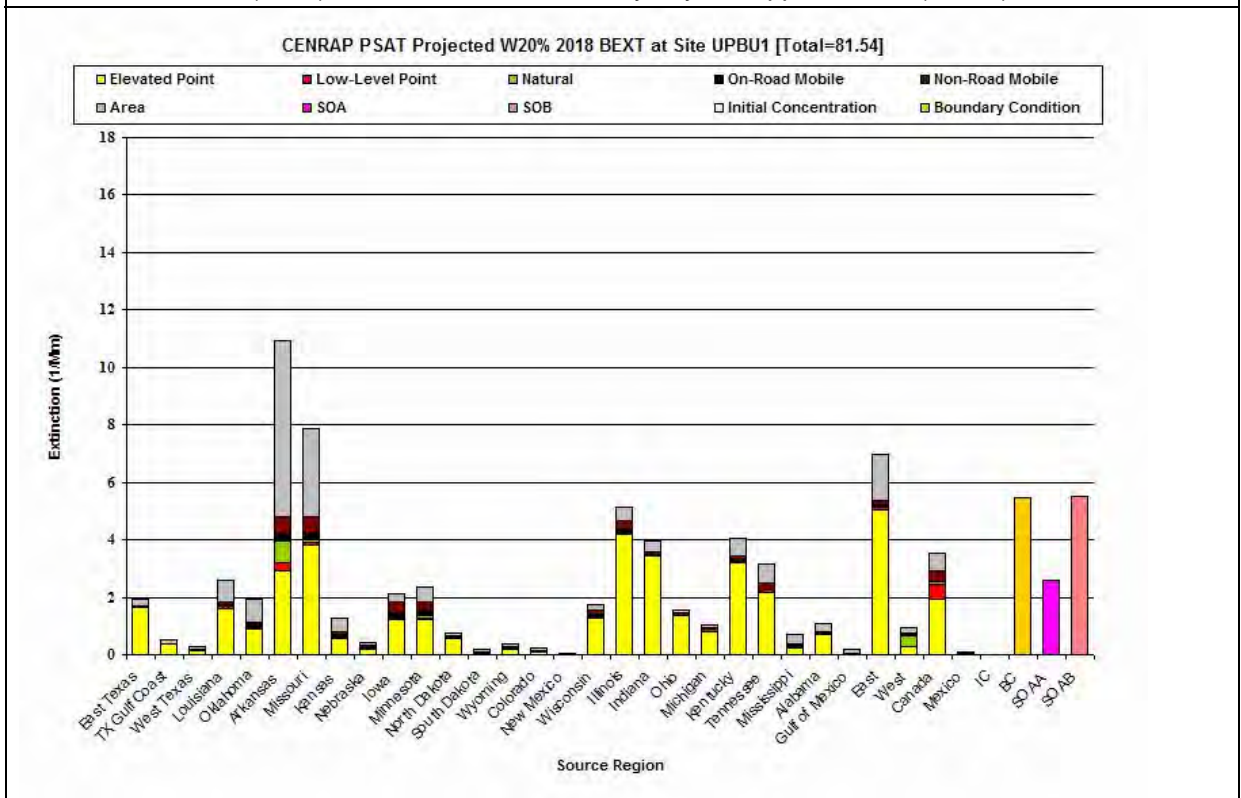


Figure E-2d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

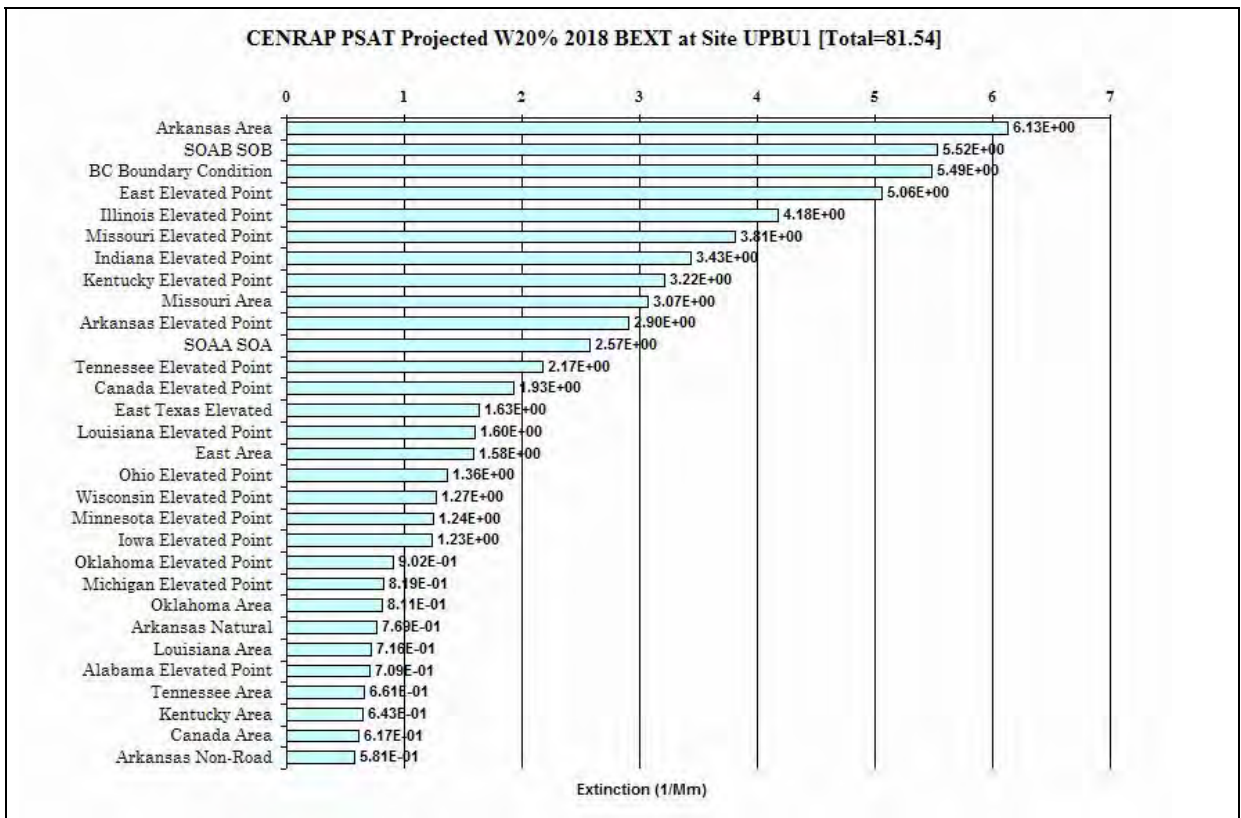


Figure E-2e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

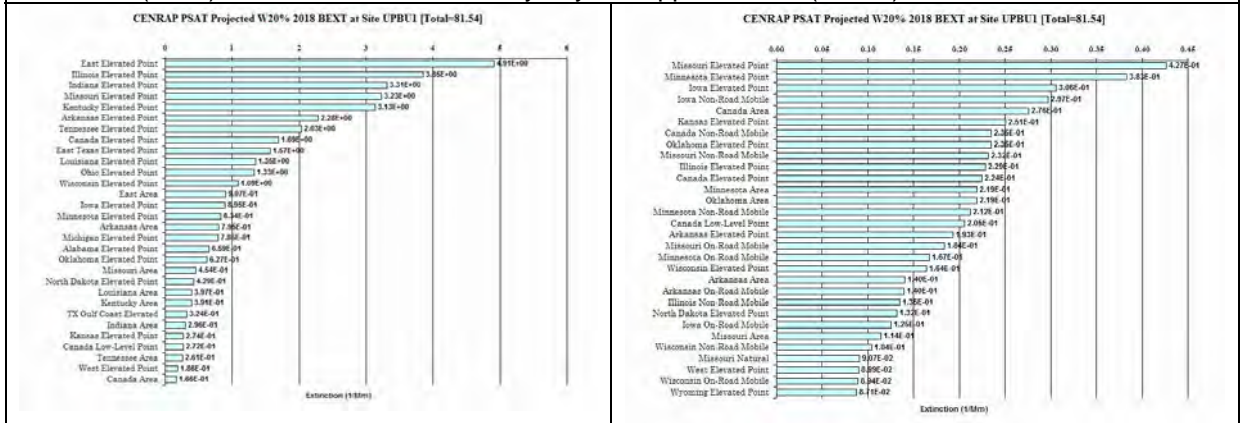


Figure E-2f. Ranked PSAT source region by source category contributions to the average 2018 SO₄ (left) and NO₃ (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Upper Buffalo (UPBU), Arkansas.

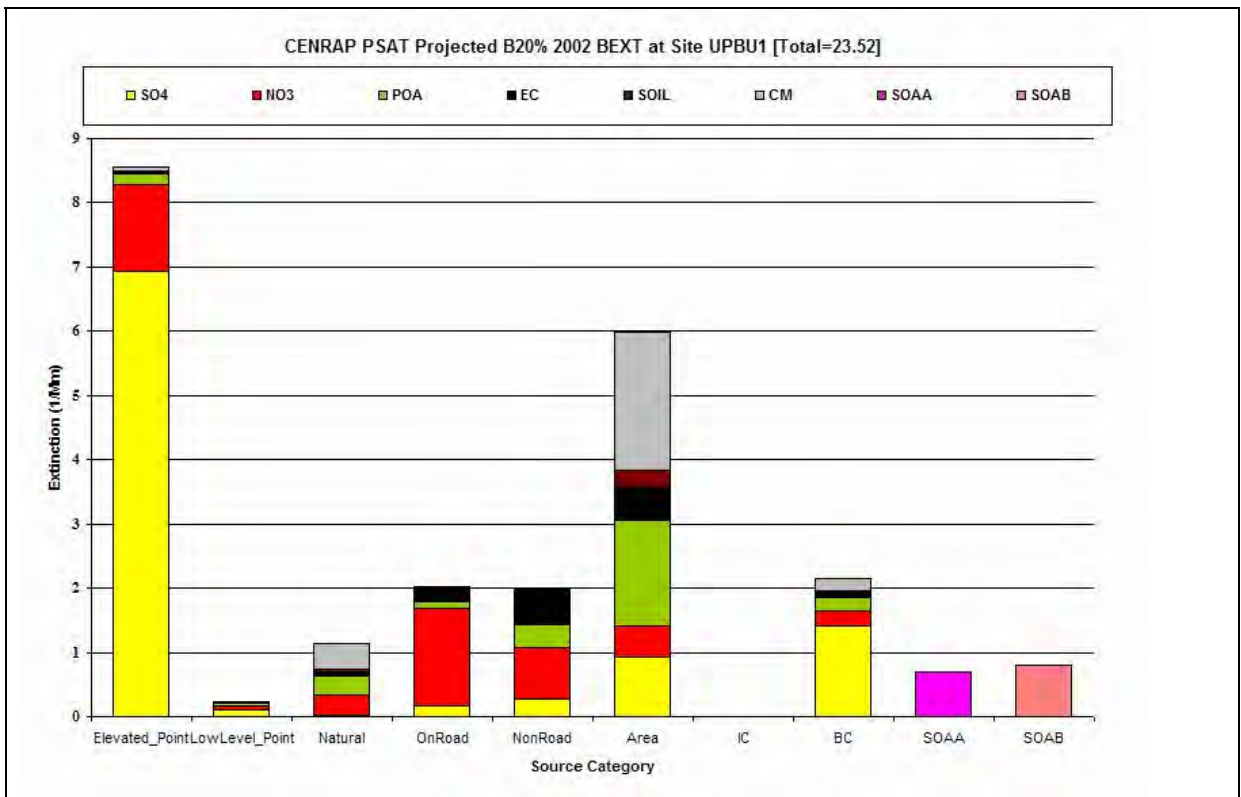


Figure E-2g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Upper Buffalo (UPBU), Arkansas.

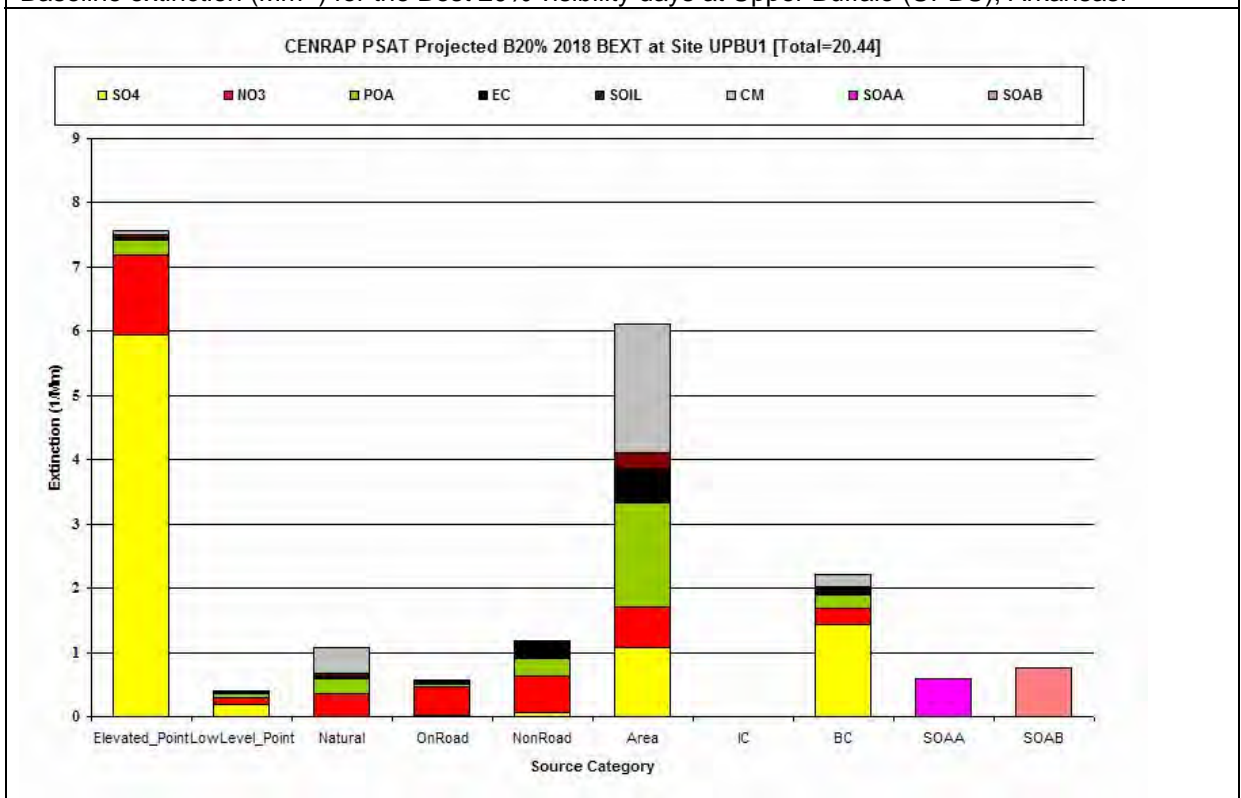


Figure E-2h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Upper Buffalo (UPBU), Arkansas.

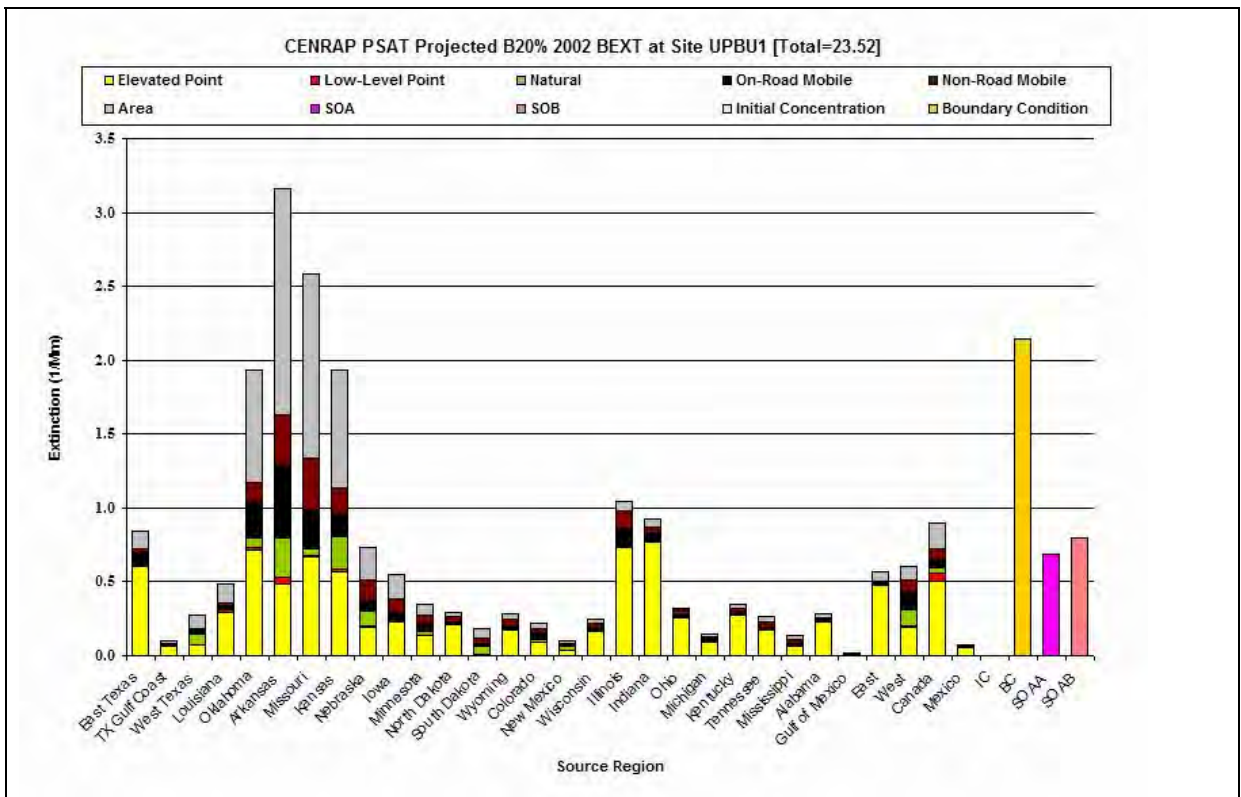


Figure E-2i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Upper Buffalo (UPBU), Arkansas.

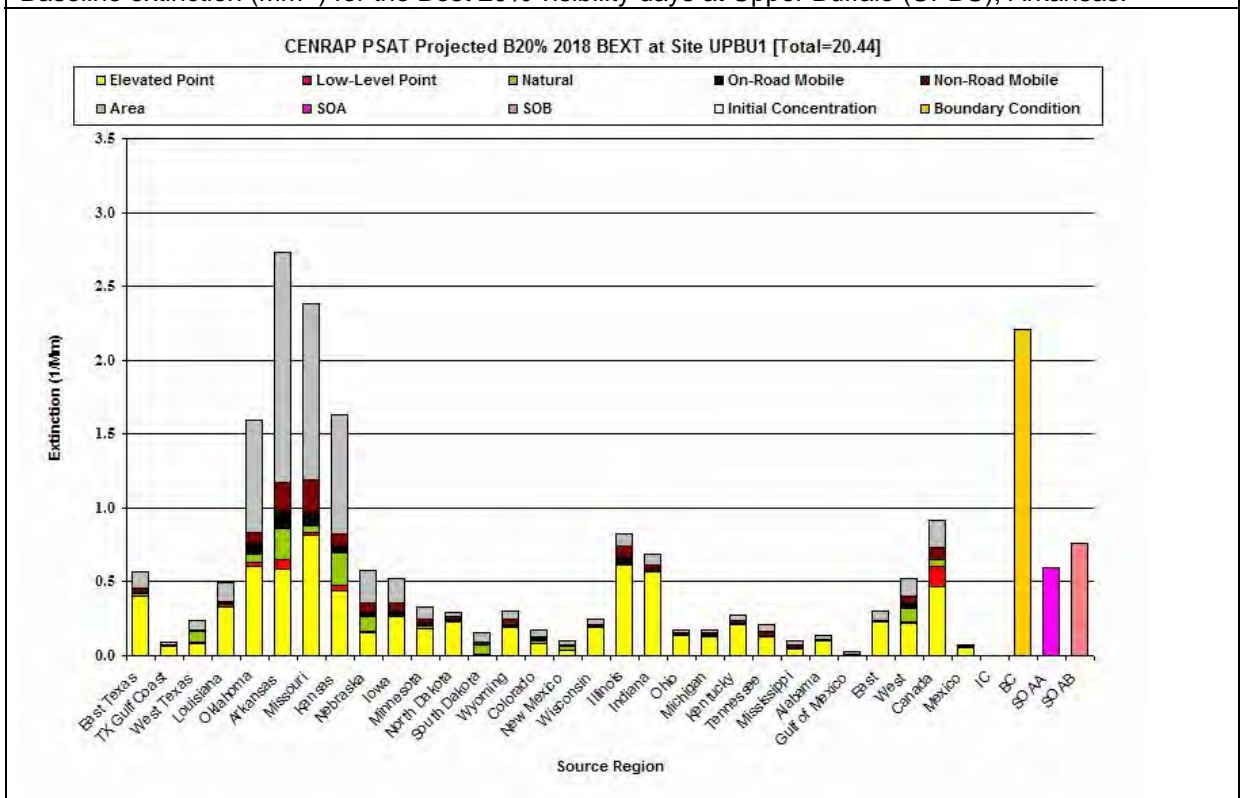


Figure E-2j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Upper Buffalo (UPBU), Arkansas.

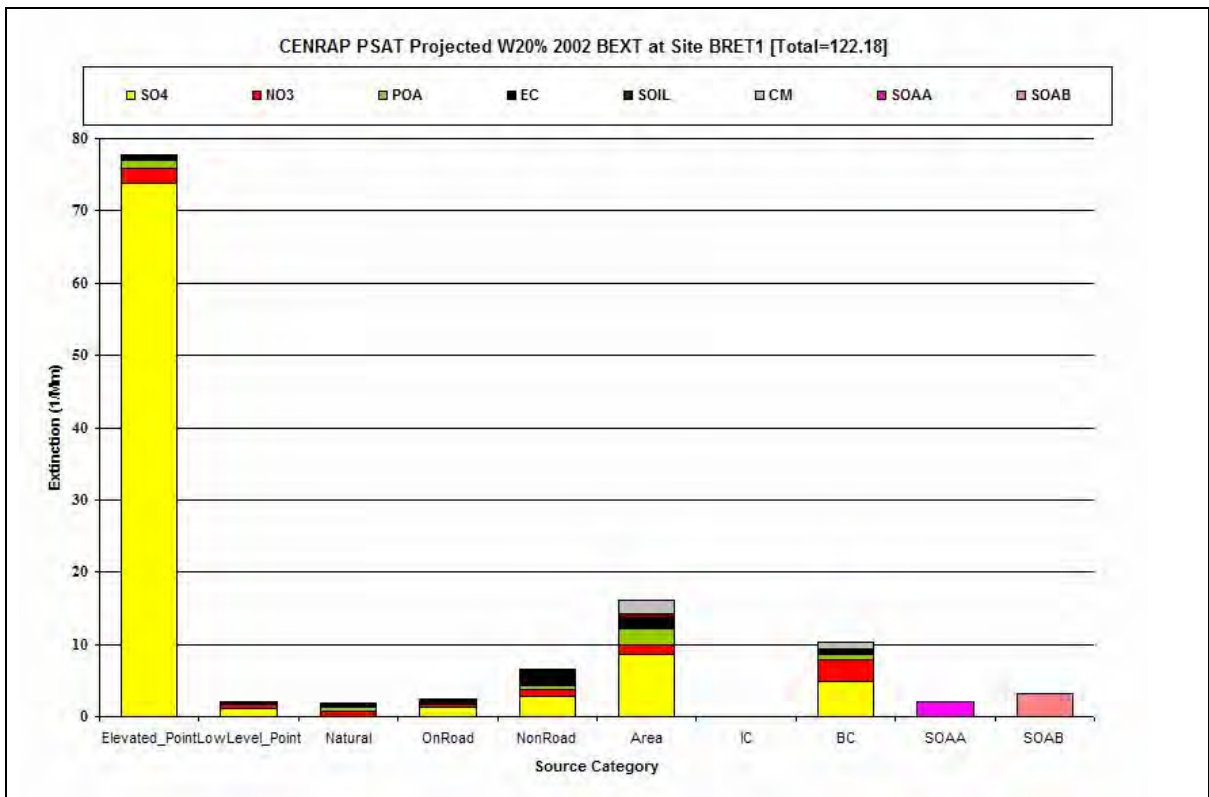


Figure E-3a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

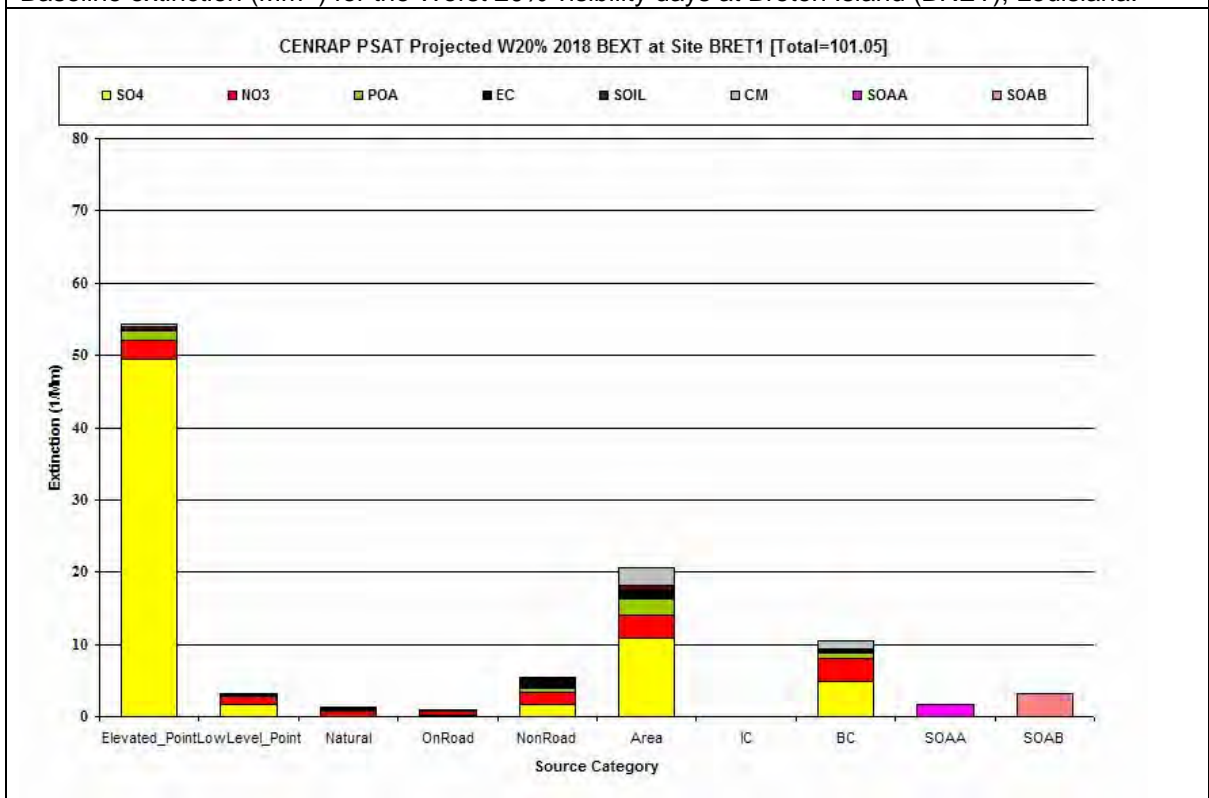


Figure E-3b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

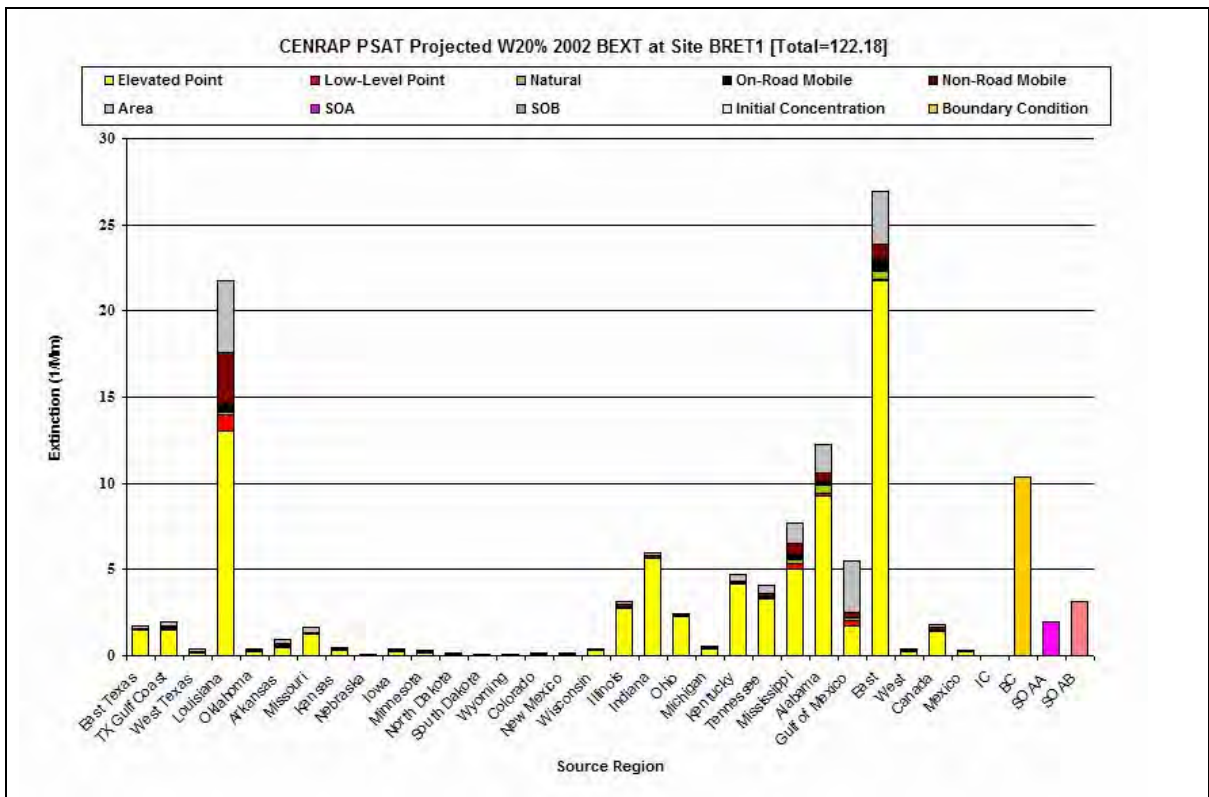


Figure E-3c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

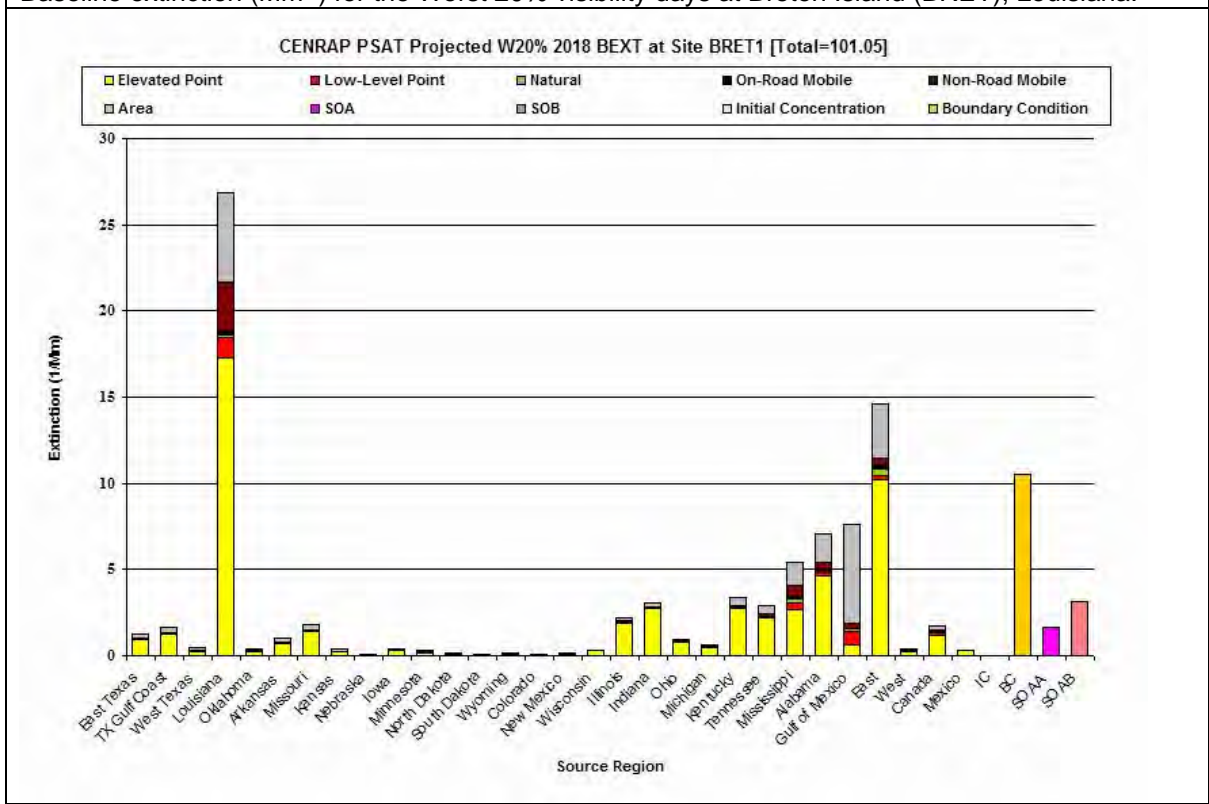


Figure E-3d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

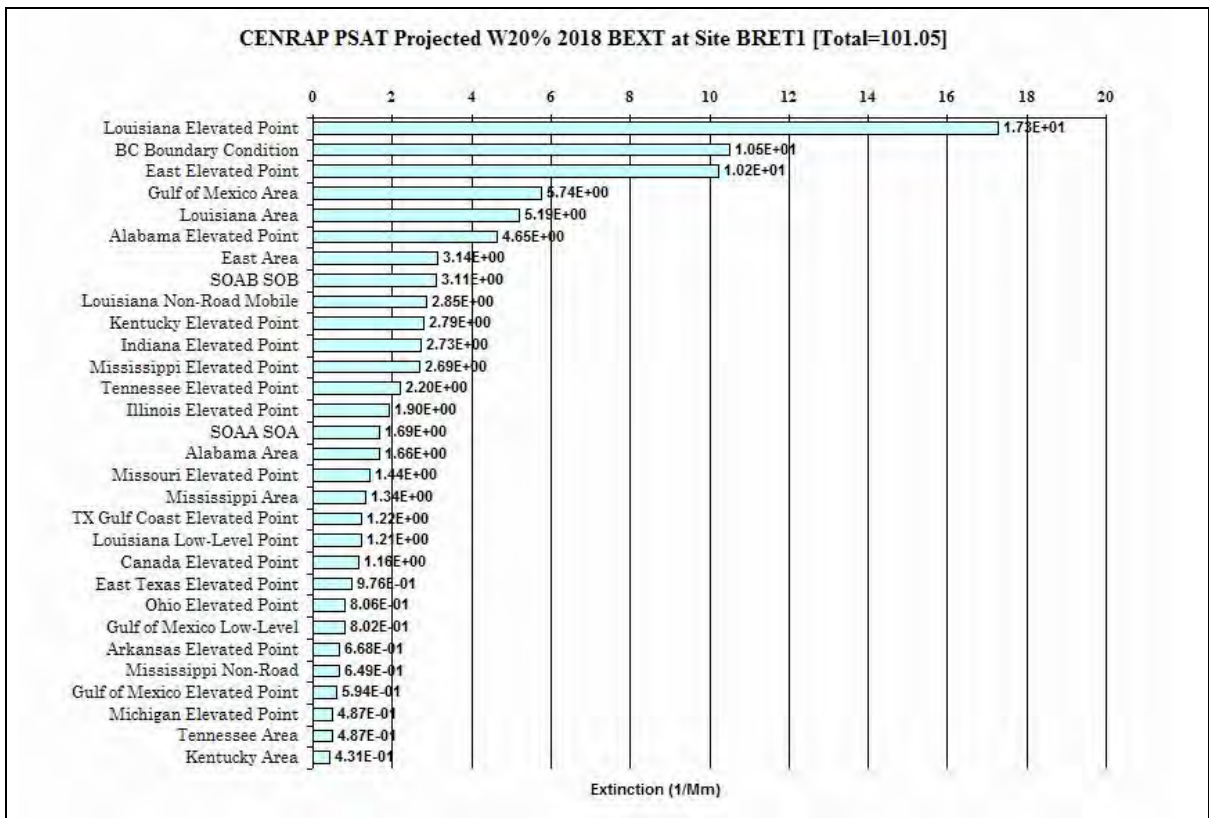


Figure E-3e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

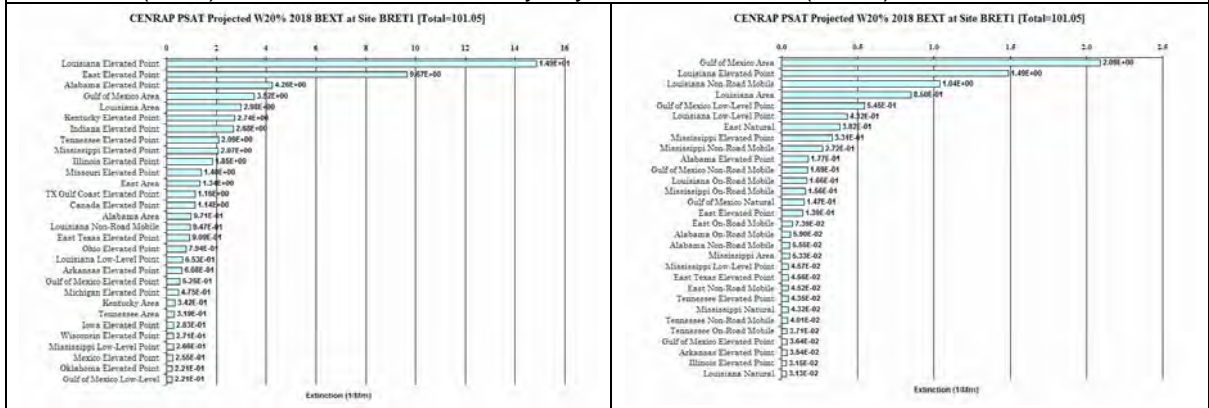


Figure E-3f. Ranked PSAT source region by source category contributions to the average 2018 SO₄ (left) and NO₃ (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Breton Island (BRET), Louisiana.

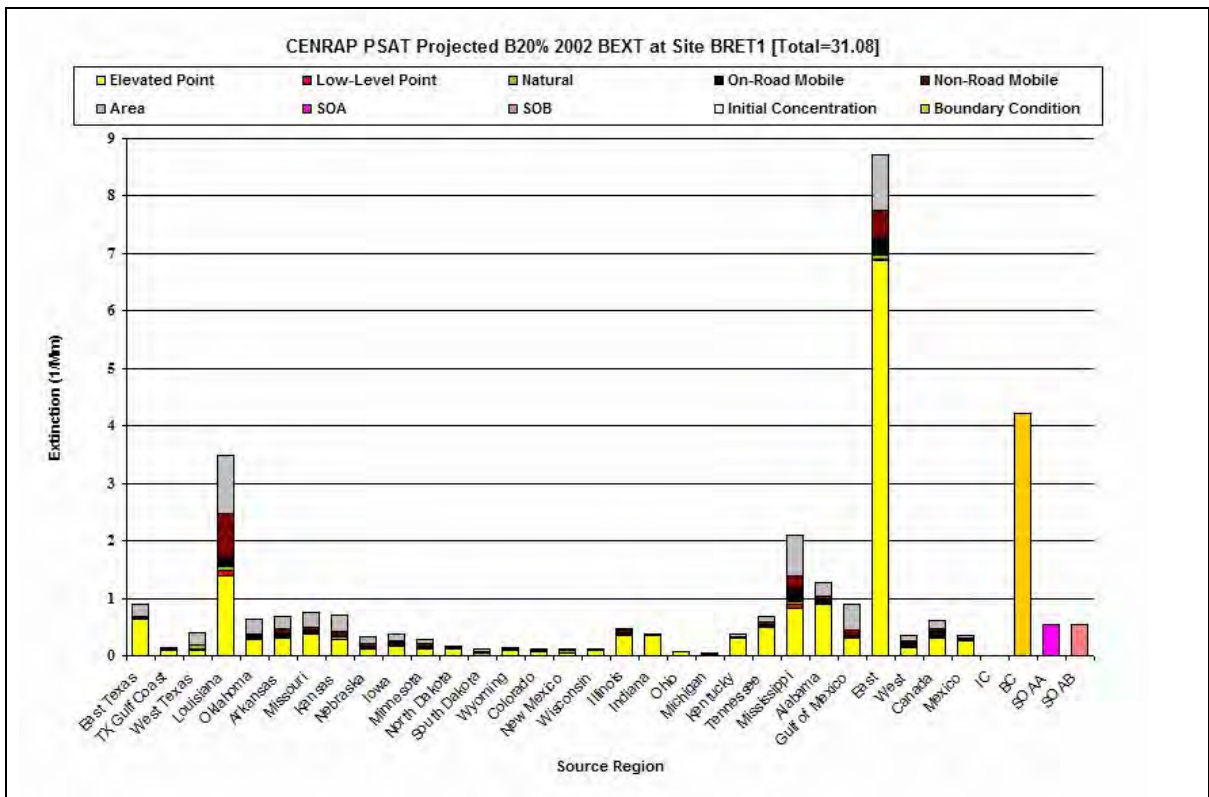


Figure E-3g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Breton Island (BRET), Louisiana.

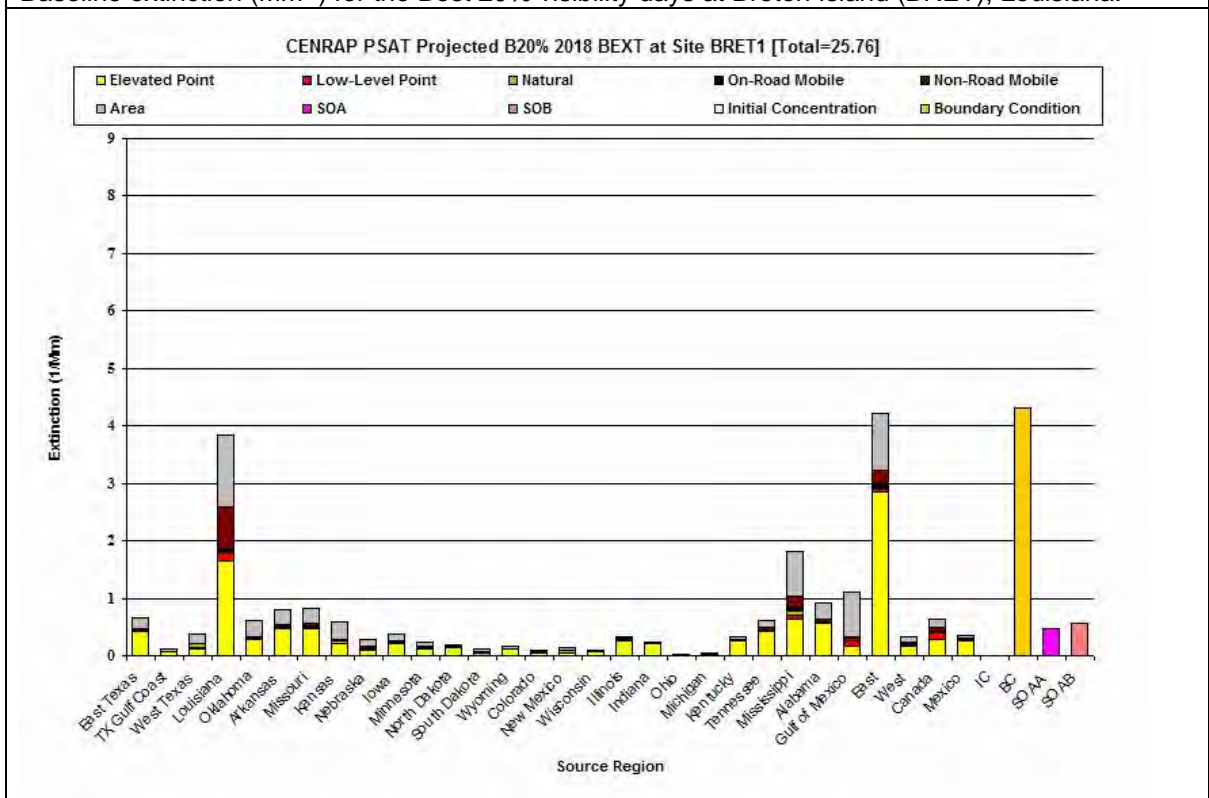


Figure E-3h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Breton Island (BRET), Louisiana.

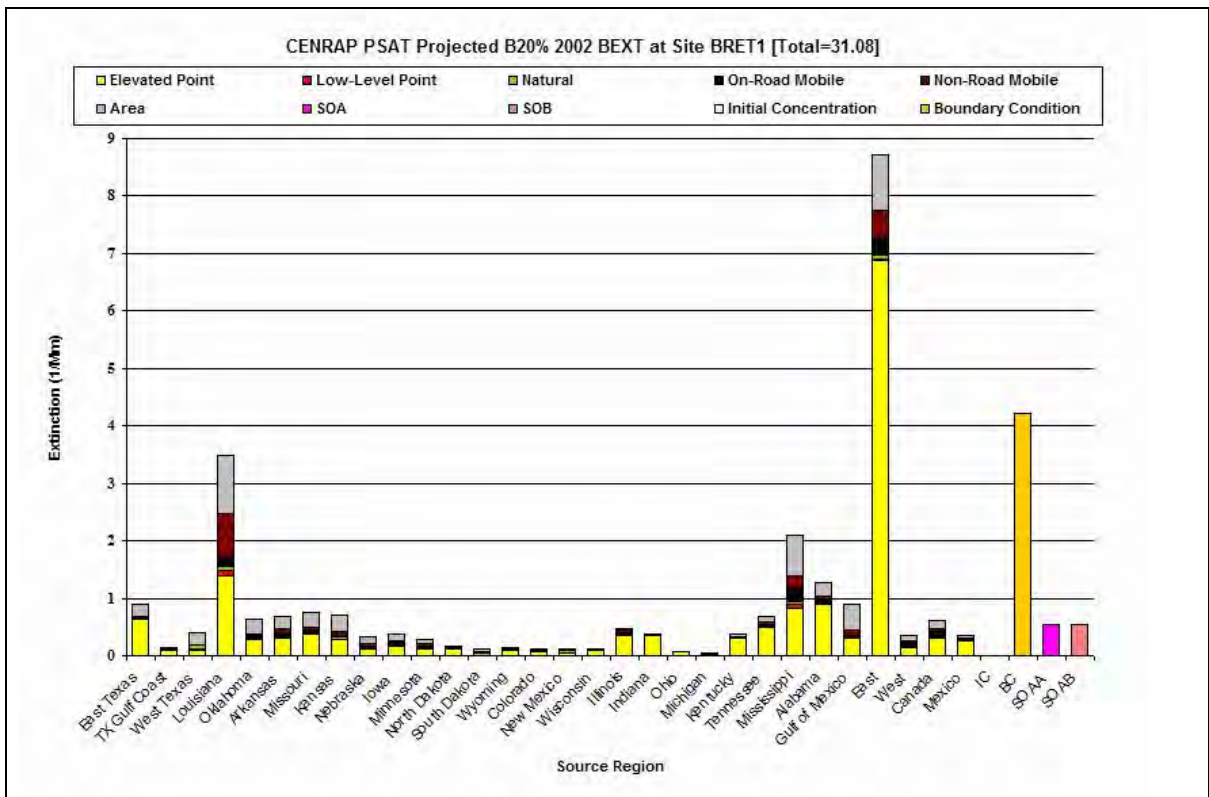


Figure E-3i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Breton Island (BRET), Louisiana.

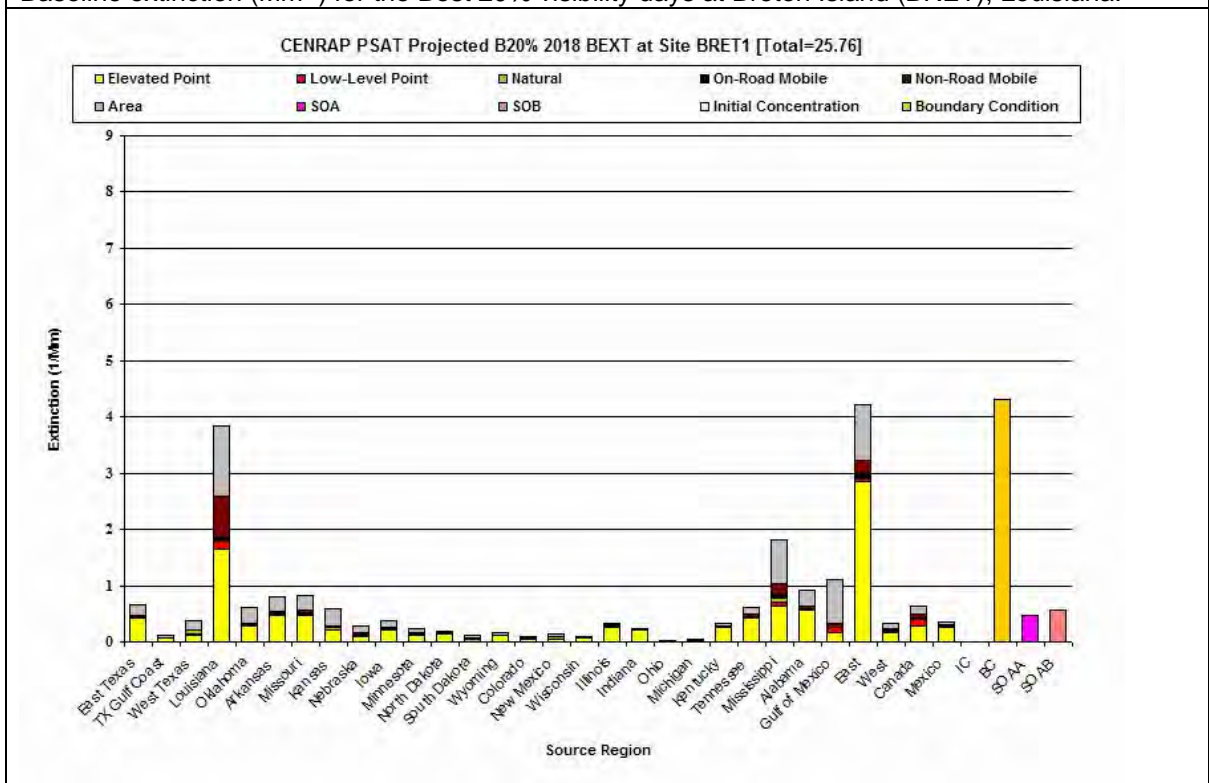


Figure E-3j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Breton Island (BRET), Louisiana.

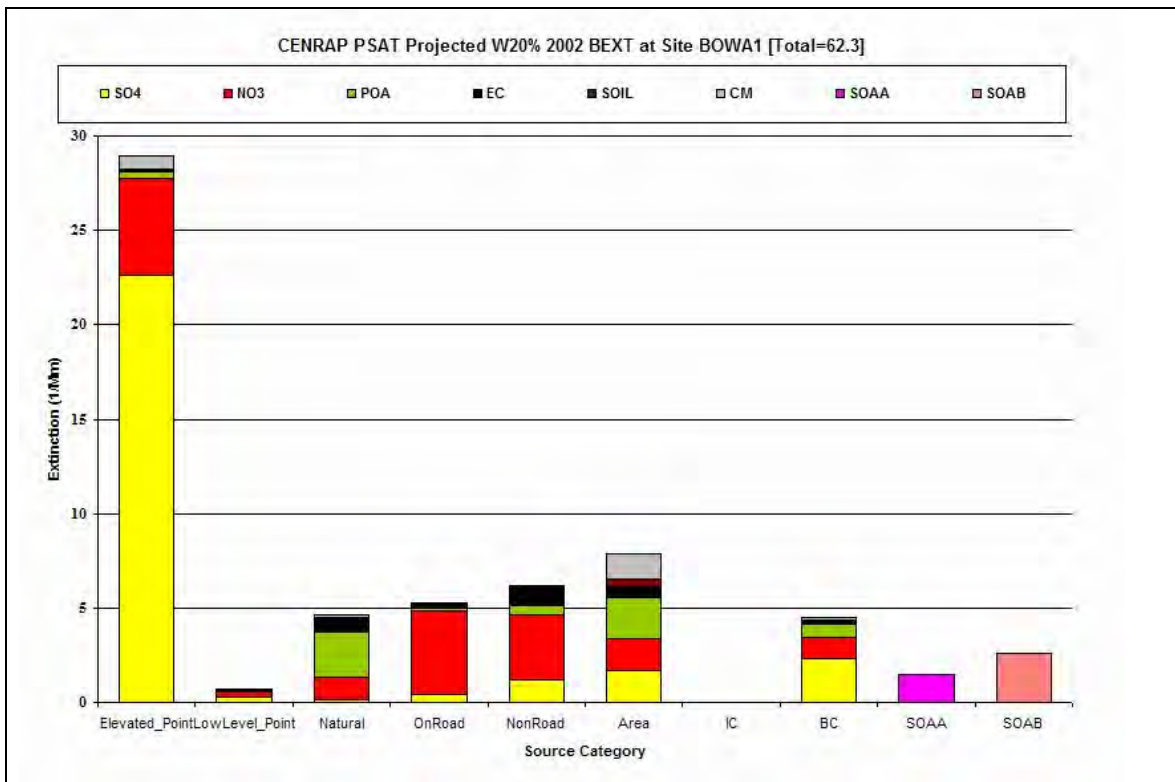


Figure E-4a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

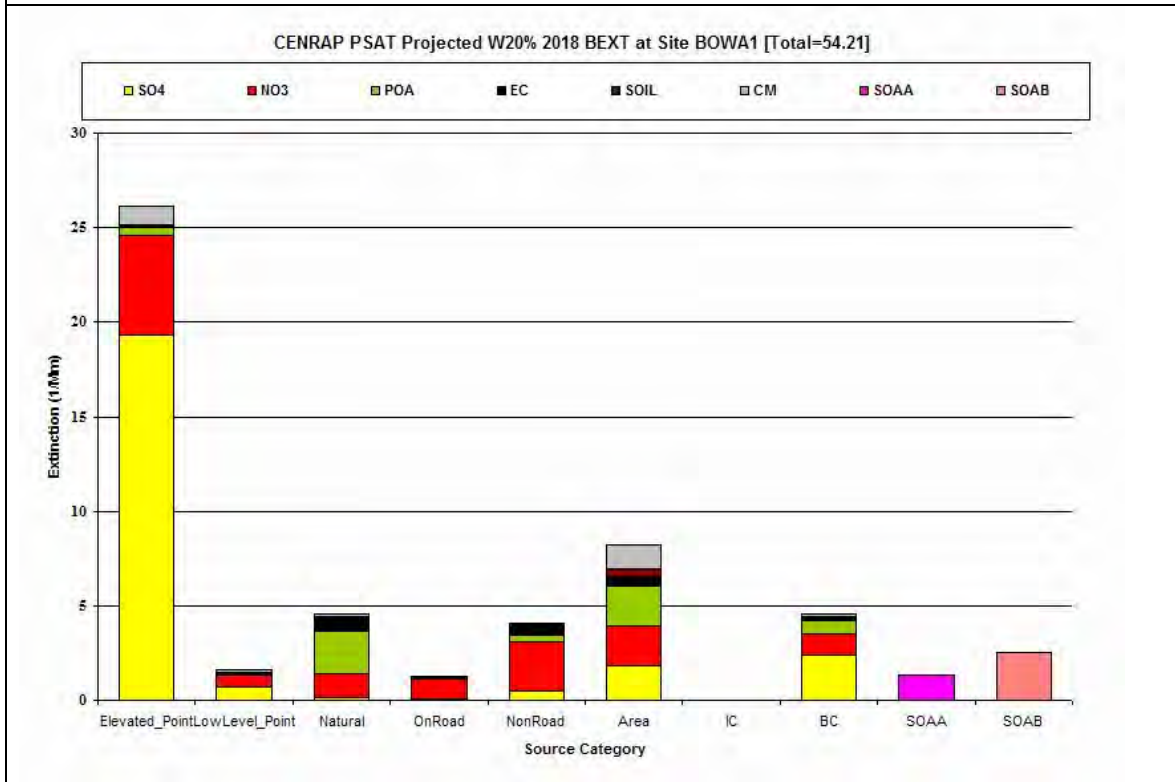


Figure E-4b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

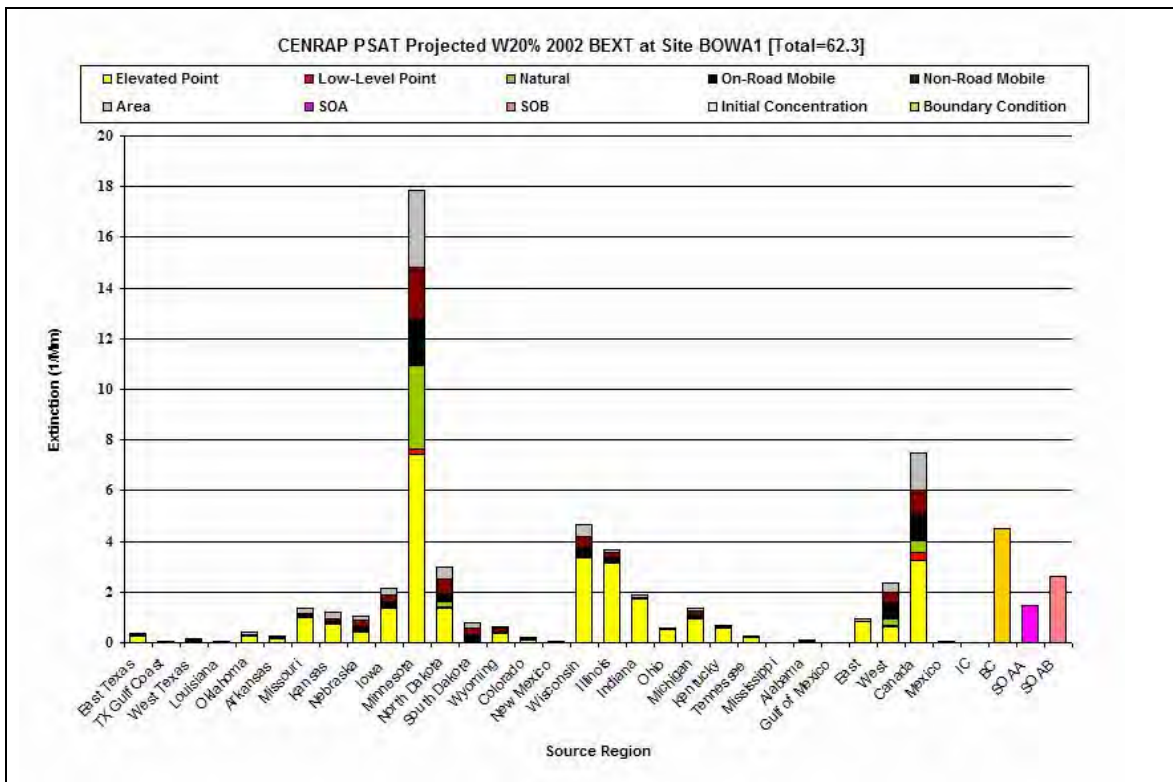


Figure E-4c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

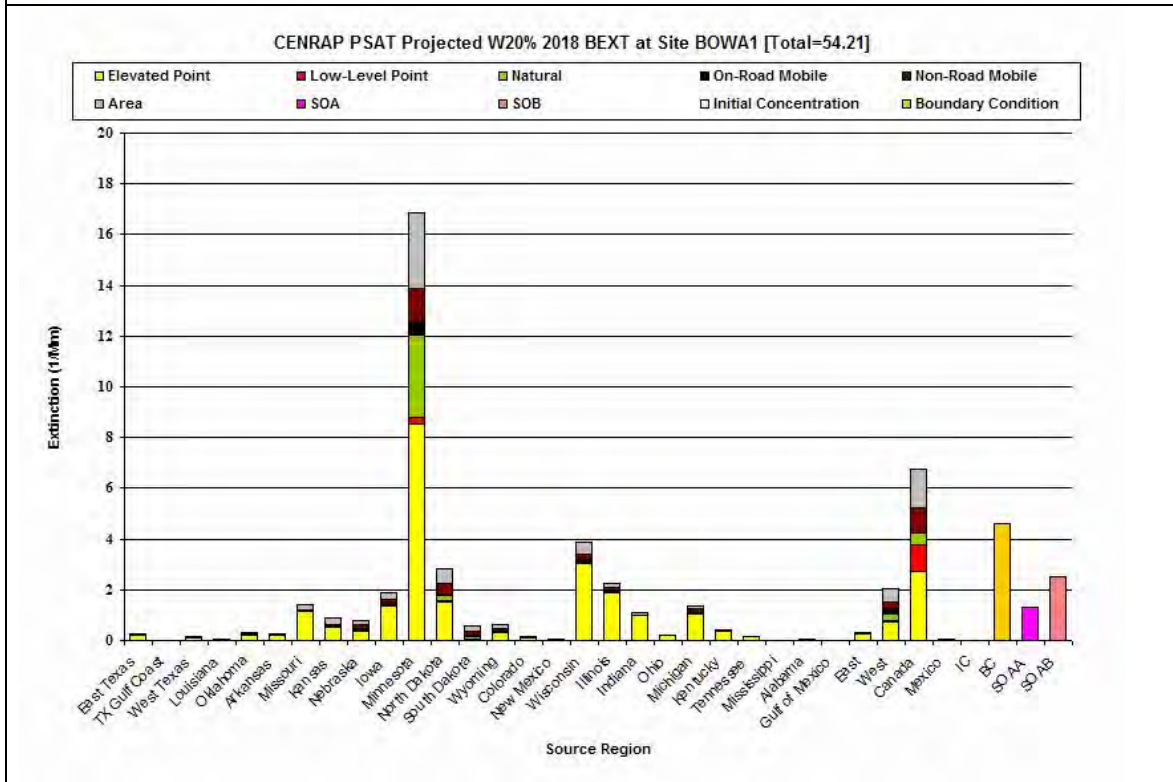


Figure E-4d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

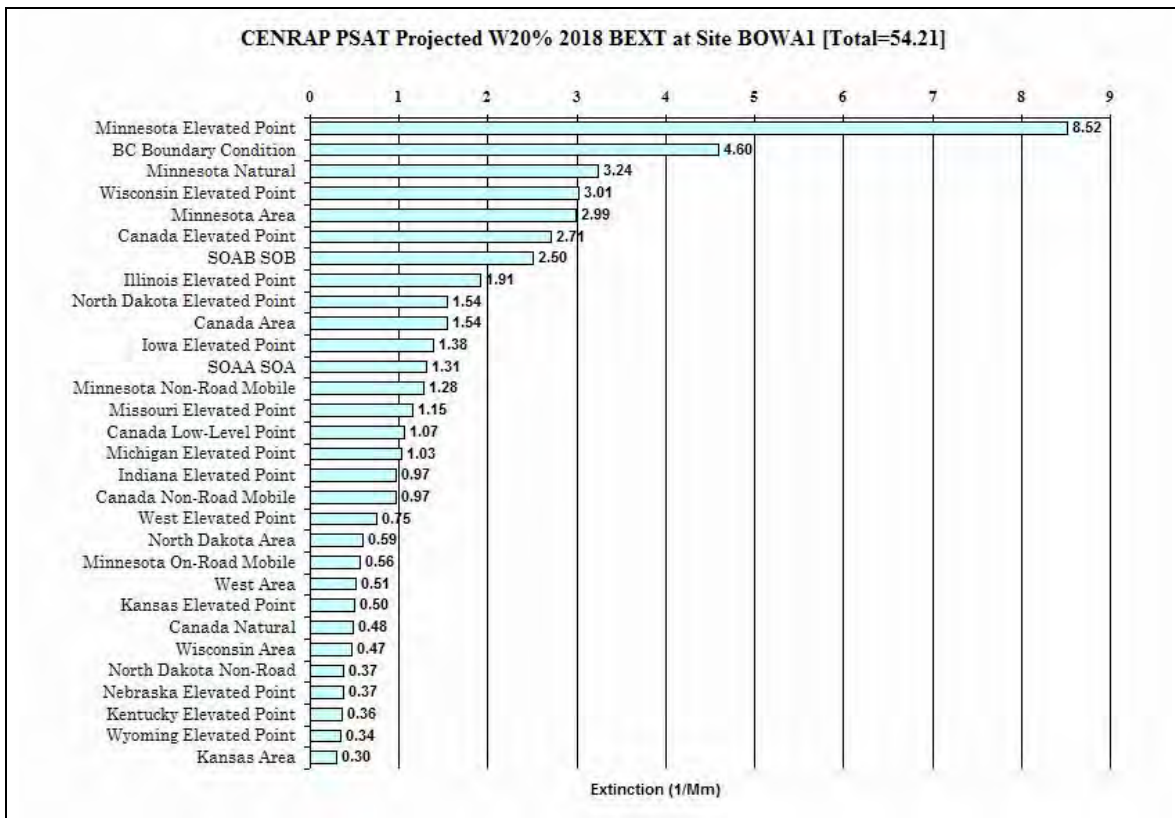


Figure E-4e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

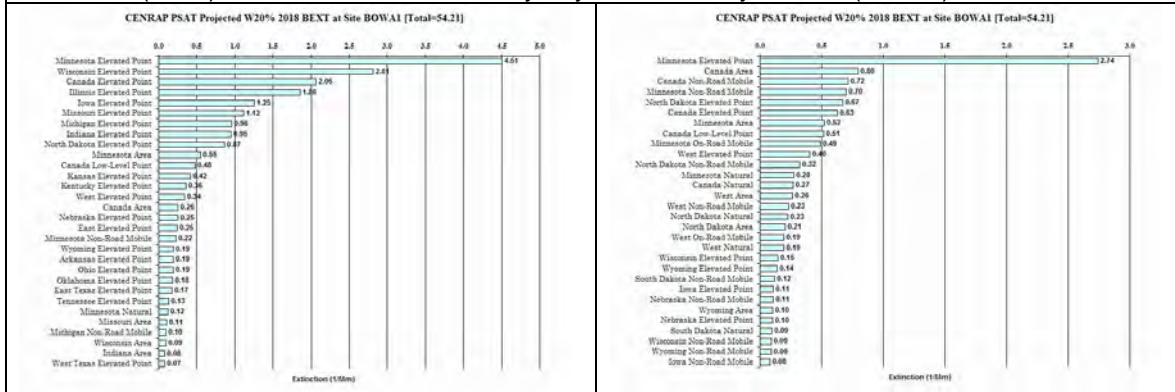


Figure E-4f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Boundary Waters (BOWA), Minnesota.

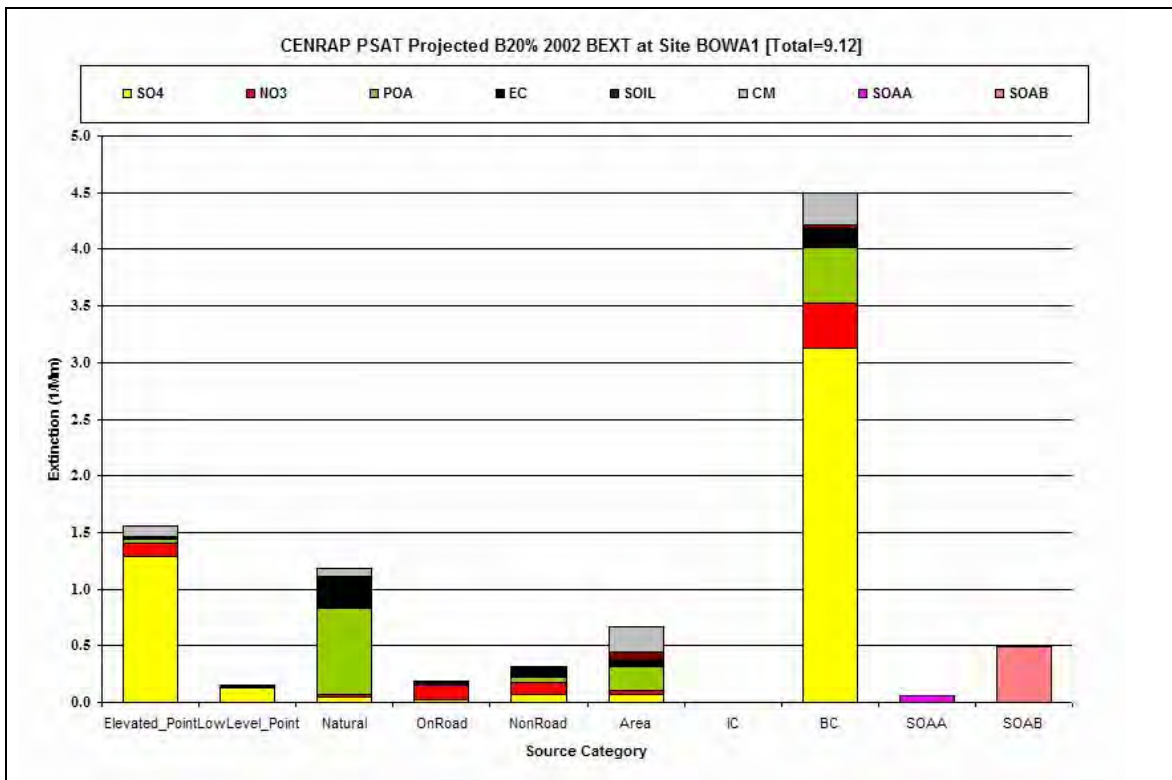


Figure E-4g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Boundary Waters (BOWA), Minnesota.

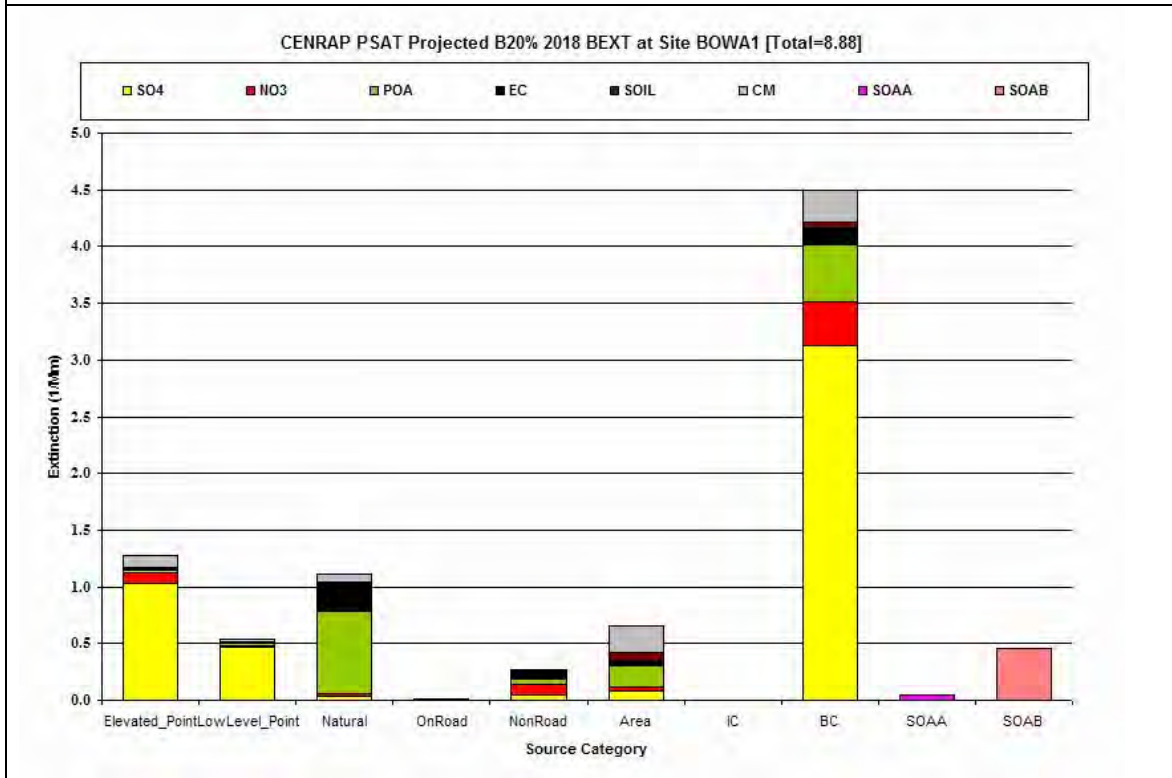


Figure E-4h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Boundary Waters (BOWA), Minnesota.

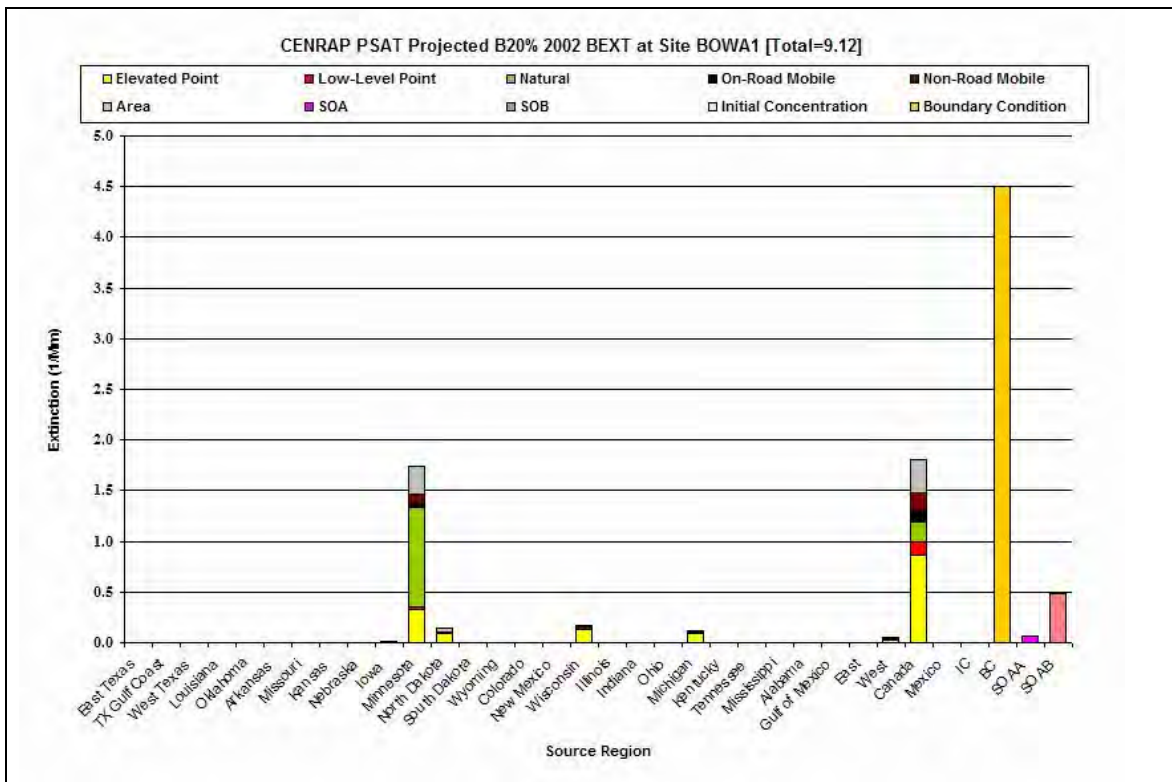


Figure E-4i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Boundary Waters (BOWA), Minnesota.

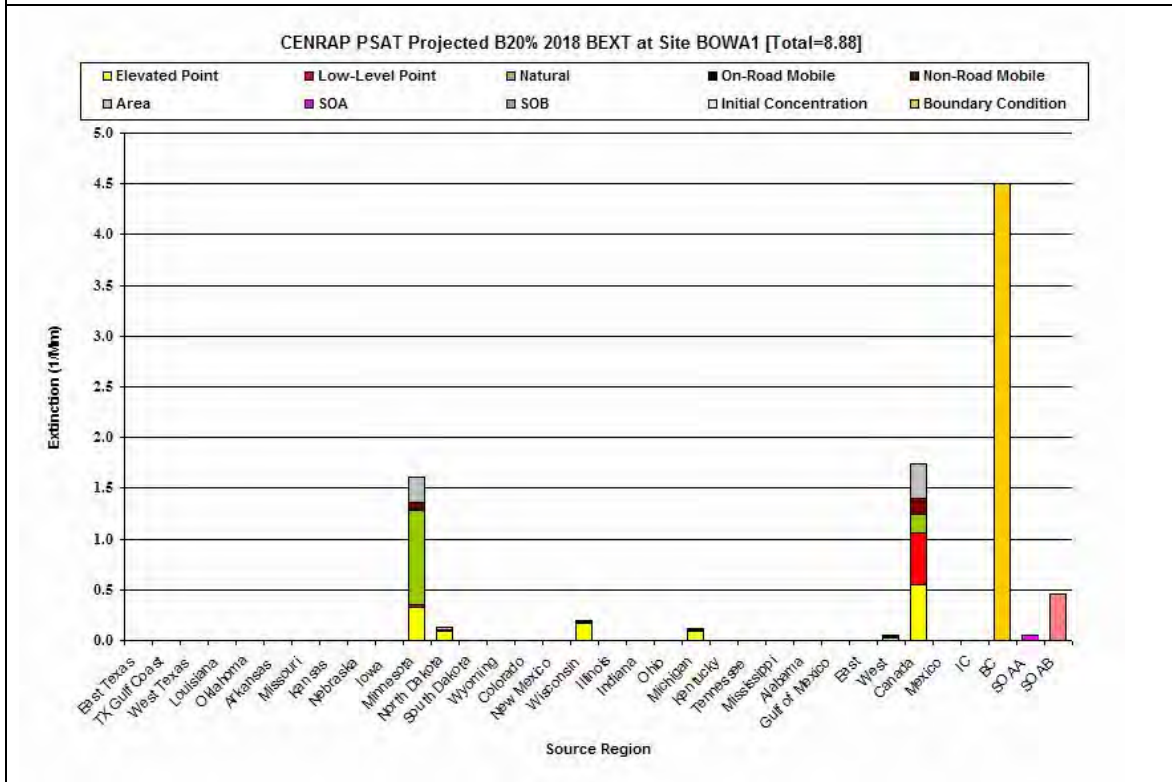


Figure E-4j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Boundary Waters (BOWA), Minnesota.

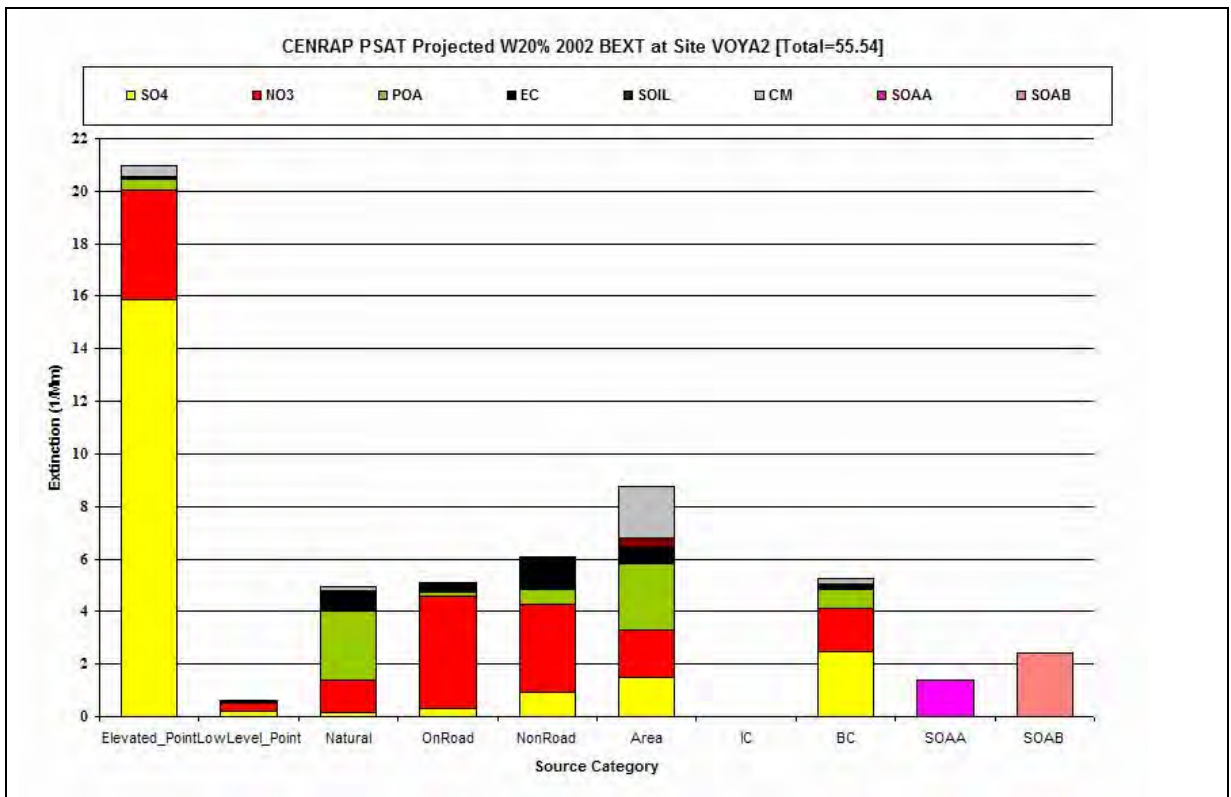


Figure E-5a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

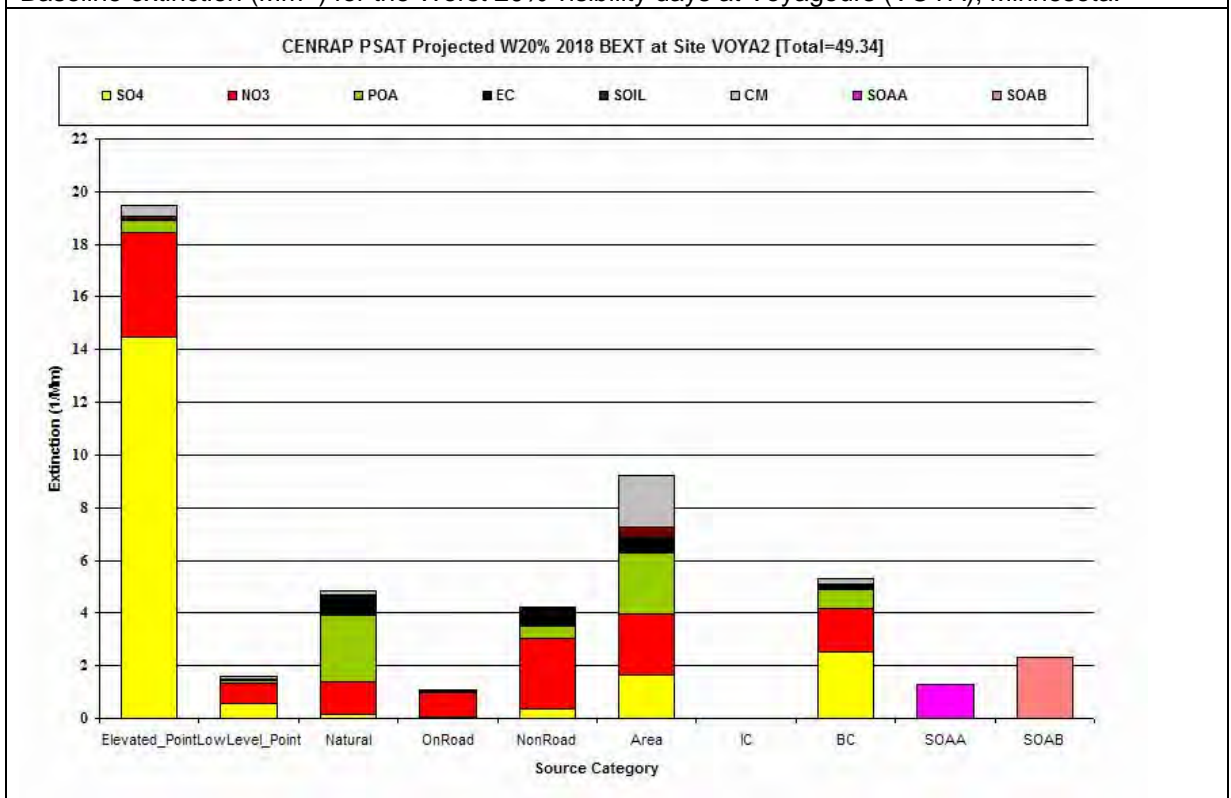


Figure E-5b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

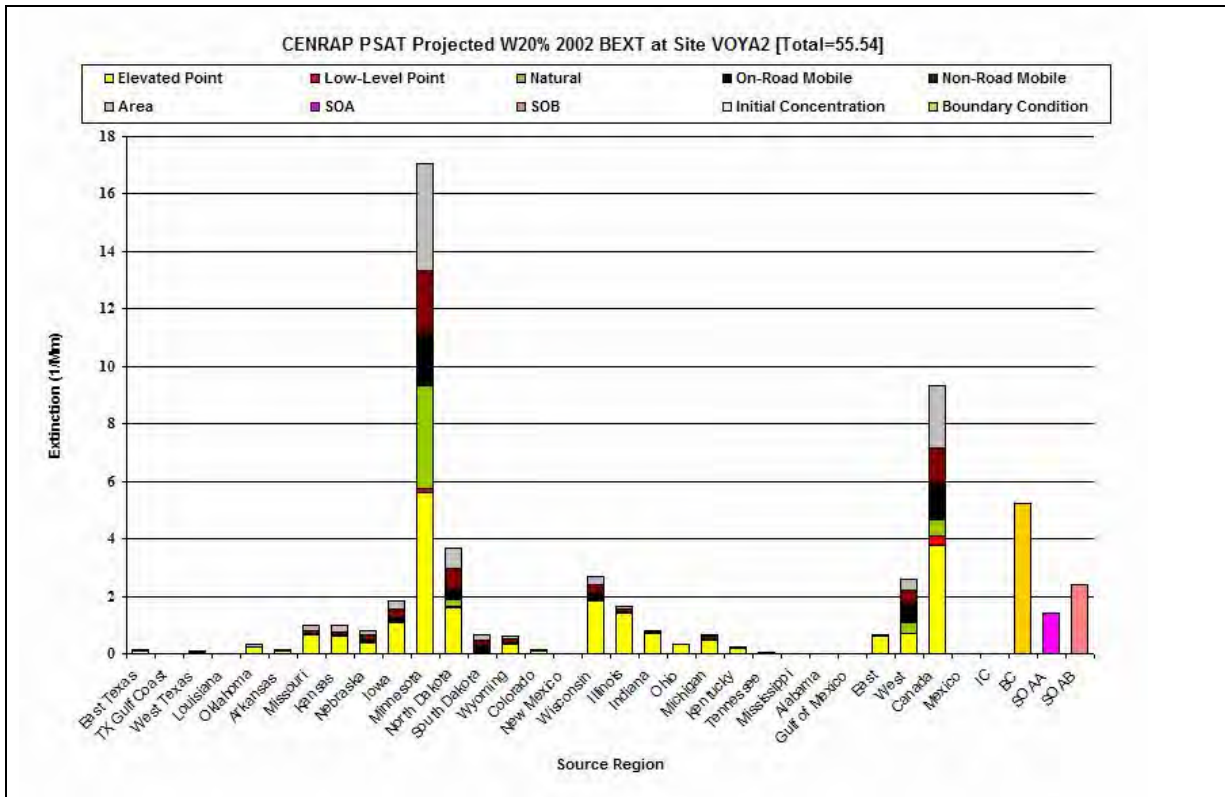


Figure E-5c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

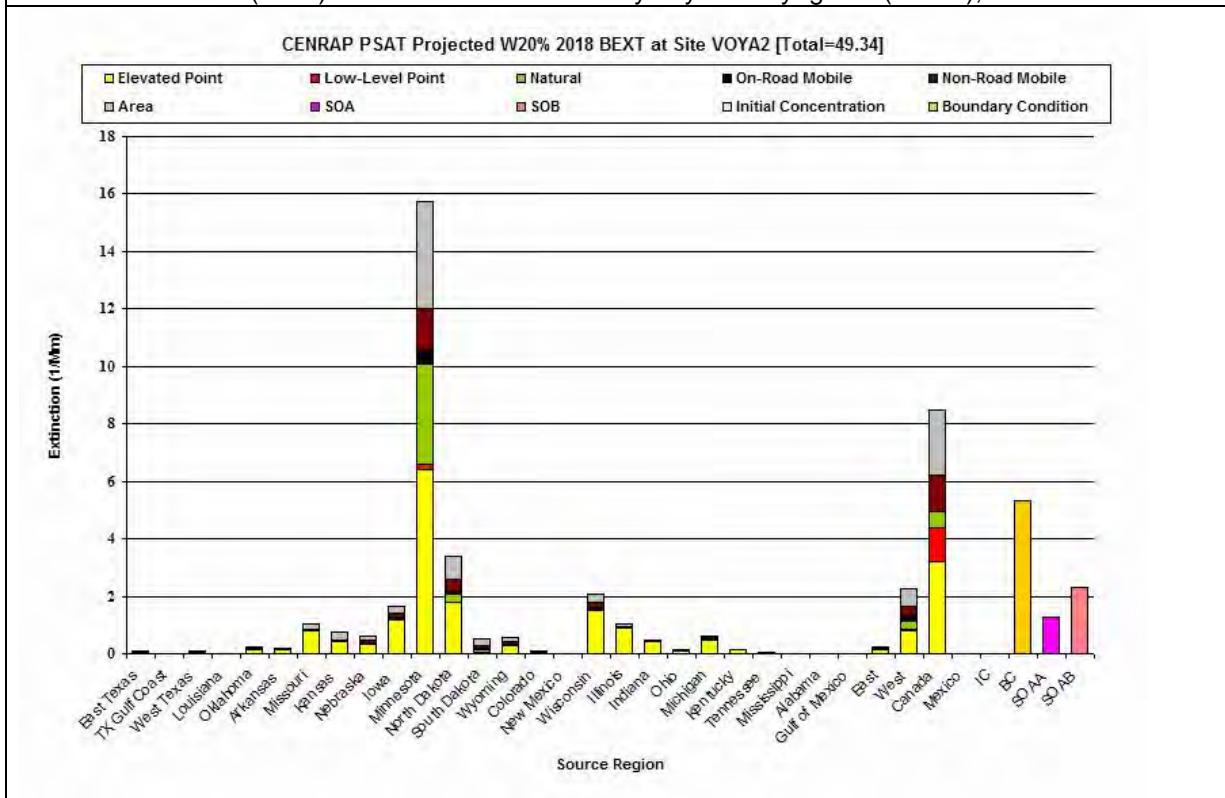


Figure E-5d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

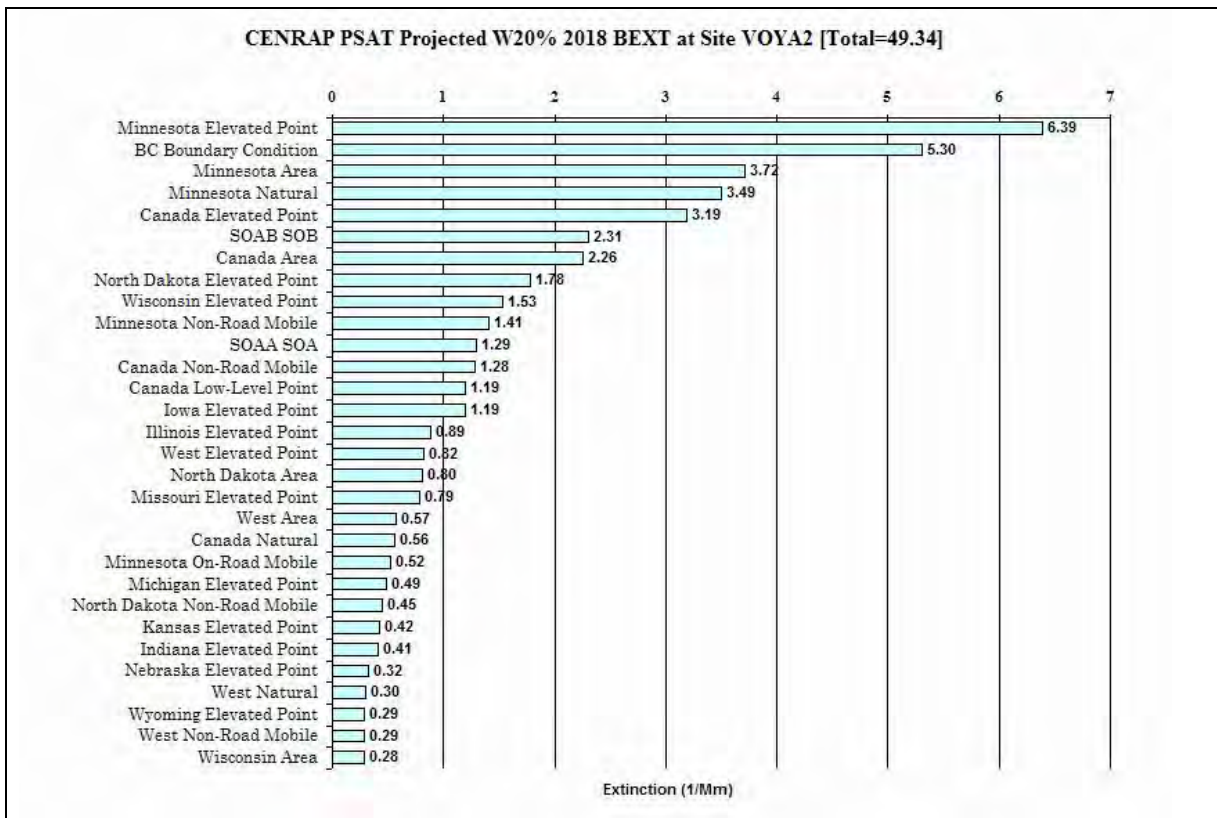


Figure E-5e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

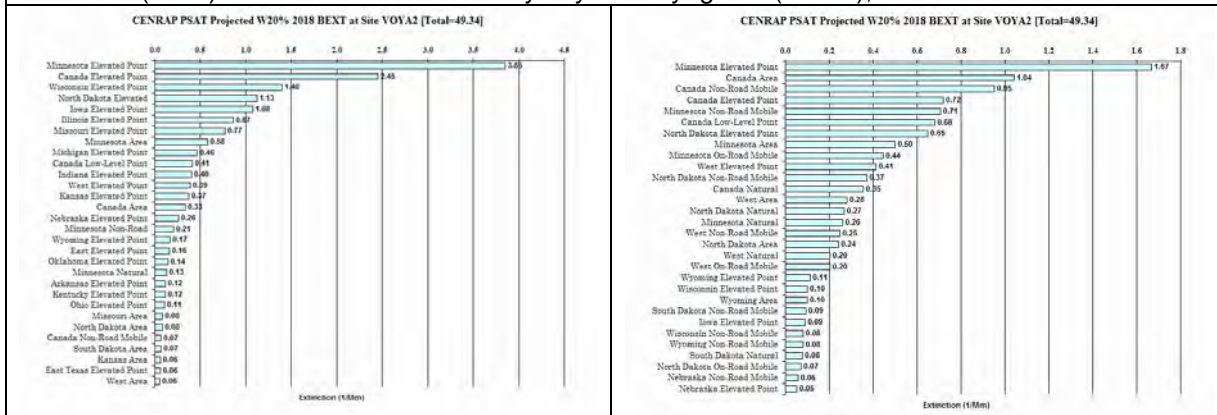


Figure E-5f. Ranked PSAT source region by source category contributions to the average 2018 SO₄ (left) and NO₃ (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Voyageurs (VOYA), Minnesota.

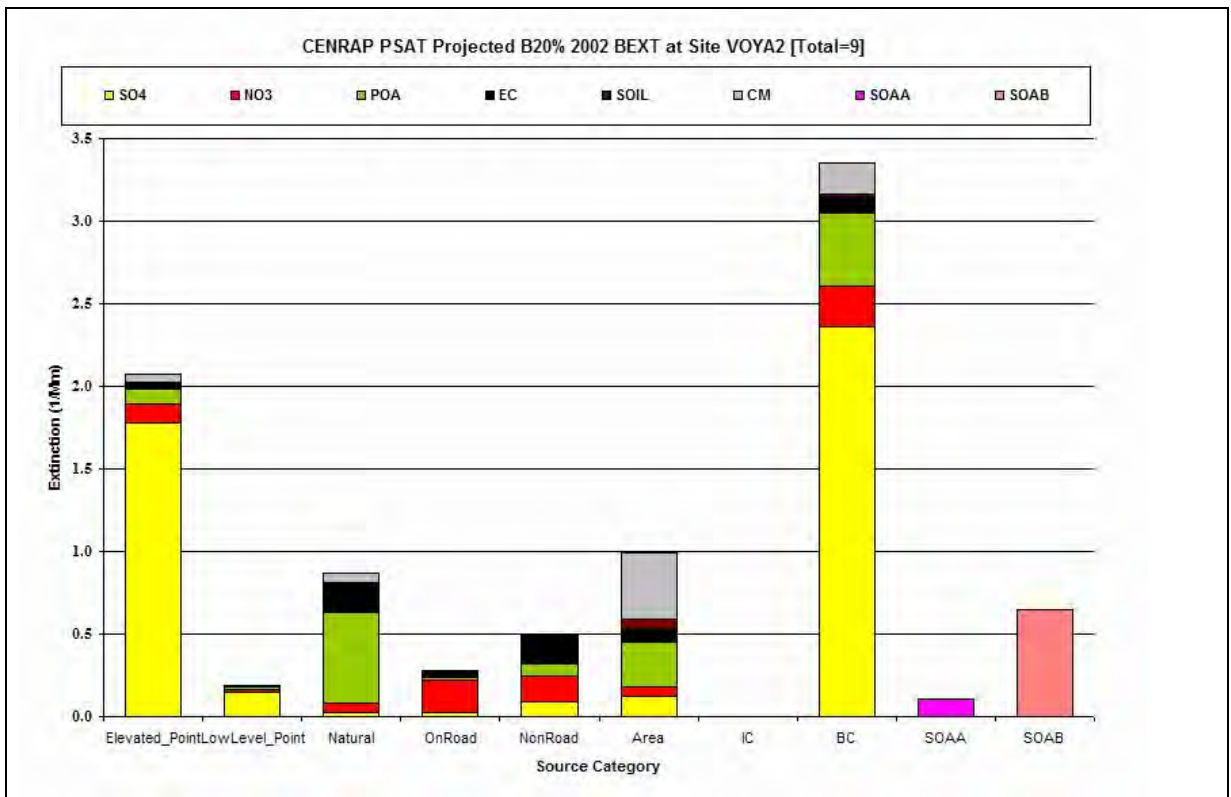


Figure E-5g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Voyagers (VOYA), Minnesota.

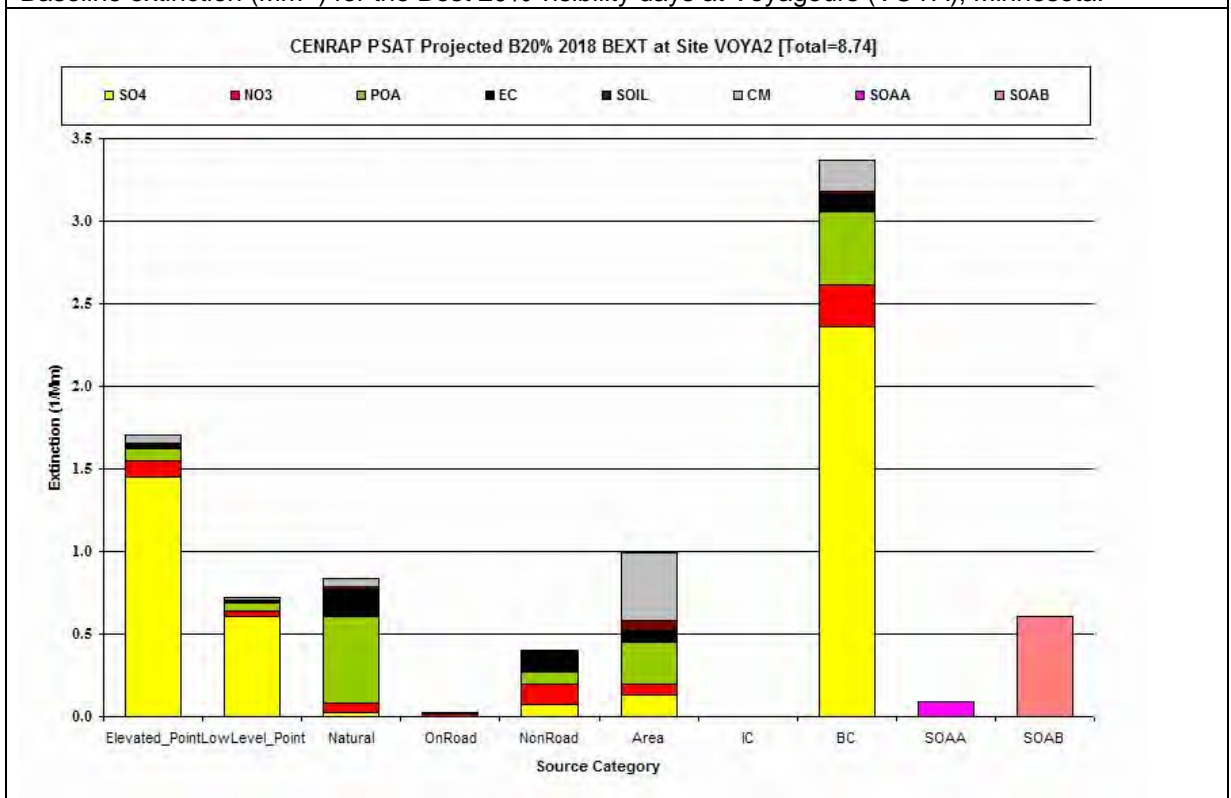


Figure E-5h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Voyagers (VOYA), Minnesota.

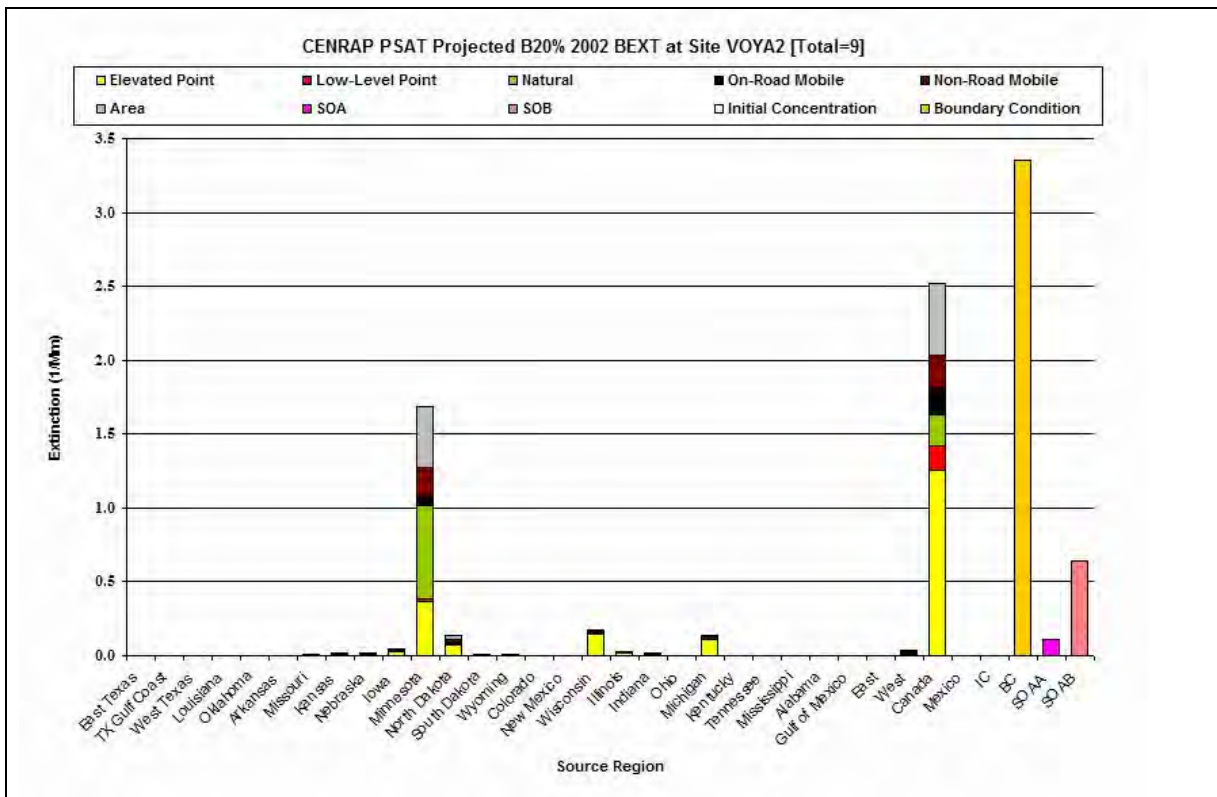


Figure E-5i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Voyageurs (VOYA), Minnesota.

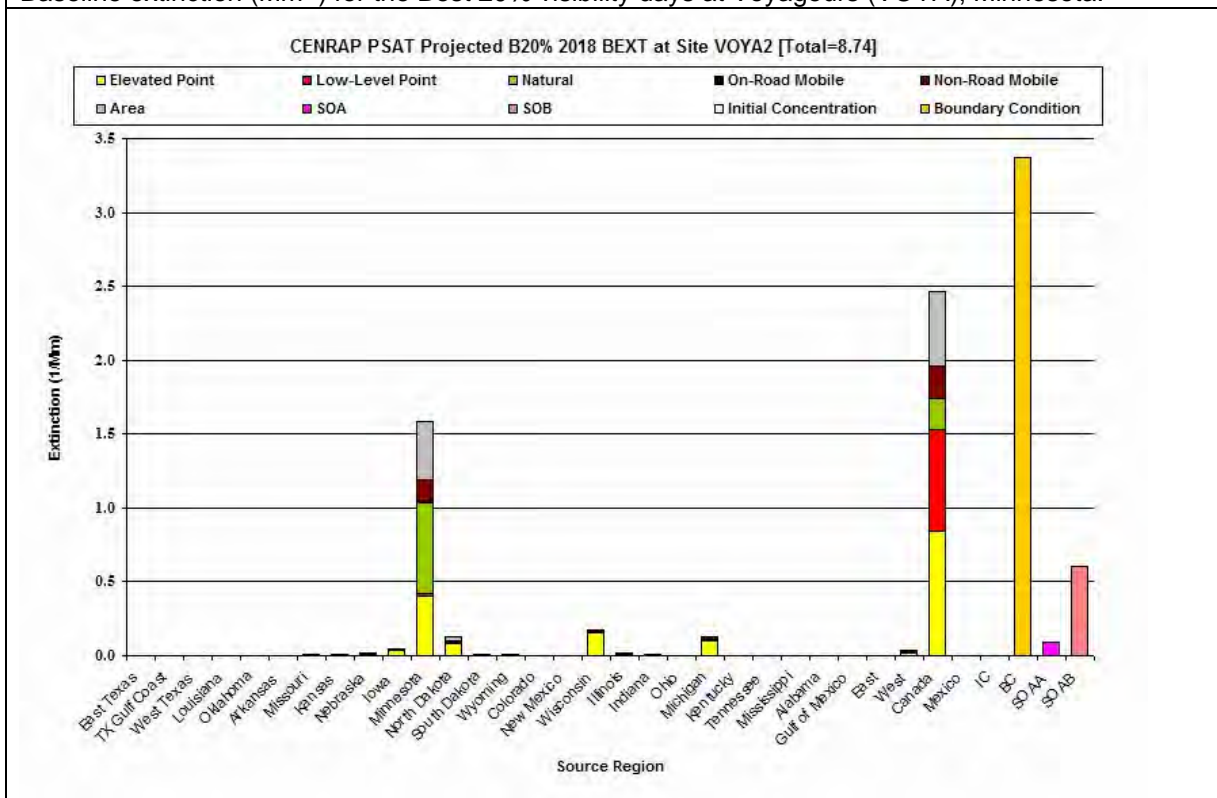


Figure E-5j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Voyageurs (VOYA), Minnesota.

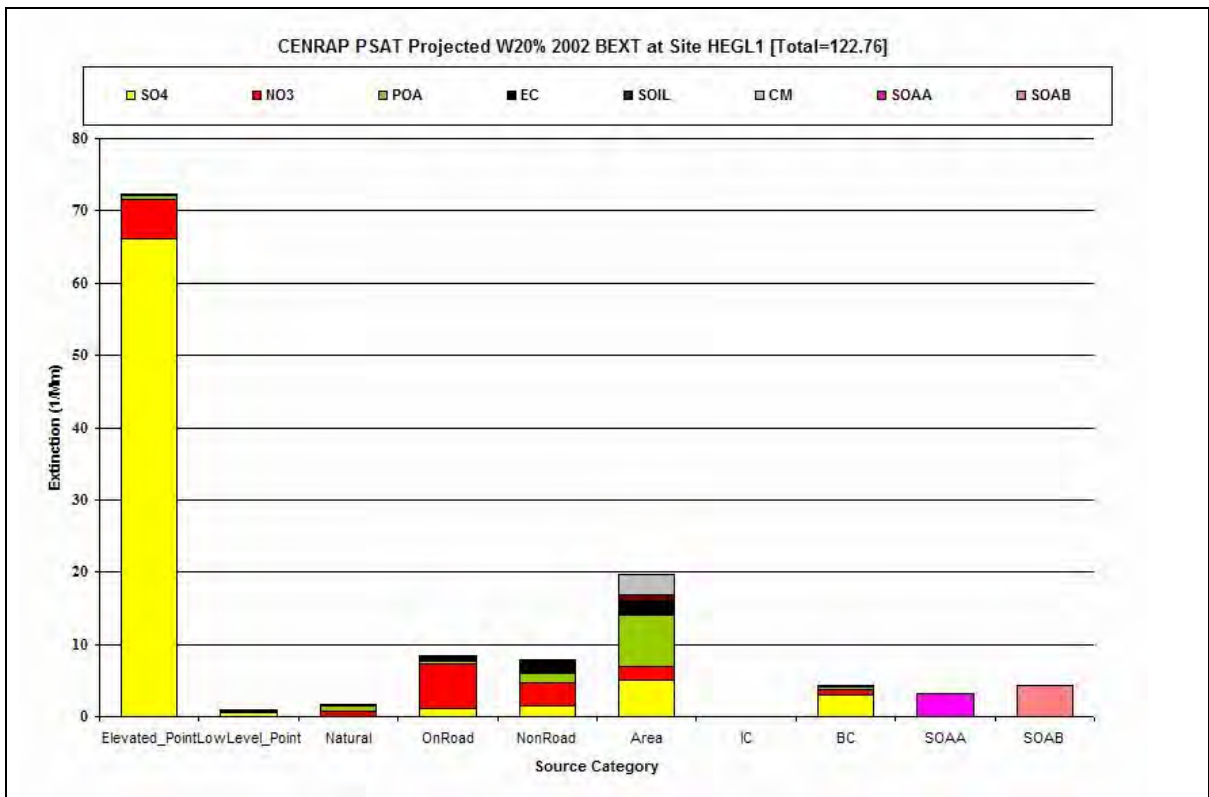


Figure E-6a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

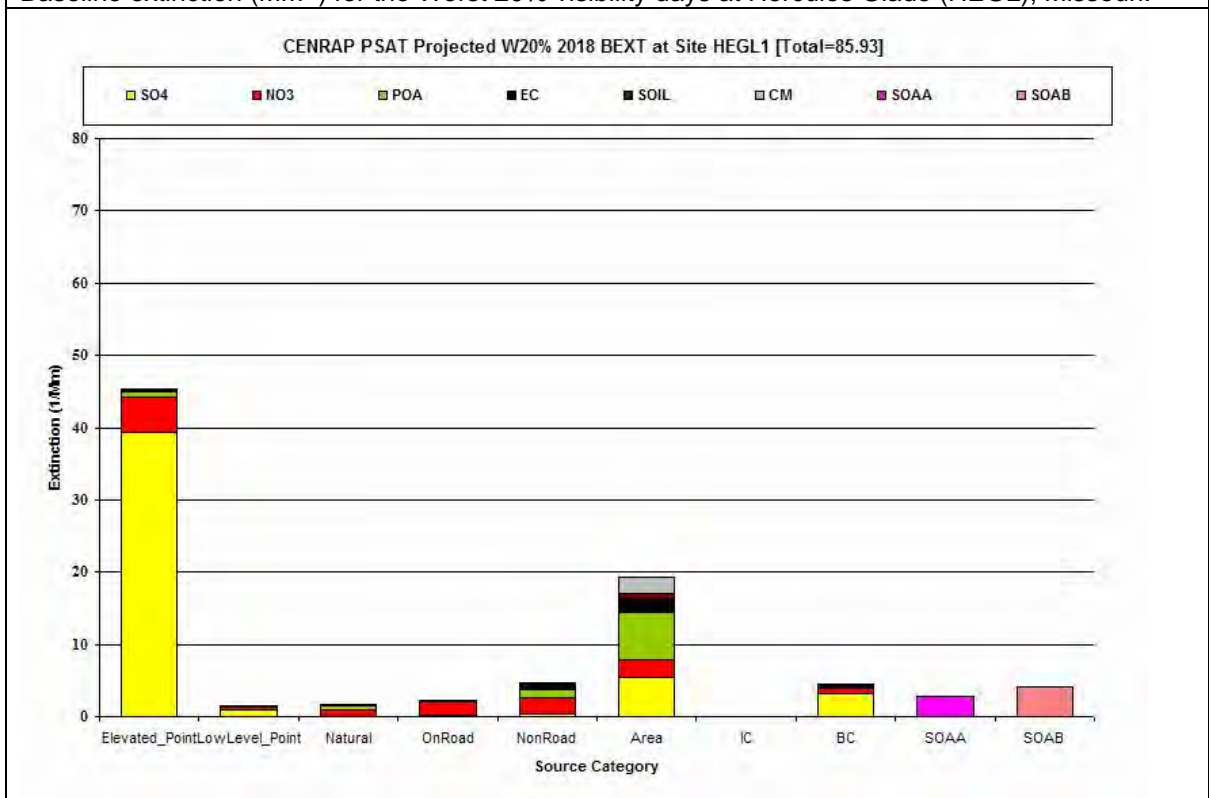


Figure E-6b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

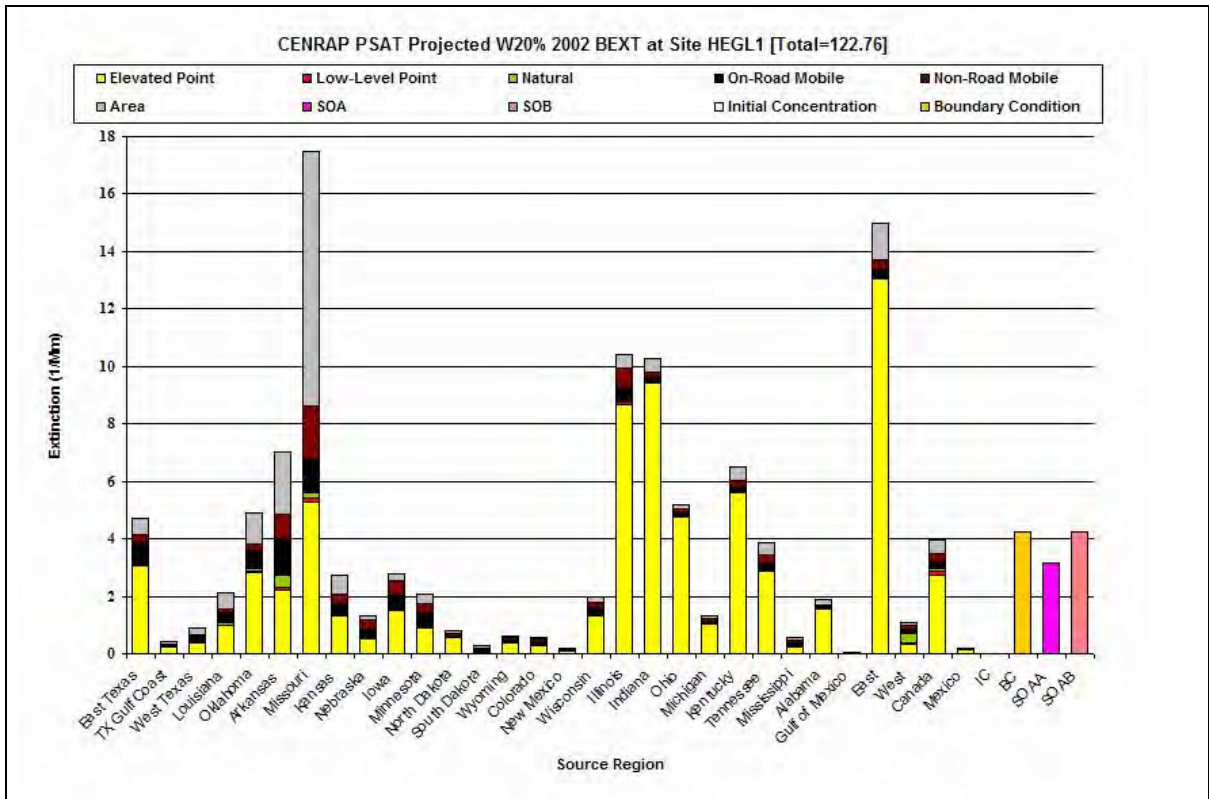


Figure E-6c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

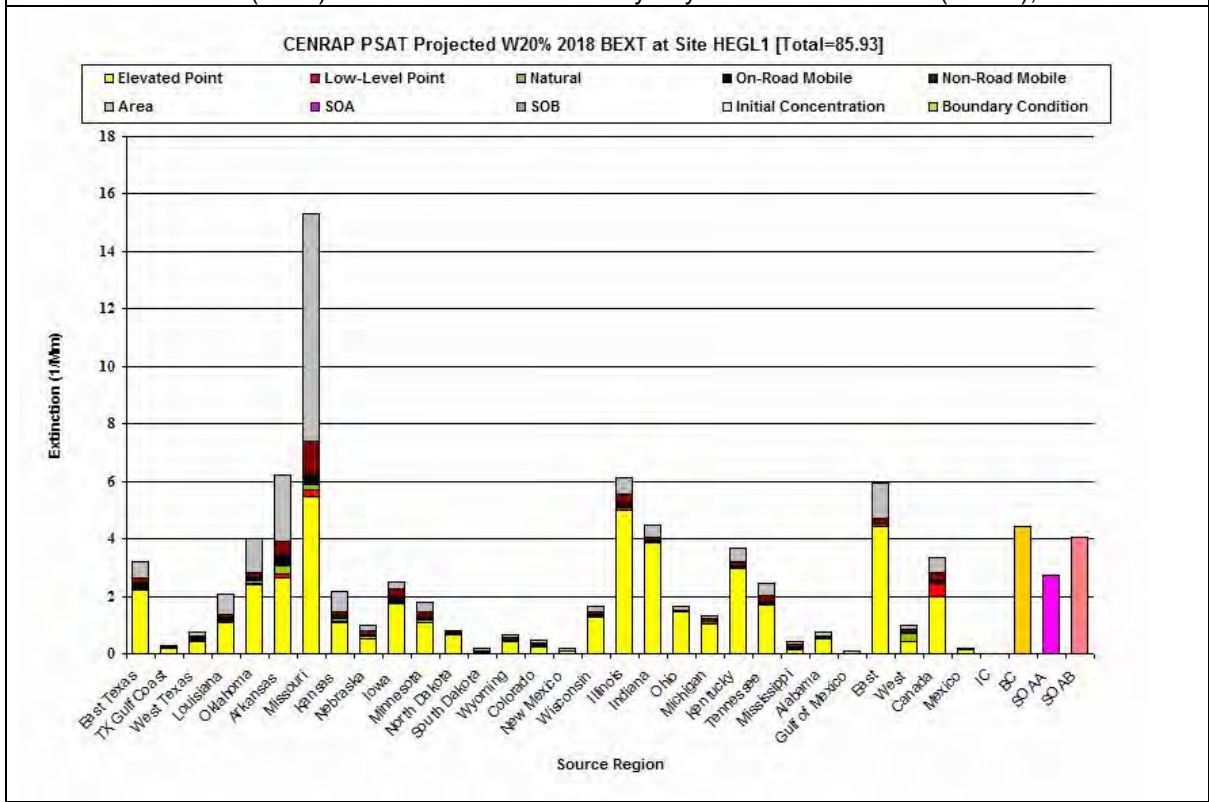


Figure E-6d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

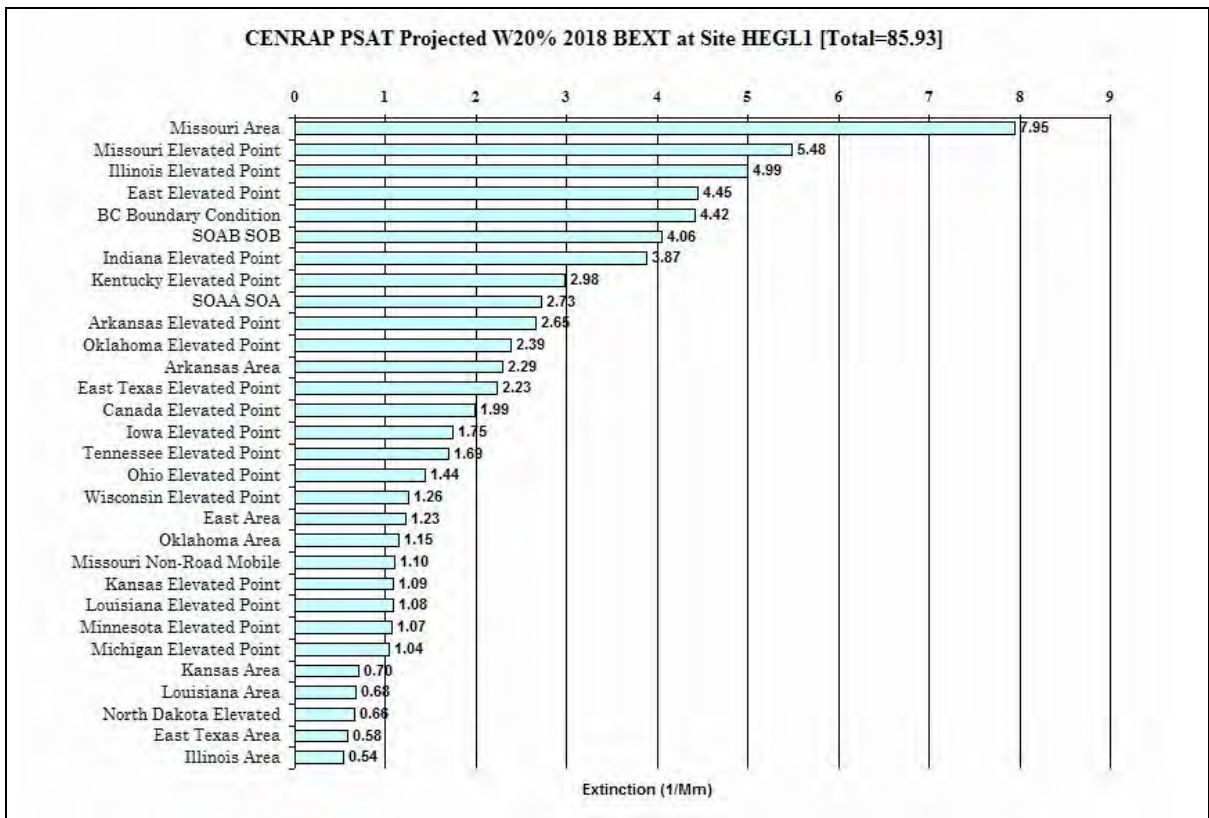


Figure E-6e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

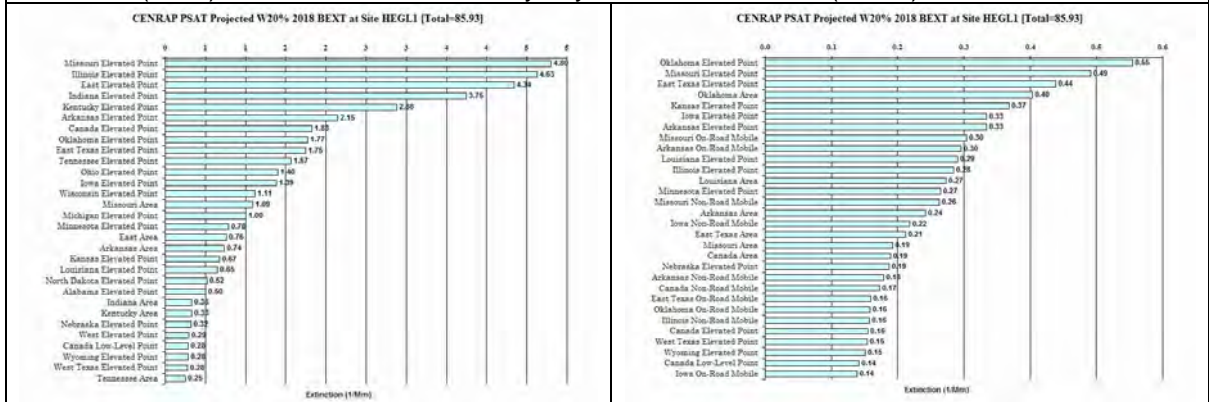


Figure E-6f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Hercules Glade (HEGL), Missouri.

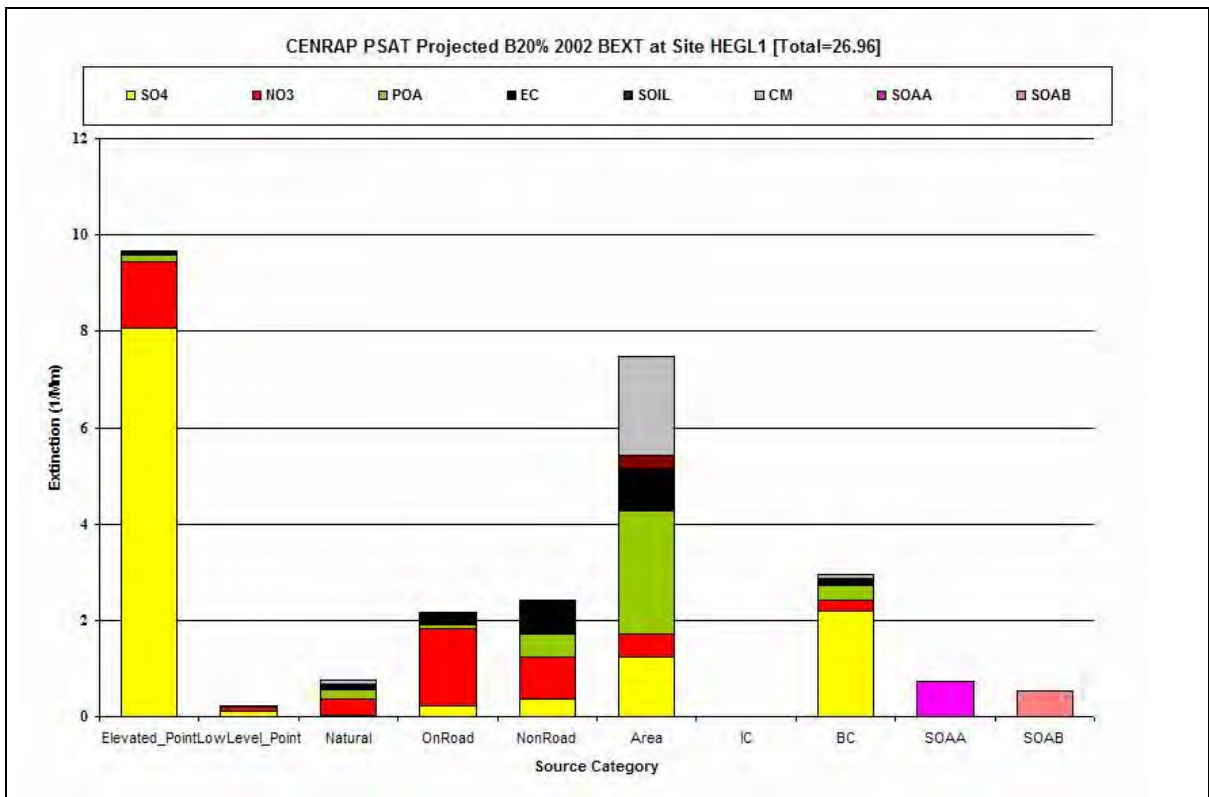


Figure E-6g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Hercules Glade (HEGL), Missouri.

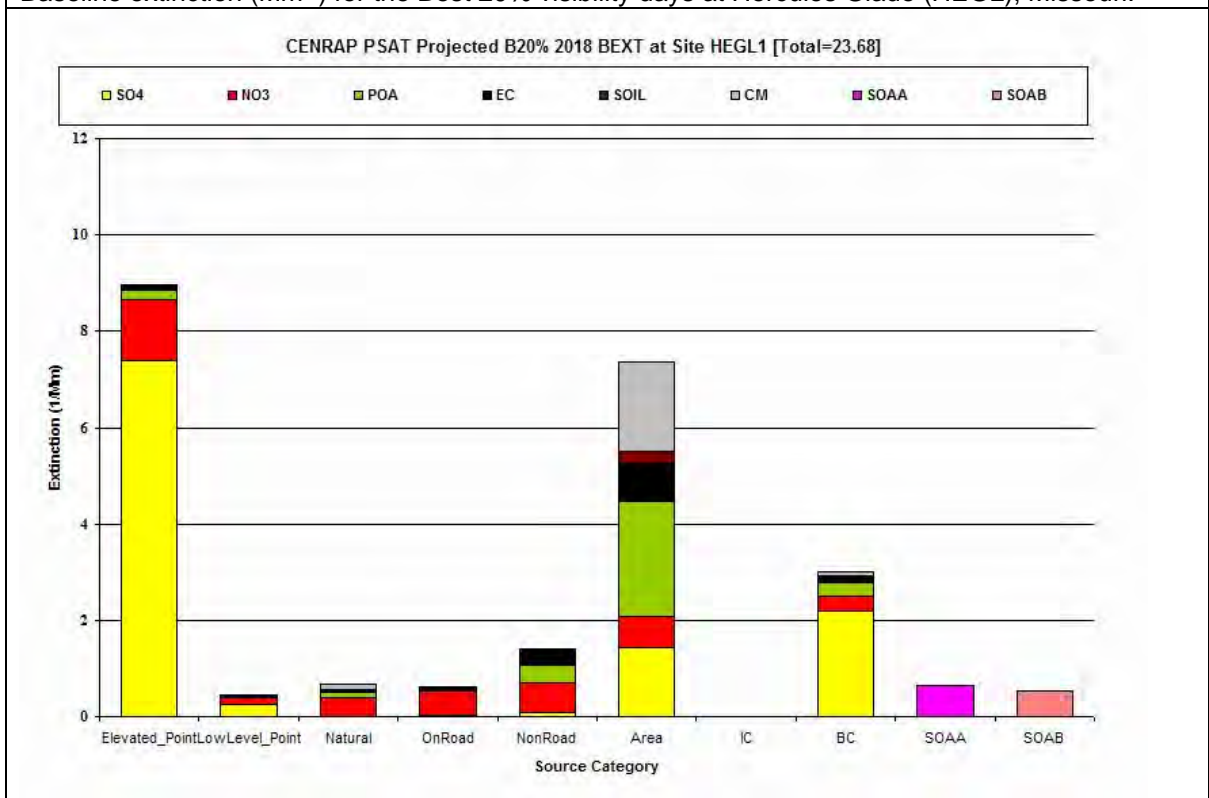


Figure E-6h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Hercules Glade (HEGL), Missouri.

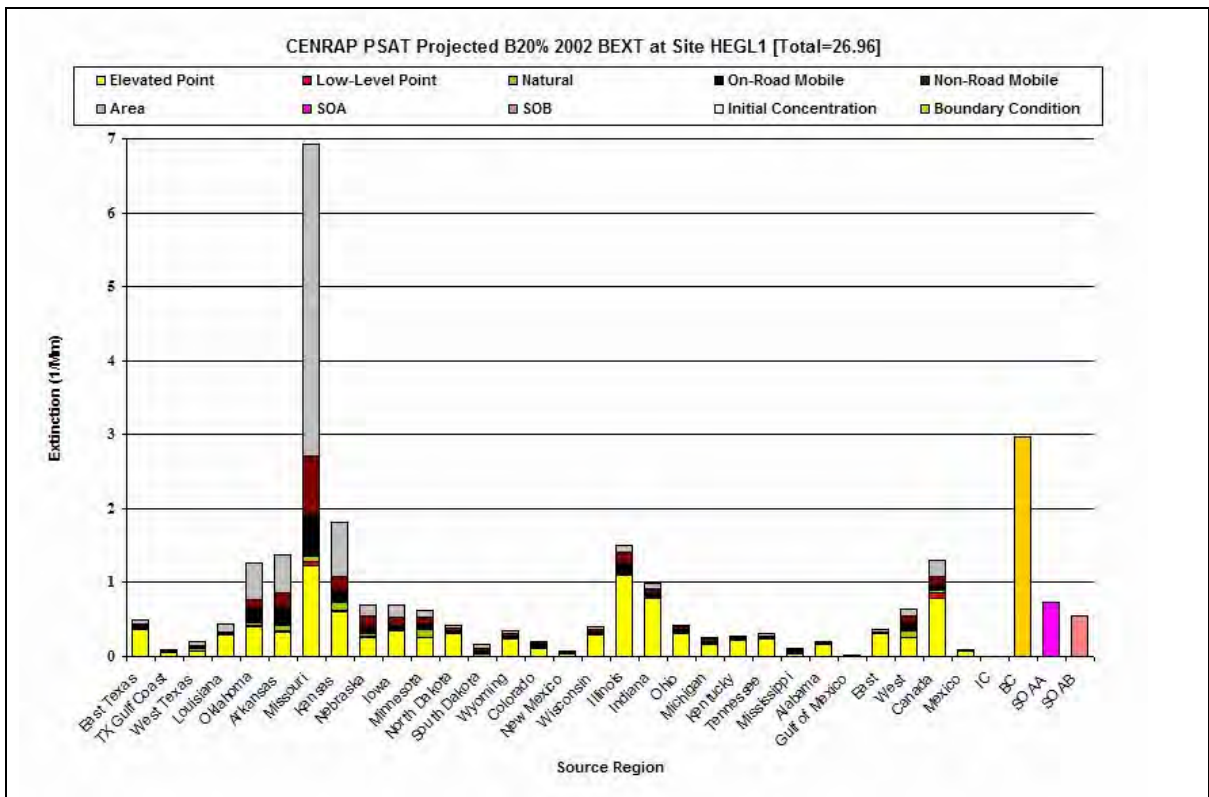


Figure E-6i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Hercules Glade (HEGL), Missouri.

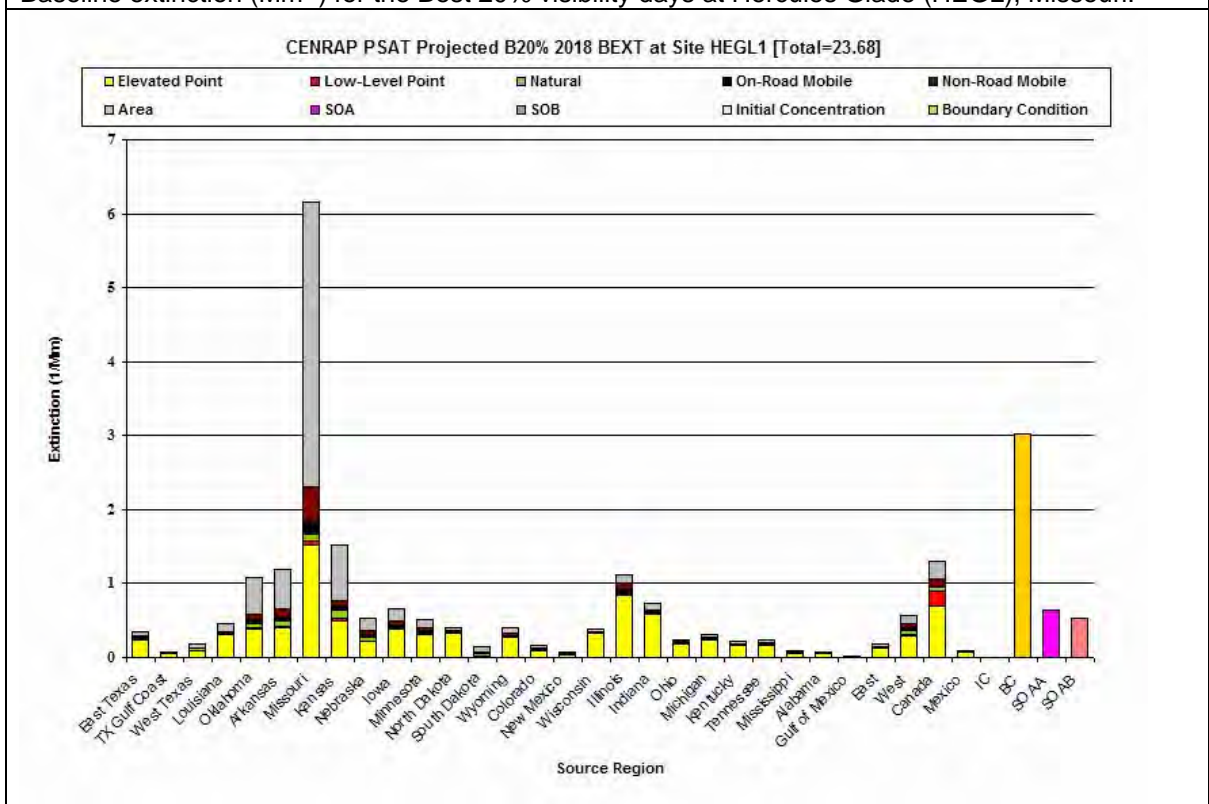


Figure E-6j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Voyageurs Hercules Glade (HEGL), Missouri.

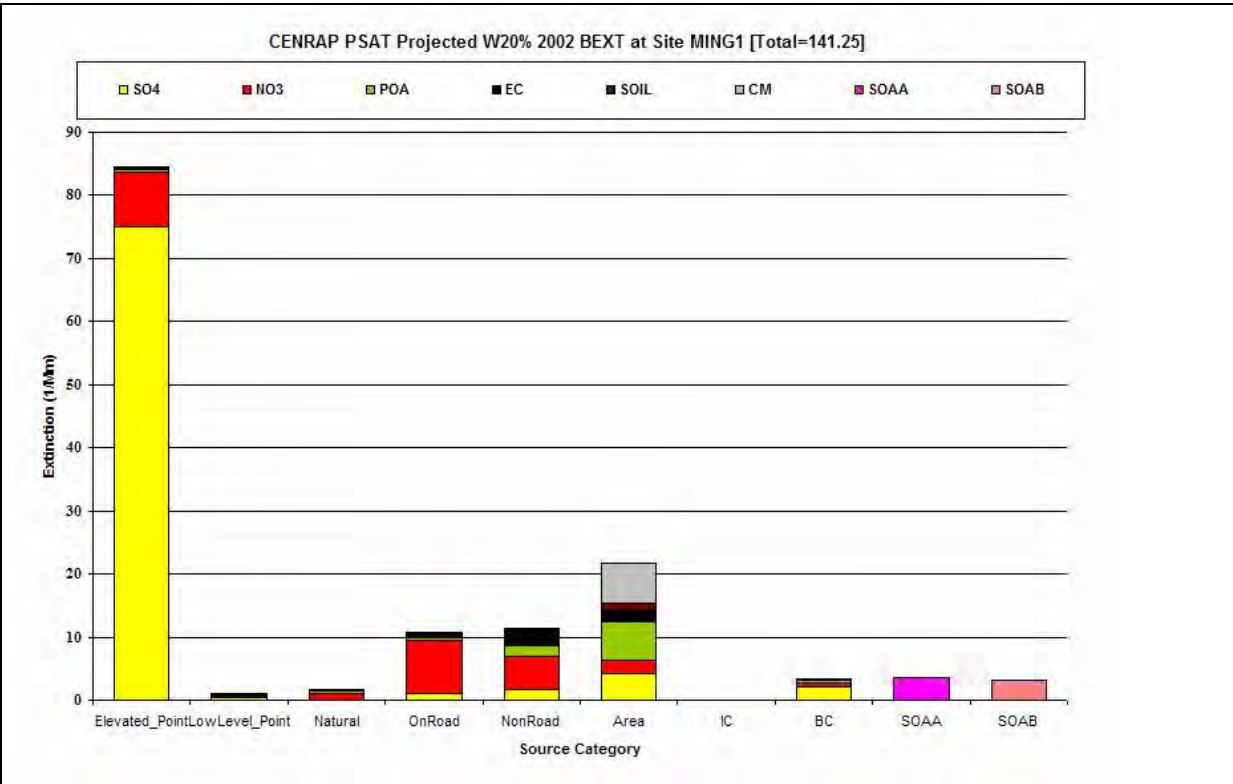


Figure E-7a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

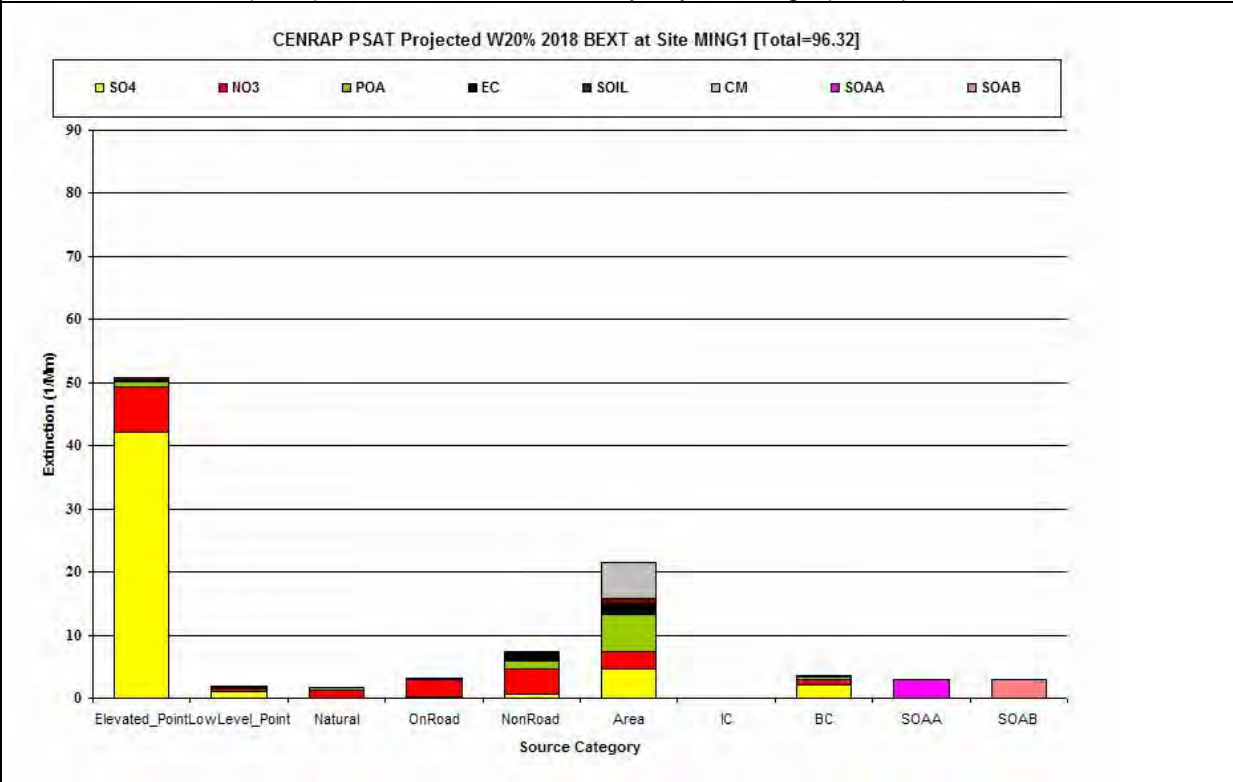


Figure E-7b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

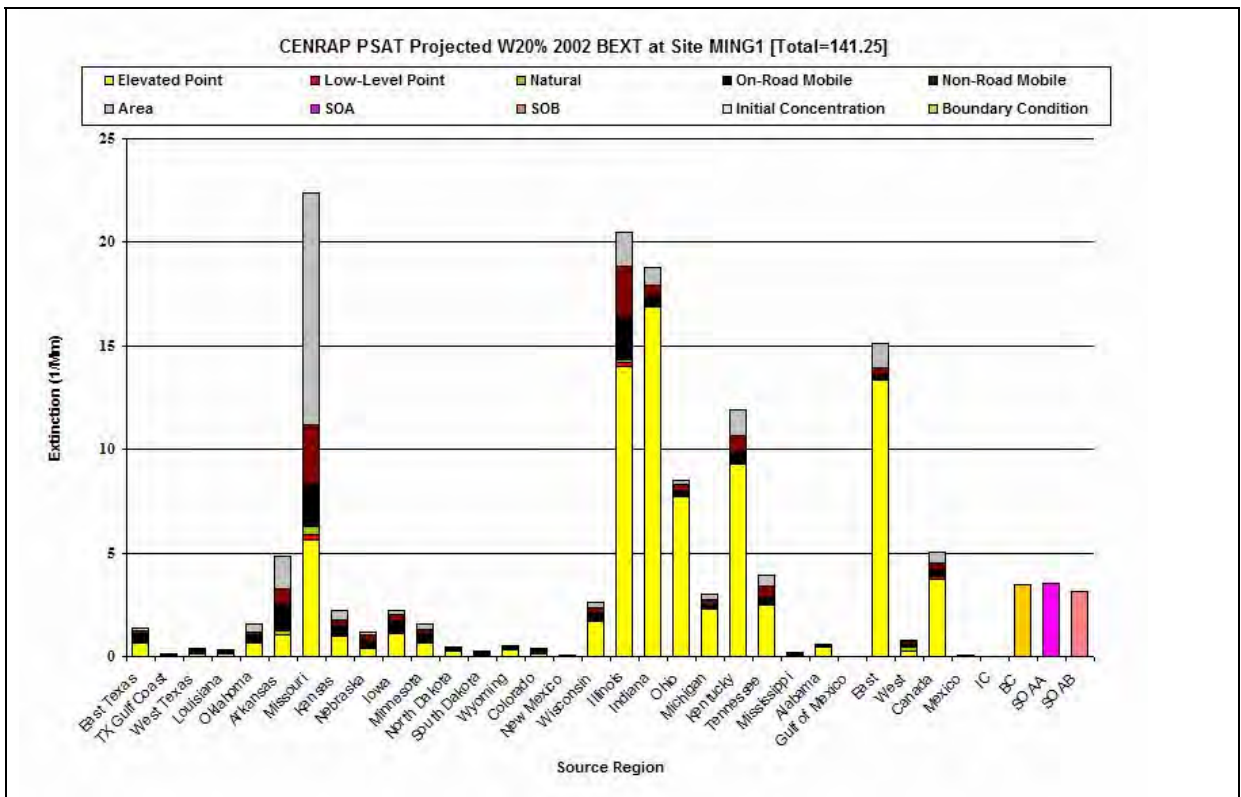


Figure E-7c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

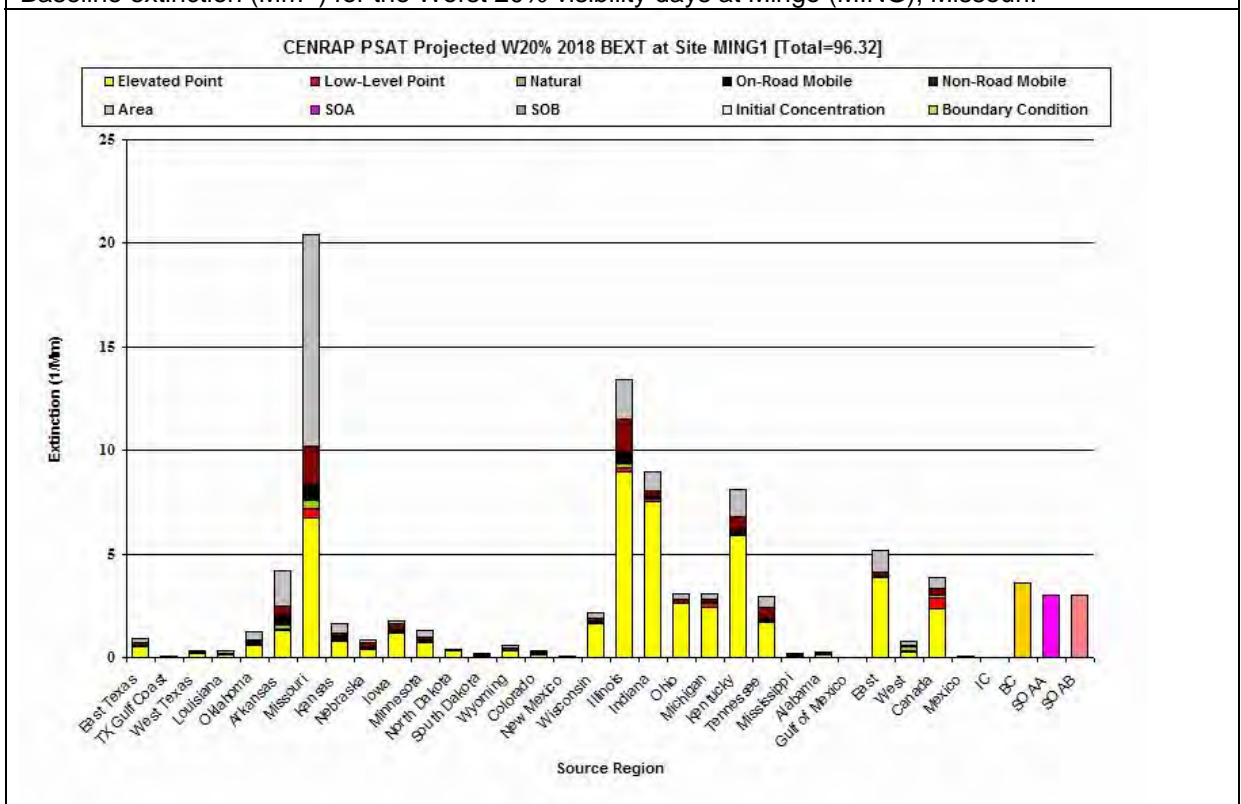


Figure E-7d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

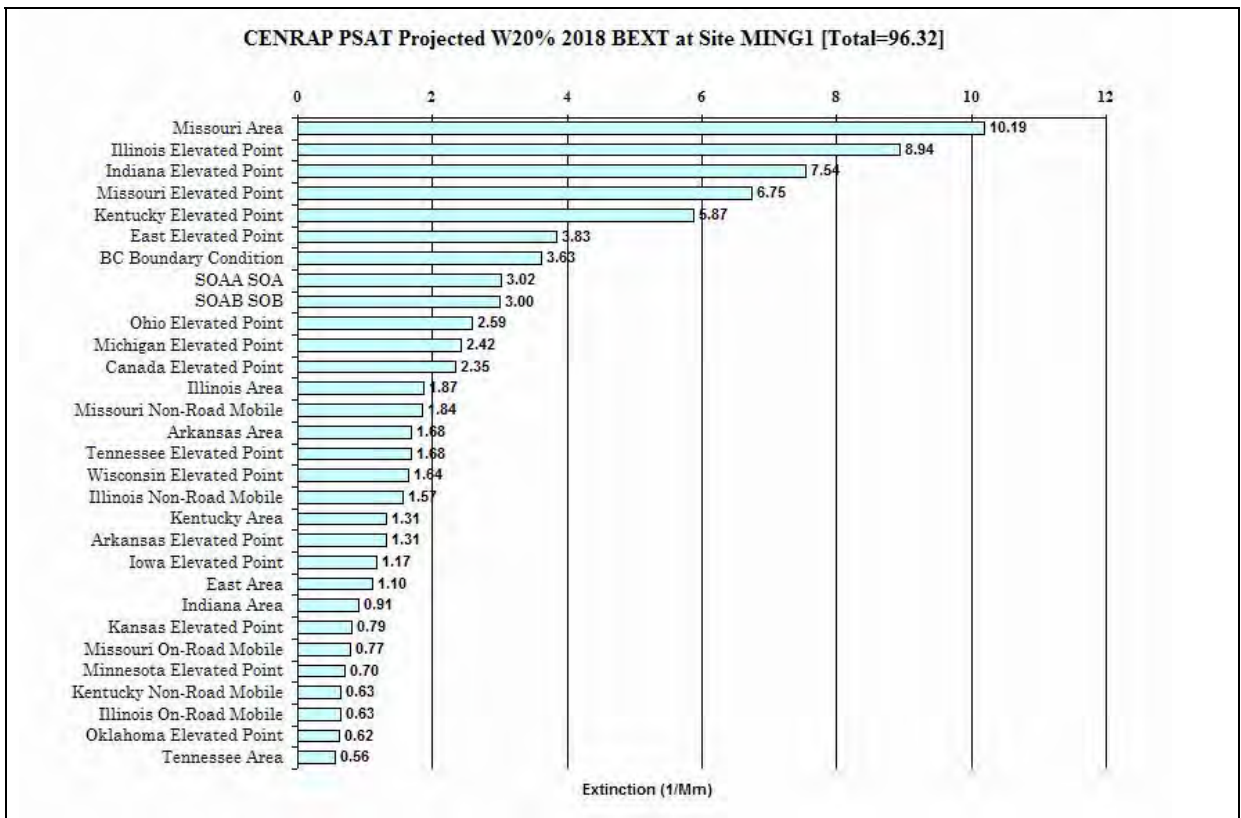


Figure E-7e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

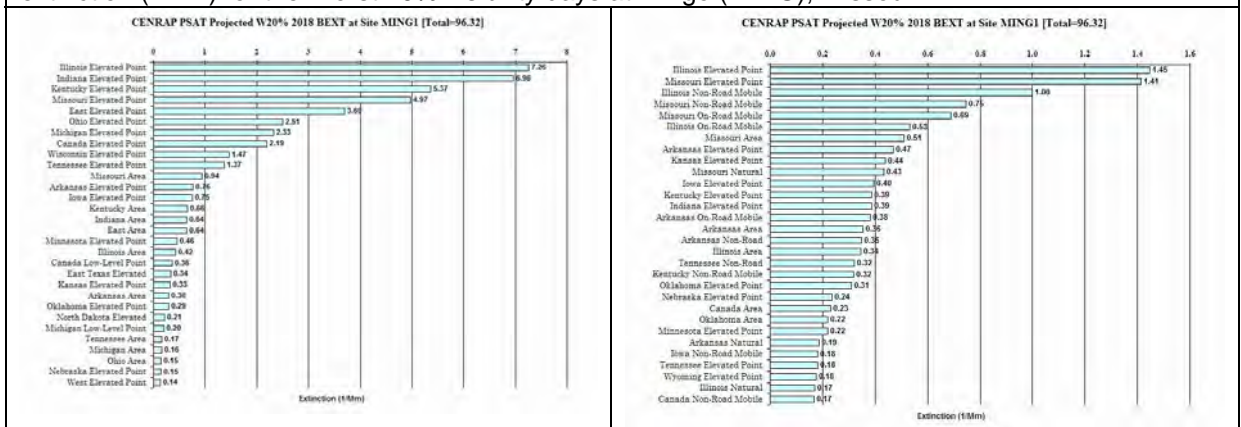


Figure E-7f. Ranked PSAT source region by source category contributions to the average 2018 SO₄ (left) and NO₃ (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Mingo (MING), Missouri.

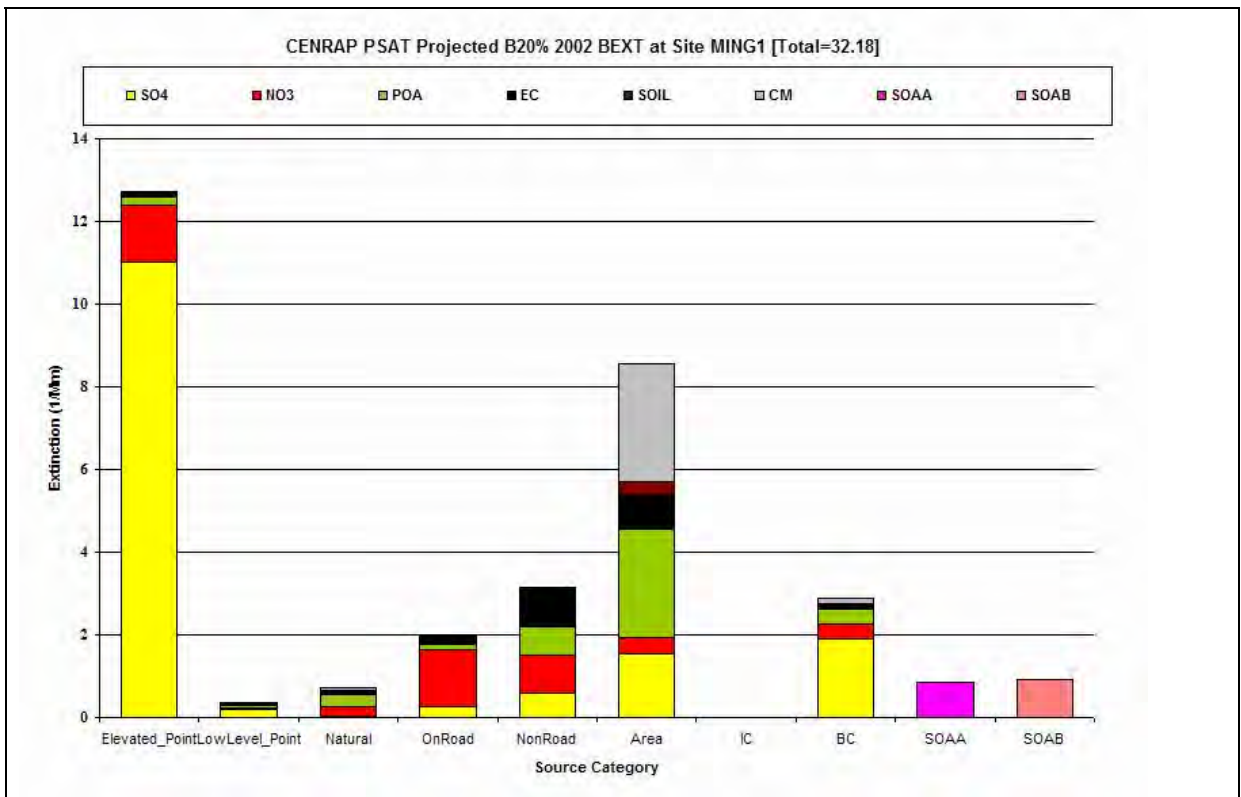


Figure E-7g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Mingo (MING), Missouri.

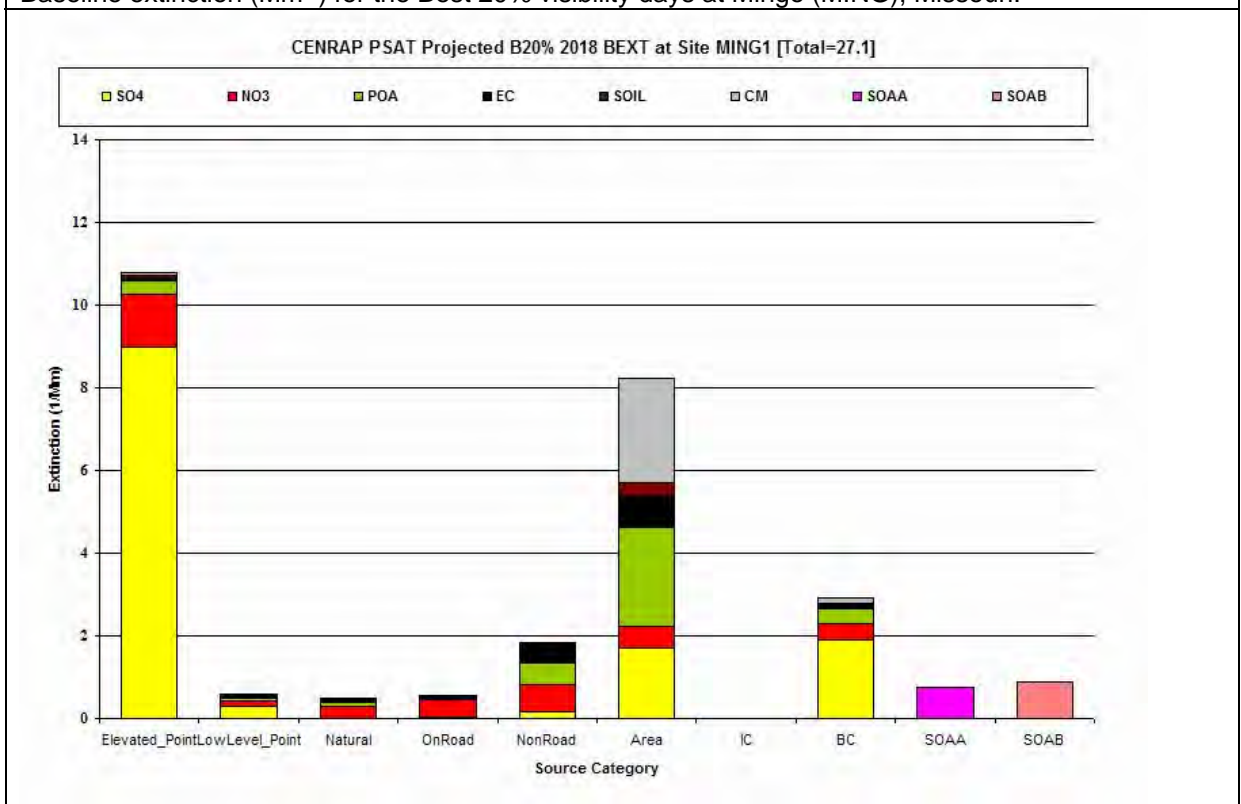


Figure E-7h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Mingo (MING), Missouri.

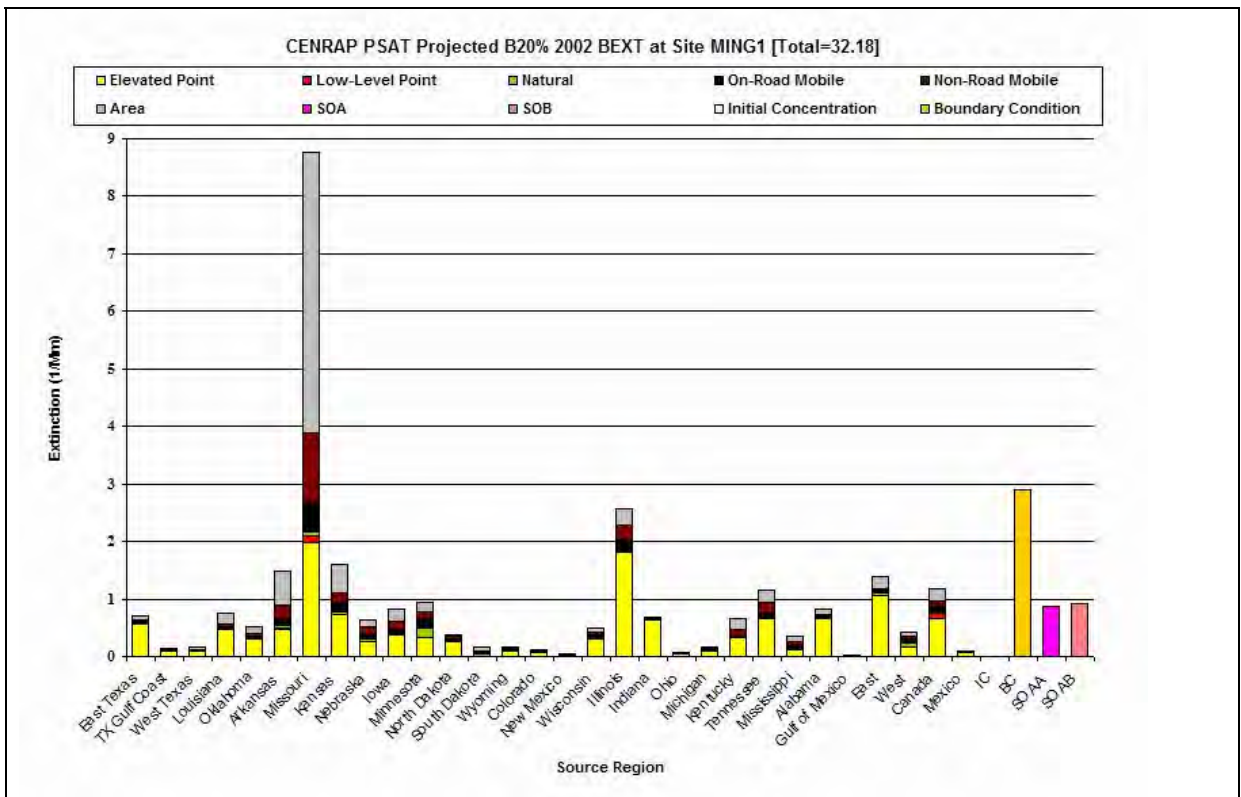


Figure E-7i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Mingo (MING), Missouri.

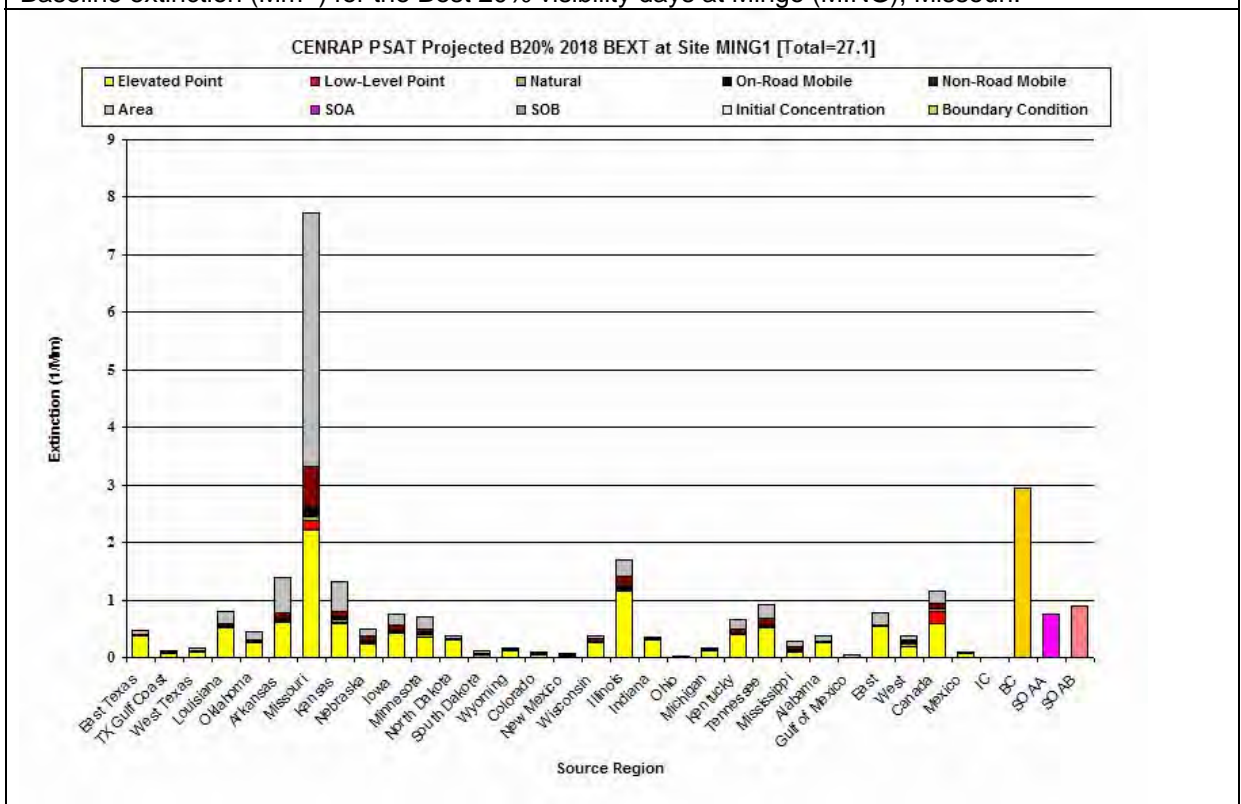


Figure E-7j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Mingo (MING), Missouri.

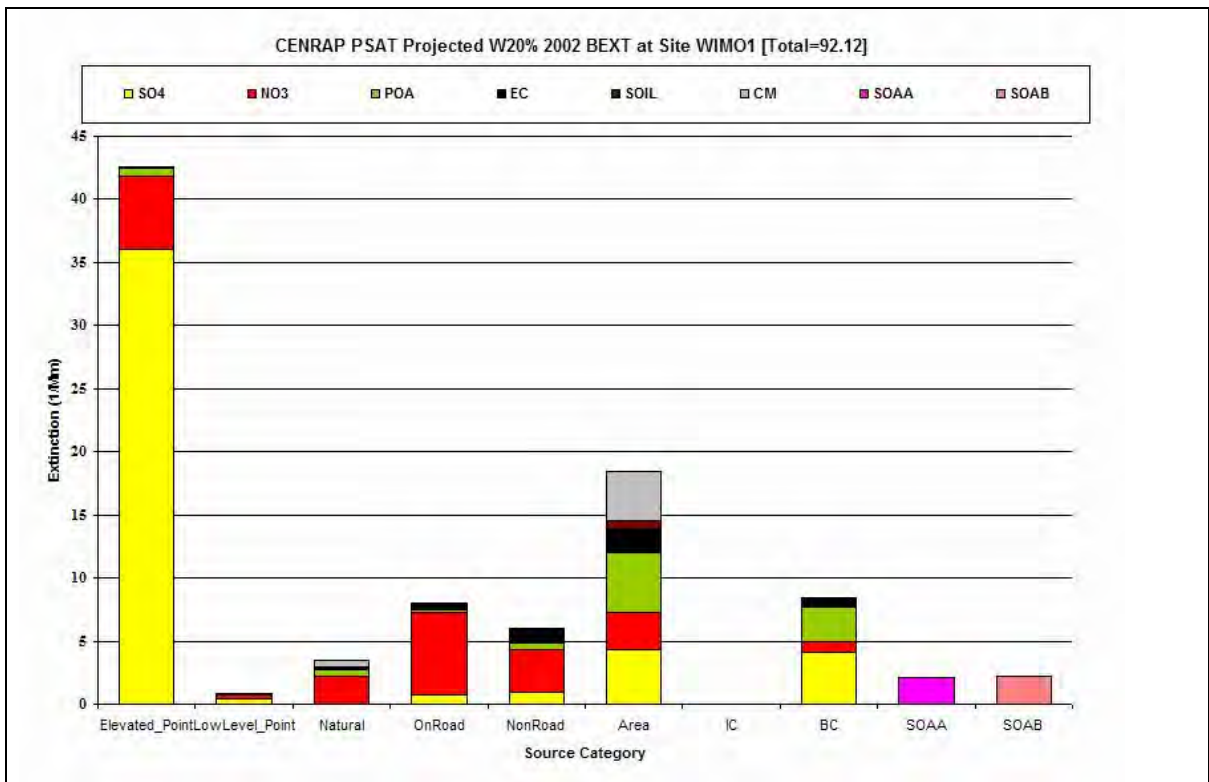


Figure E-8a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

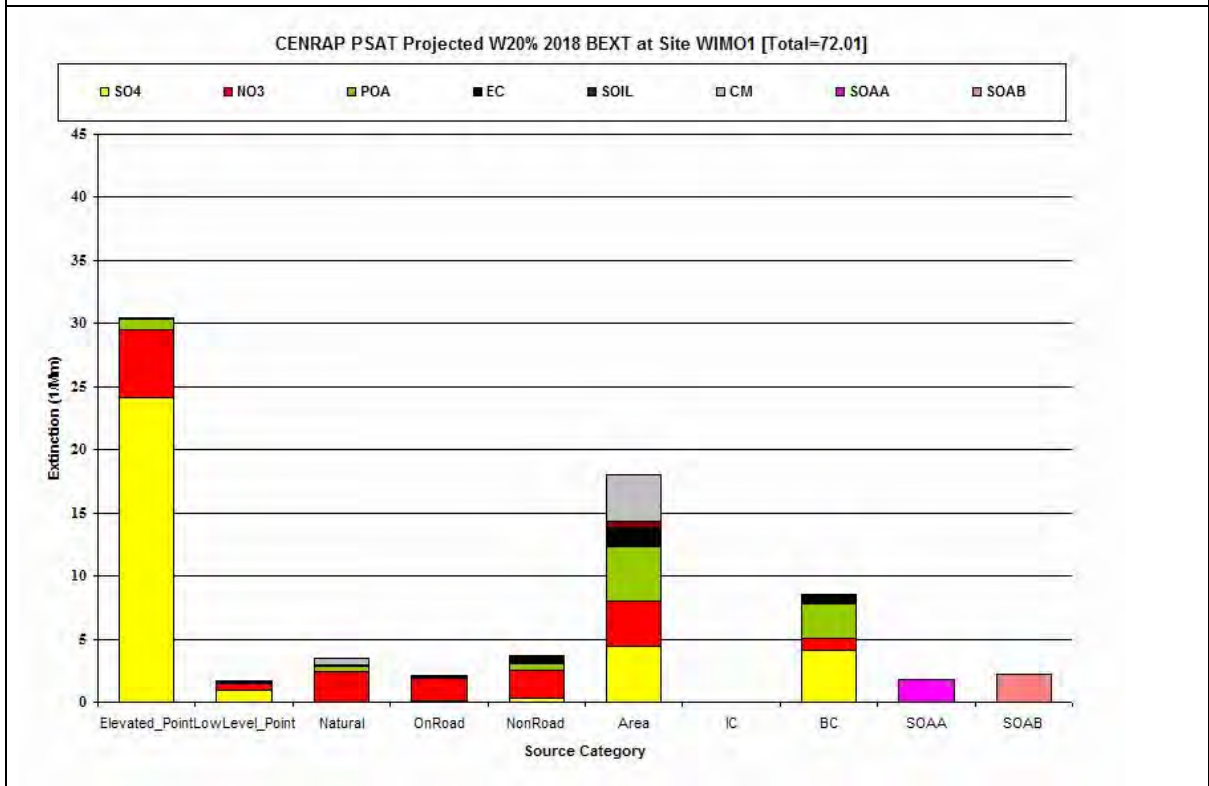


Figure E-8b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

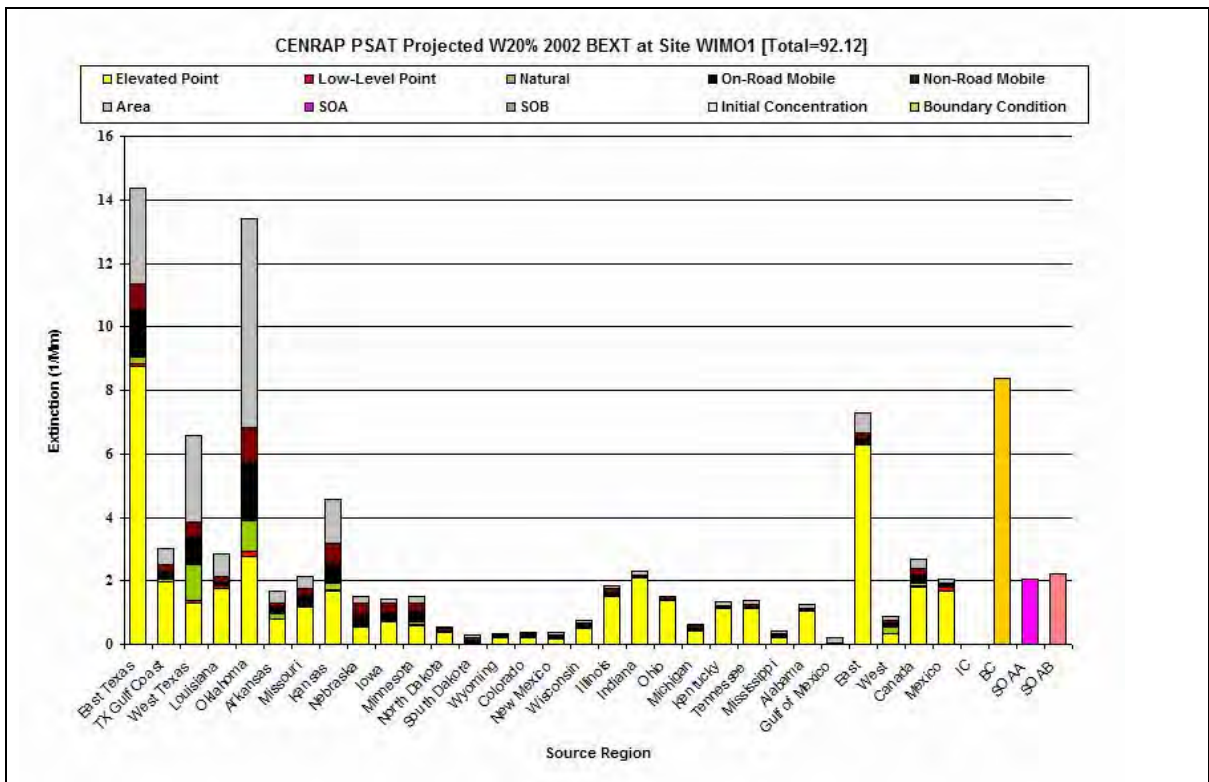


Figure E-8c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

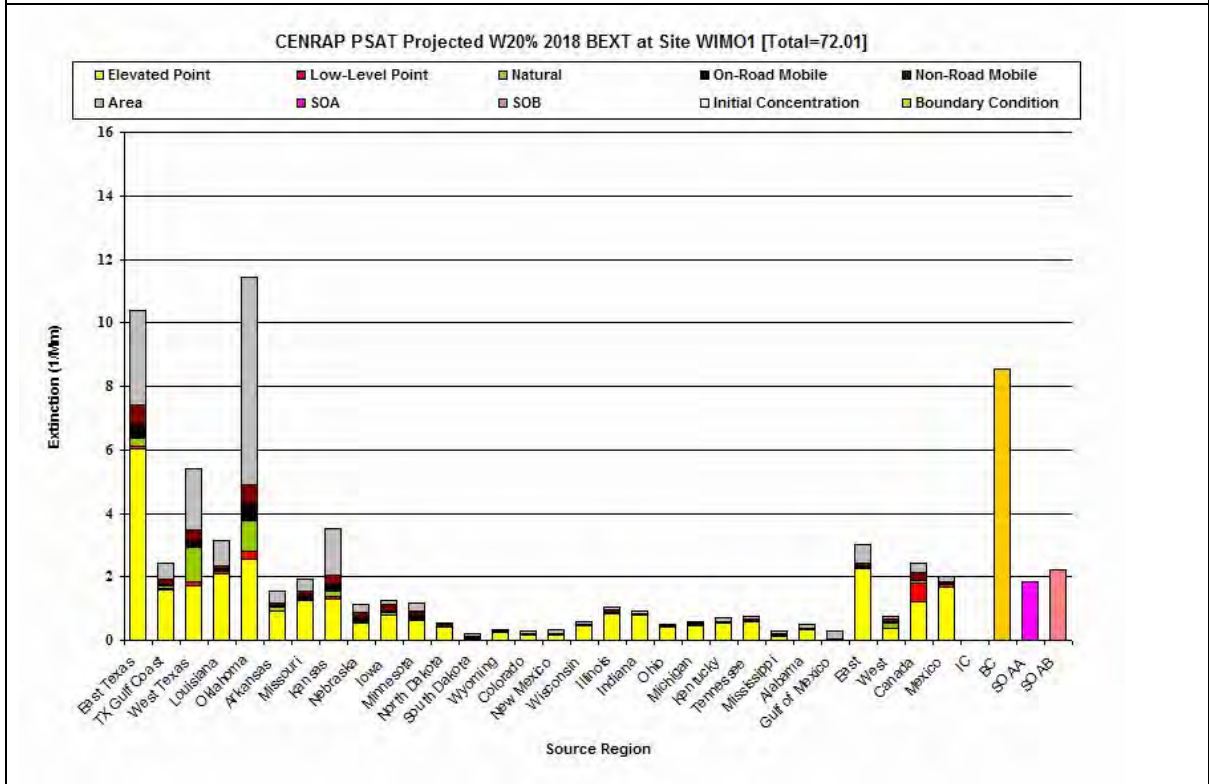


Figure E-8d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

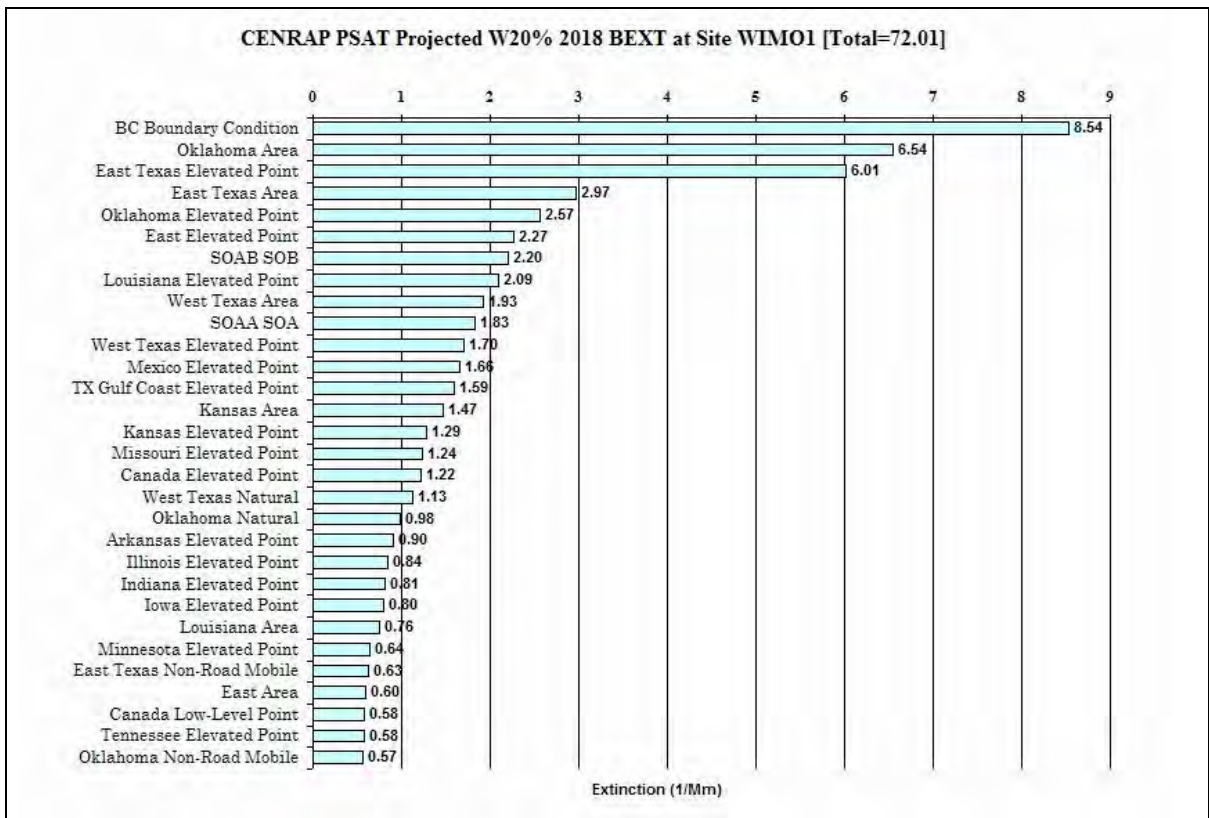


Figure E-8e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

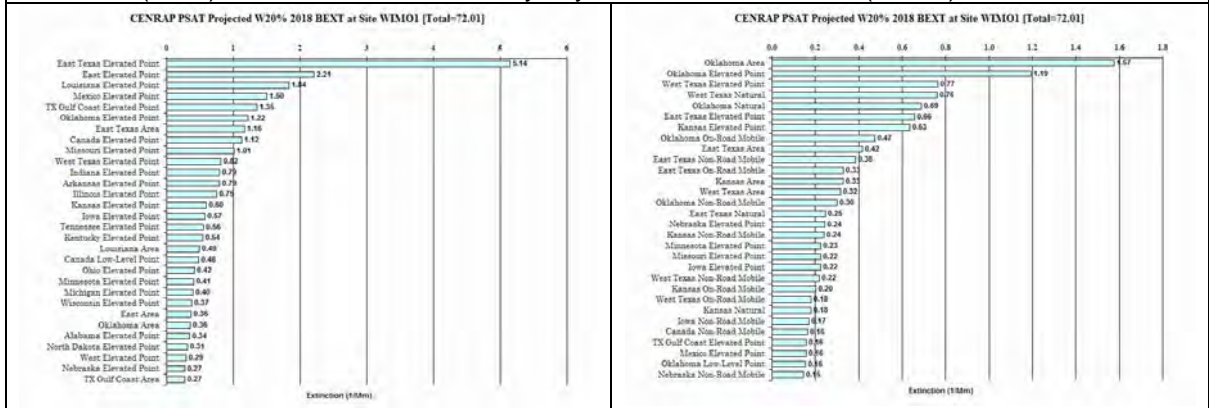


Figure E-8f. Ranked PSAT source region by source category contributions to the average 2018 SO₄ (left) and NO₃ (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

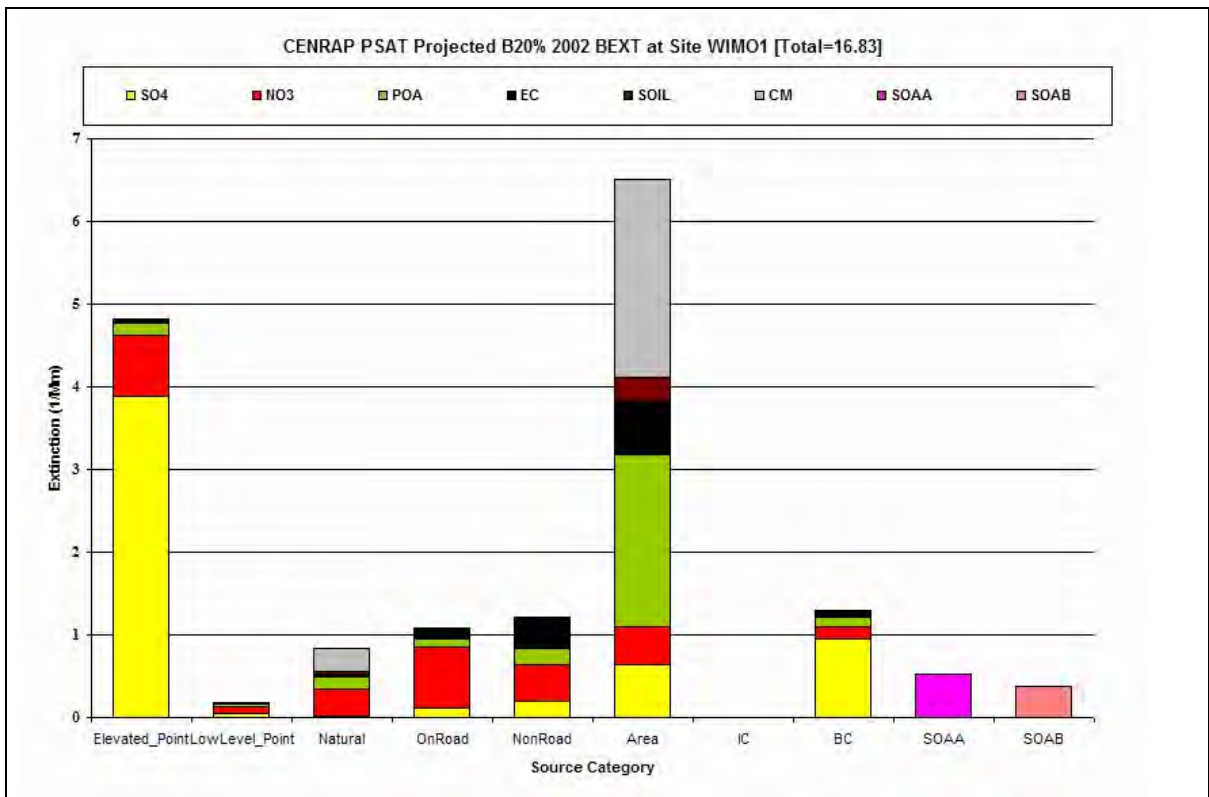


Figure E-8g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

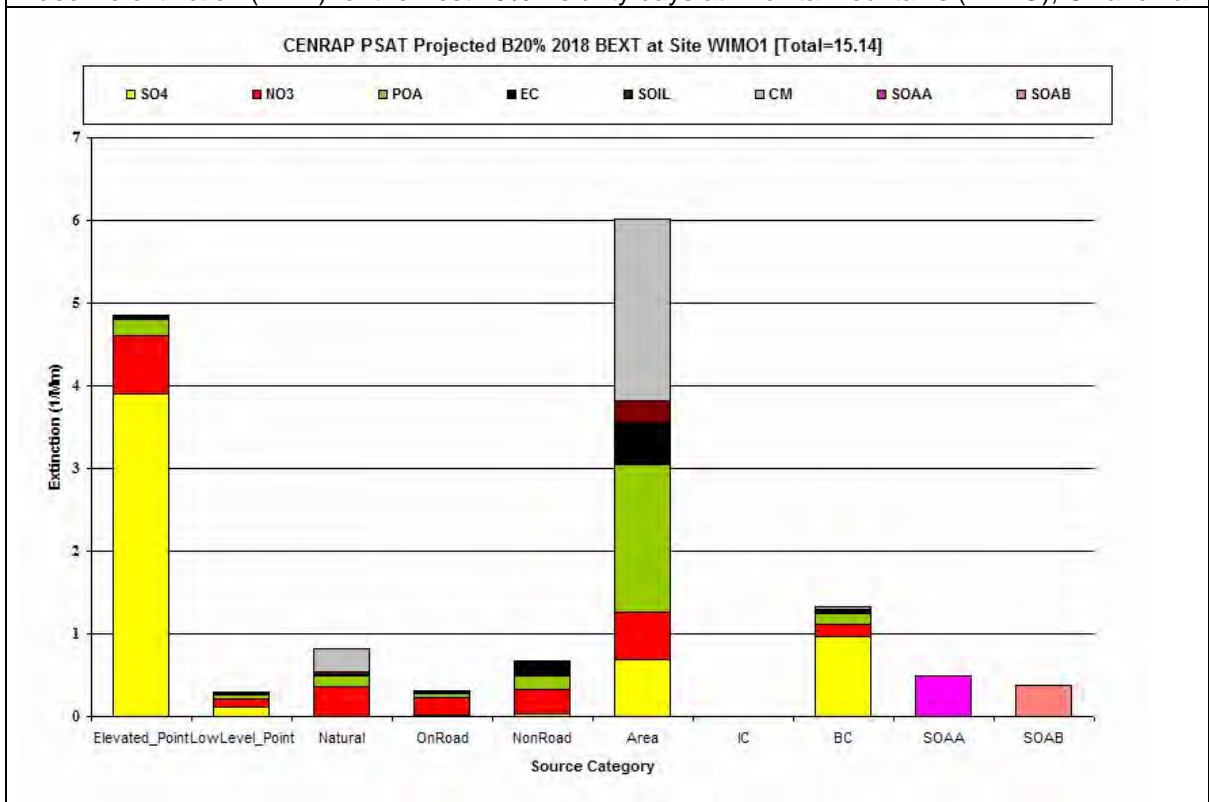


Figure E-8h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

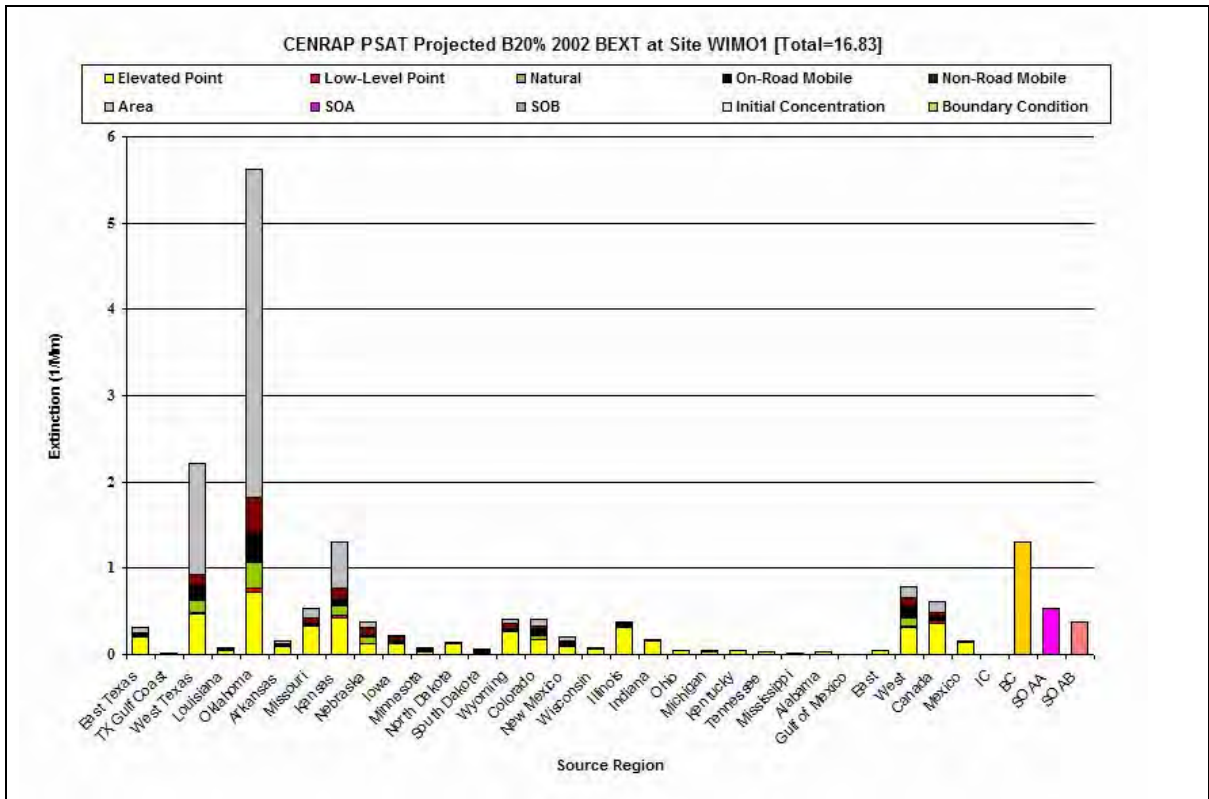


Figure E-8i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

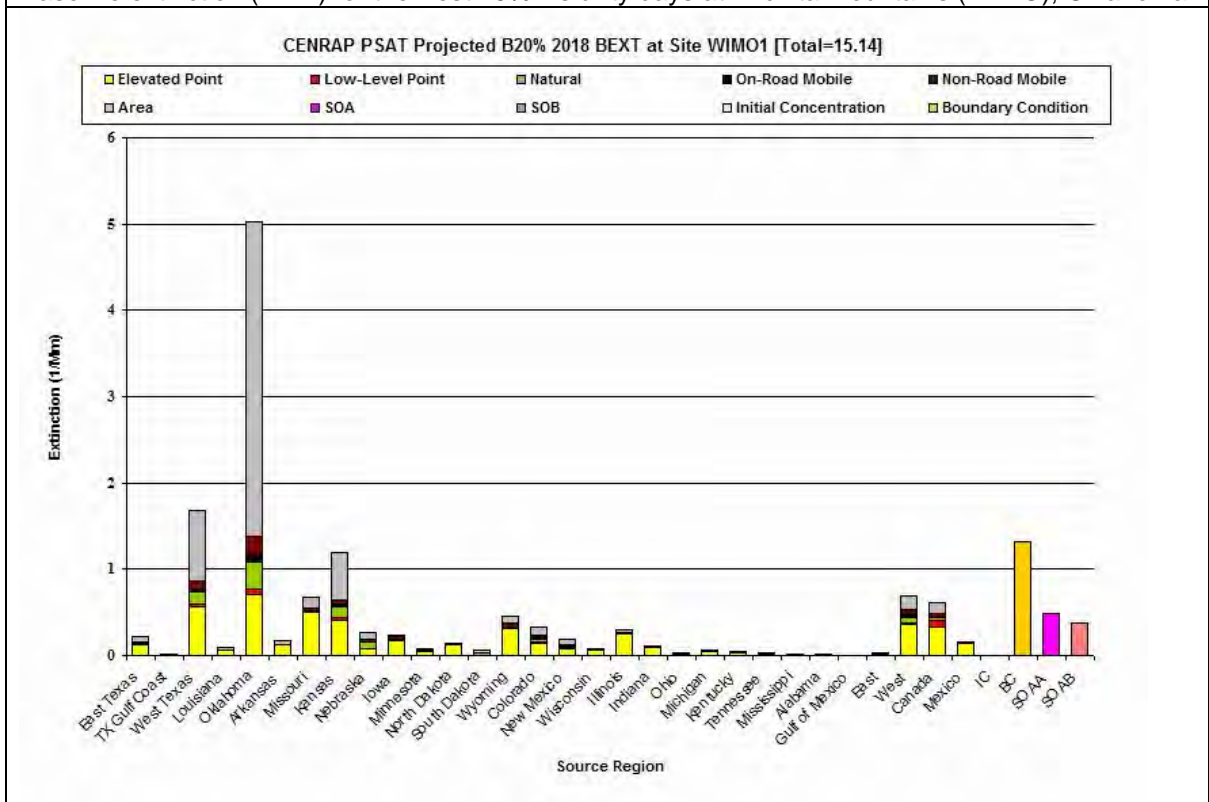


Figure E-8j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Wichita Mountains (WIMO), Oklahoma.

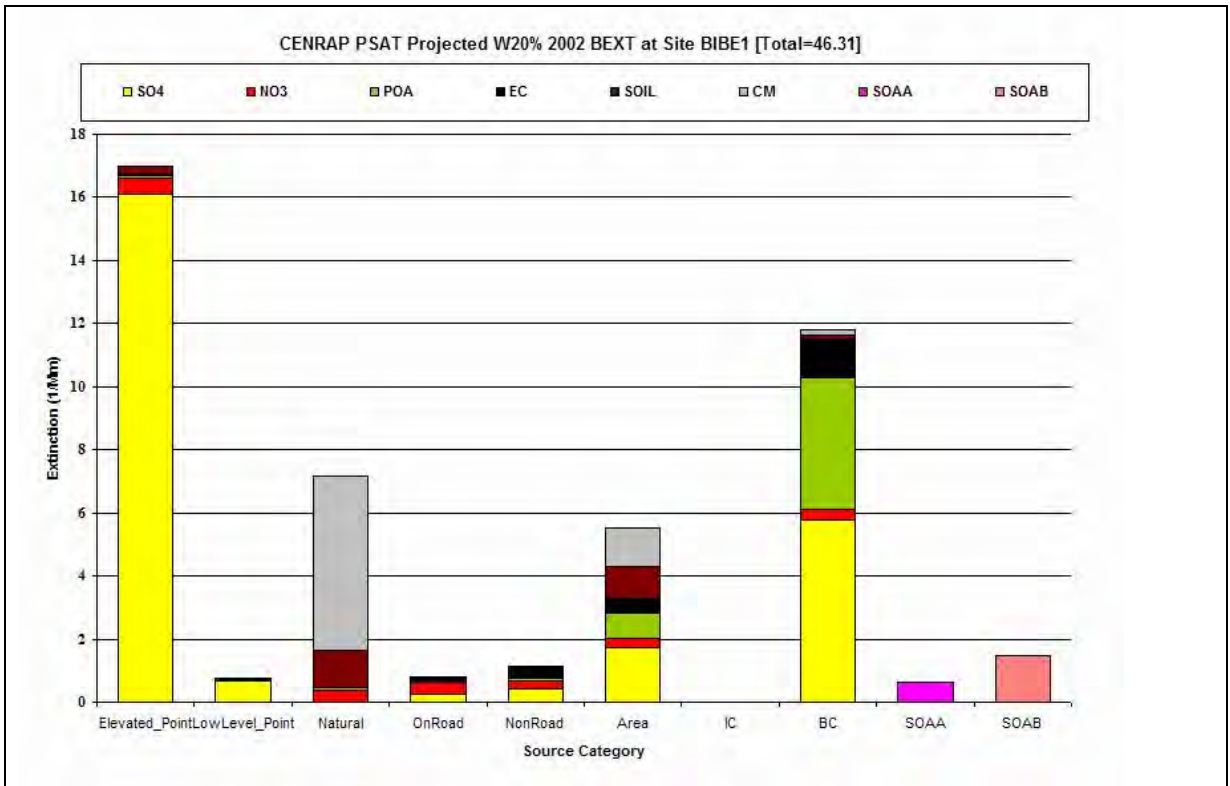


Figure E-9a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

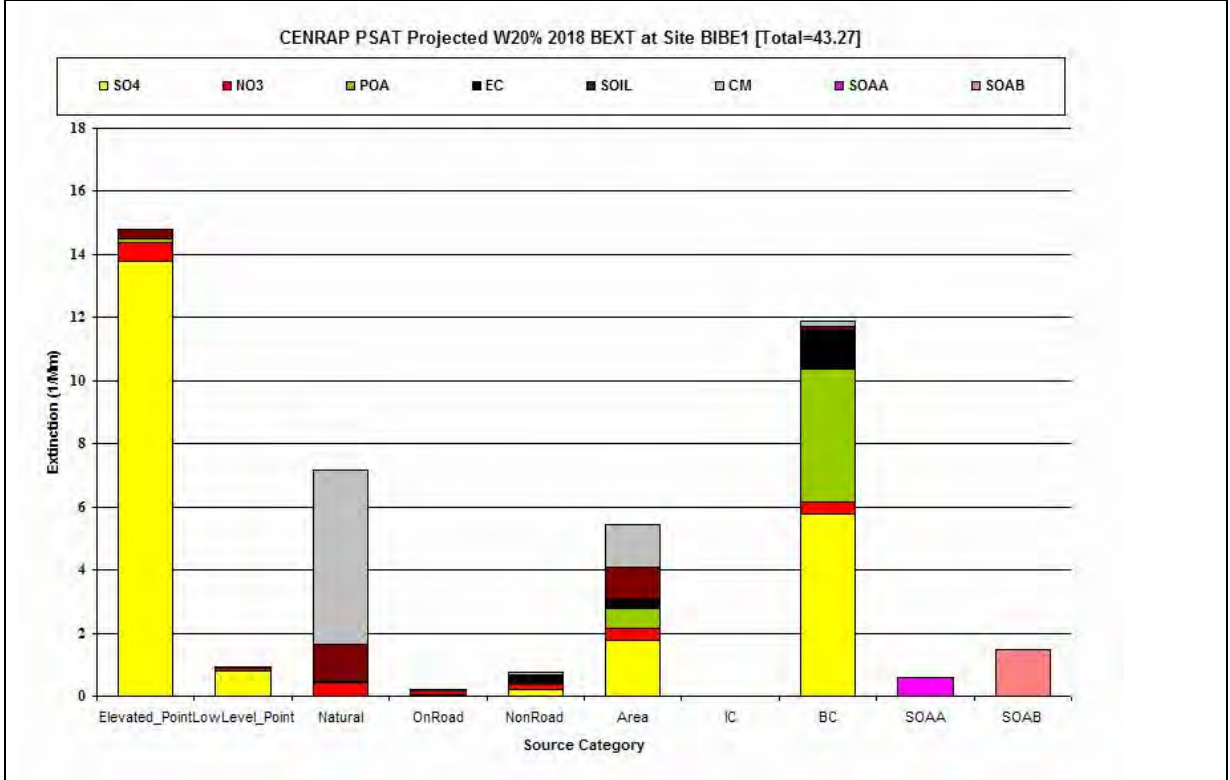


Figure E-9b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

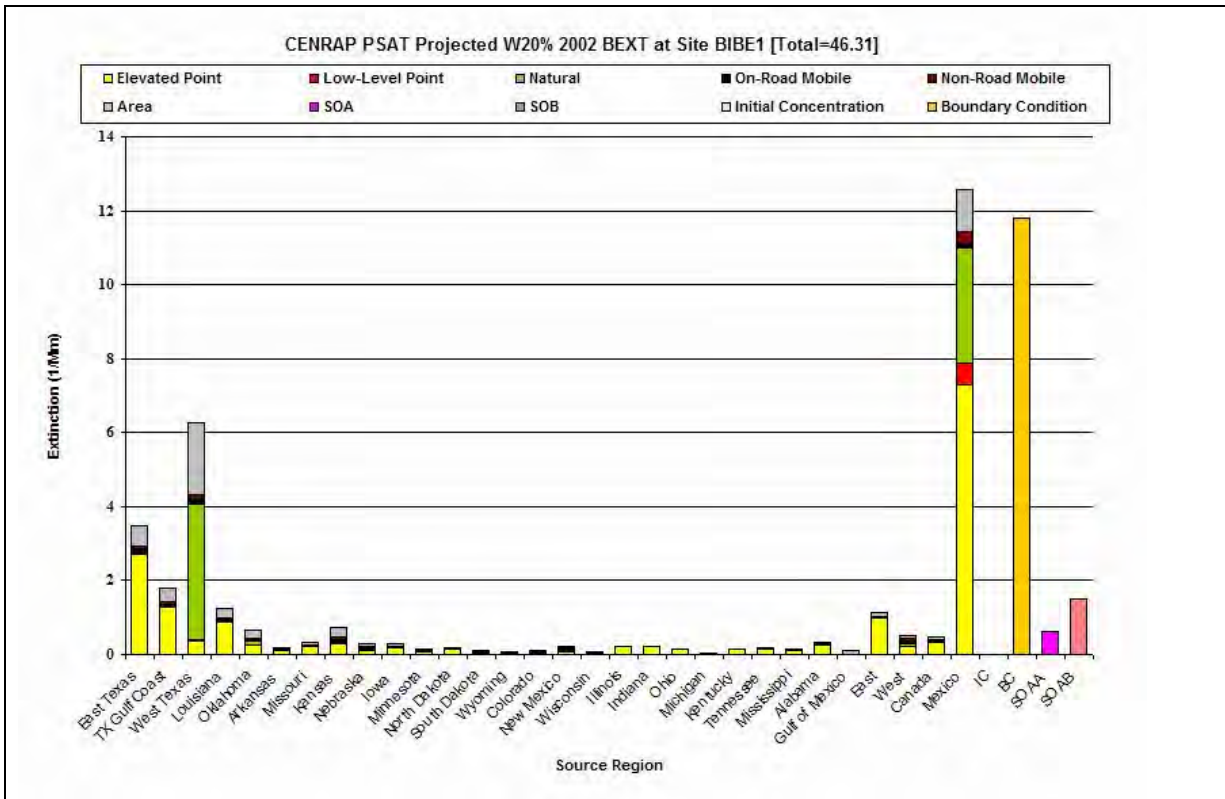


Figure E-9c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

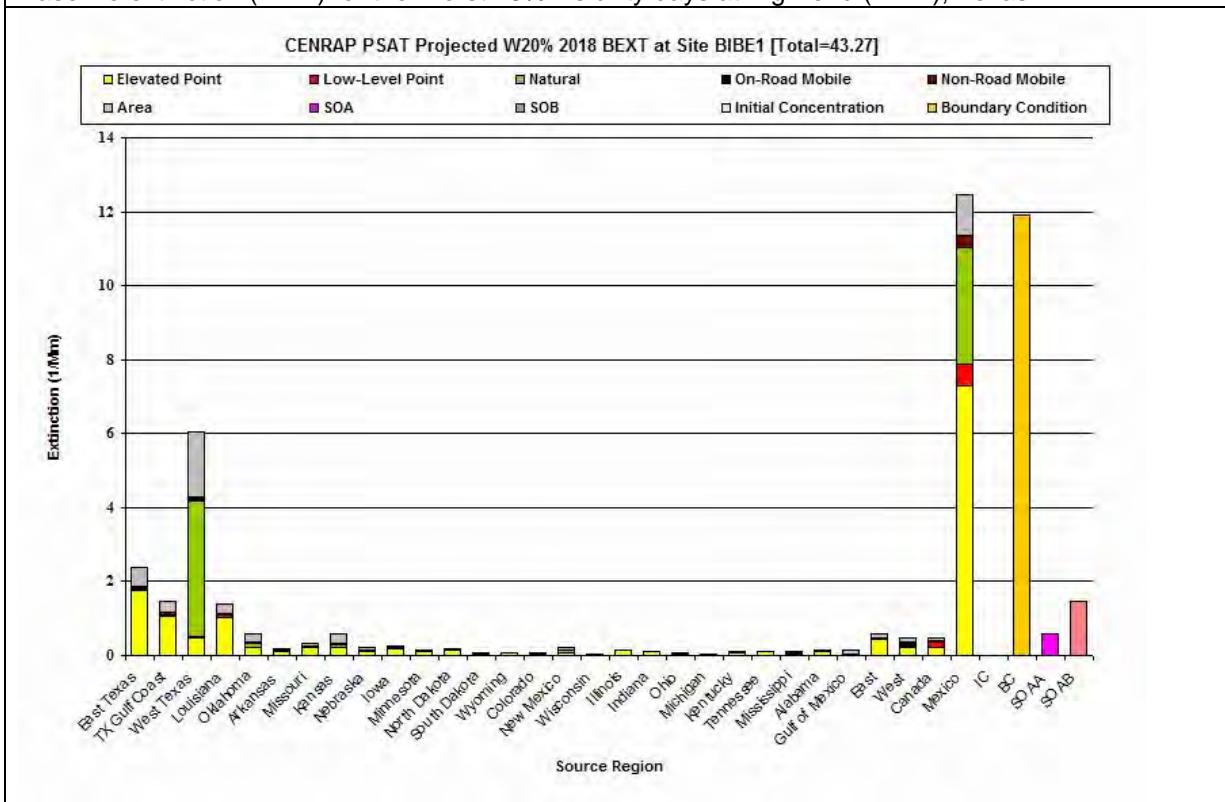


Figure E-9d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

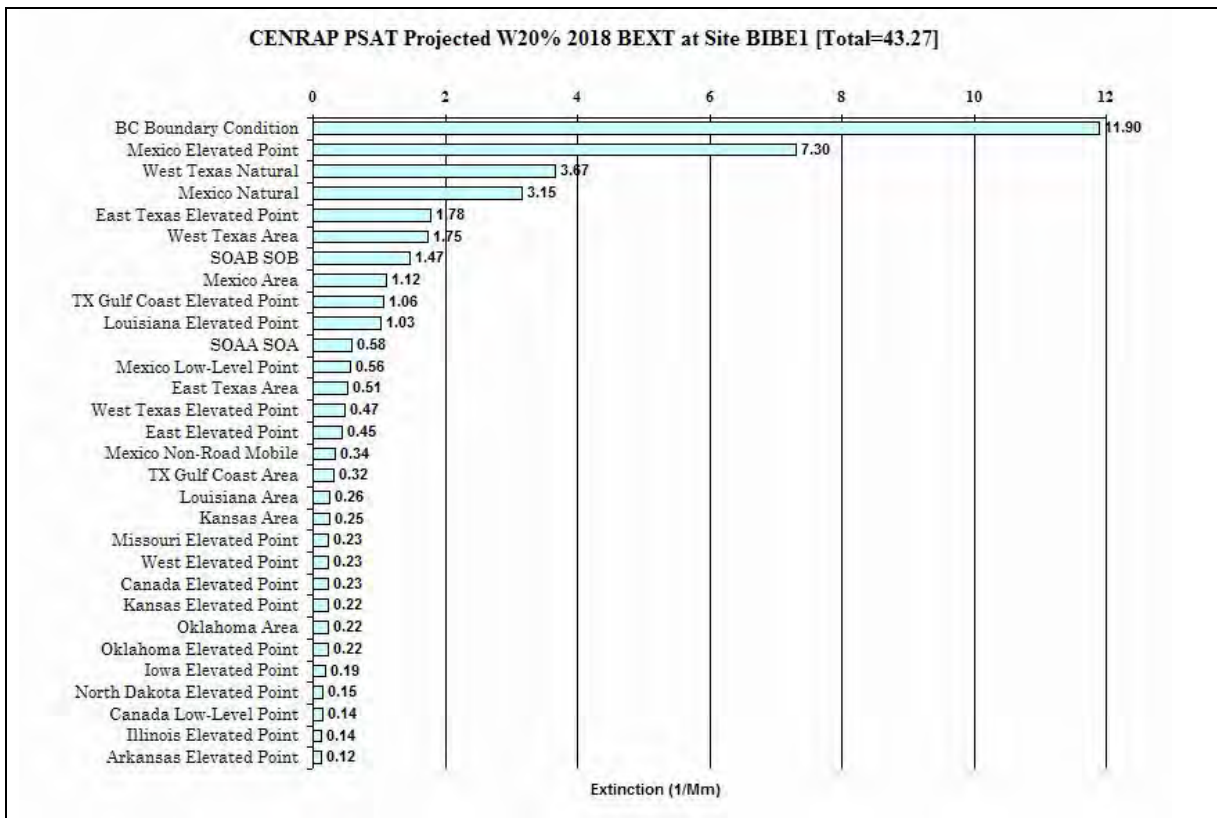


Figure E-9e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

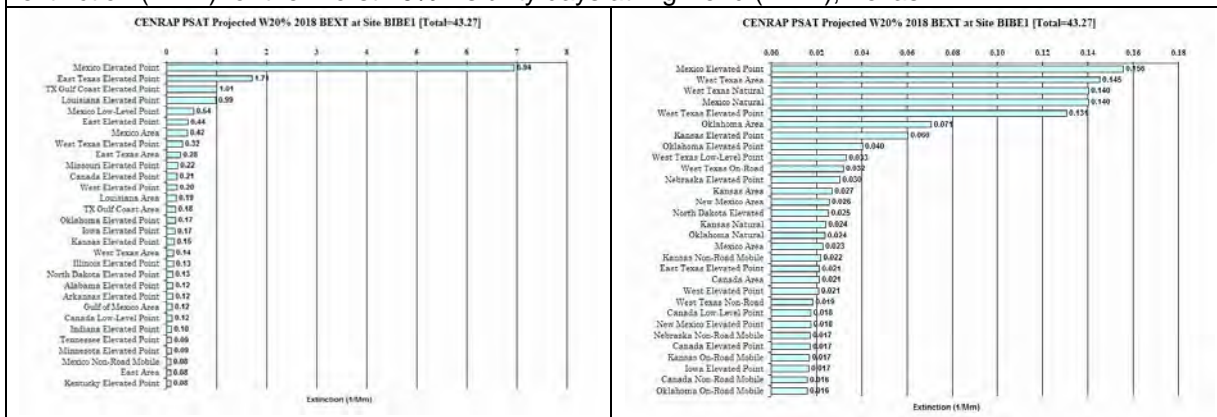


Figure E-9f. Ranked PSAT source region by source category contributions to the average 2018 SO4 (left) and NO3 (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

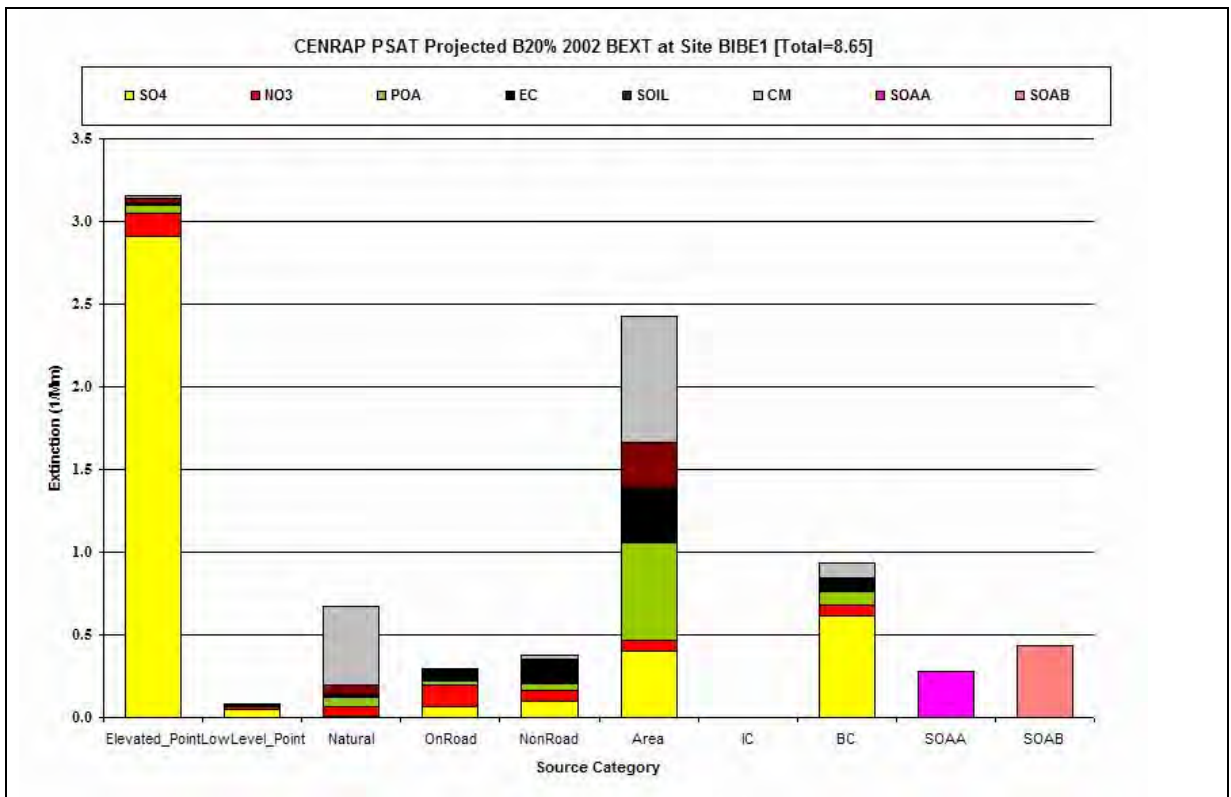


Figure E-9g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

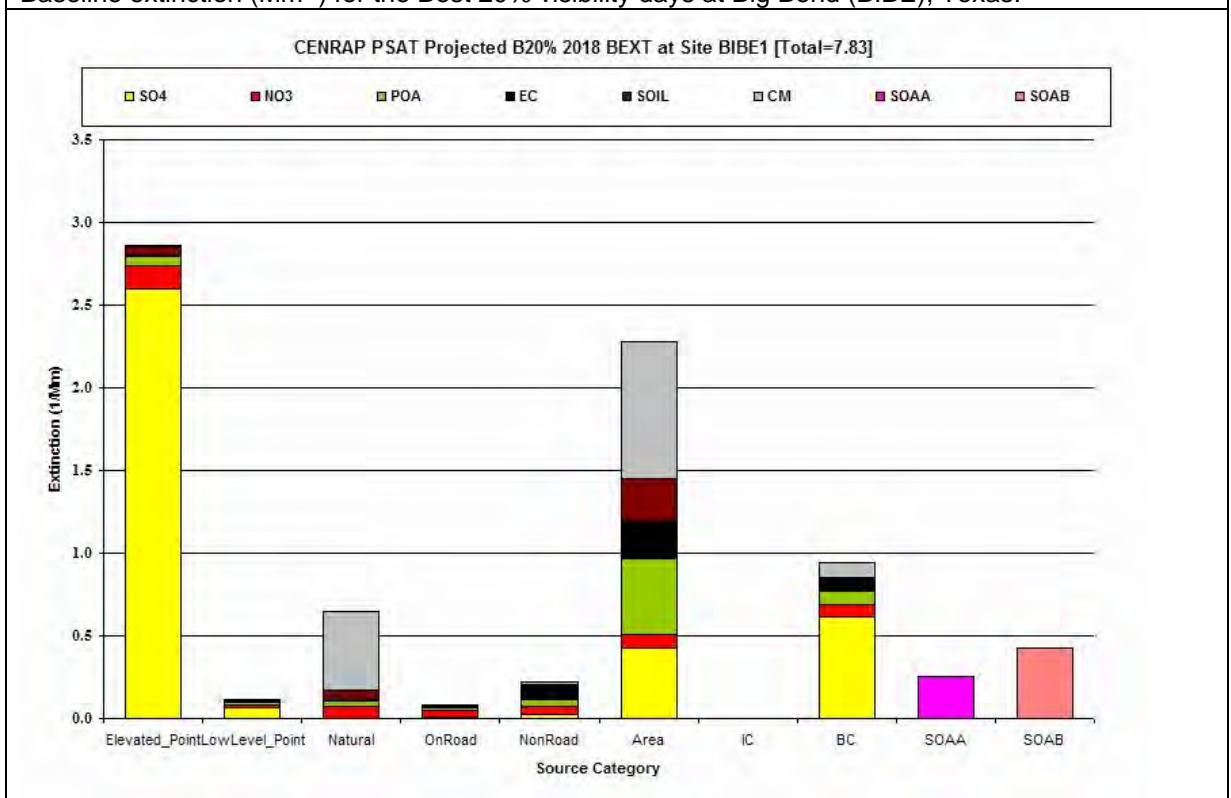


Figure E-9h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

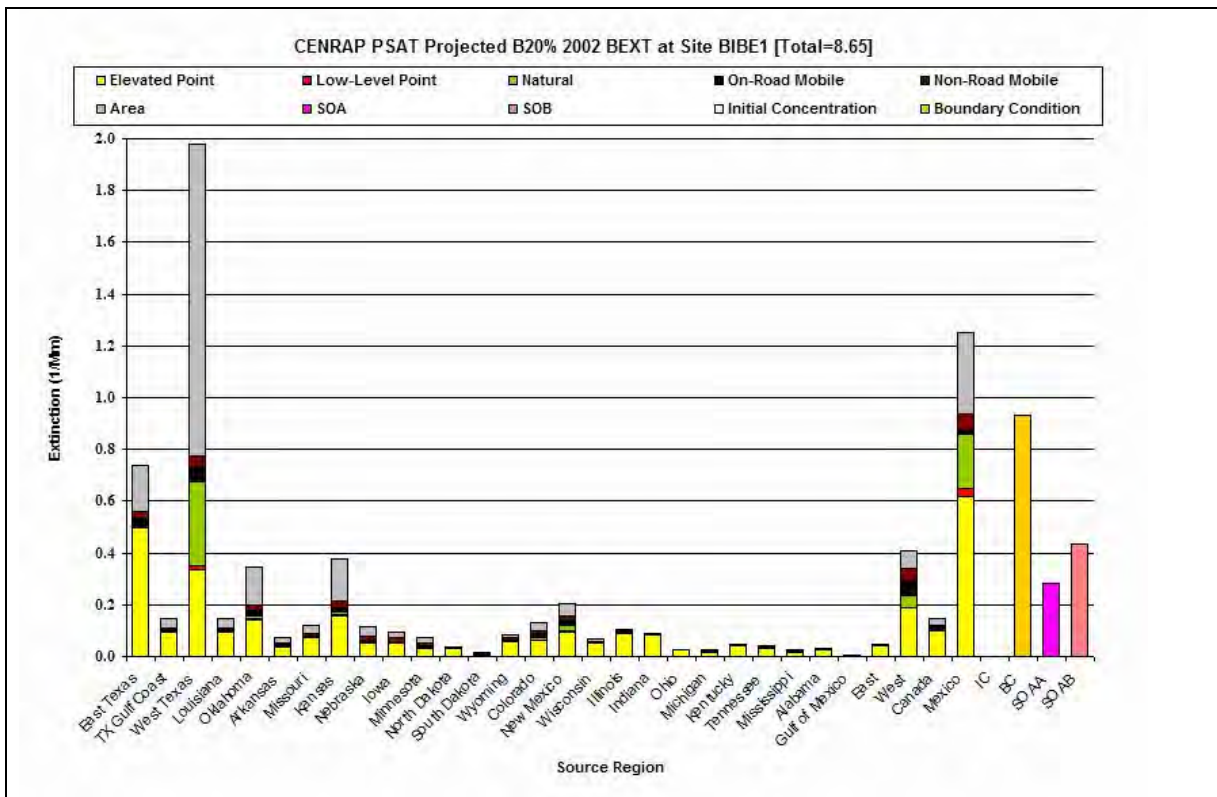


Figure E-9i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days Big Bend (BIBE), Texas.

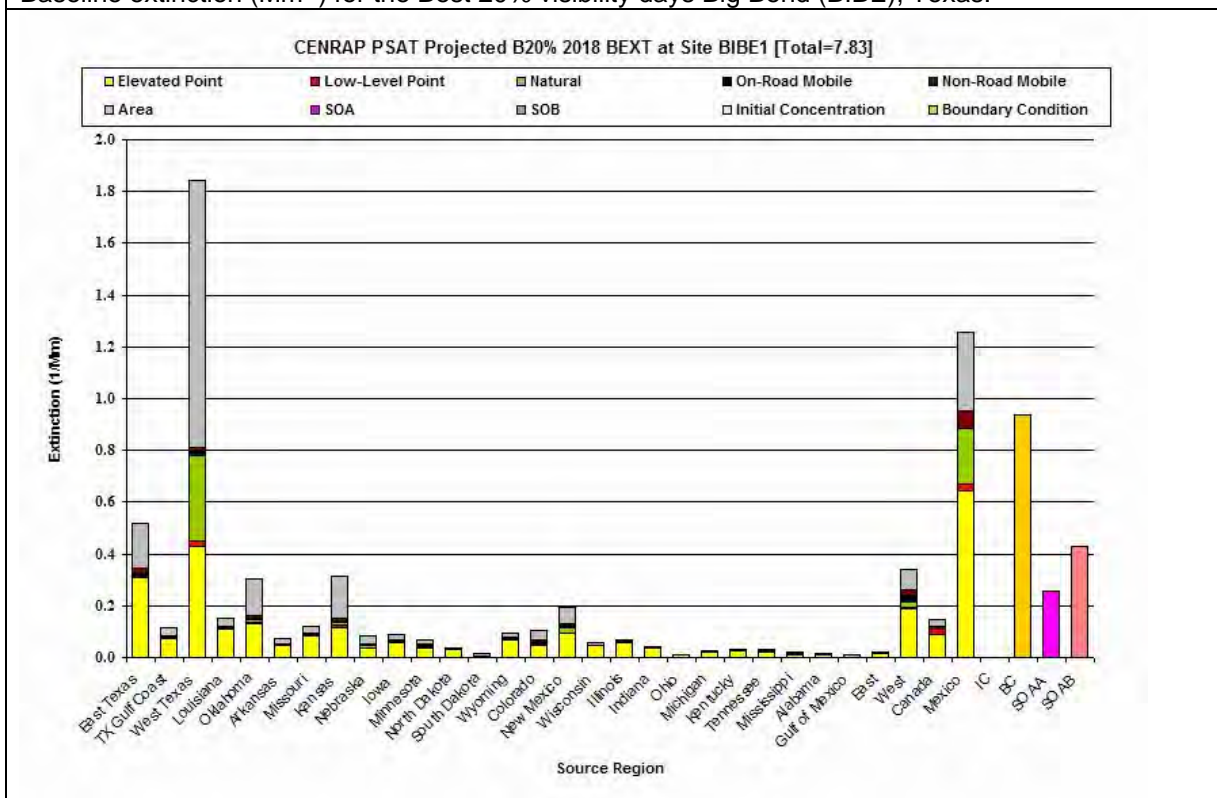


Figure E-9j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

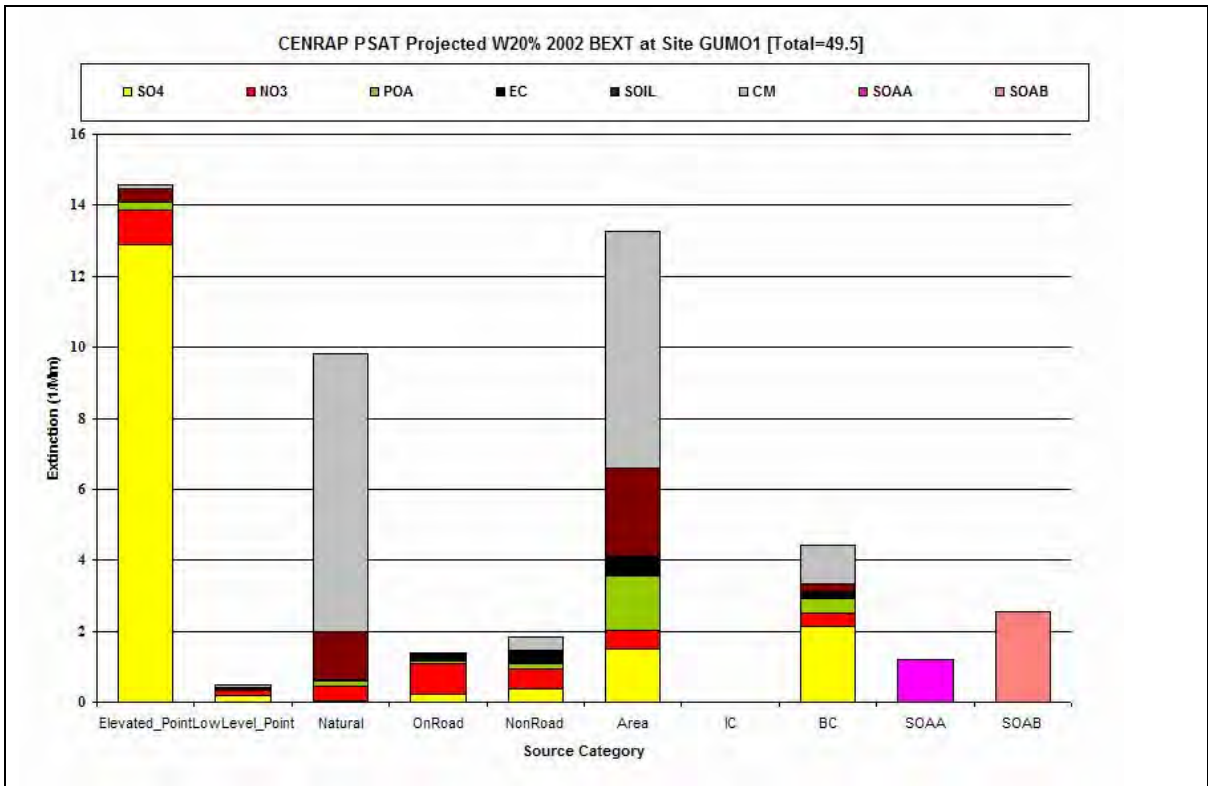


Figure E-10a. PSAT source categories by PM species contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

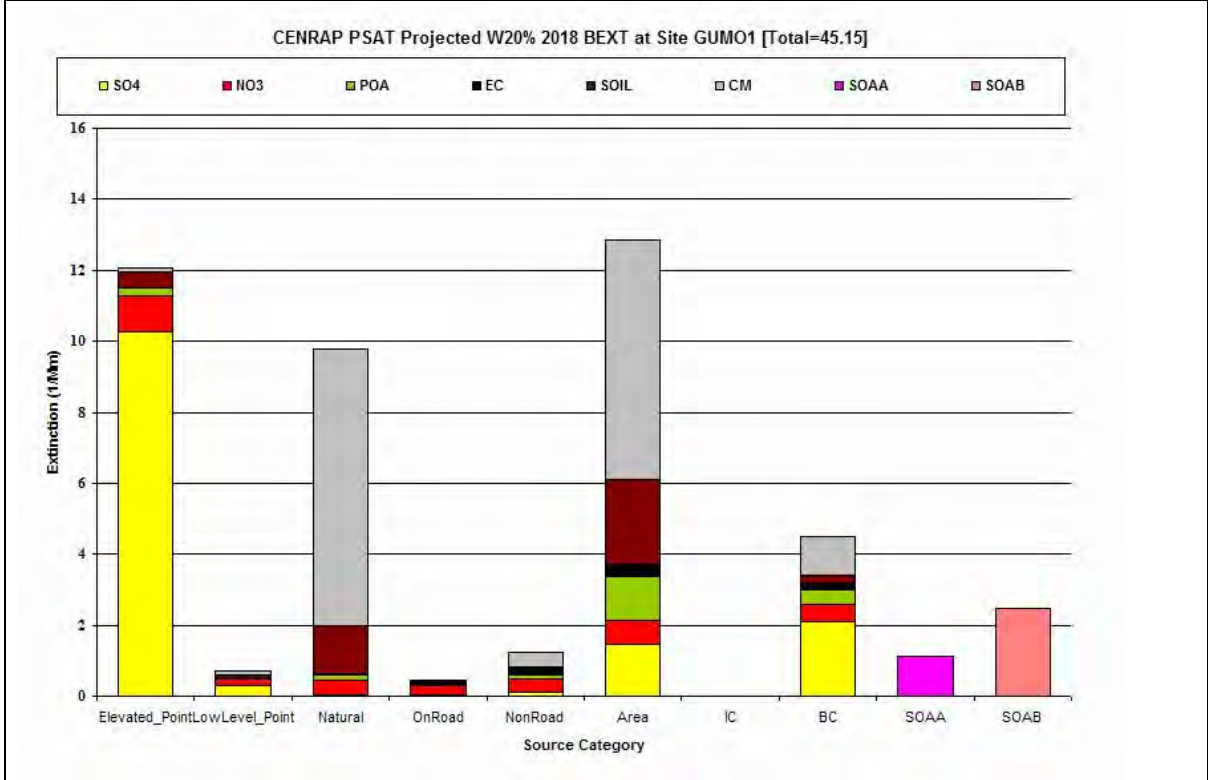


Figure E-10b. PSAT source category by PM species contributions to the average 2018 projected extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

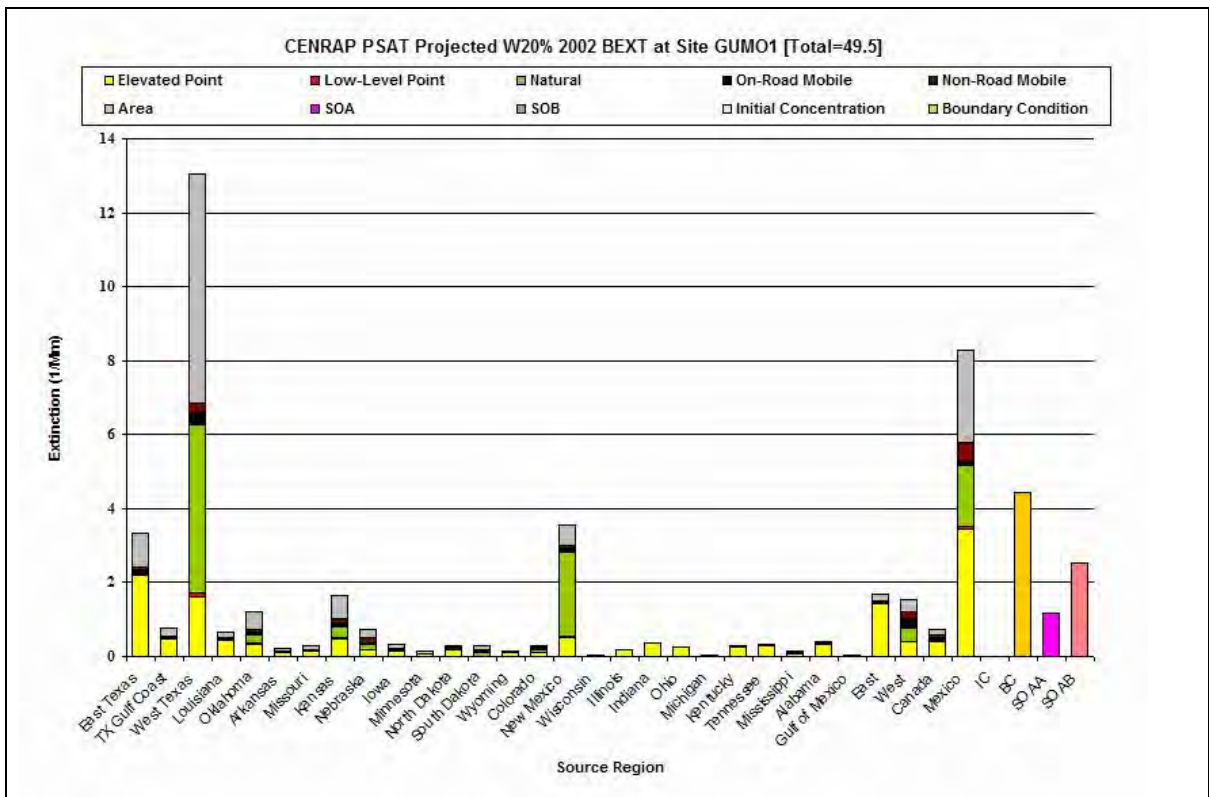


Figure E-10c. PSAT source region by source category contributions to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

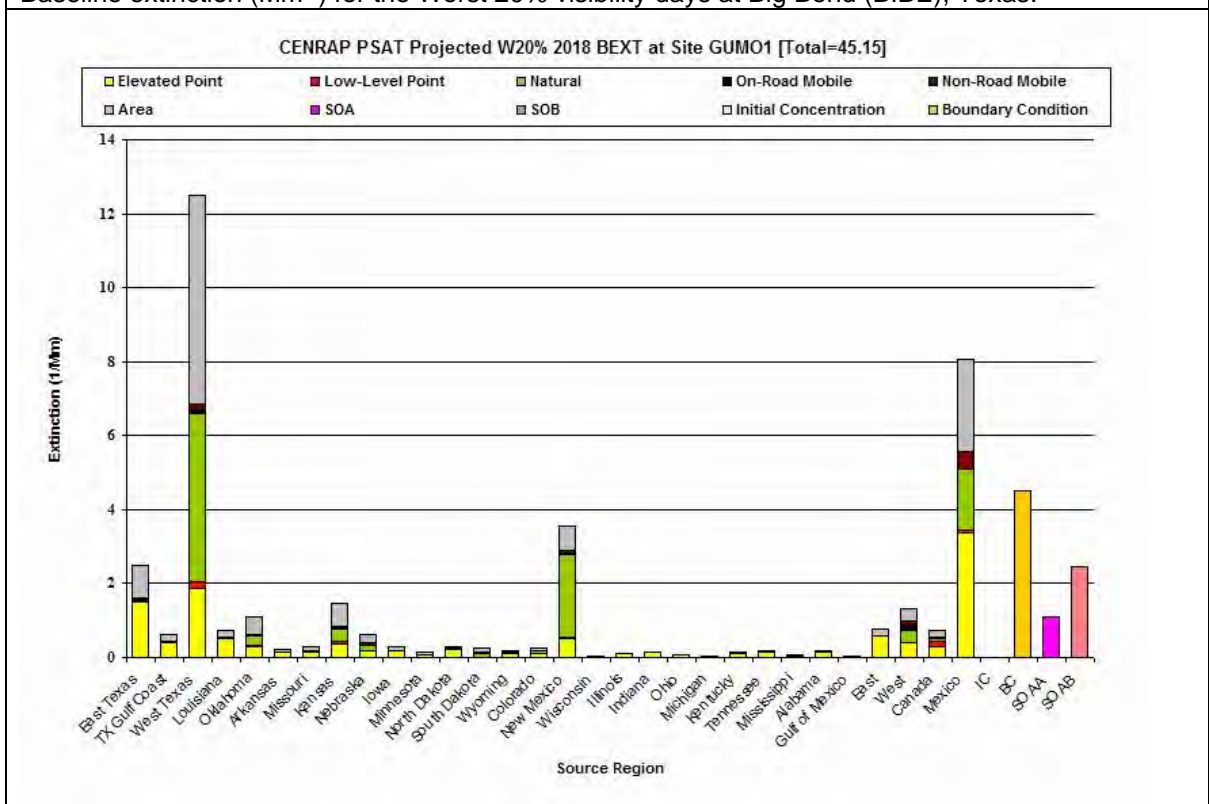


Figure E-10d. PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

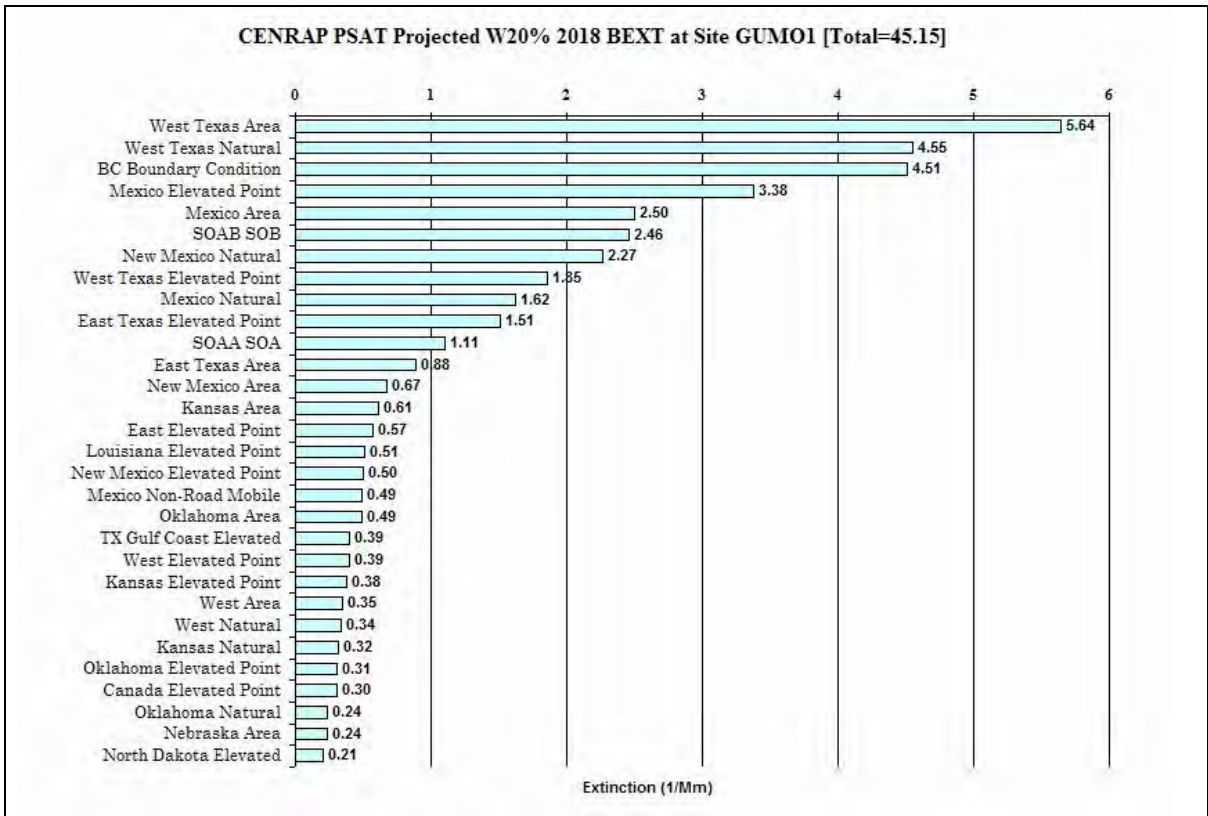


Figure E-10e. Ranked PSAT source region by source category contributions to the average 2018 extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

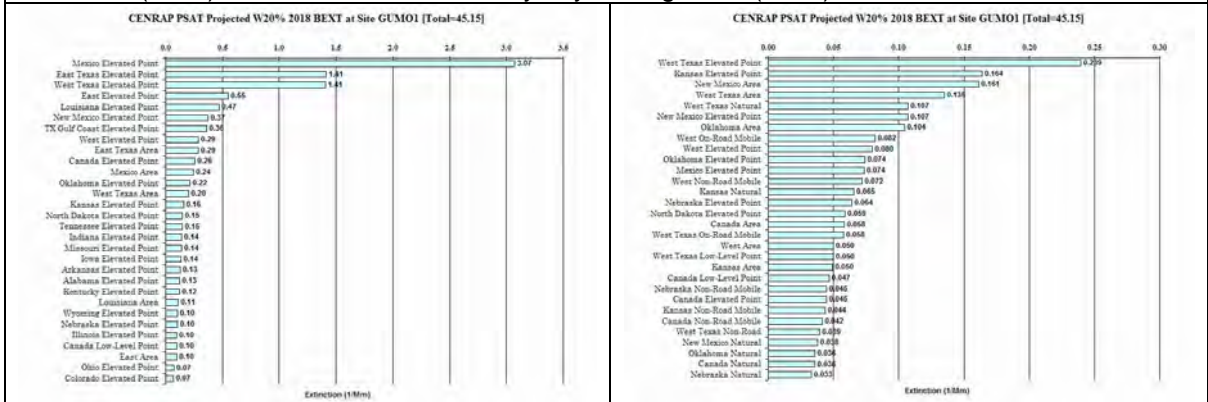


Figure E-10f. Ranked PSAT source region by source category contributions to the average 2018 SO₄ (left) and NO₃ (right) extinction (Mm^{-1}) for the Worst 20% visibility days at Big Bend (BIBE), Texas.

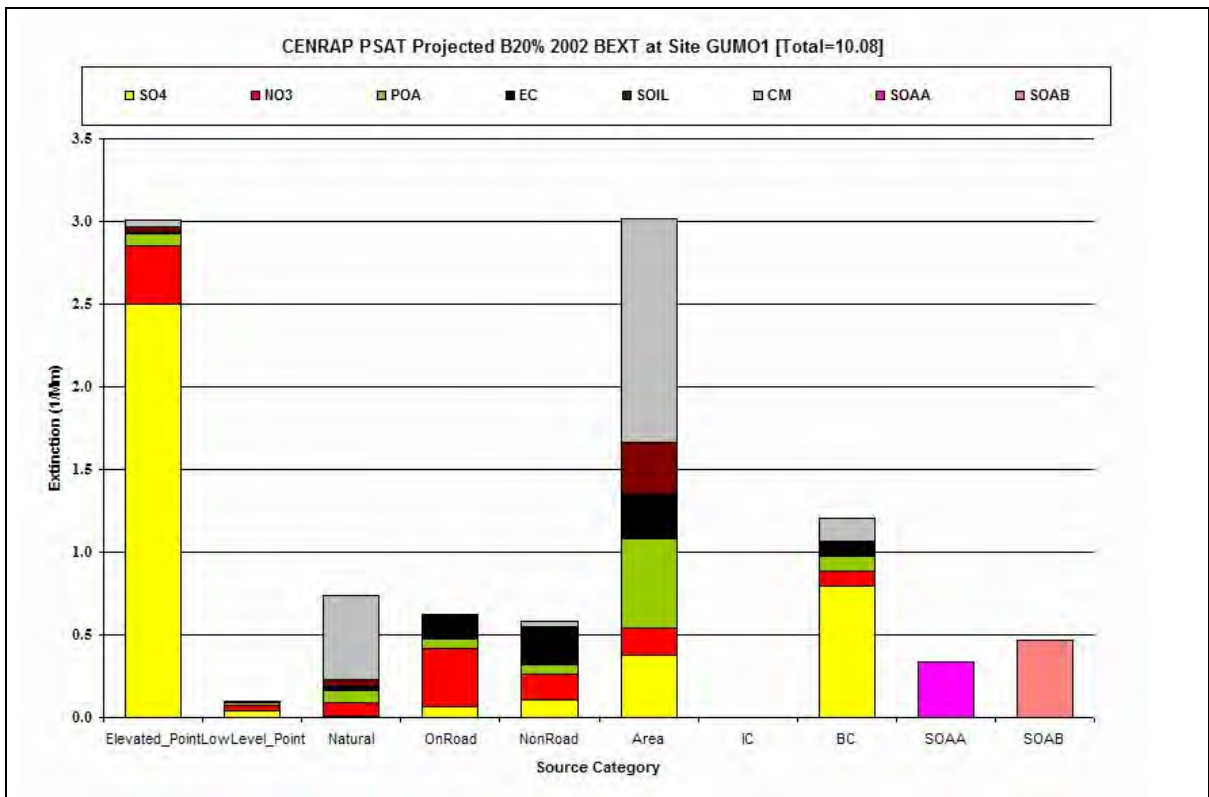


Figure E-10g. PSAT contributions by source category and PM species to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

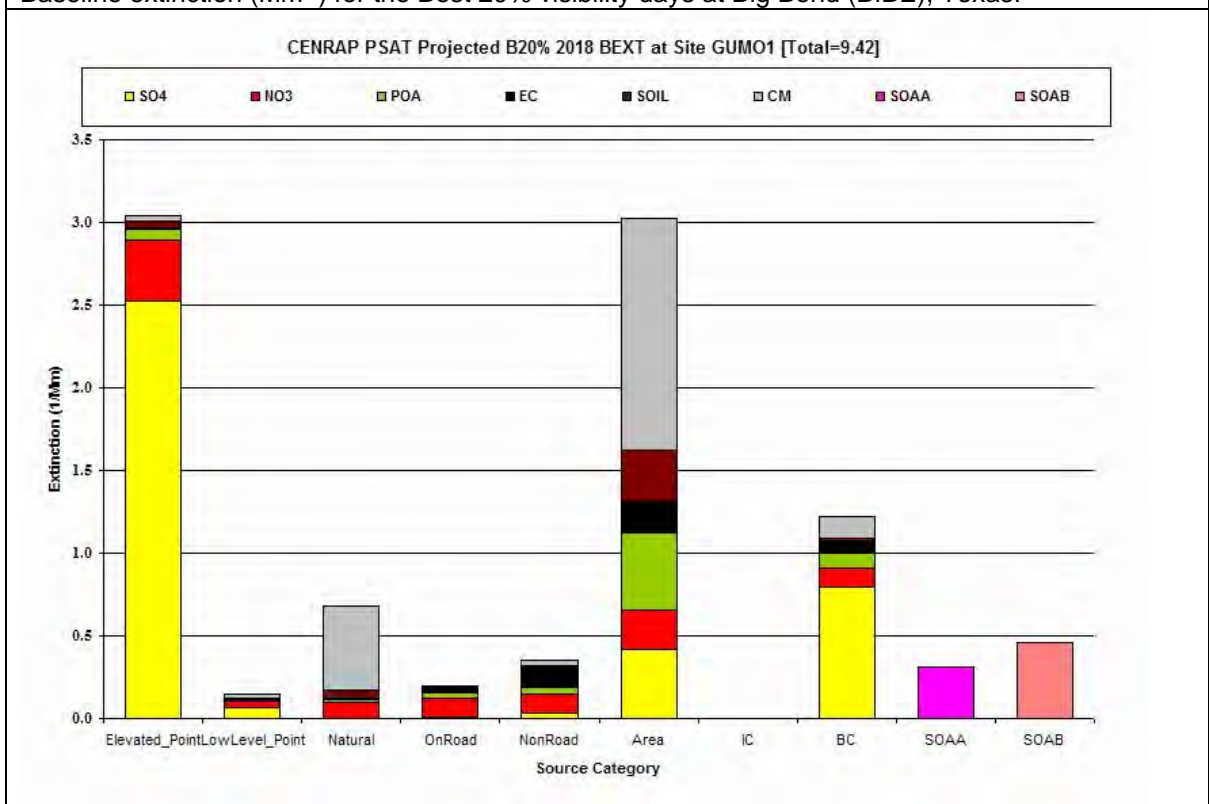


Figure E-10h. PSAT contributions by source category and PM species to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

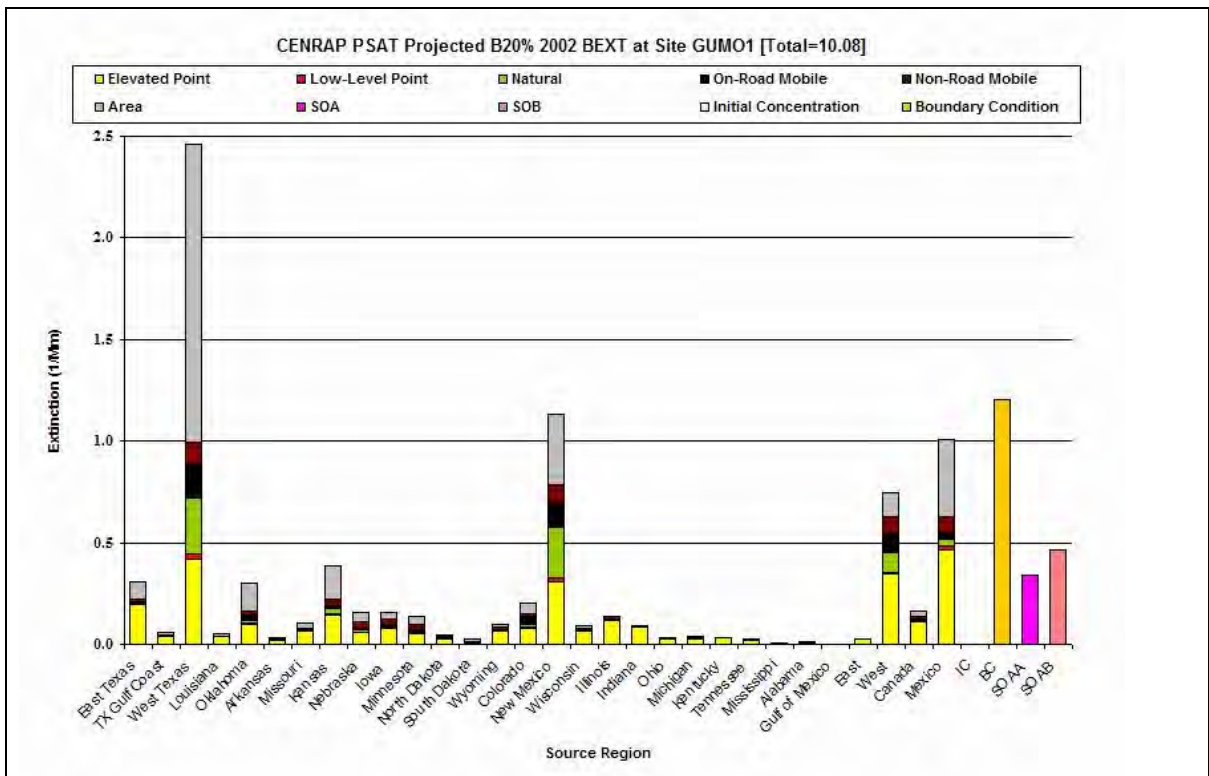


Figure E-10i. PSAT contributions by source region and source category to the average 2000-2004 Baseline extinction (Mm^{-1}) for the Best 20% visibility days Big Bend (BIBE), Texas.

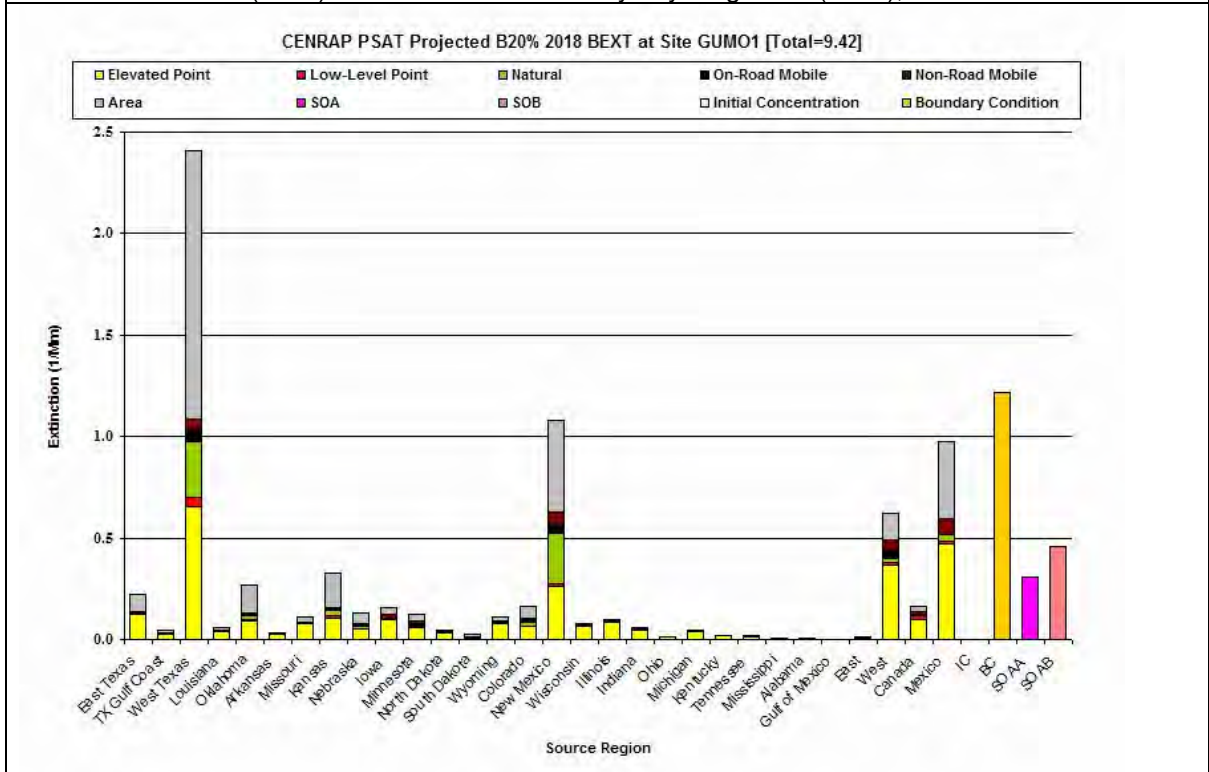


Figure E-10j. PSAT contributions by source region and source category to the average 2018 extinction (Mm^{-1}) for the Best 20% visibility days at Big Bend (BIBE), Texas.

APPENDIX F

Extinction and PM Species-Specific 2018 Visibility Projections and Comparisons with 2018 URP Points

- Figure F-1: Caney Creek Wilderness Area (CACR), Arkansas
- Figure F-2: Upper Buffalo Wilderness Area (UPBU), Arkansas
- Figure F-3: Breton Island Wilderness Area (BRET), Louisiana
- Figure F-4: Boundary Waters Canoe Area Wilderness Area (BOWA), Minnesota
- Figure F-5: Voyageurs National Park (VOYA), Minnesota
- Figure F-6: Hercules Glade Wilderness Area (HEGL), Missouri
- Figure F-7: Mingo Wilderness Area (MING), Missouri
- Figure F-8: Wichita Mountains Wilderness Area (WIMO), Oklahoma
- Figure F-9: Big Bend National Park (BIBE), Texas
- Figure F-10: Guadalupe Mountains National Park (GUAD), Texas

**Uniform Rate of Reasonable Progress Glide Path
Caney Creek Wilderness - 20% Data Days**

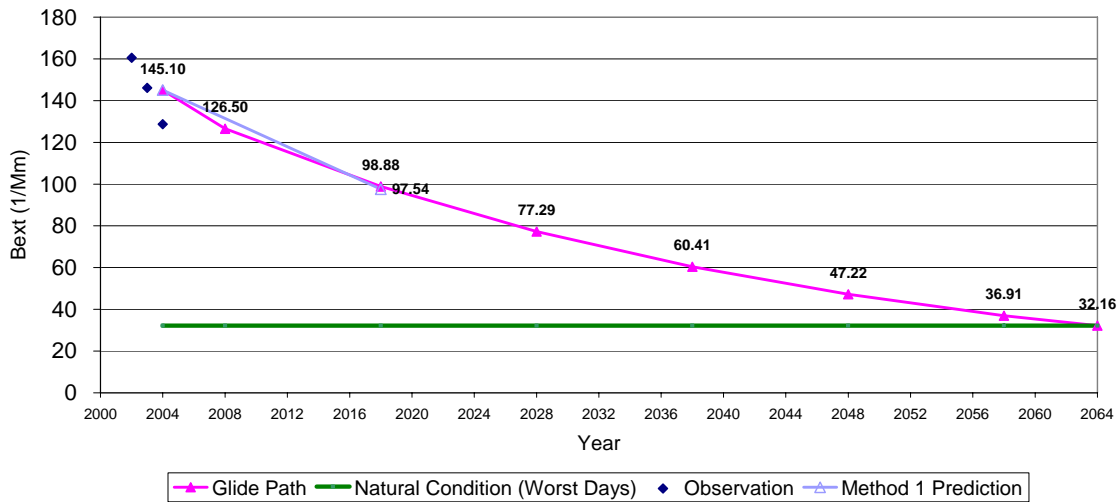


Figure F-1a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

**Uniform Rate of Reasonable Progress Glide Path
Caney Creek Wilderness - 20% Data Days**

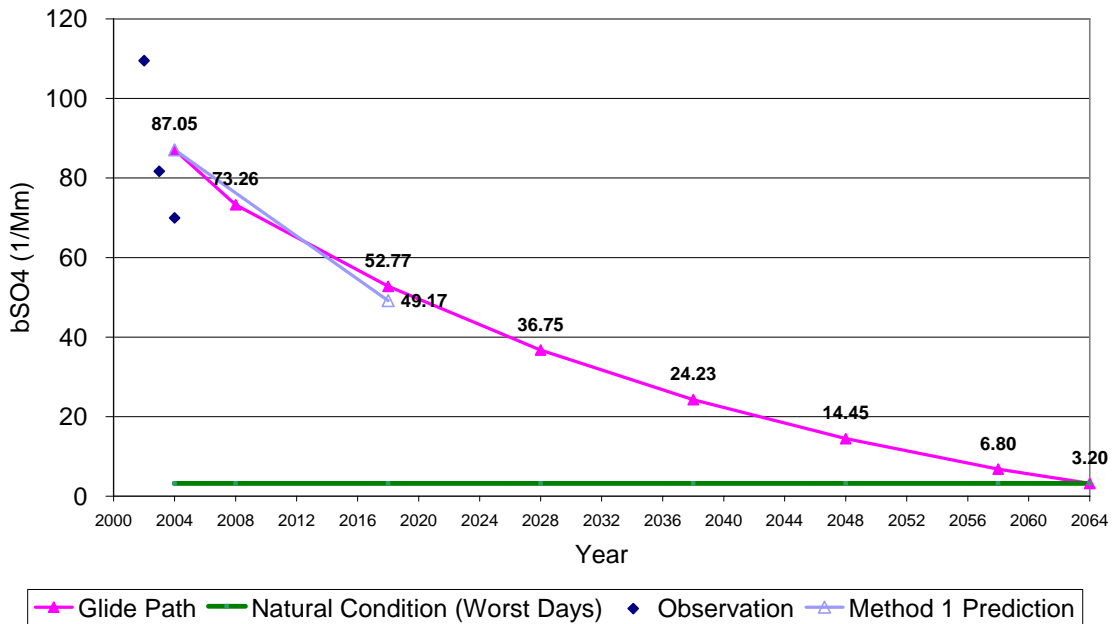


Figure F-1b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Caney Creek Wilderness - 20% Data Days

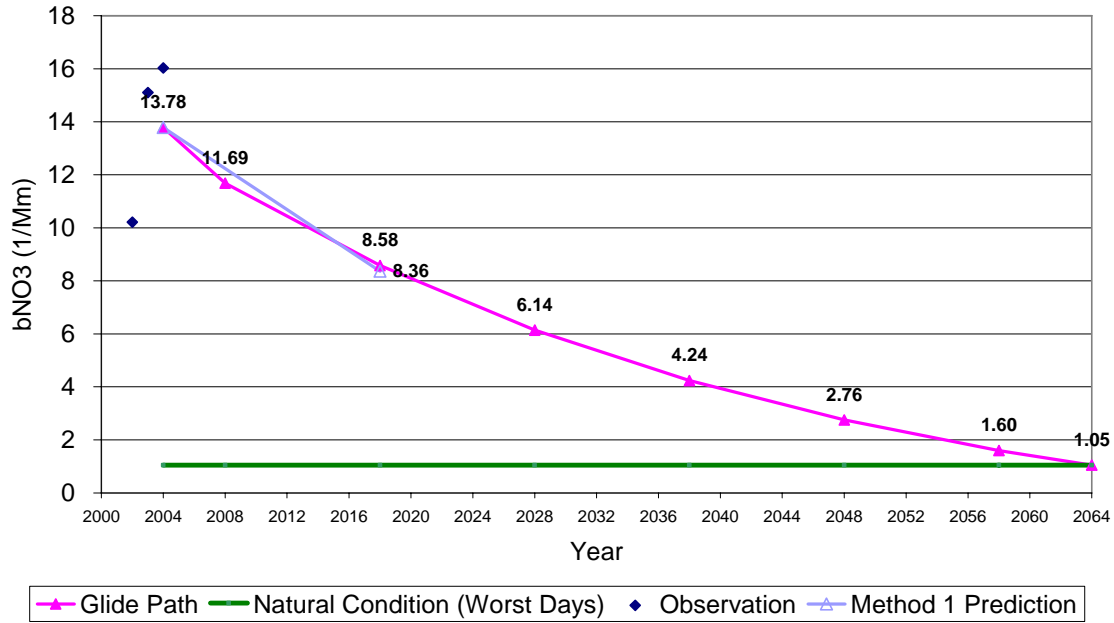


Figure F-1c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO_3) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Caney Creek Wilderness - 20% Data Days

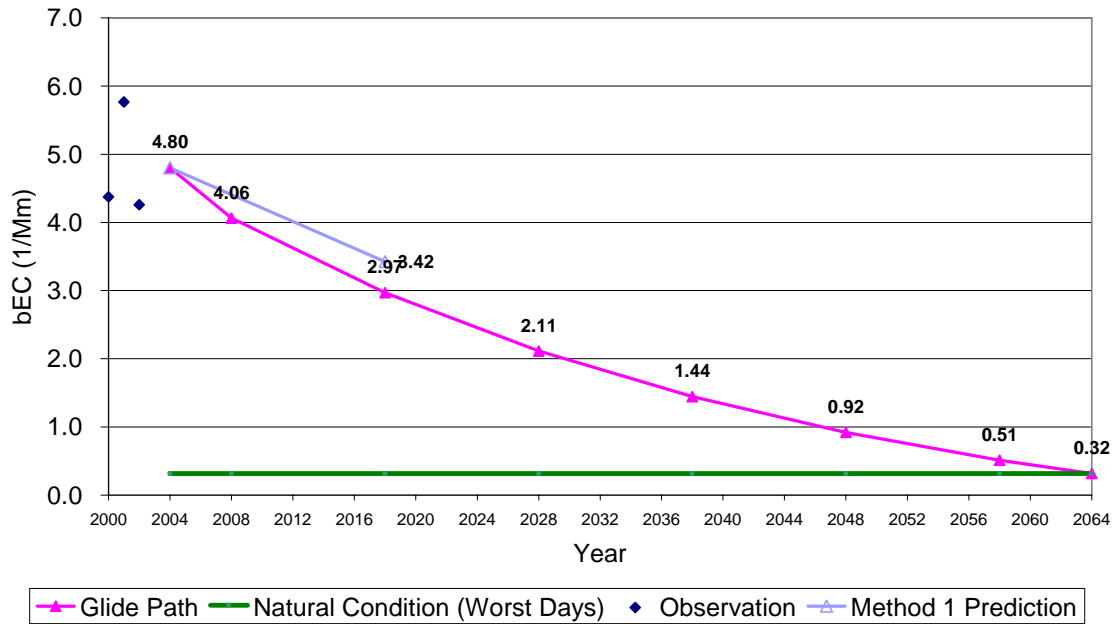


Figure F-1d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Caney Creek Wilderness - 20% Data Days

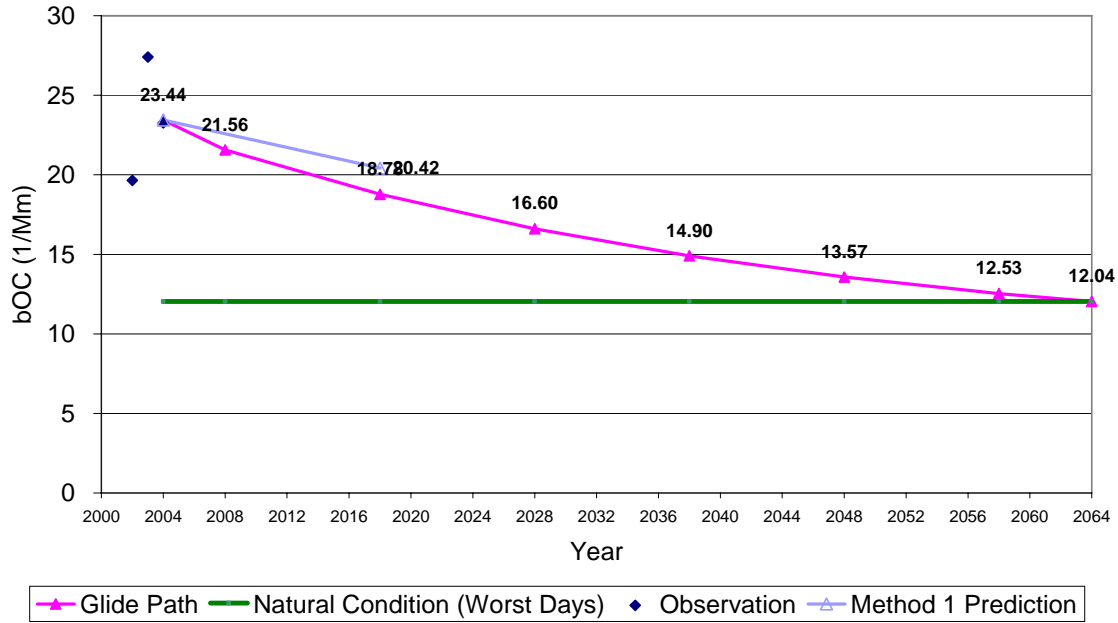


Figure F-1e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Caney Creek Wilderness - 20% Data Days

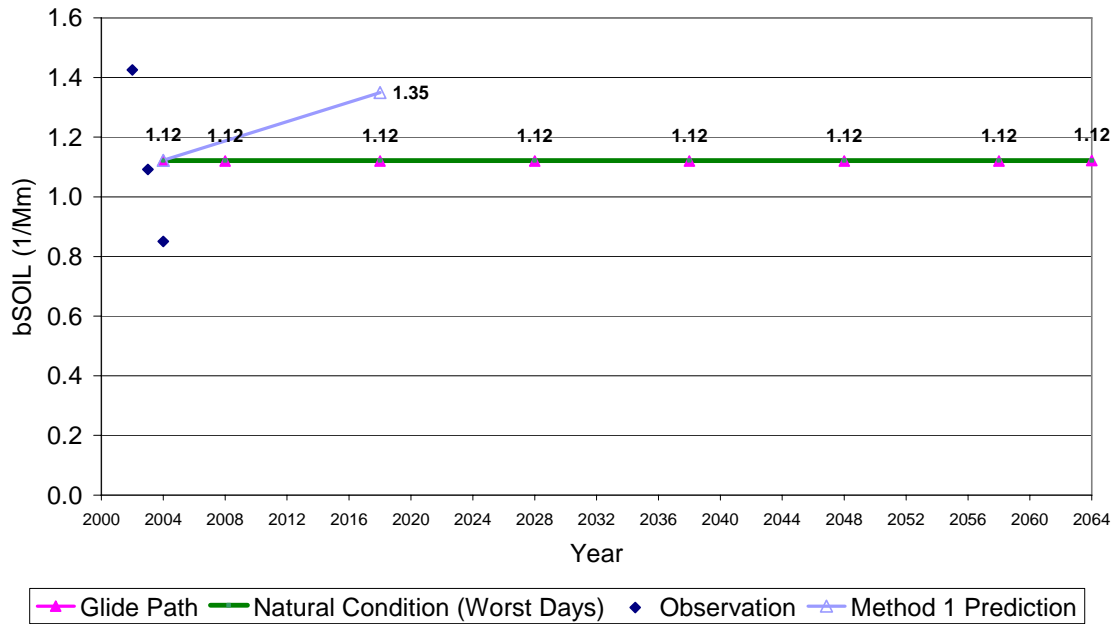


Figure F-1f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Caney Creek Wilderness - 20% Data Days

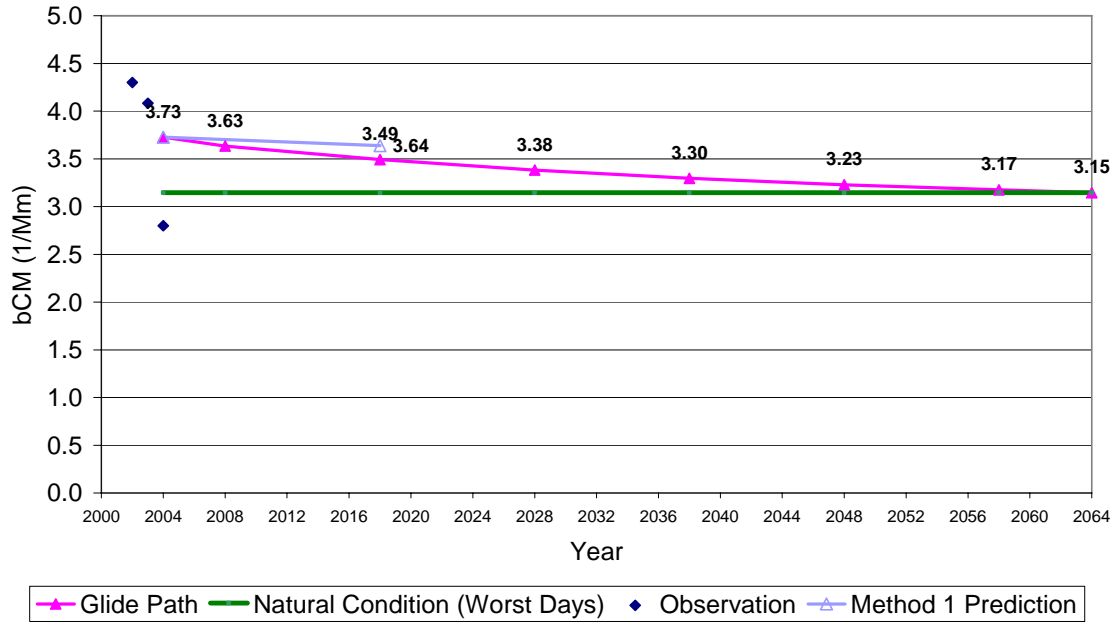


Figure F-1g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Caney Creek (CACR), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Upper Buffalo Wilderness - 20% Data Days

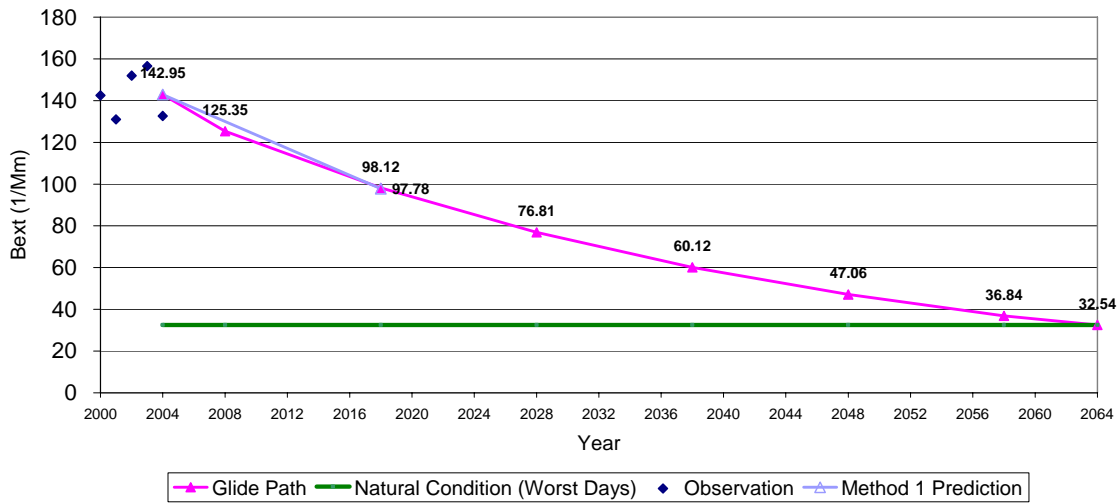


Figure F-2a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Upper Buffalo Wilderness - 20% Data Days

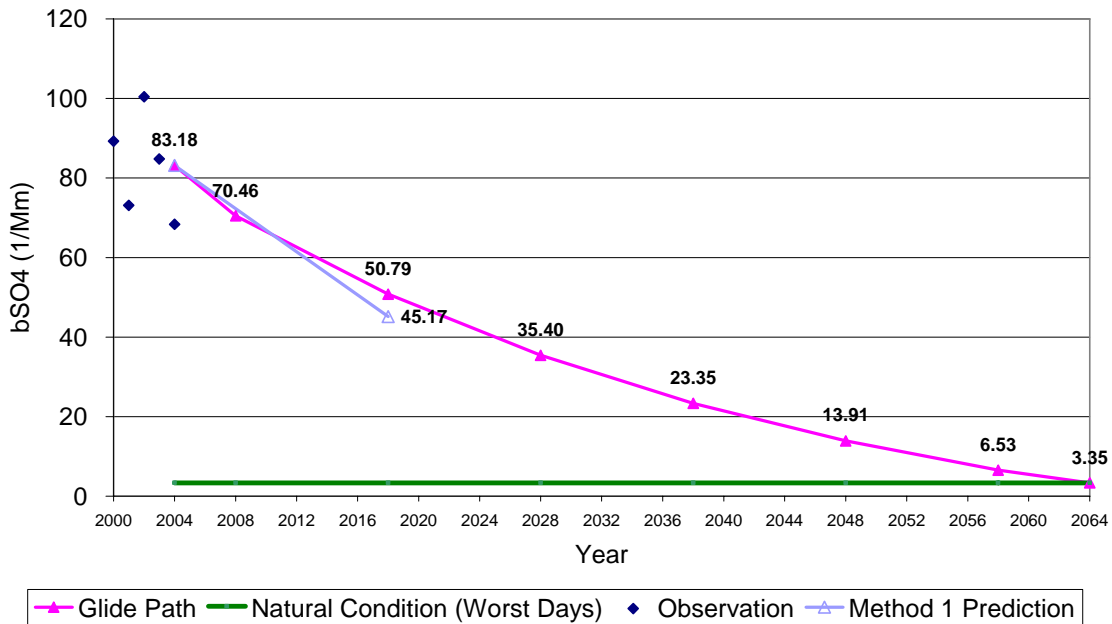


Figure F-2b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Upper Buffalo Wilderness - 20% Data Days

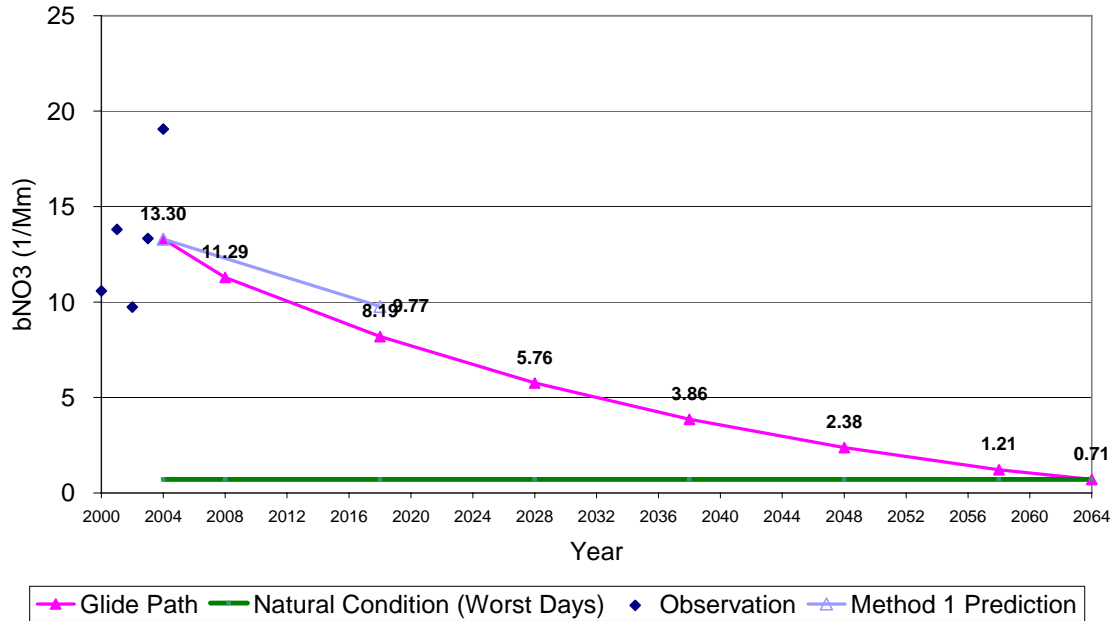


Figure F-2c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO_3) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Upper Buffalo Wilderness - 20% Data Days

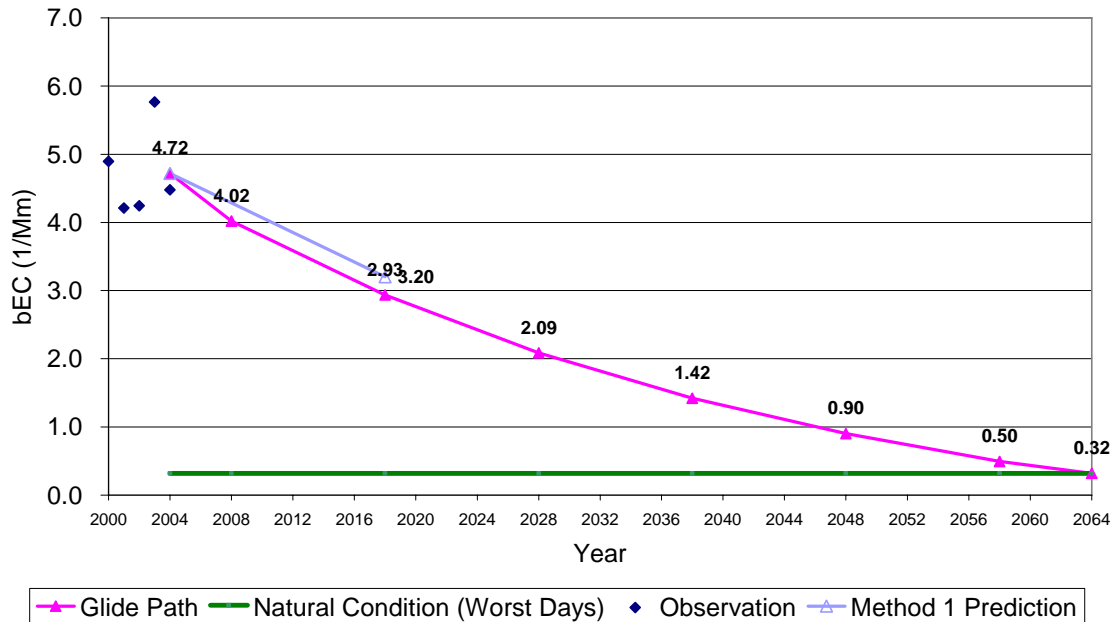


Figure F-2d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Upper Buffalo Wilderness - 20% Data Days

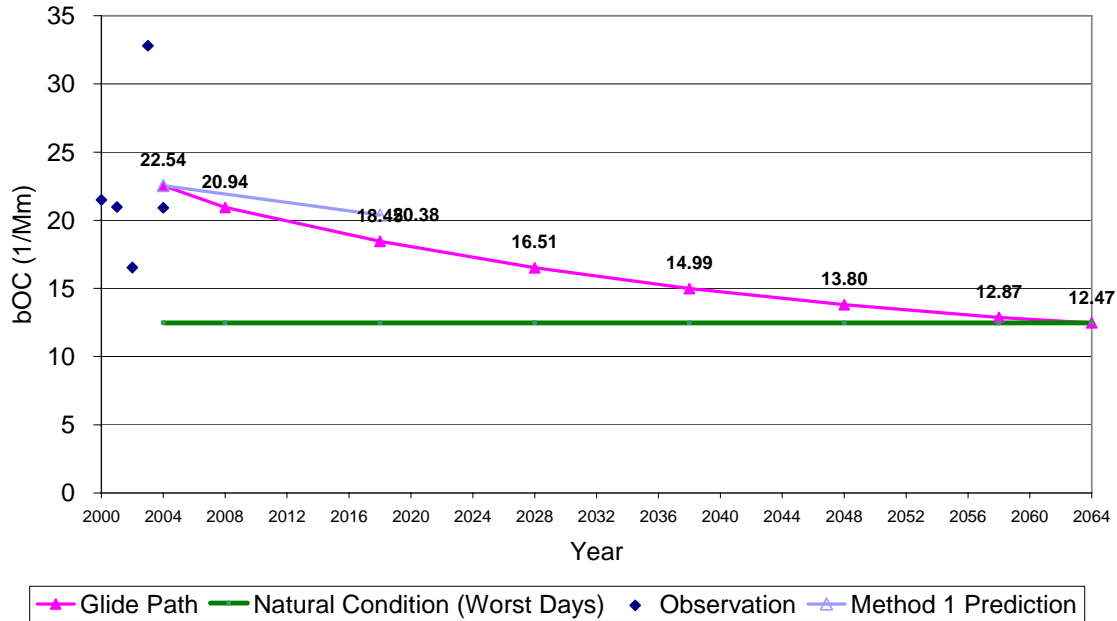


Figure F-2e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Upper Buffalo Wilderness - 20% Data Days

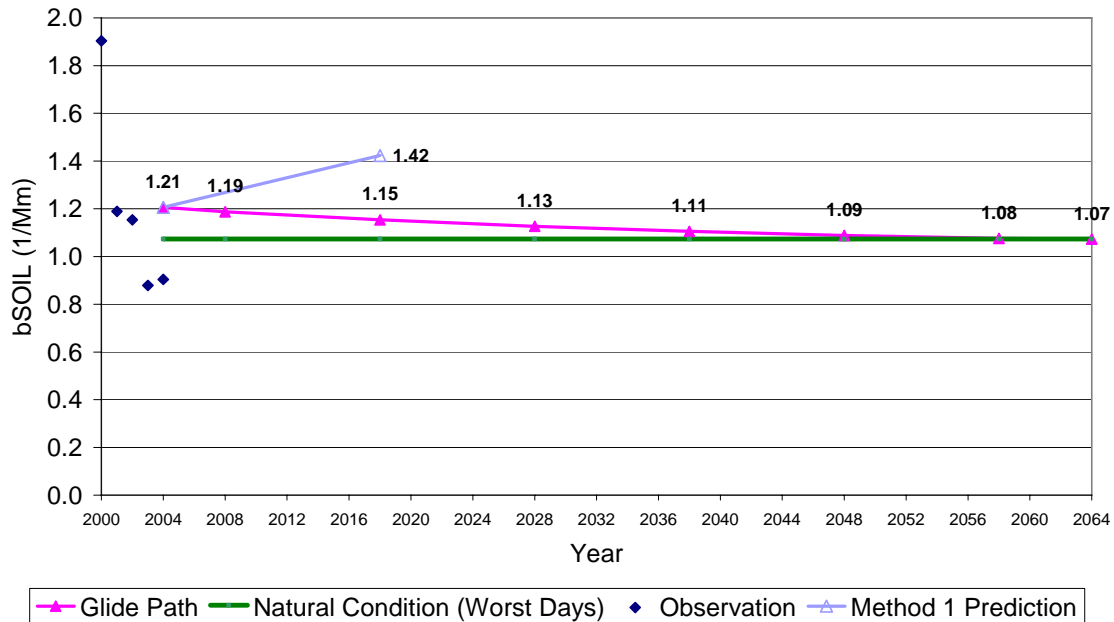


Figure F-2f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Upper Buffalo Wilderness - 20% Data Days

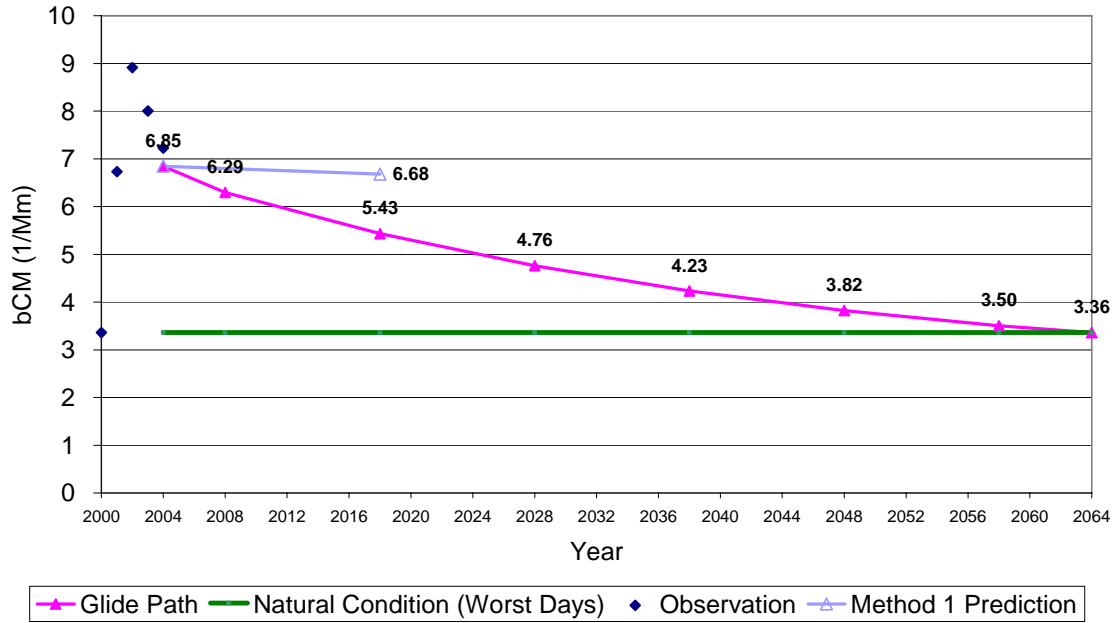


Figure F-2g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Upper Buffalo (UPBU), Arkansas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Breton - 20% Data Days

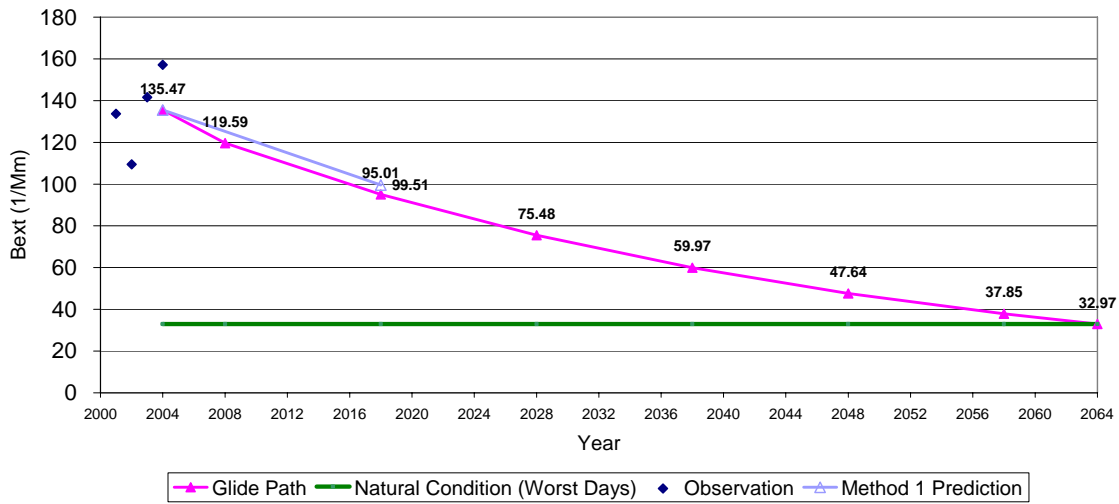


Figure F-3a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Breton - 20% Data Days

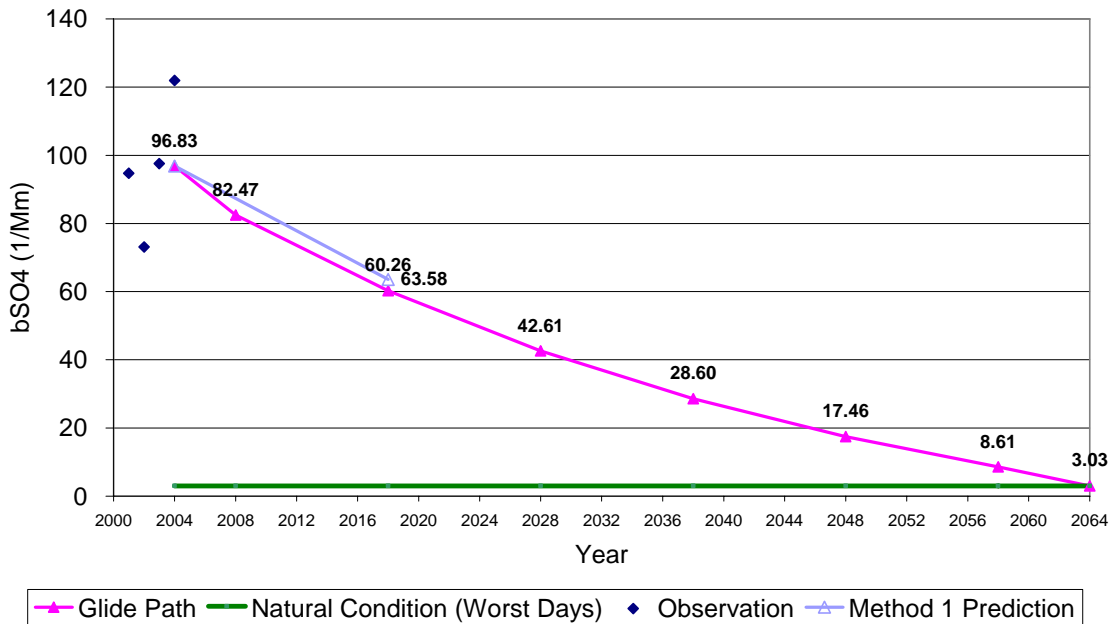


Figure F-3b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Breton - 20% Data Days

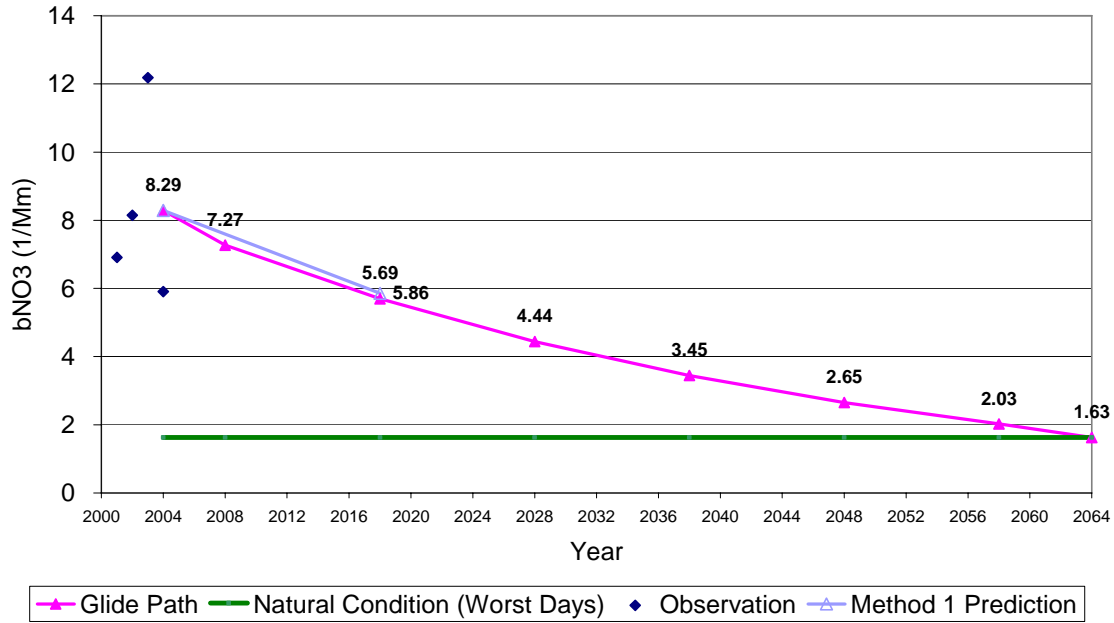


Figure F-3c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO₃) in extinction (Mm⁻¹) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Breton - 20% Data Days

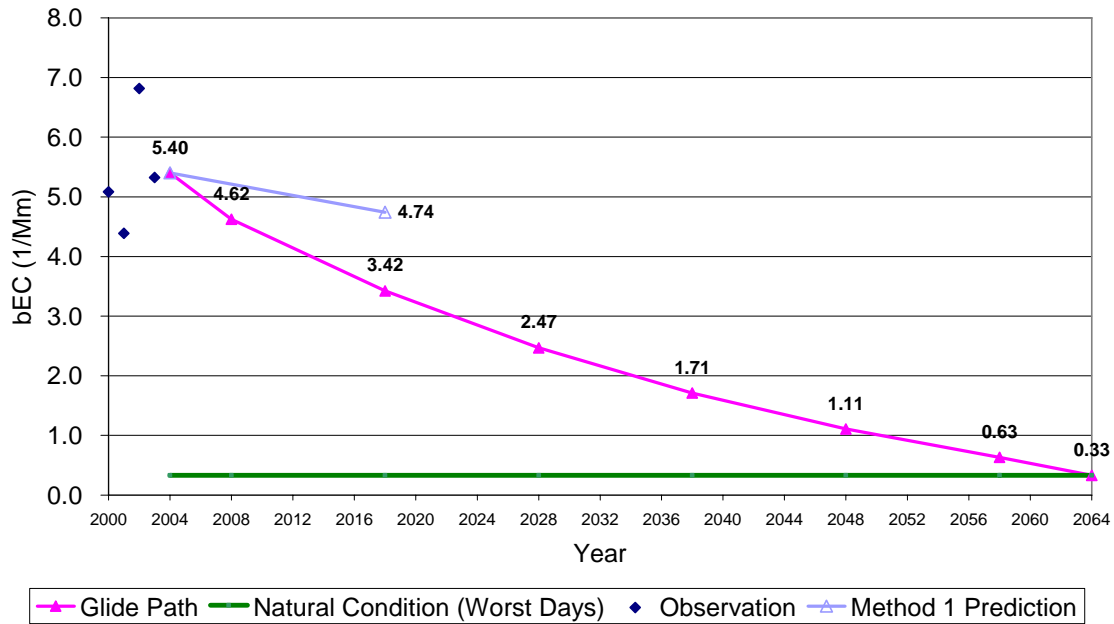


Figure F-3d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm⁻¹) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Breton - 20% Data Days

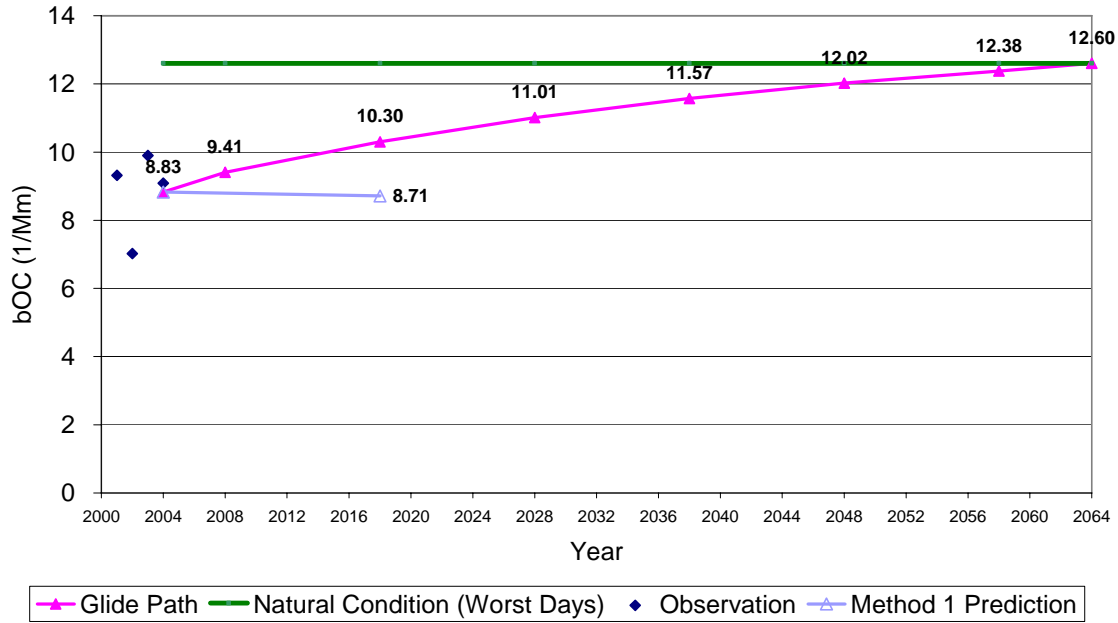


Figure F-3e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Breton - 20% Data Days

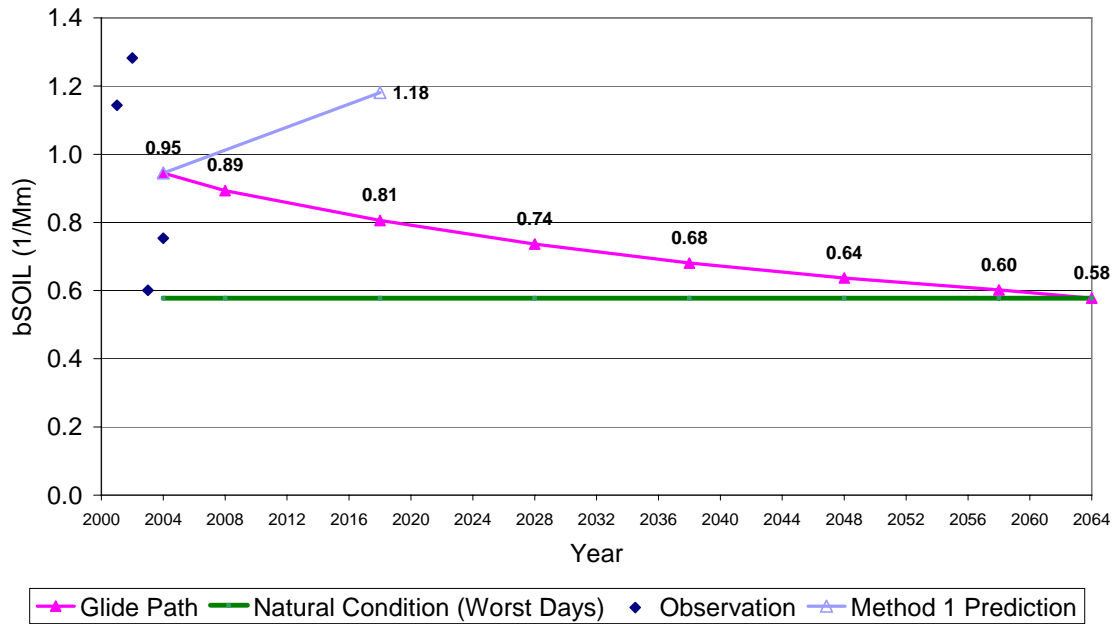


Figure F-3f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Breton - 20% Data Days

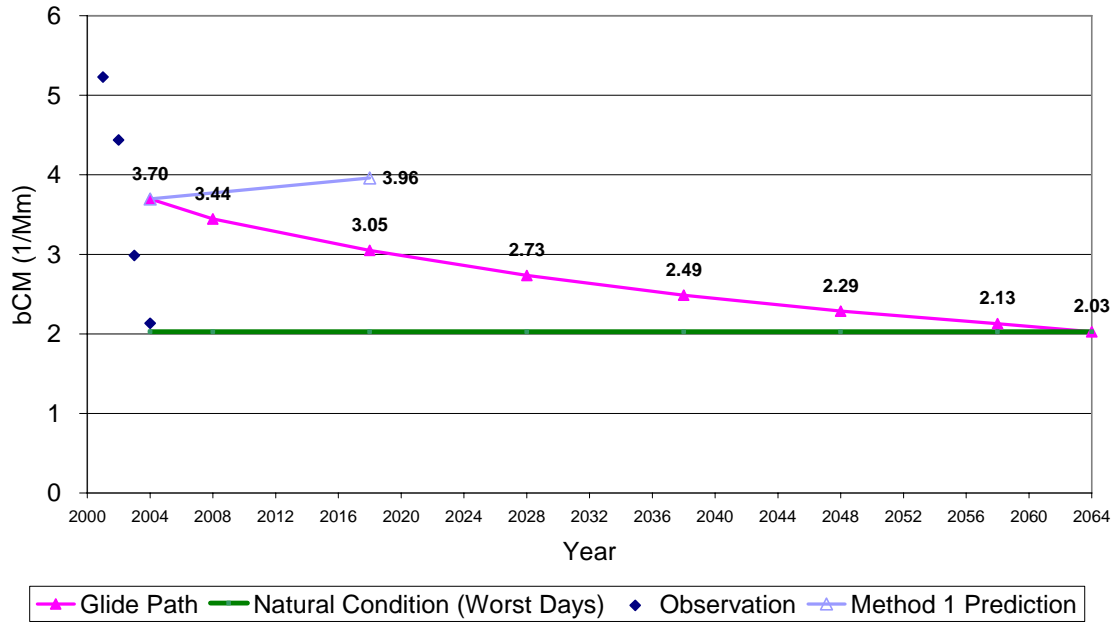


Figure F-3g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Breton Island (BRET), Louisiana and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Boundary Waters Canoe Area - 20% Data Days

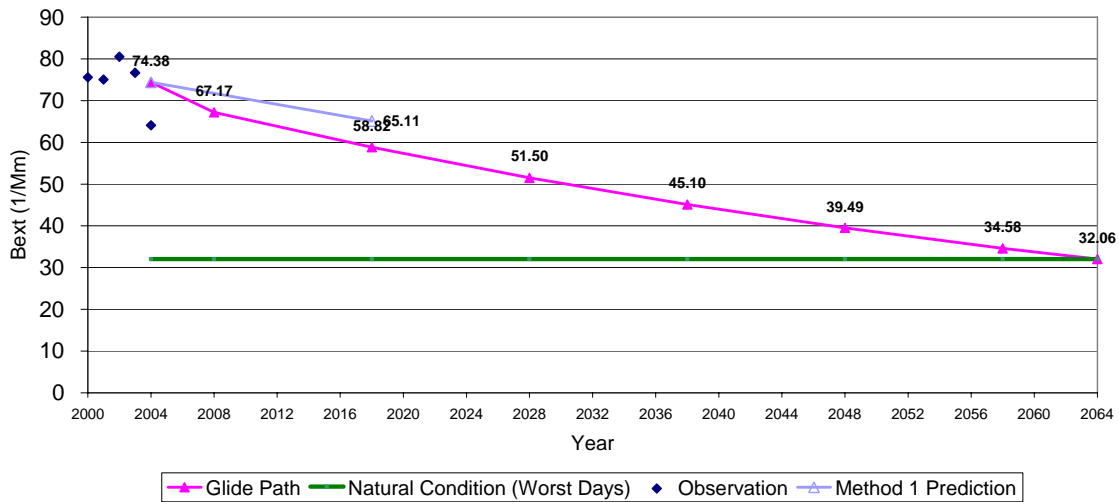


Figure F-4a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Boundary Waters Canoe Area - 20% Data Days

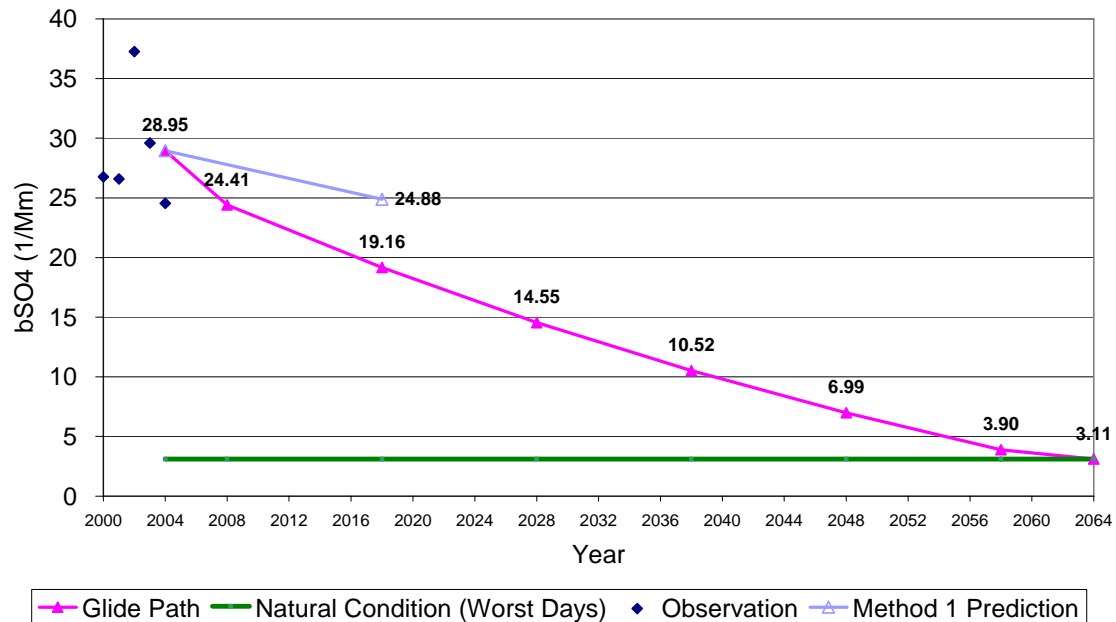


Figure F-4b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Boundary Waters Canoe Area - 20% Data Days

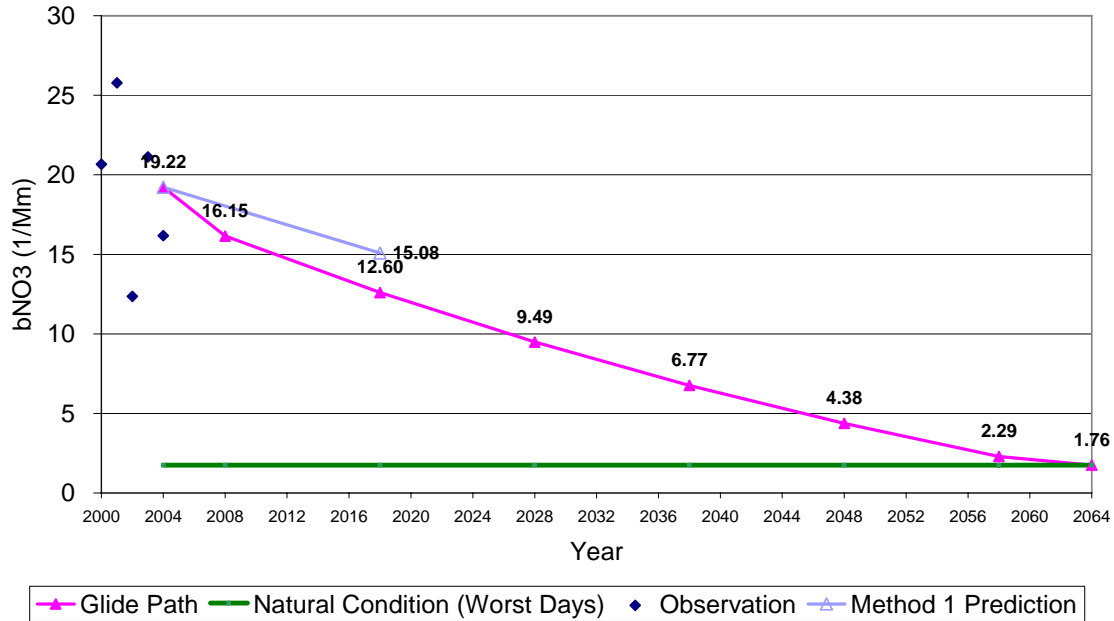


Figure F-4c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO_3) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Boundary Waters Canoe Area - 20% Data Days

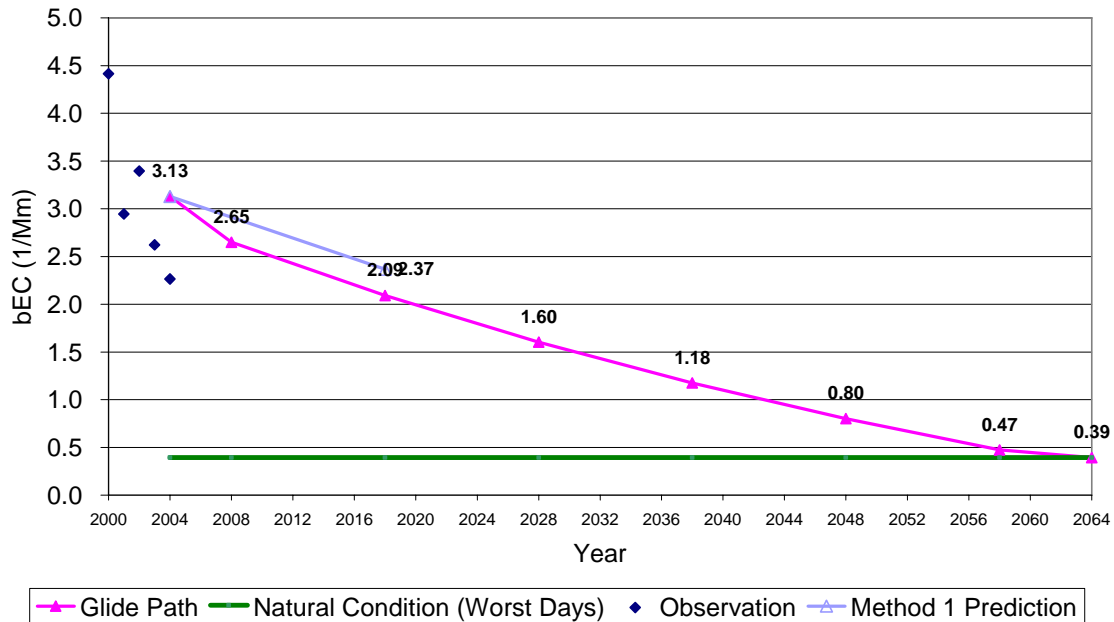


Figure F-4d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Boundary Waters Canoe Area - 20% Data Days

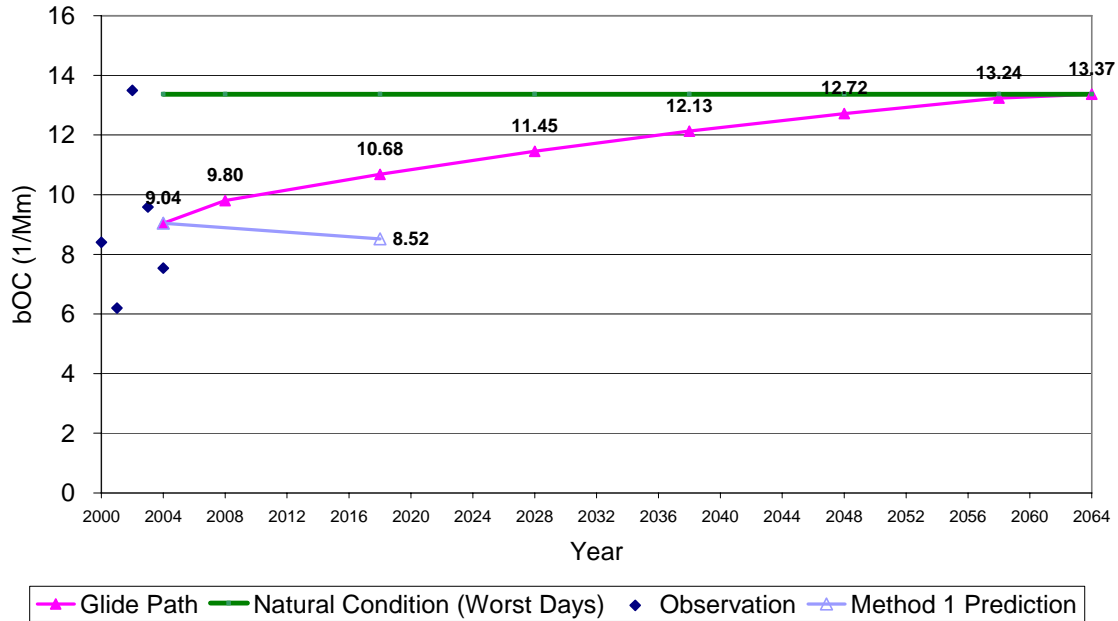


Figure F-4e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Boundary Waters Canoe Area - 20% Data Days

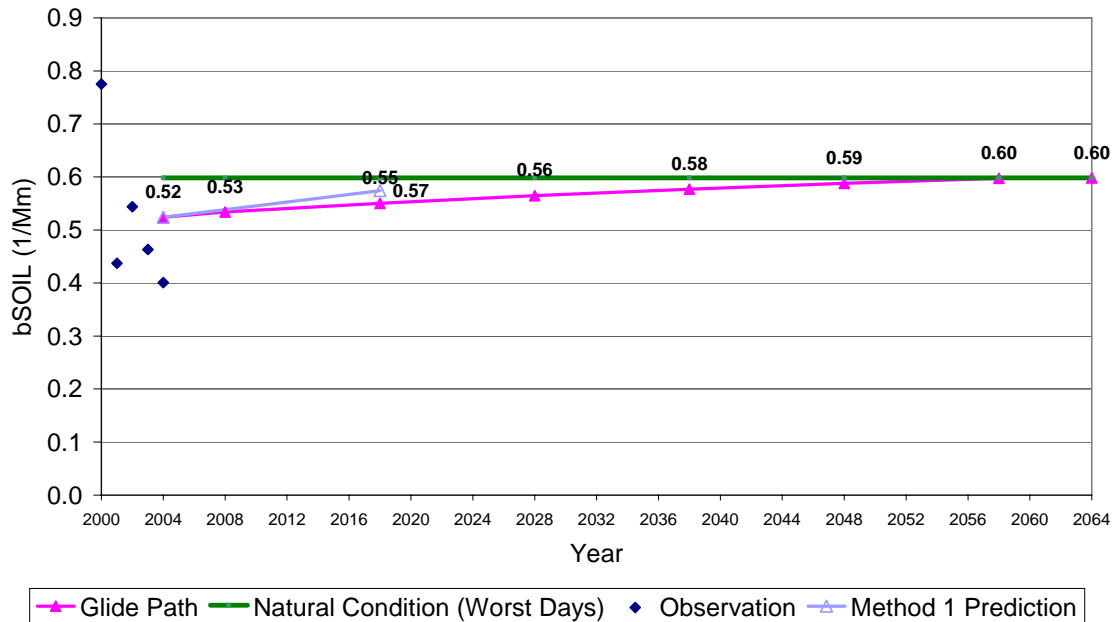


Figure F-4f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Boundary Waters Canoe Area - 20% Data Days

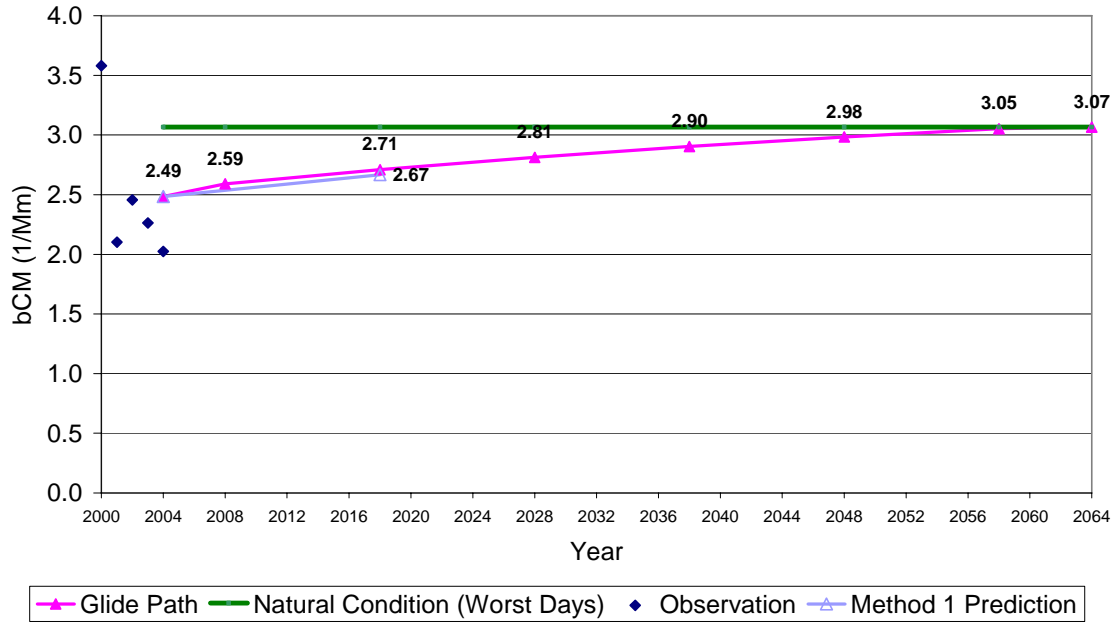


Figure F-4g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Boundary Waters (BOWA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Voyagers NP - 20% Data Days

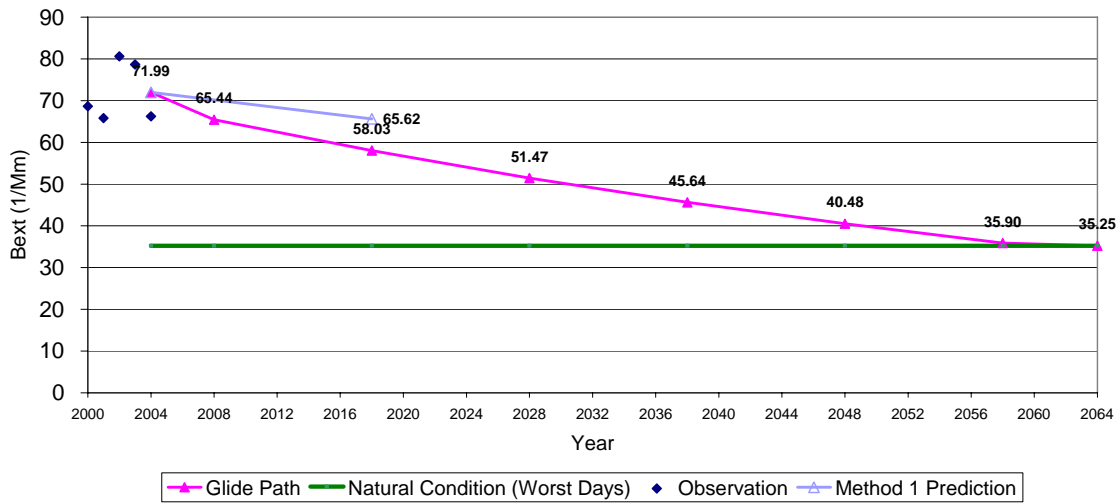


Figure F-5a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Voyagers NP - 20% Data Days

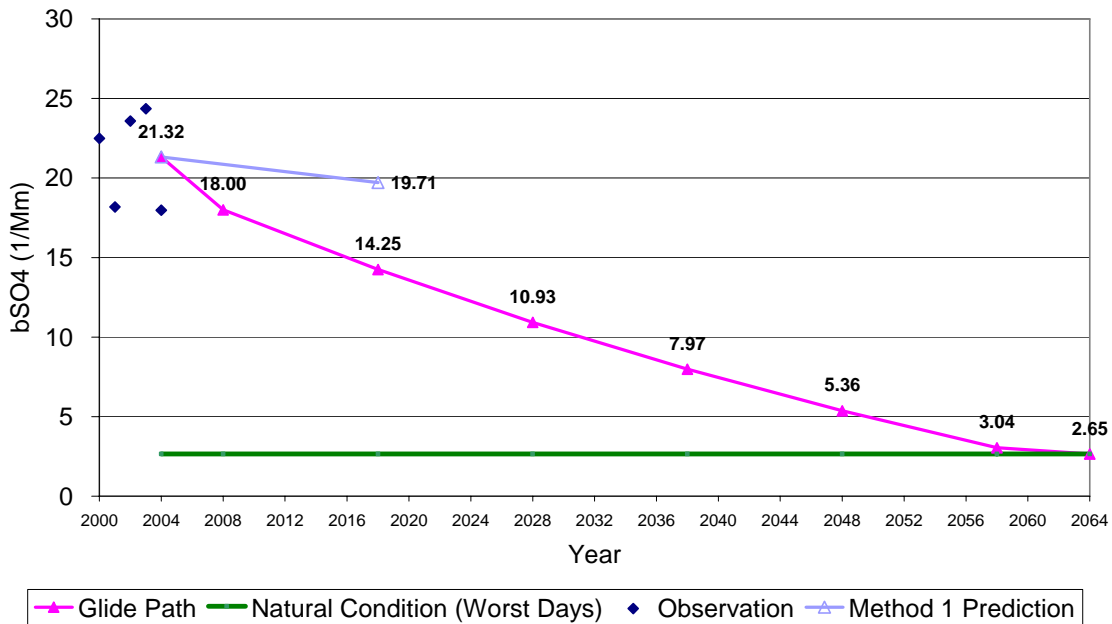


Figure F-5b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Voyagers NP - 20% Data Days

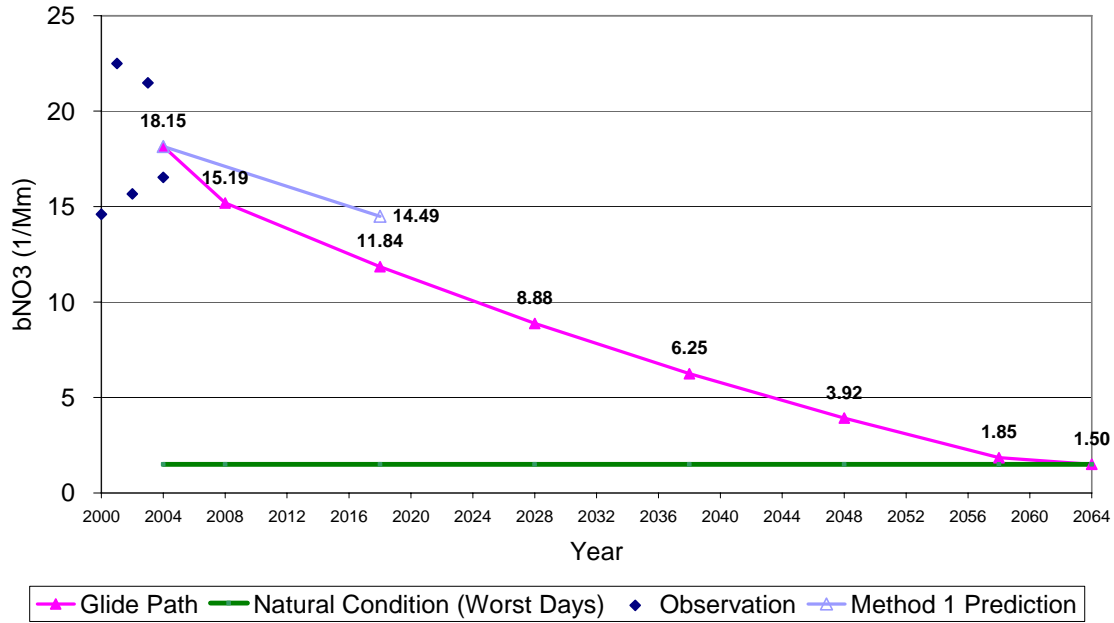


Figure F-5c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO₃) in extinction (Mm⁻¹) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Voyagers NP - 20% Data Days

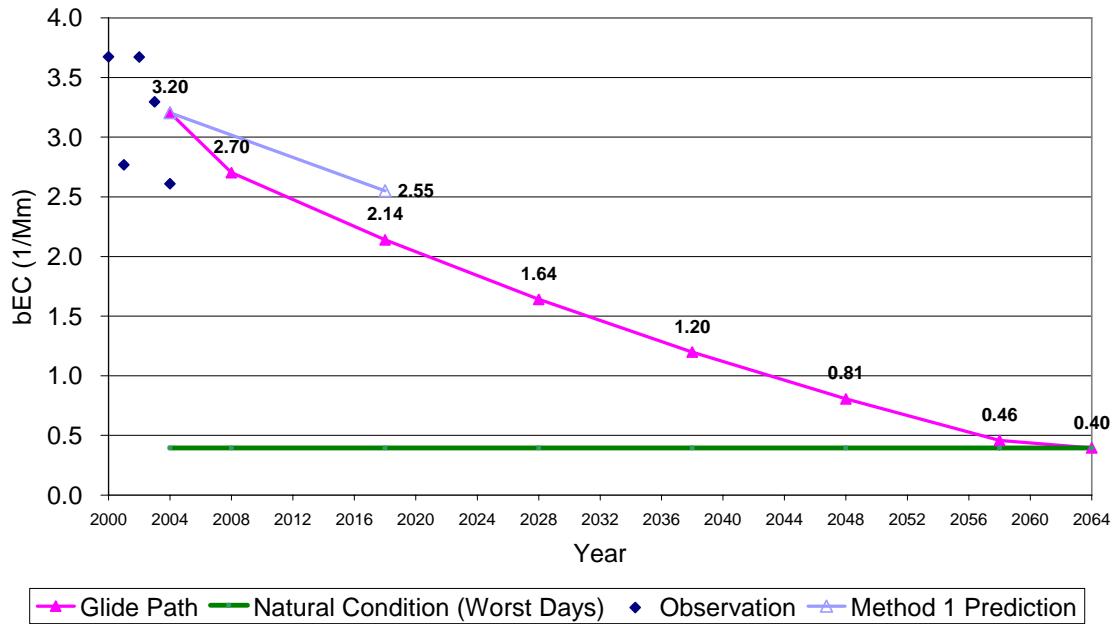


Figure F-5d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm⁻¹) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Voyageurs NP - 20% Data Days

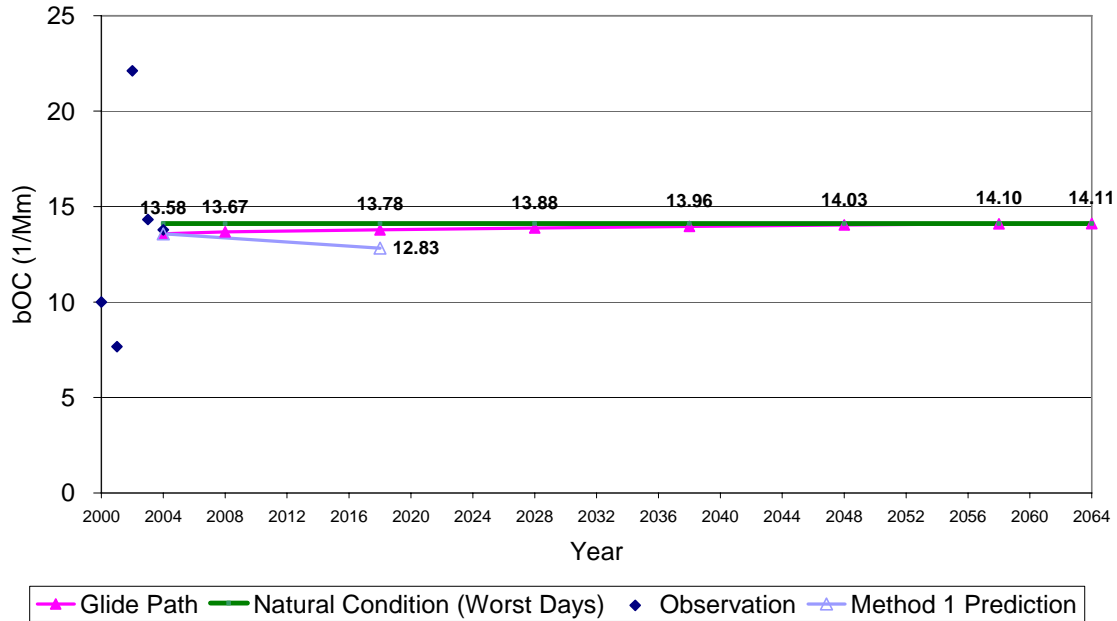


Figure F-5e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Voyageurs NP - 20% Data Days

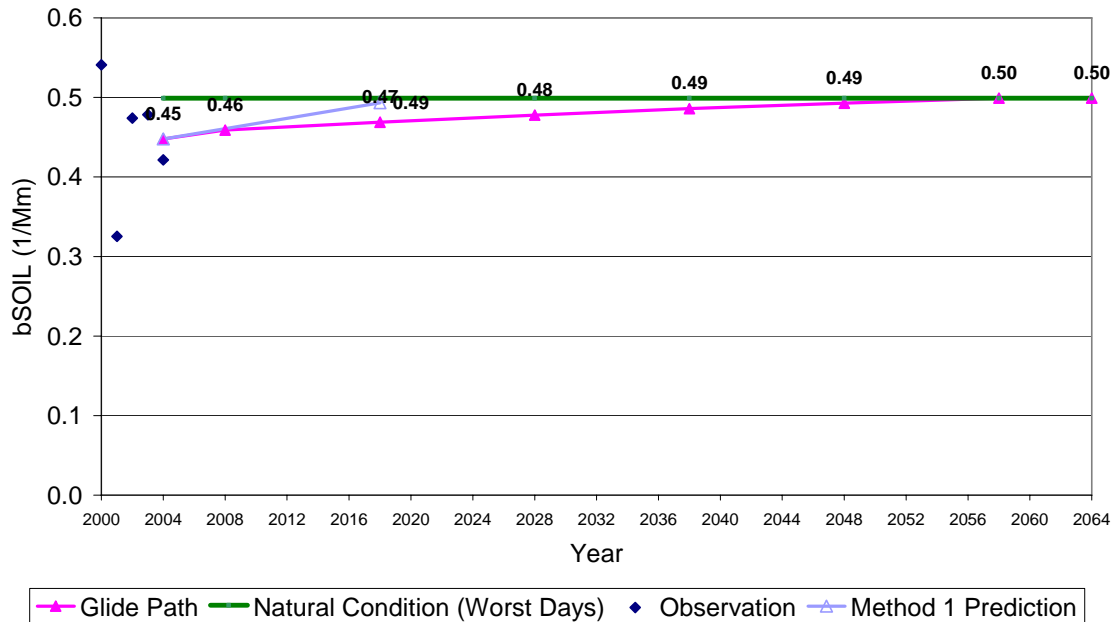


Figure F-5f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Voyageurs NP - 20% Data Days

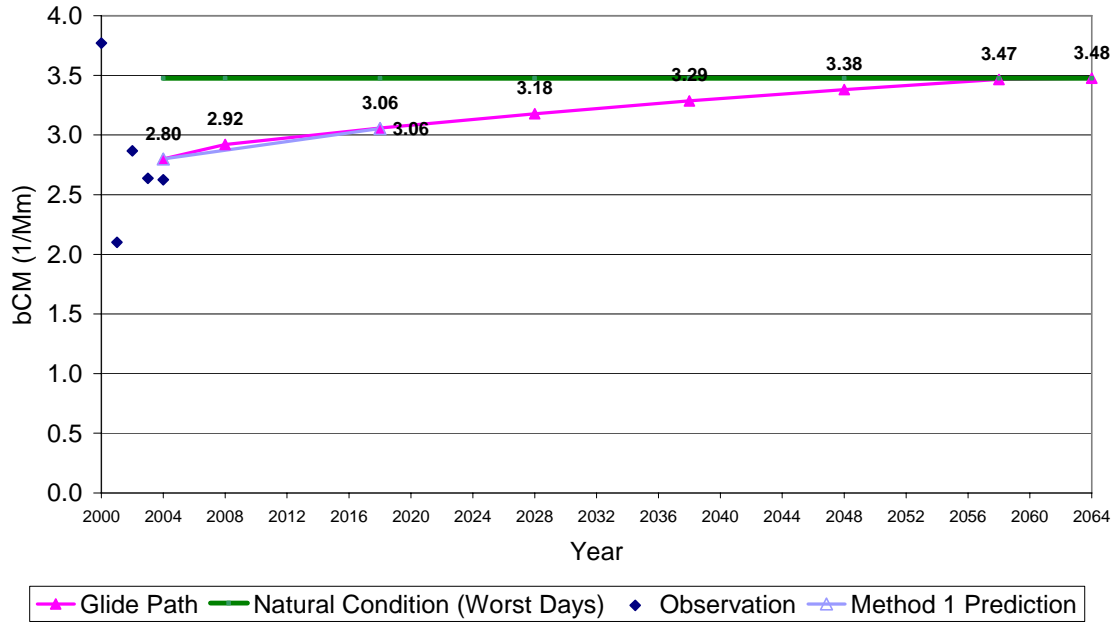


Figure F-5g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Voyageurs (VOYA), Minnesota and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Hercules-Glades Wilderness - 20% Data Days

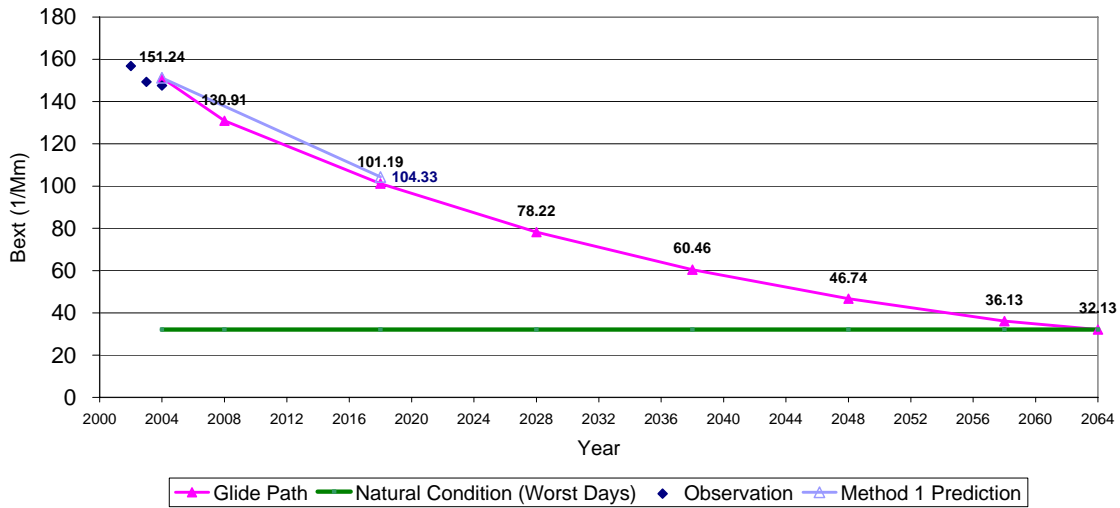


Figure F-6a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Hercules-Glades Wilderness - 20% Data Days

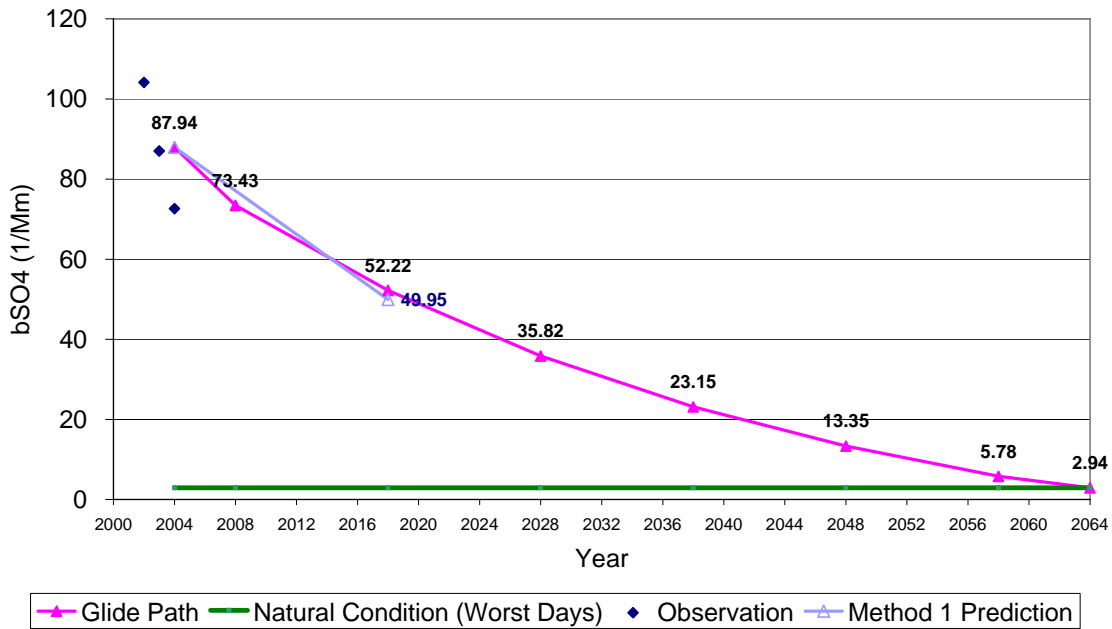


Figure F-6b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Hercules-Glades Wilderness - 20% Data Days

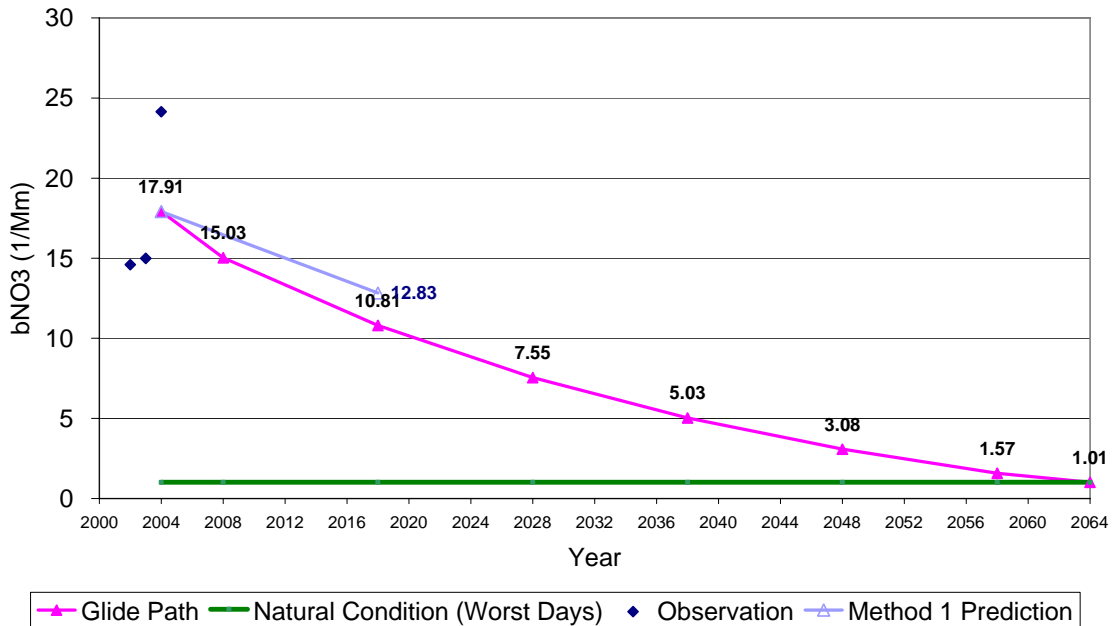


Figure F-6c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO₃) in extinction (Mm⁻¹) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Hercules-Glades Wilderness - 20% Data Days

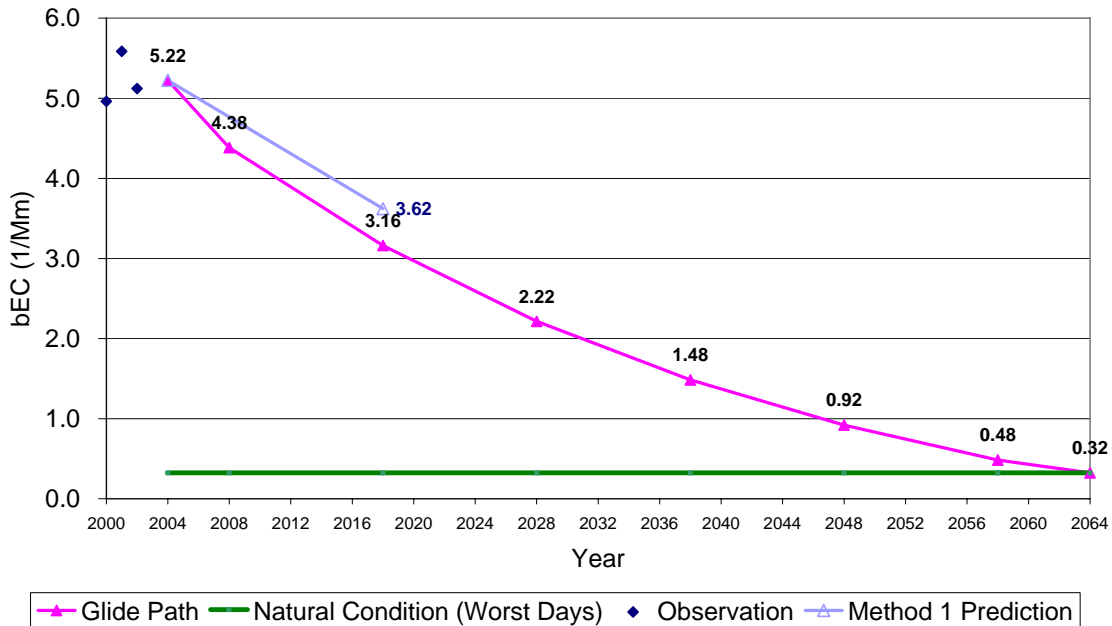


Figure F-6d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm⁻¹) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Hercules-Glades Wilderness - 20% Data Days

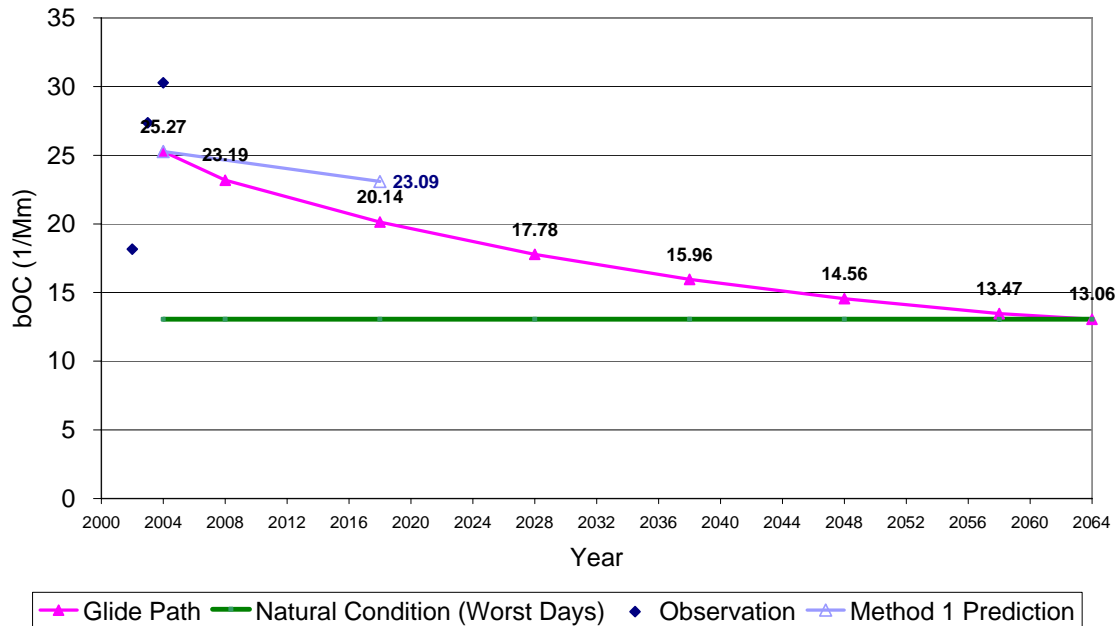


Figure F-6e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Hercules-Glades Wilderness - 20% Data Days

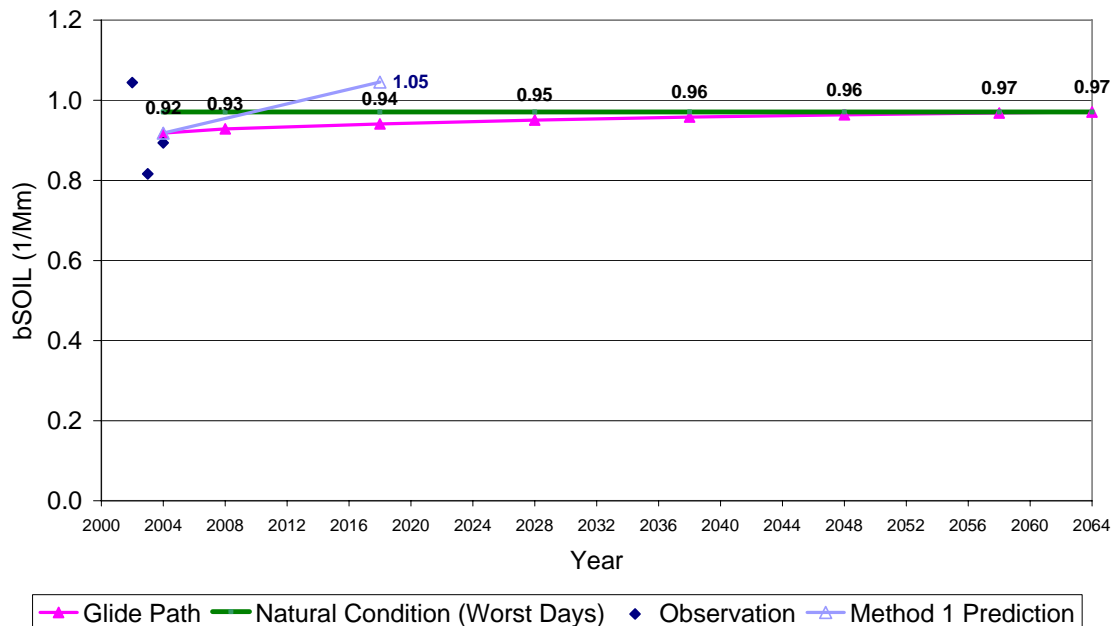


Figure F-6f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Hercules-Glades Wilderness - 20% Data Days

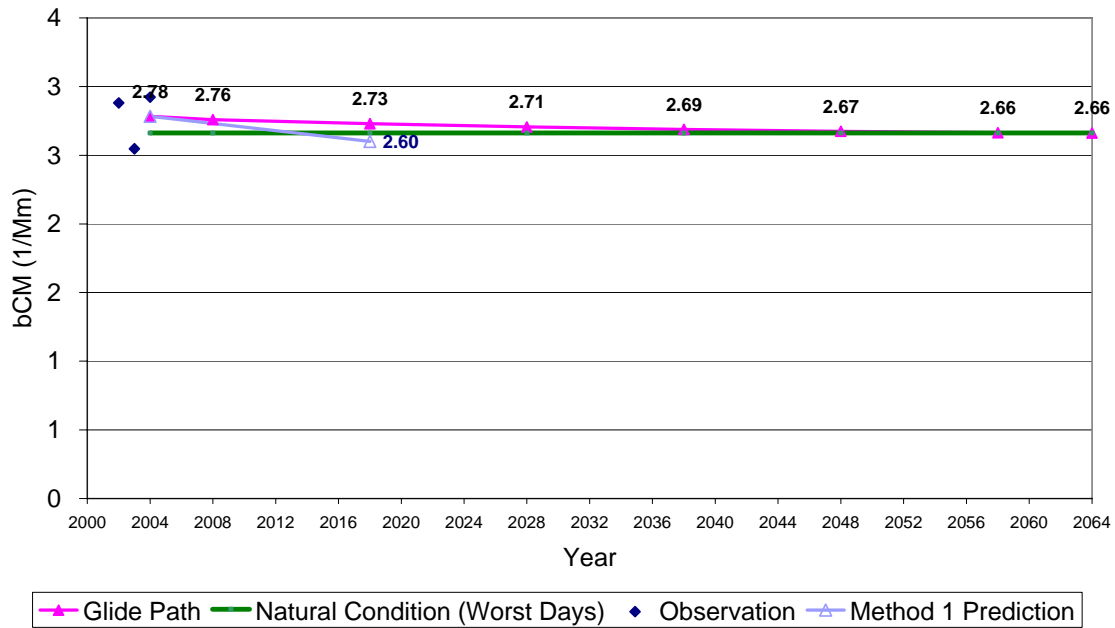


Figure F-6g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Hercules-Glade (HEGL), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

**Uniform Rate of Reasonable Progress Glide Path
Mingo - 20% Data Days**

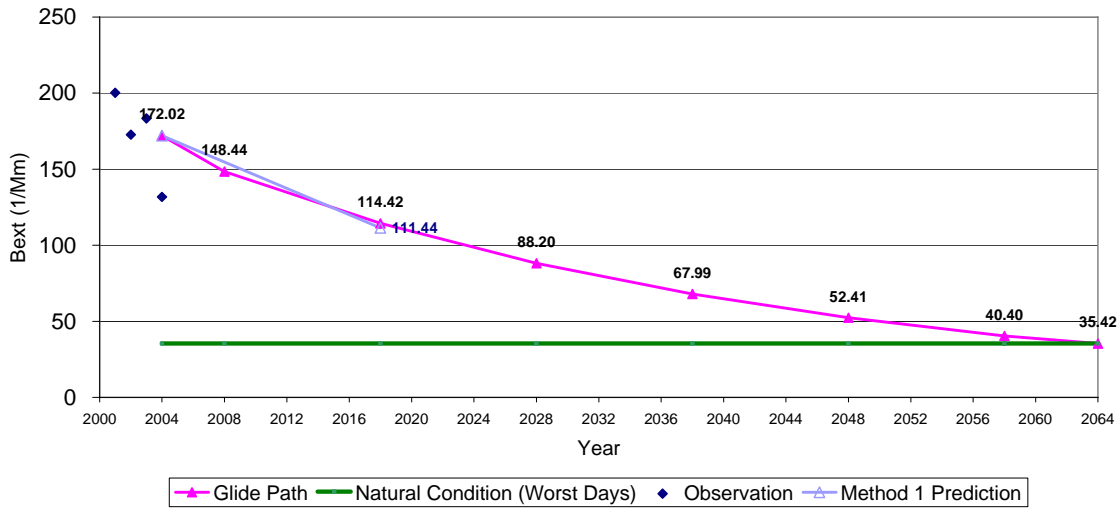


Figure F-7a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

**Uniform Rate of Reasonable Progress Glide Path
Mingo - 20% Data Days**

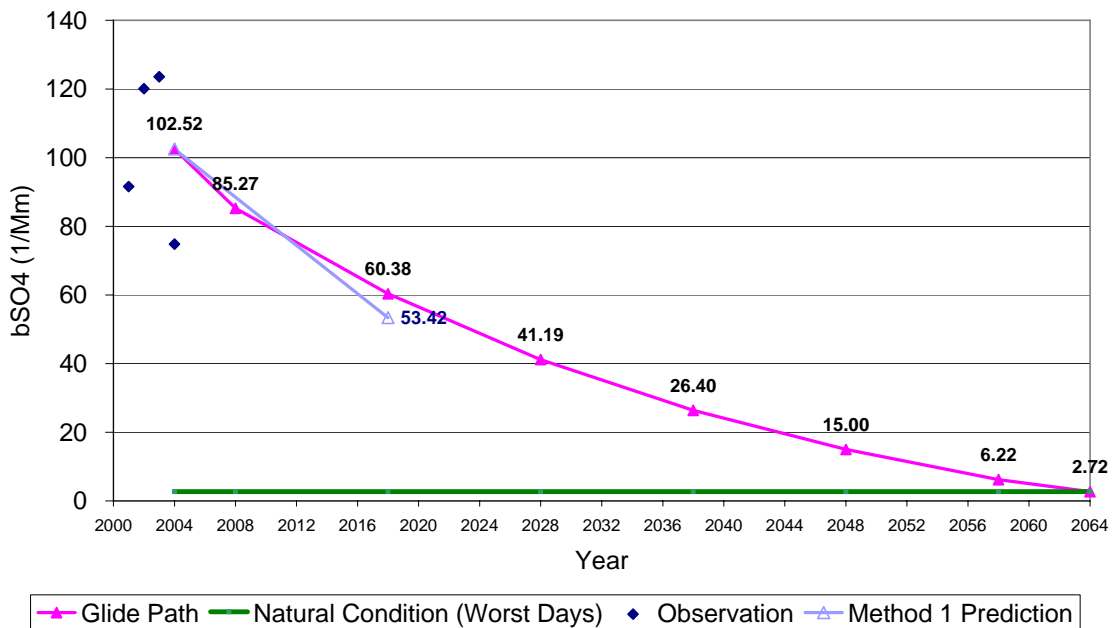


Figure F-7b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Mingo - 20% Data Days

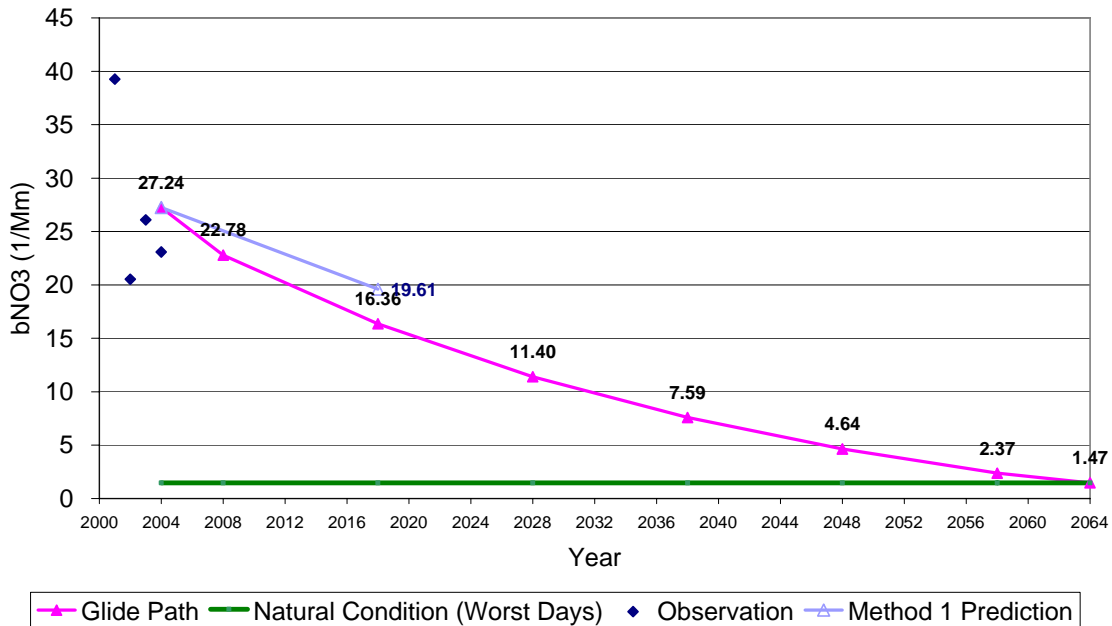


Figure F-7c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO_3) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Mingo - 20% Data Days

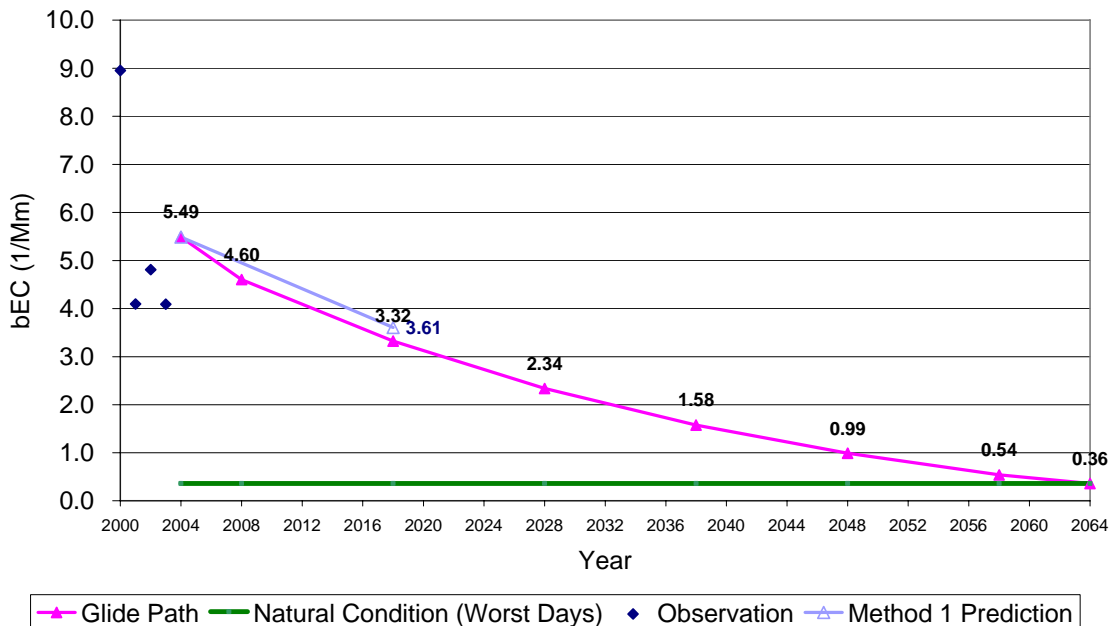


Figure F-7d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Mingo - 20% Data Days

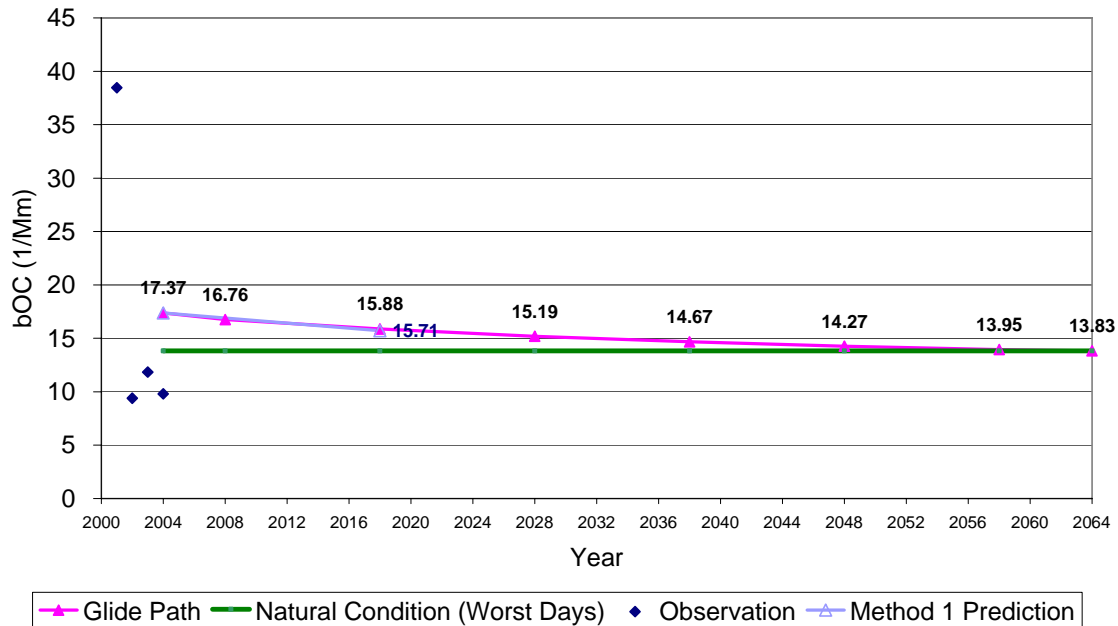


Figure F-7e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Mingo - 20% Data Days

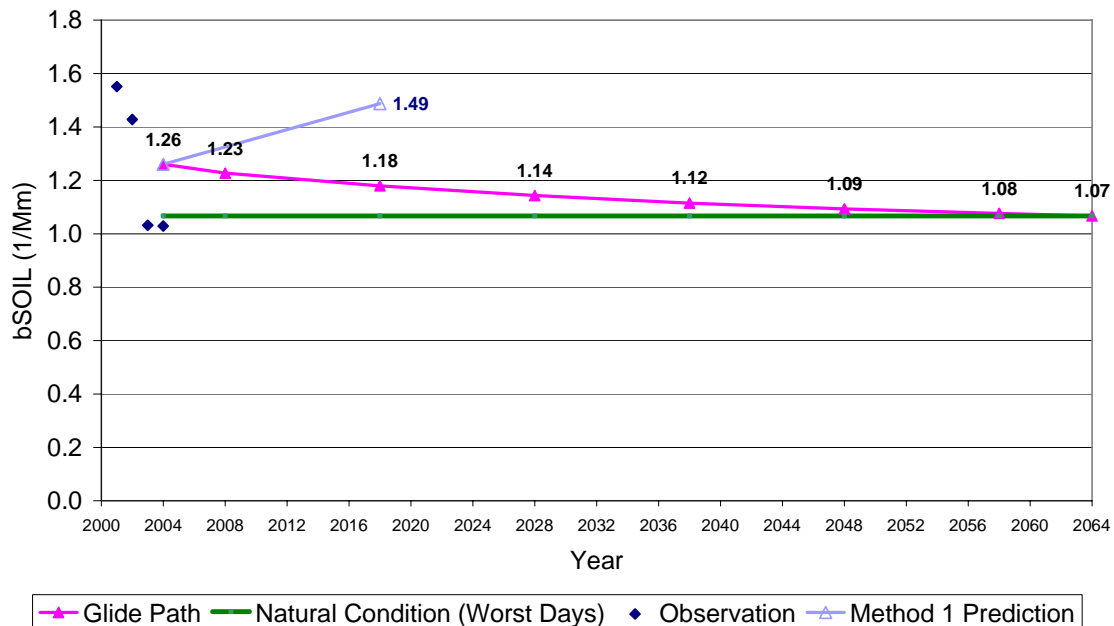


Figure F-7f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Mingo - 20% Data Days

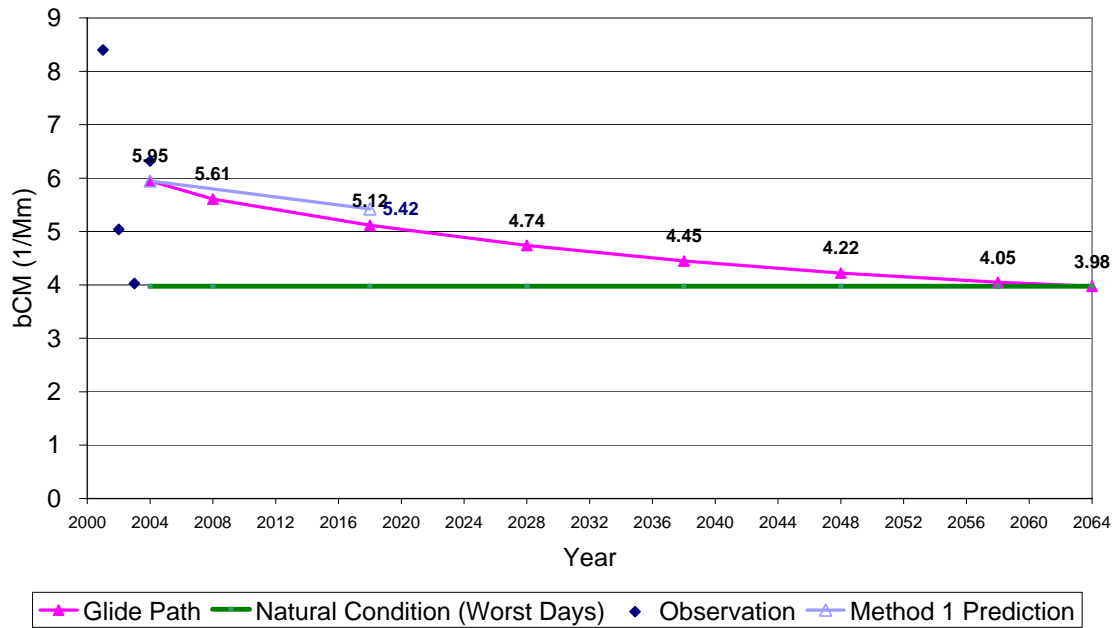


Figure F-7g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Mingo (MING), Missouri and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

**Uniform Rate of Reasonable Progress Glide Path
Wichita Mountains - 20% Data Days**

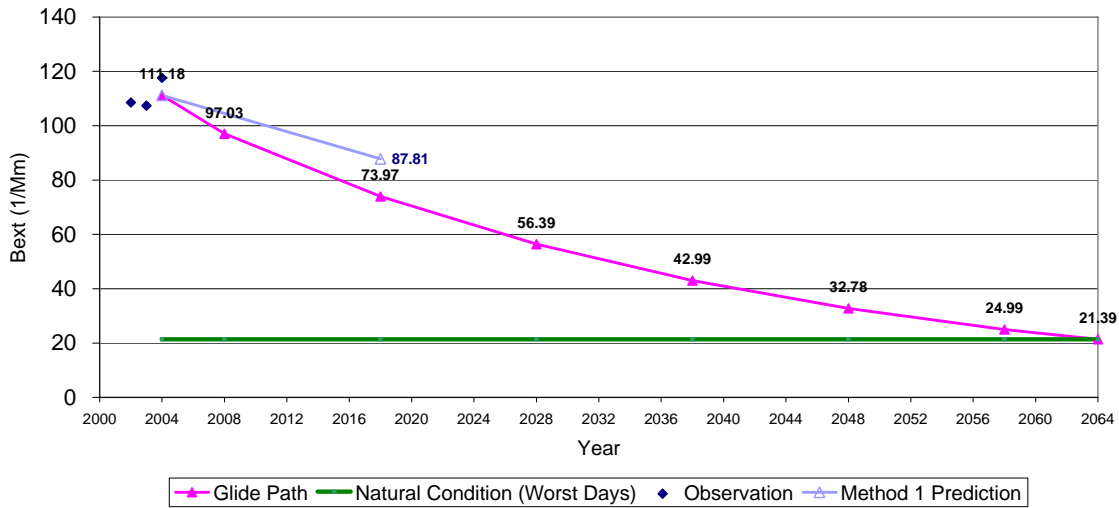


Figure F-8a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

**Uniform Rate of Reasonable Progress Glide Path
Wichita Mountains - 20% Data Days**

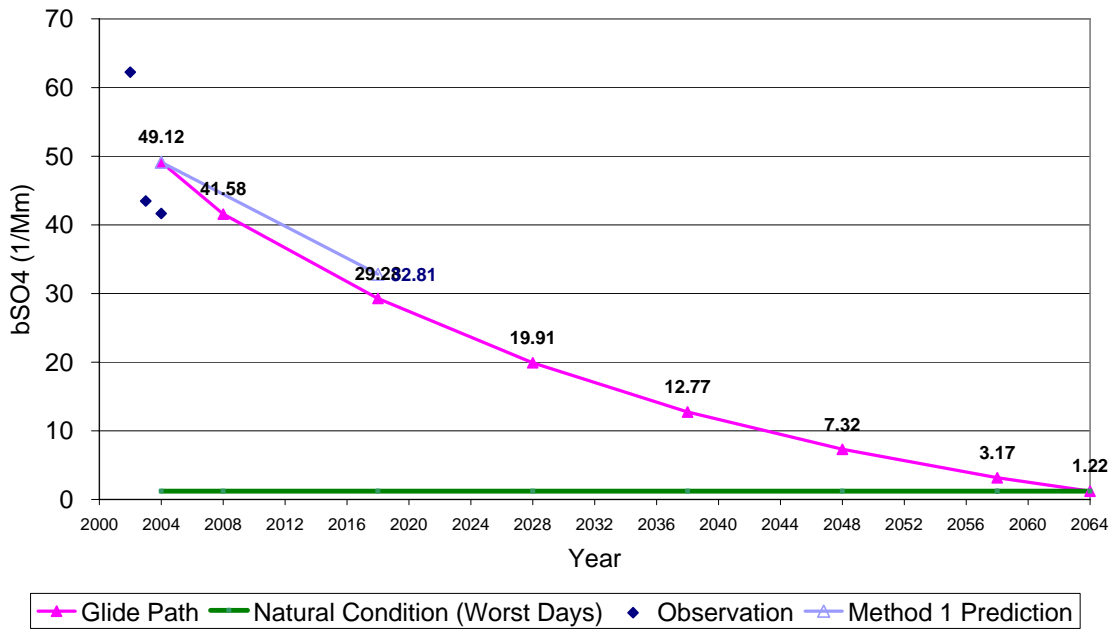


Figure F-8b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Wichita Mountains - 20% Data Days

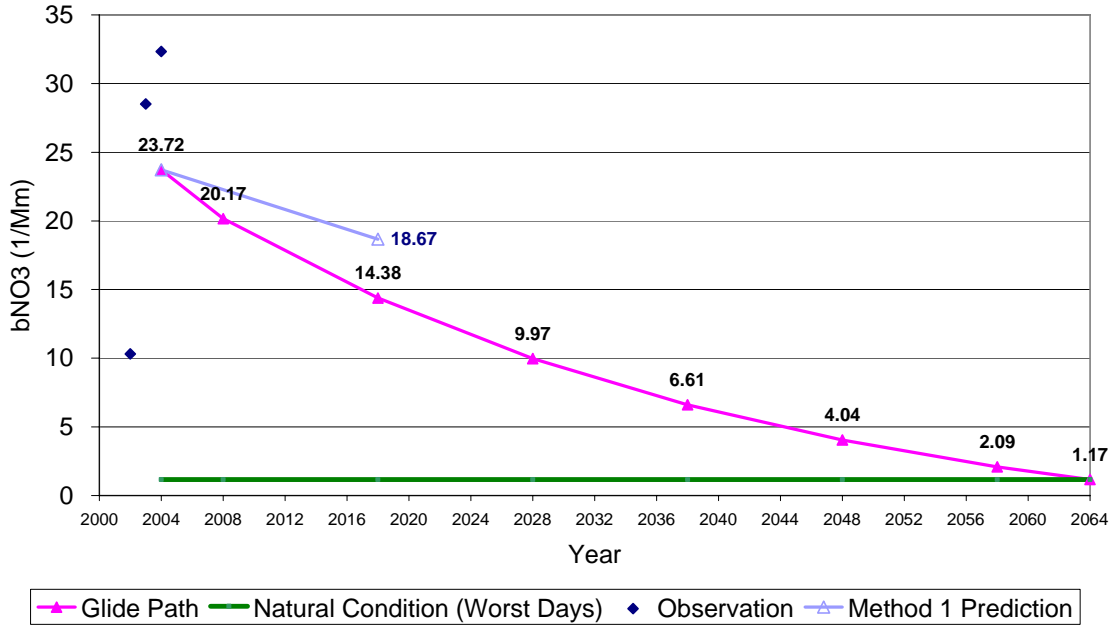


Figure F-8c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO₃) in extinction (Mm⁻¹) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Wichita Mountains - 20% Data Days

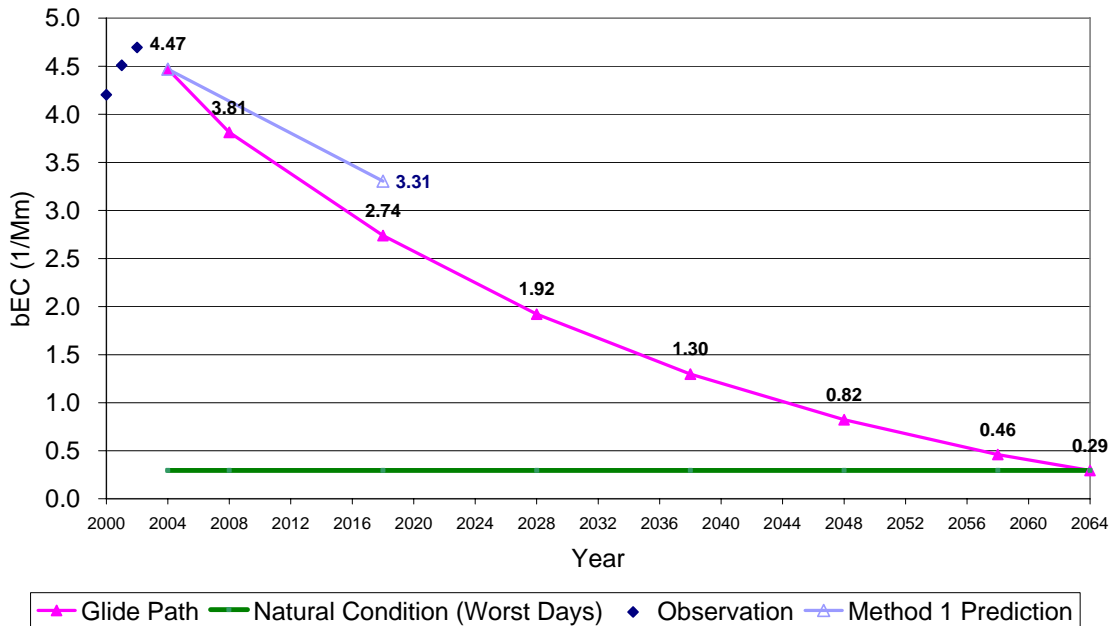


Figure F-8d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm⁻¹) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Wichita Mountains - 20% Data Days

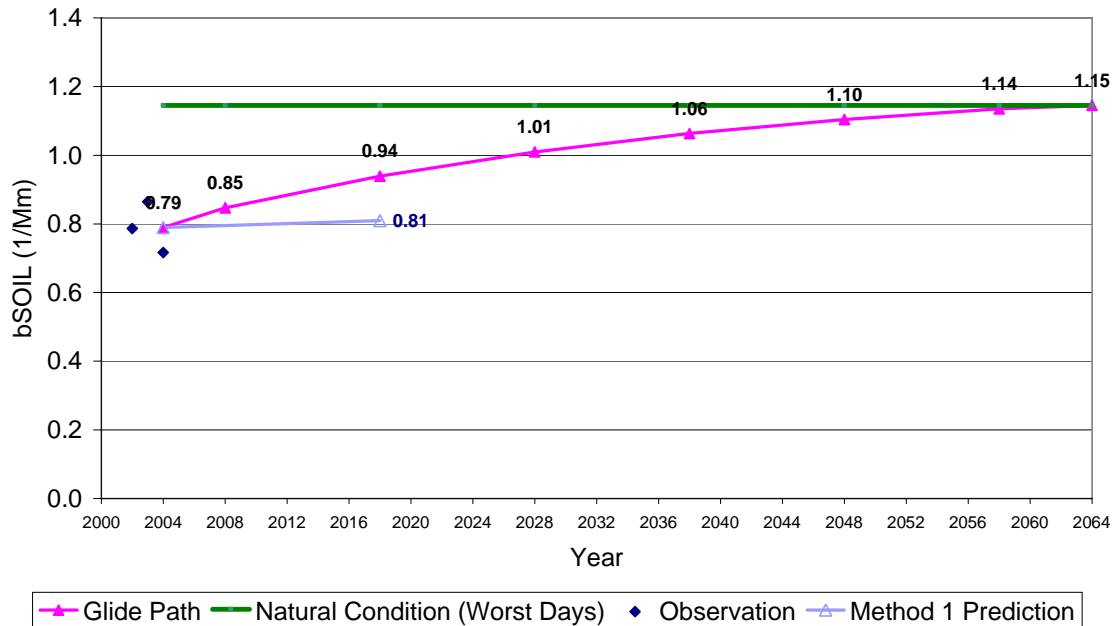


Figure F-8e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Wichita Mountains - 20% Data Days

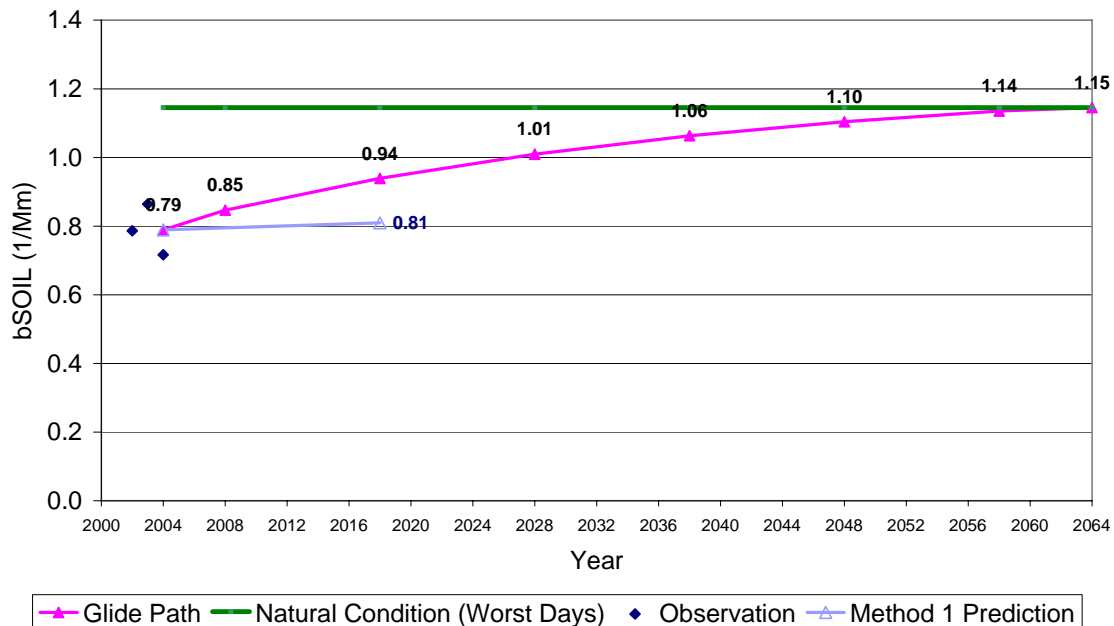


Figure F-8f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Wichita Mountains - 20% Data Days

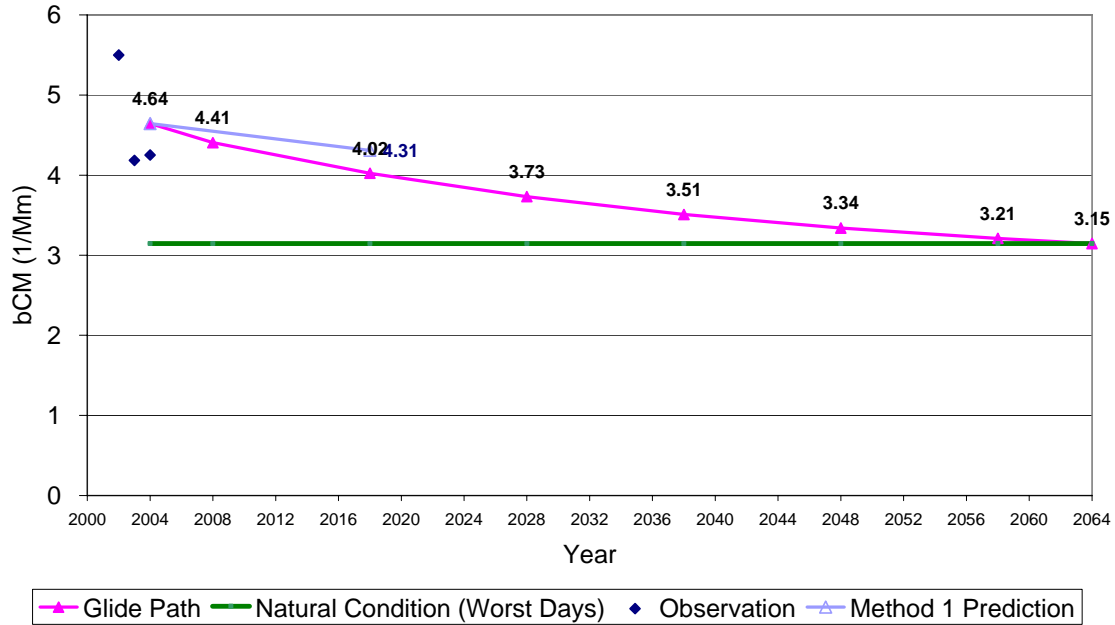


Figure F-8g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Wichita Mountains (WIMO), Oklahoma and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

**Uniform Rate of Reasonable Progress Glide Path
Big Bend NP - 20% Data Days**

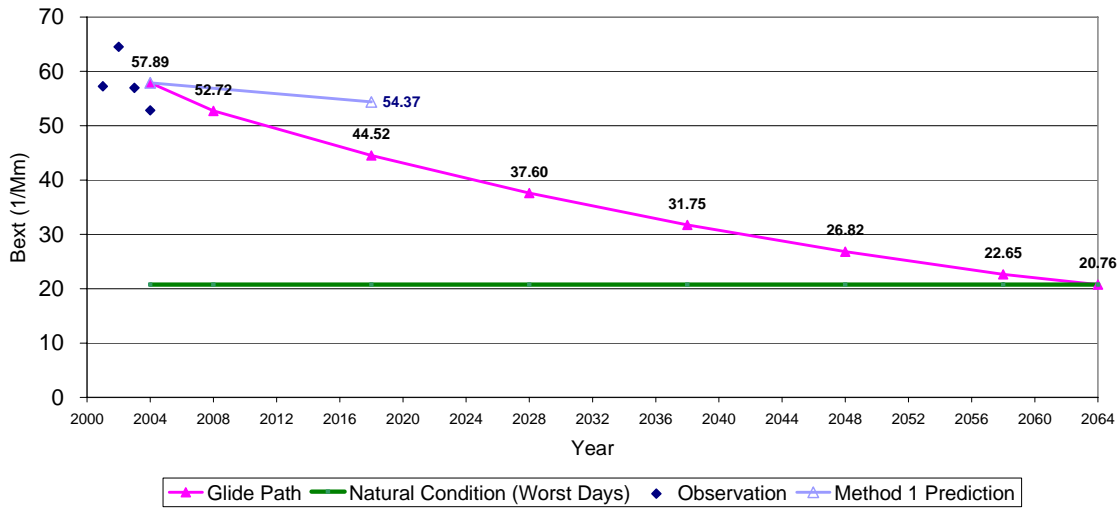


Figure F-9a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

**Uniform Rate of Reasonable Progress Glide Path
Big Bend NP - 20% Data Days**

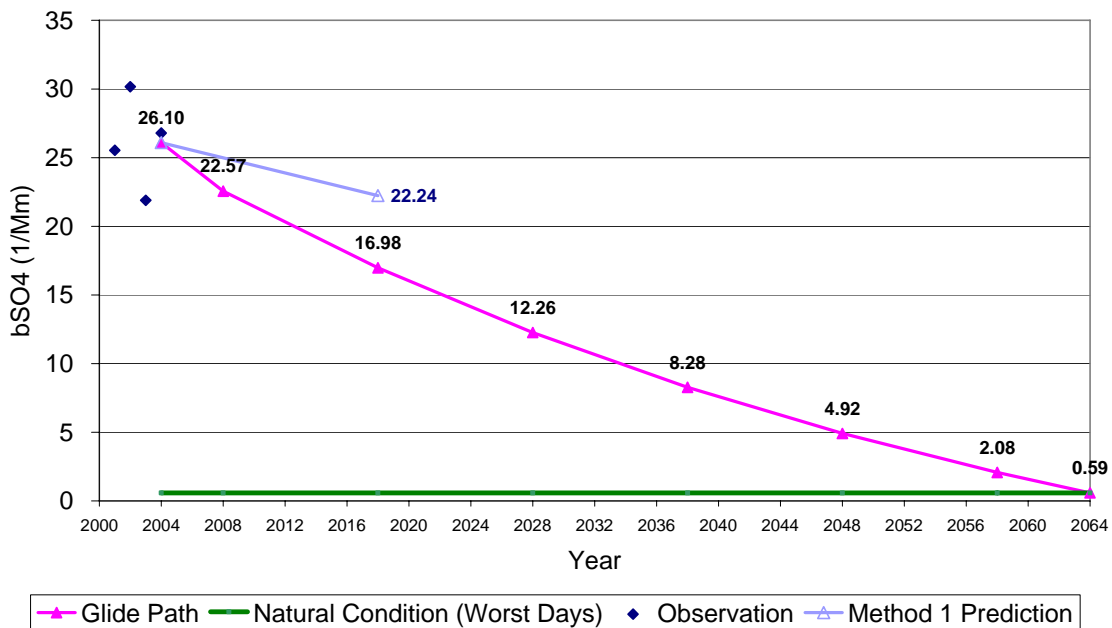


Figure F-9b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Big Bend NP - 20% Data Days

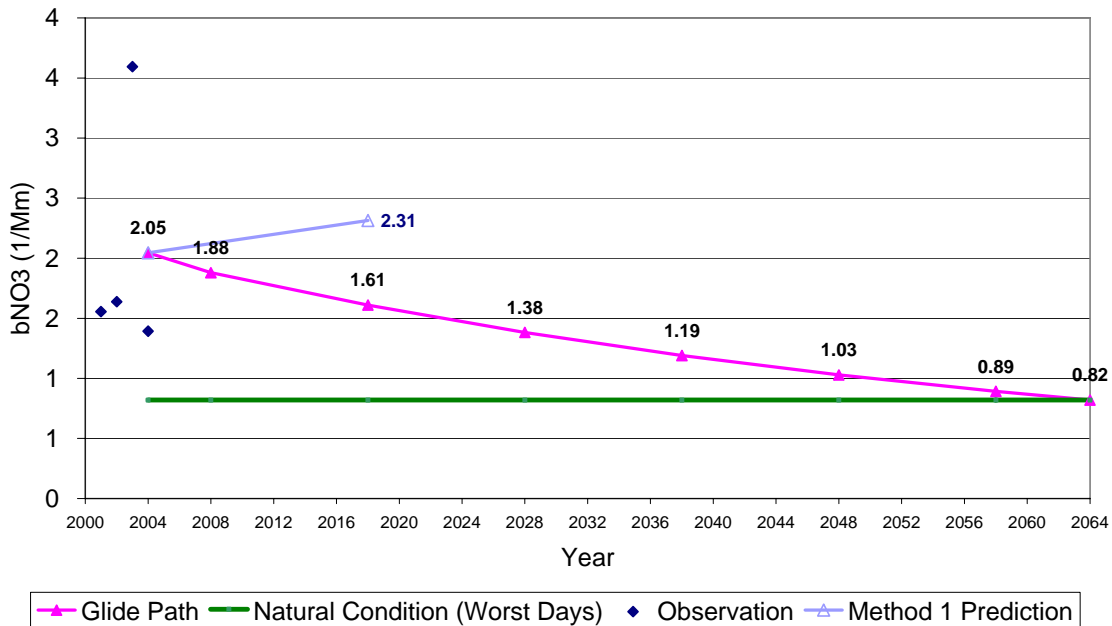


Figure F-9c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO₃) in extinction (Mm⁻¹) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Big Bend NP - 20% Data Days

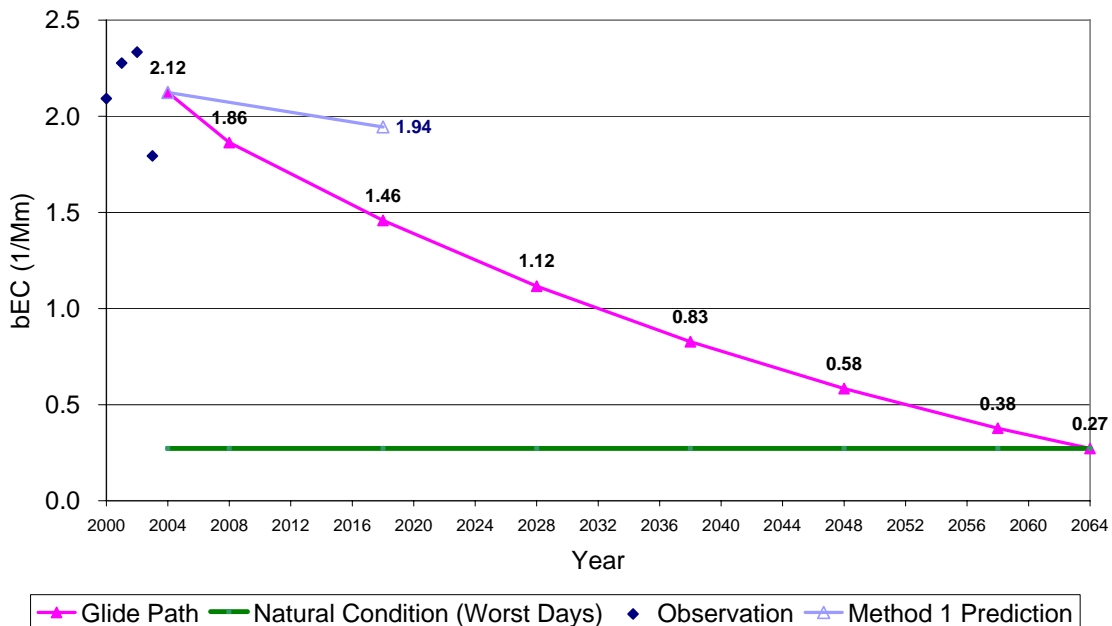


Figure F-9d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm⁻¹) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Big Bend NP - 20% Data Days

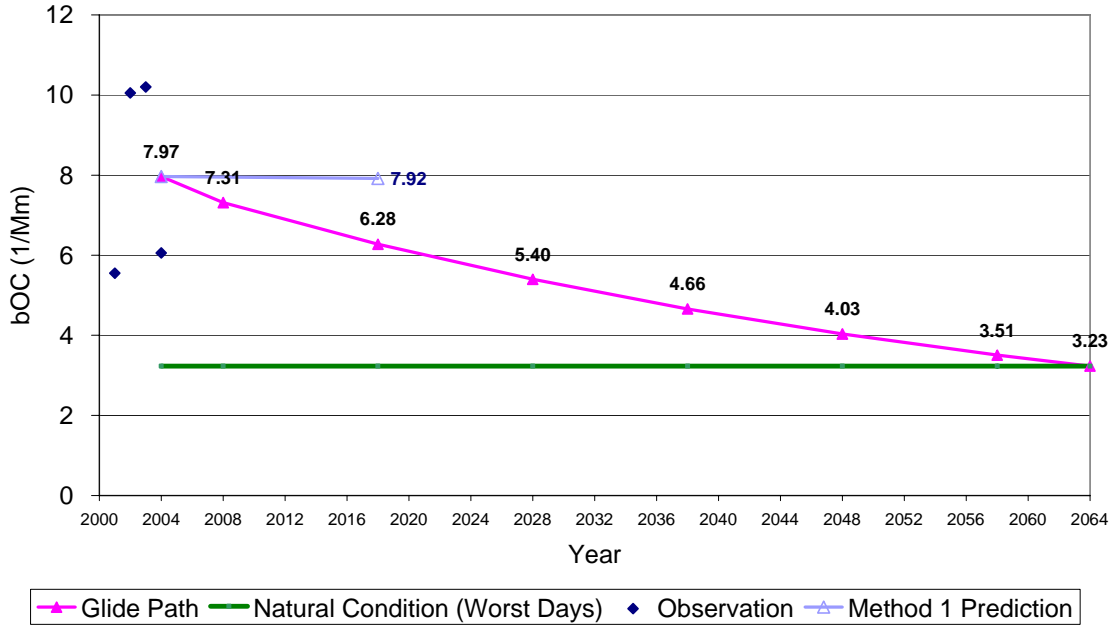


Figure F-9e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Big Bend NP - 20% Data Days

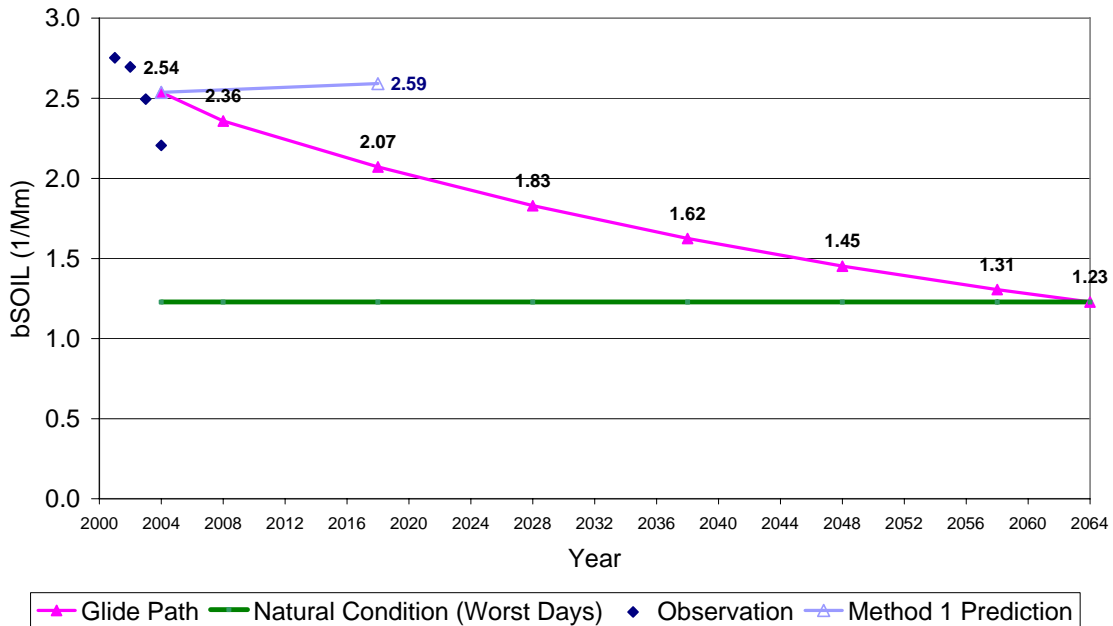


Figure F-9f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Big Bend NP - 20% Data Days

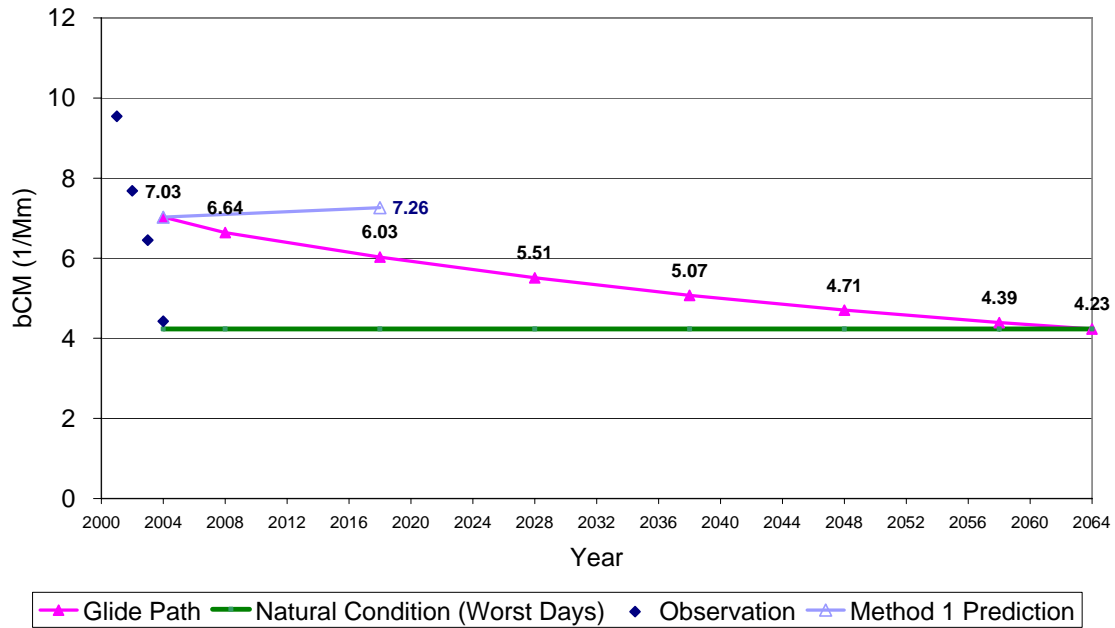


Figure F-9g. 2018 Visibility Projections and 2018 URP Glidepaths for Coarse Mass (CM) in extinction (Mm^{-1}) for Big Bend (BIBE), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

**Uniform Rate of Reasonable Progress Glide Path
Guadalupe Mountains NP - 20% Data Days**

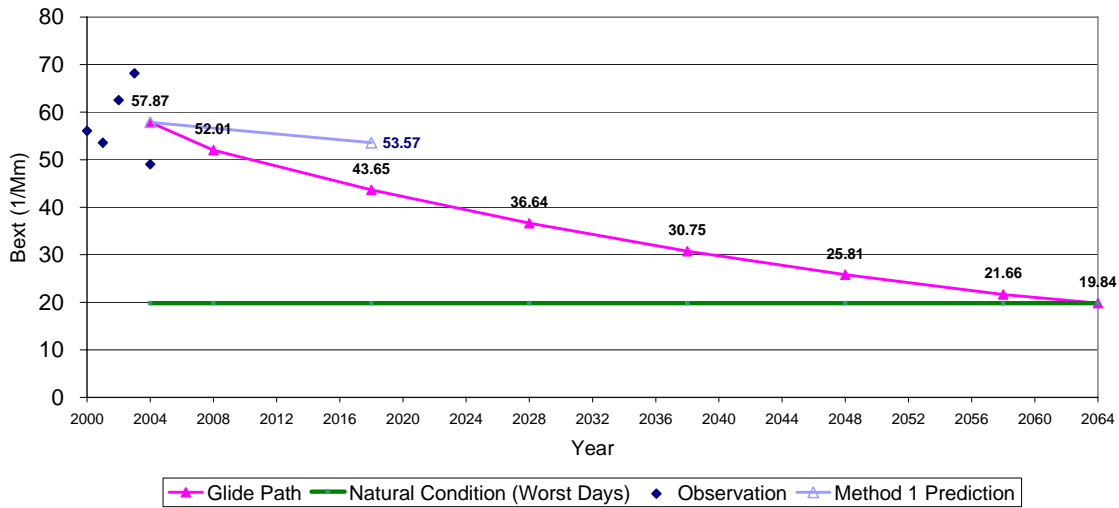


Figure F-10a. 2018 Visibility Projections and 2018 URP Glidepaths in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

**Uniform Rate of Reasonable Progress Glide Path
Guadalupe Mountains NP - 20% Data Days**

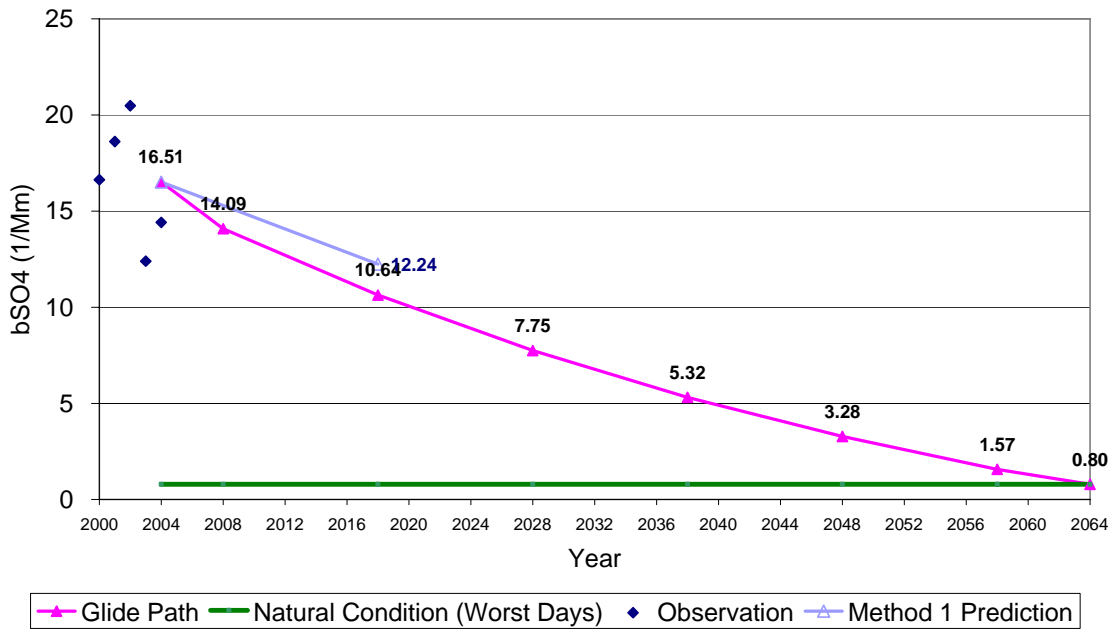


Figure F-10b. 2018 Visibility Projections and 2018 URP Glidepaths for Sulfate (SO_4) in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Guadalupe Mountains NP - 20% Data Days

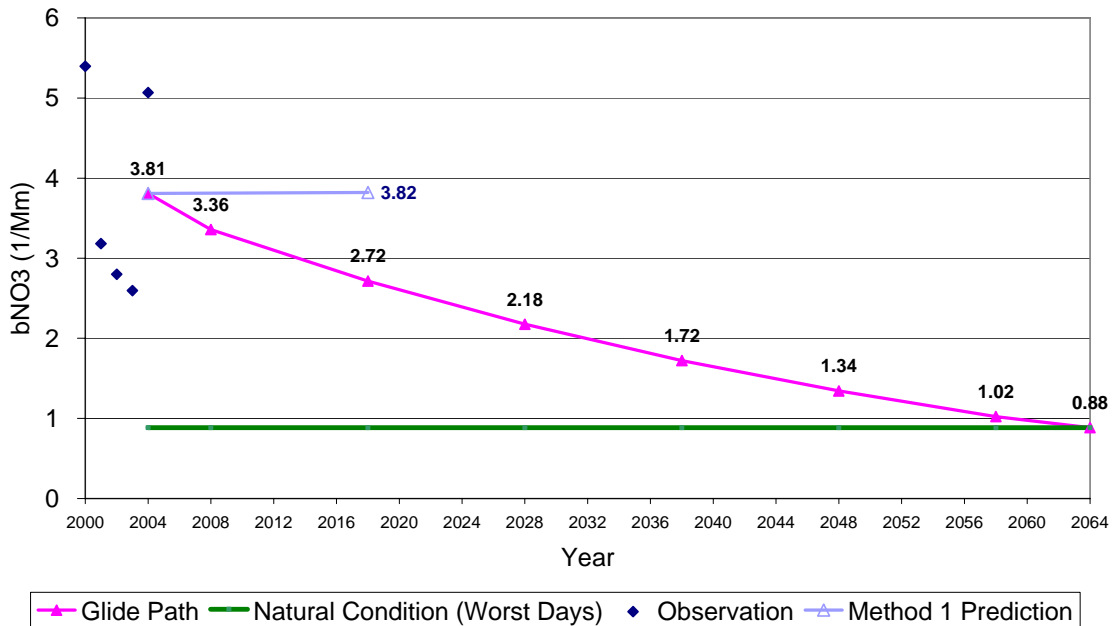


Figure F-10c. 2018 Visibility Projections and 2018 URP Glidepaths for Nitrate (NO₃) in extinction (Mm⁻¹) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Guadalupe Mountains NP - 20% Data Days

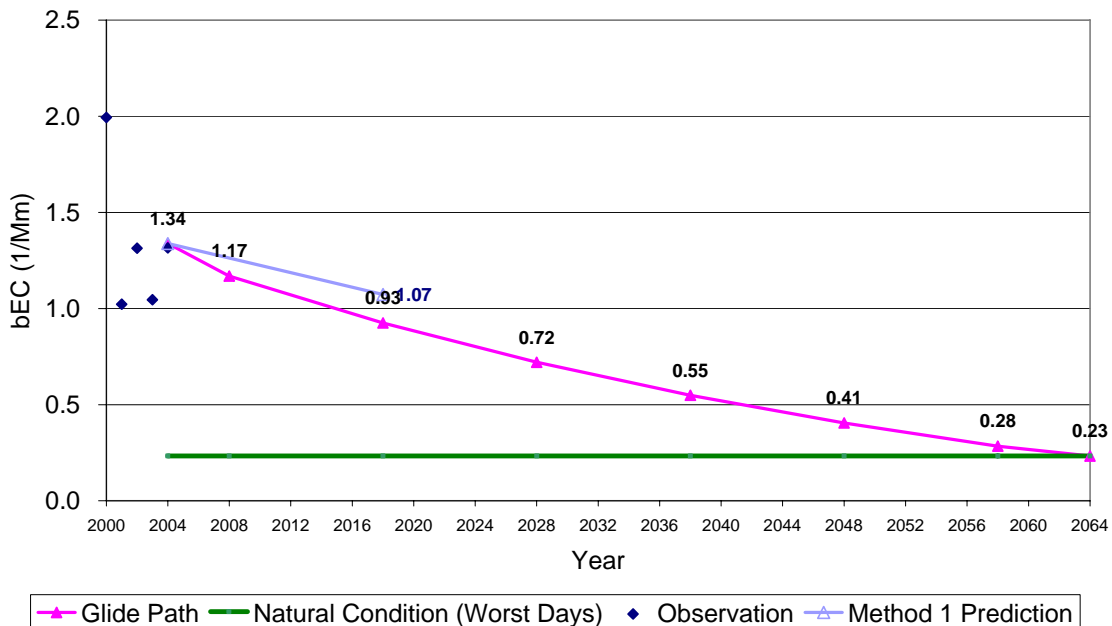


Figure F-10d. 2018 Visibility Projections and 2018 URP Glidepaths for Elemental Carbon (EC) in extinction (Mm⁻¹) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Guadalupe Mountains NP - 20% Data Days

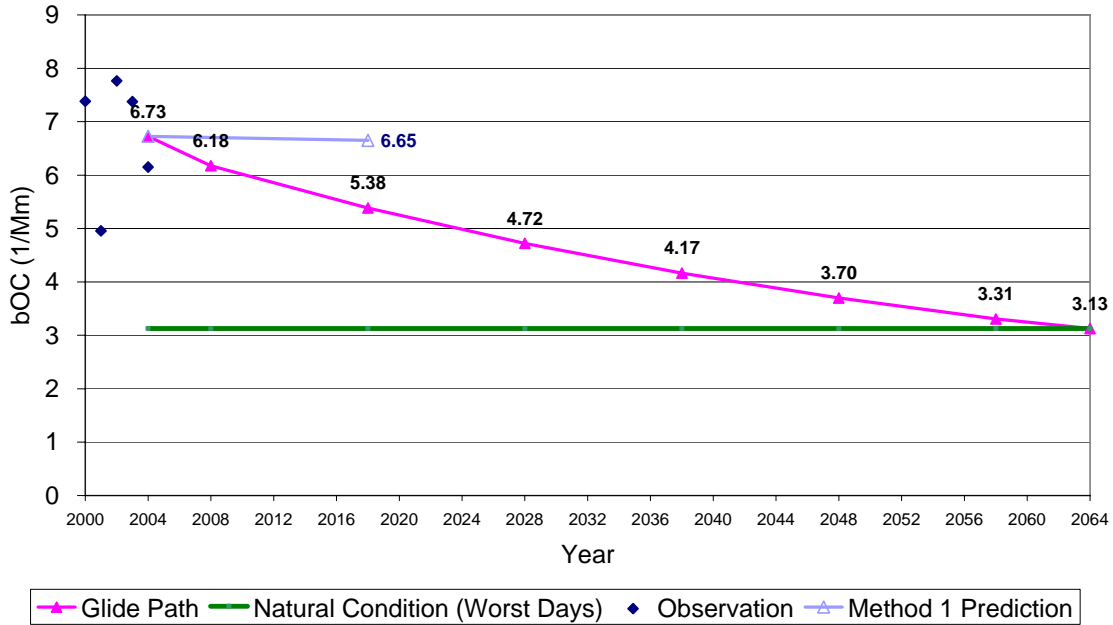


Figure F-10e. 2018 Visibility Projections and 2018 URP Glidepaths for Organic Mass Carbon (OMC) in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Guadalupe Mountains NP - 20% Data Days

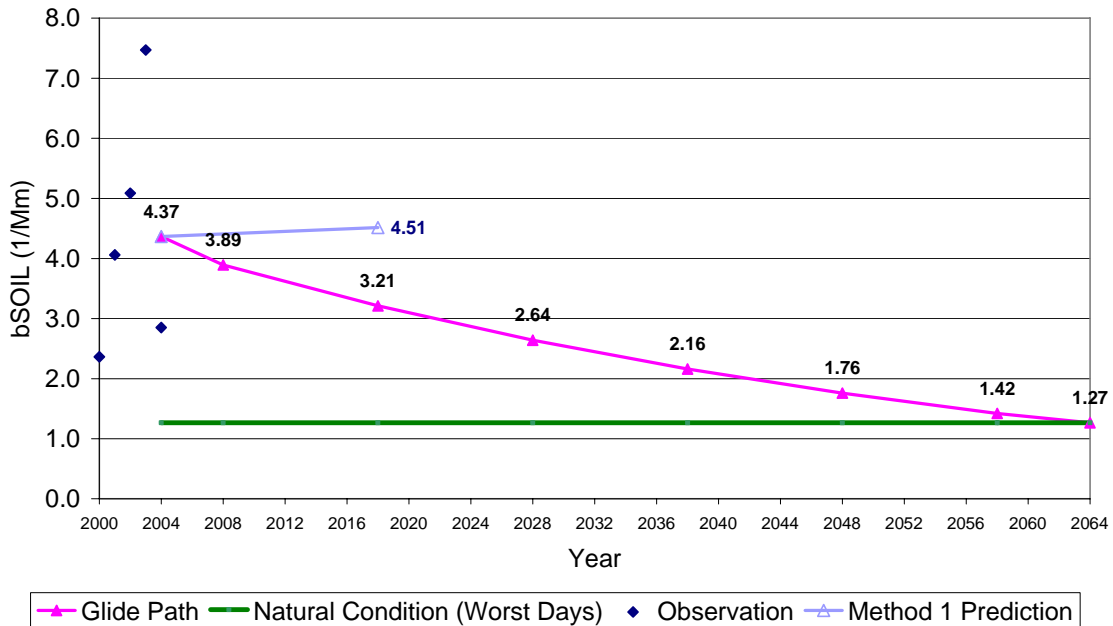


Figure F-10f. 2018 Visibility Projections and 2018 URP Glidepaths for Other Fine Particulate (SOIL) in extinction (Mm^{-1}) for Guadalupe Mountains (GUMO), Texas and Worst 20% (W20%) days using 2002/2018 Base G CMAQ 36 km modeling results.

Uniform Rate of Reasonable Progress Glide Path Guadalupe Mountains NP - 20% Data Days

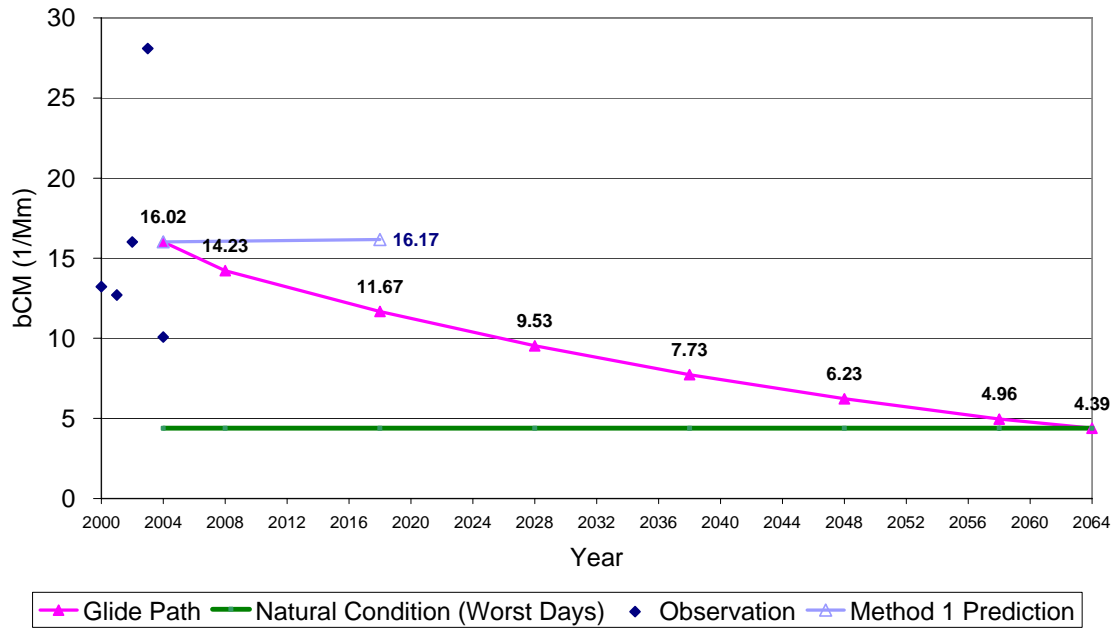


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Exhibit B

CENRAP Regional Haze Control Strategy Analysis Plan

Jeff Peltola

From: Gregory Stella [gms@alpinegeophysics.com]
Sent: Tuesday, May 09, 2006 3:53 PM
To: Jeff Peltola
Cc: 'Seltz, John'; mac@adeq.state.ar.us; 'T. W. Tesche'; 'Wilkinson, Jim'
Subject: Final CENRAP Regional Haze Control Strategy Analysis Plan

Attachments: Alpine Geophysics Final Report (9 May '06).pdf



Alpine Geophysics
Final Report...

VIA E-MAIL

9 May 2006

Mr. Jeff Peltola
CENRAP Technical Director
10005 S. Pennsylvania, Ste C
Oklahoma City, OK 73159

Dear Jeff:

The scientists at Alpine Geophysics are pleased to submit the attached document titled "Final CENRAP Regional Haze Control Strategy Analysis Plan" as outlined in Task 6 of our previously submitted quotation and work plan.

This document and associated materials are the product of our development and application of a quantitative procedure to identify and prioritize potential regional haze control strategies for Class I areas failing to meet visibility goal objectives. Additionally, we have addressed as many of the comments on the draft control strategy analysis plan as submitted to Alpine (April 25 and later) as we have determined to be within the scope of our original proposal to CENRAP.

To facilitate subsequent use of this methodology by CENRAP or others, this Final Report describes the various analytical steps and provides examples of this procedure (both in the body of the report and in supporting in appendixes). Document appendices and relevant technical support information have archived on the Alpine Geophysics project website facilitating easy access by interested parties. The login and password to access these data is provided below.

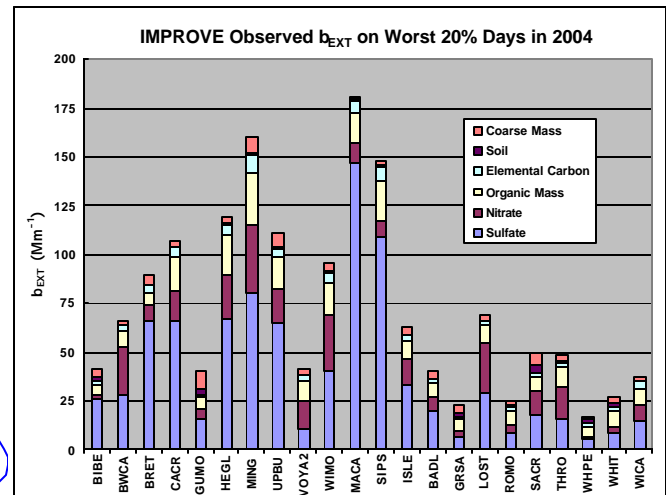
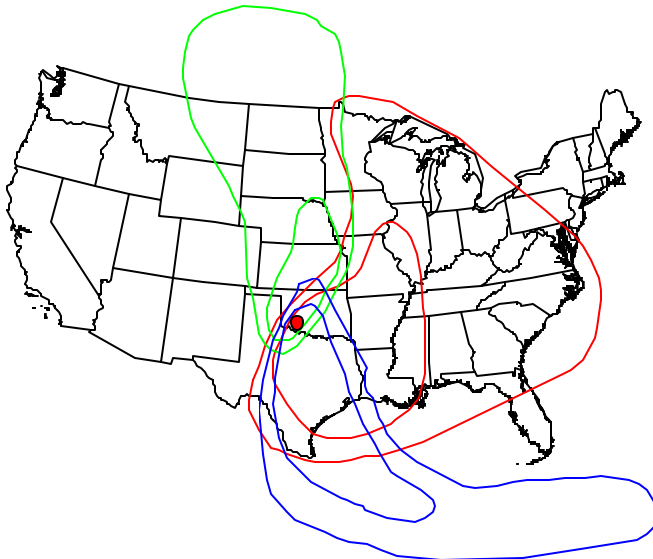
```
ftp> ftp.alpinegeophysics.com  
login> cenrap  
pass> pass4ftp
```

Should you have any questions or problems accessing these files and supporting materials, please contact me at your convenience.

Respectfully yours,

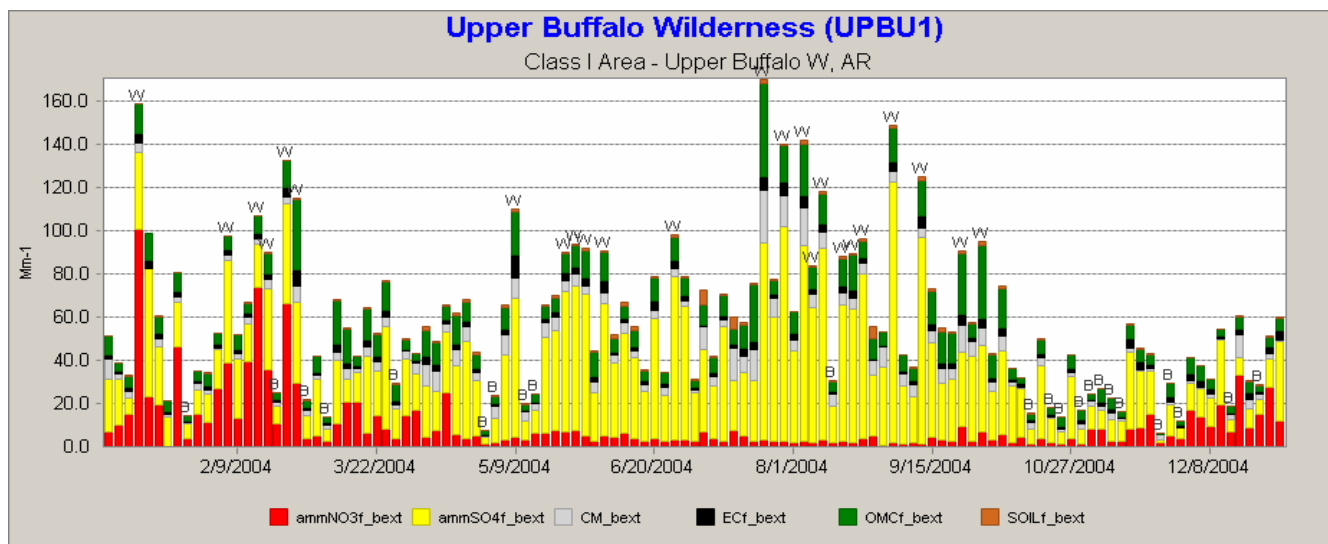
Gregory Stella
Senior Scientist
Alpine Geophysics, LLC
Burnsville, NC 28714

CENRAP REGIONAL HAZE CONTROL STRATEGY ANALYSIS PLAN



Wichita Mountains Areas of Influence (AOIs)

b_{EXT} on CENRAP Worst 20% Days in 2004



Daily Variation in PM_{2.5} Components at Upper Buffalo Wilderness

Prepared by

Prepared for

Mr. Gregory M. Stella
Dr. Jim Wilkinson
Dr. T. W. Tesche
Alpine Geophysics, LLC

CENRAP/CENSARA
10005 S. Pennsylvania, Ste C
Oklahoma City, OK 73159

9 May 2006

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EXECUTIVE SUMMARY

The Implementation and Control Strategies (ICS) Workgroup of the Central Regional Air Planning Association (CENRAP), together with other workgroups and state, tribal and federal agencies, have been working for more than four years gathering information for developing regional haze (RH) control strategies for pertinent Class I areas within and adjacent to the CENRAP states and tribes. In late February 2006, under the direction of the CENRAP Technical Director, Alpine Geophysics, LLC was contracted to assist the ICS in this effort. Building upon information developed by the ICS and others, Alpine was charged with developing a quantitative procedure to identify and prioritize potential RH control strategies to be tested by CENRAP modelers. Alpine formulated a methodology for constructing control strategy recommendations based on presently available information and submitted a Work Plan detailing this approach to the ICS/CENRAP leadership for review and approval.

Using the results of preliminary and more recent CENRAP visibility projection modeling together with current information on the composition of visibility-impairing fine particulate aerosols at 22 Class I monitors, Alpine identified residual visibility progress 'increments' that potentially require additional regional and/or subregional emission reductions to achieve visibility goals¹. We synthesized pertinent 'attribution of haze' documents, CENRAP CAMx/CMAQ visibility modeling results, our own fine particulate modeling in the central U.S, and other technical reports, papers, and analyses bearing directly on the quantification of emissions-source/visibility-receptor impacts at the ten CENRAP Class I and twelve adjoining areas.

Complementing this task, we synthesized a number of recent regional modeling studies helpful in relating emissions reductions of visibility precursors (e.g. SO₂, NO_x) in upwind source regions (Areas of Influence or AOIs) to the improvement in visibility (in deciviews or Mm⁻¹) at downwind Class I areas. Figures ES-1 and ES-2 present 'level 1' AOI plots for sulfate and nitrate impacts at the Big Bend, Guadalupe, Wichita Mountains, Breton Island, Voyageurs, and Boundary Waters Class I Areas, respectively. Three distinct levels of AOI have been estimated for each visibility precursor and Class I areas, but the controls most likely to be considered for modeling will be drawn from the closest (i.e., AOI level 1 or AOI-1) area of influence for each Class I area/visibility precursor pair.

¹ We use the term 'increment' to denote the difference between the modeled visibility at a Class I area in 2018 compared to the value based on the Reasonable Progress Goal (RPG) glide path, evaluated at the same time period. A positive increment means that the modeled visibility at the Class I area is 'poorer' than the level associated with the linear RPG glide path. Accordingly, CENRAP may wish to consider recommending additional precursor controls to ameliorate such a positive visibility increment. In contrast, a negative increment suggests that the modeled growth and emissions controls by 2018 may produce better visibility conditions at the monitor when compared to the linear glide path.

We then deduced from available regional modeling studies 'rules of thumb' relating percentage or tonnage reductions in visibility reducing precursors (e.g., SO₂, NO_x, ammonia, and VOCs) on the expected impact on visibility downwind. These 'rules of thumb', i.e., source-receptor relationships, were essential in estimating the amounts of incremental precursor emissions reductions in regions upwind of each of the various Class I areas that CENRAP modelers should consider in the prescription of initial RH control strategy simulations.

Once an emissions reduction target was determined for each Class I area showing visibility projections above the uniform rate of progress line (i.e., a positive visibility increment), we applied a master list of controls on sources within the Class I AOIs to formulate the CENRAP Control Strategy plan, including cost-effectiveness as a key element.

Alpine's analysis of the most recent CENRAP visibility projection data identified six Class I areas within the CENRAP domain whose projected visibility falls above the uniform rate of progress line (i.e., a projected positive visibility increment). On this basis, we quantified their associated AOIs, emission reduction estimates for reaching 2018 reasonable progress objectives, and potential incremental emission reductions worthy of annual CMAQ/CAMx modeling. For each area, sulfate and to a lesser extent, nitrate reductions were shown to be most beneficial during the 20 percent worst visibility days in 2002.

As each of these areas (and all of the other Class I AOIs in the CENRAP domain) are dominated by EGU SO₂ and NO_x emissions and many of the Class I area AOIs intersect with States currently excluded by the EPA CAIR rule, a region-wide strategy for additional EGU emission reductions at CAIR levels for the non-CAIR EGUs may be beneficial to each Class I area in the CENRAP domain projected below the uniform rate of progress line. An alternate intra-state trading permutation of this regional approach is also recommended for review by CENRAP.

In lieu of a single regional control option applied consistently across the entire CENRAP domain, individual subregional control applications are proposed to reduce emissions within certain Class I area AOIs. Based on the single precursor emission reduction target calculations defined by the ICS, subregional control strategies can be defined for three of the Class I areas projected to be above the reasonable progress glide path². In each case, the marginal cost curves (based on the application of all available control options on all controllable industries and source types) allow the selection of control technologies which attains the ICS defined, AOI-1 specific emission reduction targets.

However, the application of incremental control on all controllable point and area sources within certain AOIs still fails to meet the visibility objectives of three Class I areas modeled to be above the reasonable progress glide slope. In fact, as a result of the implementation of the exhaustive list of additional controls in each primary AOI, Alpine has determined that these three Class I areas³ will be unable to achieve a level of emissions reduction necessary to bring these areas under the reasonable progress line. Influences such as incrementally uncontrollable source categories, cost-effectiveness limitations and international and inter-RPO emissions transport are barriers that prevent strategies from being configured for these Class I areas within the confines of the CENRAP domain.

² These areas include Boundary Waters, Wichita Mountains, and Voyageurs.

³ These areas include Big Bend, Breton Island, and Guadalupe Mountains.

Although application of the exhaustive list of available control technologies to sources within the AOIs for each of the Class I areas failing to achieve ICS identified emission reduction targets, emission reductions beyond the base case should not be forsaken as a result. Indeed, *significant emission reductions may be warranted* in order to prepare impacted States and tribes for future attainment demonstrations where these measures may set the basis for defining and meeting future progress goals.

It should be noted that although this report and associated material includes controls for particular sources or source categories as options to consider for further photochemical modeling, it does not necessarily indicate that they will be modeled, and does not imply that these strategies ultimately will be implemented.

Finally, while the this methodology was developed and tested for regional haze control programs, with very minor adaptation, the same methods can be used effectively to aid in the design of regional 8-hr ozone and annual $PM_{2.5}$ NAAQS attainment strategies.



Figure ES-1. Level I Areas of Influence (AOI-1) for Sulfate associated with the Big Bend, Guadalupe, Wichita Mountains, Breton Island, Voyageur, and Boundary Waters Class I Areas.



Figure ES-2. Level I Areas of Influence (AOI-1) for Nitrate Associated with the Big Bend, Guadalupe, Wichita Mountains, Breton Island, Voyageur, and Boundary Waters Class I Areas.

1.0 INTRODUCTION

The Implementation and Control Strategies (ICS) Workgroup of the Central Regional Air Planning Association (CENRAP), together with other workgroups and state, tribal and federal agencies, have worked for more than four years in developing the foundation for constructing regional haze (RH) control strategies for pertinent Class I areas (Table 1-1) within and adjacent to the CENRAP states and tribes (Seltz, 2006a,b; Anderson; 2005; Sharp and Anderson, 2005). In late February 2006, Alpine Geophysics, LLC (AG) was contracted to assist the ICS in these ongoing efforts. Specifically, using information developed by the ICS and others, AG was charged with developing a quantitative procedure to identify and prioritize potential RH control strategies to be tested by CENRAP modelers. Alpine formulated a methodology for constructing control strategy recommendations based on presently available information and submitted a Work Plan detailing this approach to the ICS/CENRAP leadership for review (Tesche and Stella, 2006).

Table 1-1. Class I Areas Addressed in this Study.

RPO	Class I Area	ST	Name
CENRAP	Big Bend Nat'l Park	TX	BIBE
CENRAP	Boundary Waters	MN	BWCA
CENRAP	Breton Island	LA	BRET
CENRAP	Caney Creek	AR	CACR
CENRAP	Guadalupe Mountains	TX	GUMO
CENRAP	Hercules-Glades	MO	HEGL
CENRAP	Mingo	MO	MING
CENRAP	Upper Buffalo	AR	UPBU
CENRAP	Voyageurs	MN	VOYA2
CENRAP	Wichita Mountains	OK	WIMO
VISTAS	Mammoth Cave	KY	MACA
VISTAS	Sipsey Wilderness	AL	SIPS
MRPO	Isle Royale	MI	ISLE
WRAP	Badlands	SD	BADL
WRAP	Great Sand Dunes	CO	GRSA
WRAP	Lostwood Wilderness	ND	LOST
WRAP	Rocky Mtn Nat'l Park	CO	ROMO
WRAP	Salt Creek	NM	SACR
WRAP	Theodore Roosevelt	ND	THRO
WRAP	Wheeler Peak	NM	WHPE
WRAP	White Mountain	NM	WHIT
WRAP	Wind Cave	SD	WICA

Based on comments received, the approved Work Plan was implemented, culminating in the quantitative methodology for identifying potentially viable regional haze control strategies for the CENRAP states and tribes. Using the most pertinent aerometric, emissions and air quality modeling data available, we implemented this methodology and, in this report, present a set of recommendations for regional haze precursor emissions reduction strategies. These recommendations, once reviewed and refined by the ICS and Modeling workgroup, will be passed on to the CENRAP Emissions and Air Quality Modeling contractors (ENVIRON International Corporation and the University of California, Riverside) for quantitative testing with the SMOKE/CMAQ/CAMx regional modeling systems.

To facilitate subsequent use of this methodology, this report describes the various analytical steps and provides examples (both in the body of the report and in supporting appendixes). In addition, relevant technical support information, data sets, and analysis software have been supplied to CENRAP for posting on their project website for access by interested parties.

1.1 Study Overview

Preliminary (Typ02a) and more recent (Typ02b) modeling projections from the CMAQ Base18b/Typ02 scenarios (Morris et al., 2006b) have indicated that some Class I areas within or near the CENRAP domain may achieve the 2018 Reasonable Progress Goals (RPG) under current ‘on-the-books’ and ‘on-the-way’ controls while others may not unless additional emissions reductions are implemented (see Figures 1-1 and 1-2). As shown in Figure 1-1, six CENRAP Class I Areas (Big Bend, Guadalupe, Wichita Mountains, Breton Island, Voyageur, and Boundary Waters) are projected, by the latest CMAQ modeling, to have somewhat higher visibility metrics (deciviews) when compared to the 2018 RPG glide paths. While Boundary Waters does not explicitly appear in Figure 1-1 due to data base insufficiencies, recent modeling by various RPOs suggests that Boundary Waters responds similarly to Voyageurs. Accordingly, it is thus included as one of the six projected Class I areas where additional precursor controls might be considered by CENRAP/ICS.

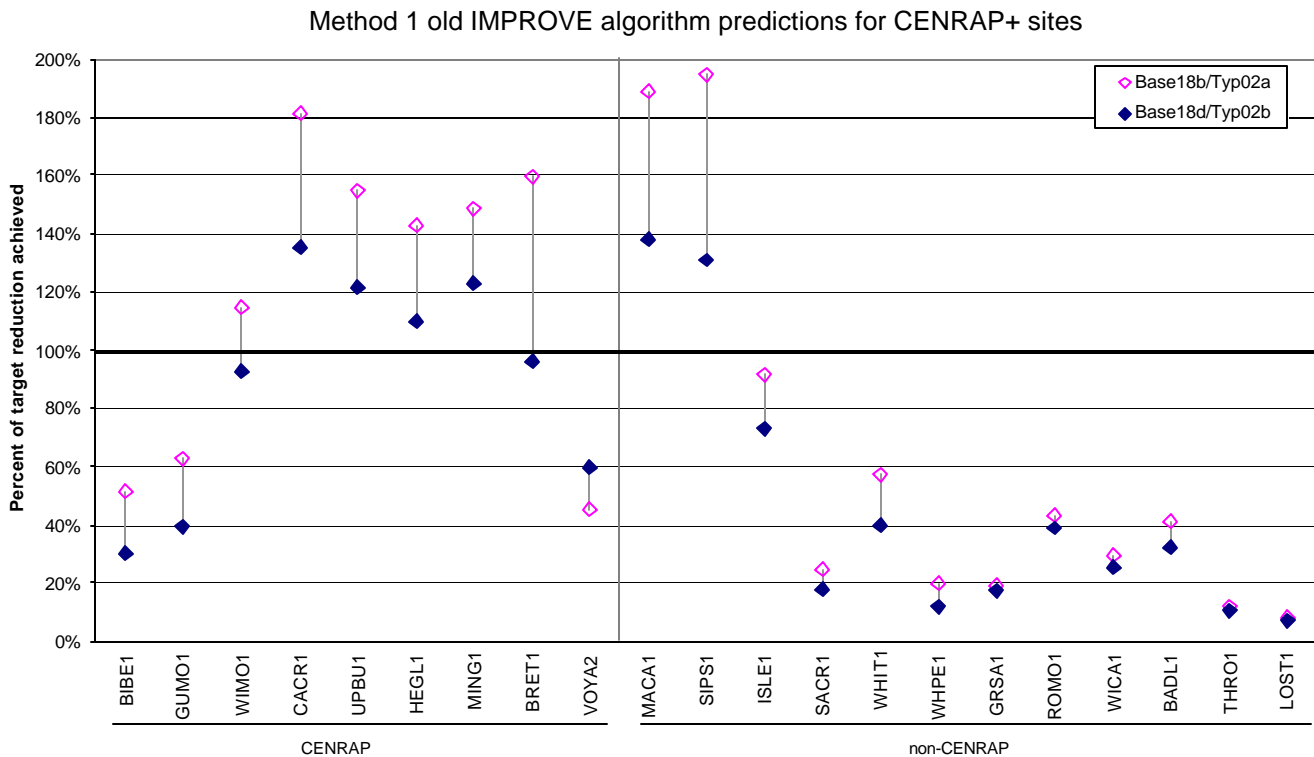


Figure 1-1. Current Visibility Projections (Base 18d/Typ02b) at CENRAP and Other Class I Sites (Source: Morris et al., 2006b).

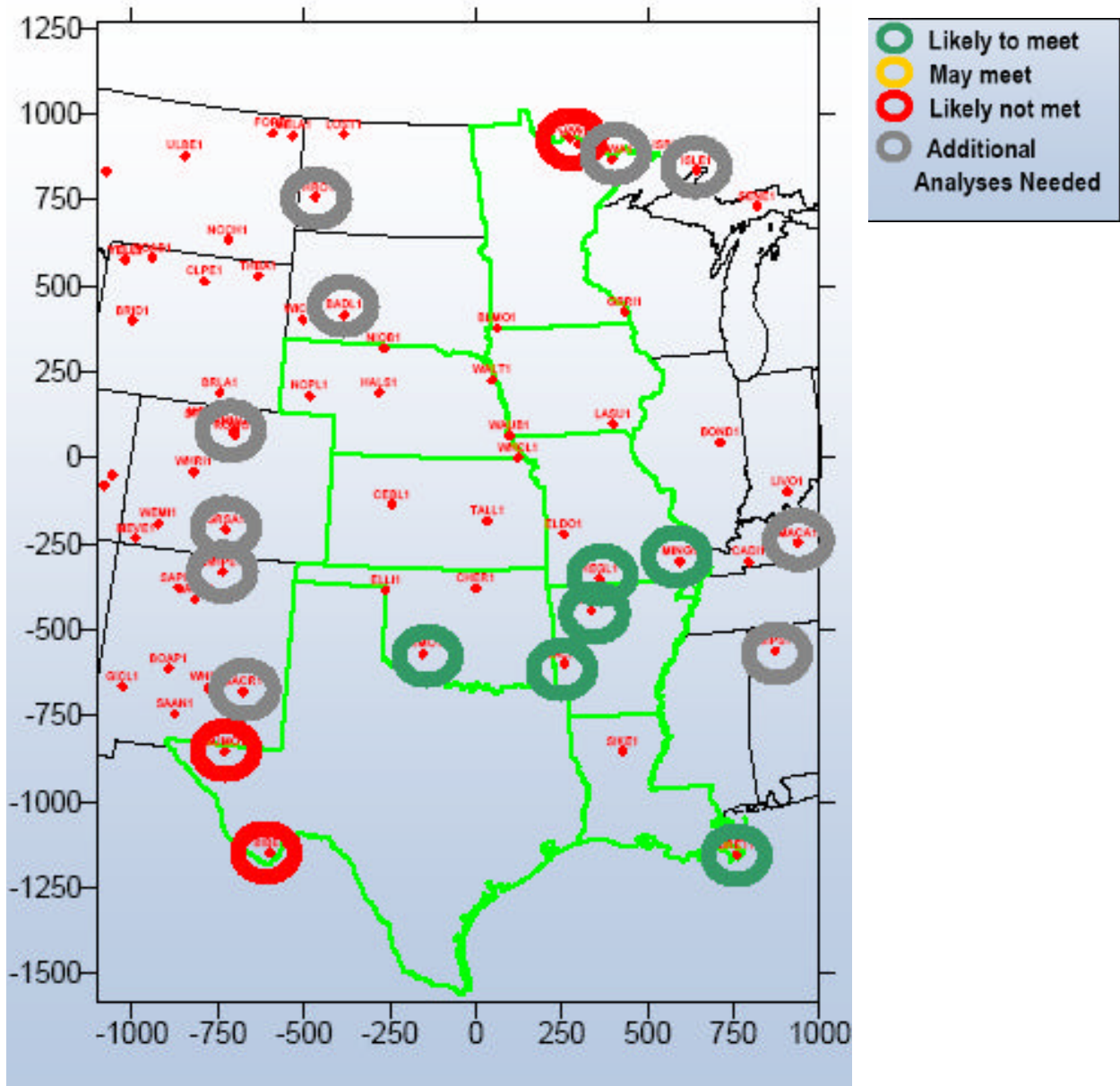


Figure 1-2. Preliminary Visibility Projections by State (Source: Morris et al., 2006b)

To prepare for the modeling of potential additional control strategies, an intensified effort has been undertaken by the ICS work group over the past two years to ‘set the stage’ for this activity (see for example ICS, 2005, Seltz, 2006). Consonant with these plans and on behalf of CENRAP, the ICS workgroup seeks to integrate focused contractor support with ongoing workgroup activities to accomplish the following objectives:

- > Analyze existing regional haze modeling inventories developed by CENRAP, the States, tribes, and other RPOs;
- > Synthesize available and pertinent air quality and meteorological data and recent ‘attribution of haze studies’ by CENRAP and the other RPOs;
- > Review preliminary 2018 RPG modeling by CENRAP and other RPOs to identify the key Class I areas for which additional emissions reductions may be needed;
- > Develop a prioritized set of regional and subregional precursor emissions control scenarios aimed at achieving the RPG at the CENRAP Class I areas; and
- > Monitor the initial 2018 control strategy modeling performed by the CENRAP modeling team to ascertain whether subsequent strategies need to be refined or new strategies developed.

The project Work Plan (Teschke and Stella, 2006) describes in detail how these objectives have been addressed in cooperation with ICS and CENRAP.

1.2 Approach, Assumptions, and Constraints

Development of recommendations for potential CENRAP regional haze control strategy simulations was a three-step process. First, we assembled available information useful in quantifying the reductions in fine particulate aerosol concentrations needed to satisfy CENRAP’s preliminary regional haze visibility projections. Naturally, the principal focus was on the Class I areas within the CENRAP region that were estimated to not meet the 2018 Reasonable Further Progress (RFP) glide paths. Based on preliminary and more recent modeling (Morris et al., 2006b), some Class I areas did meet the 2018 RFP glide paths while others did not. As new visibility projections for the Class I areas become available, the ICS may wish to re-examine this study’s strategy recommendations in order to account for more up-to-date estimates.

The second step involved developing Areas of Influence (AOIs) upwind of each Class I area within which common ‘visibility precursor-Class I receptor’ impacts could be aggregated into similar groupings. We used results of numerous statistical and pattern recognition studies, as well as pertinent regional photochemical aerosol modeling by Alpine and ENVIRON scientists as well as other groups (including the RPOs). These analyses culminated in quantitative ‘rules of thumb’ relating emissions reductions of visibility-impairing precursors (in tons/day) to ambient aerosol concentrations at each of the ten (10) CENRAP Class I monitors. We also developed these quantitative source-receptor relationships for a dozen Class I areas in adjoining RPOs to the extent possible given available data, project resources and schedule. As of this writing,

CENRAP Modeling contractors are still performing focused particulate source apportionment modeling (CAMx PSAT) over the region. Once this work is completed, the ICS may wish to re-examine our methodology and strategy recommendations to determine if refined source-receptor relationships alter in any way our present findings and conclusions.

The third step synthesized the results of the first two, together with information on the estimated 2018 CENRAP emissions inventory and the cost-effectiveness of various controls, to deduce a prioritized set of RH control strategies containing elements of both regional emissions reductions and targeted reductions within the AOIs closest to those six CENRAP Class I areas for which positive visibility increments were estimated (Morris et al., 2006b). We used the most up-to-date modeling inventory supplied by the CENRAP Modeling contractor; however, the current round of inventory corrections and refinements will undoubtedly lead to refined emissions data sets in coming months. Thus, another constraint limiting the ‘shelf-life’ of this study’s recommendations is the accuracy and representativeness of the draft 2018 emissions data used in developing this plan’s precursor emissions control recommendations.

While project work scope precluded re-running the strategy development process described in this report with updated CAMx/PSAT and CMAQ visibility projections expected in late May or early June 2006, the methodological tools are cataloged and archived should the ICS wish to undertake this activity at a later time.

1.3 Structure of Report

This report is organized as follows. Section 2 provides a brief background on the Regional Haze Rule (RHR) and the role that CENRAP and the other RPOs are playing in developing strategies that will show progress in meeting Reasonable Progress Goals by 2018. We also discuss key considerations that influence the design of regional and subregional control strategies in the context of the RHR. Our technical approach is summarized in Section 3. Details of our methodology are given in the Work Plan (Tesche and Stella, 2006a). In Section 4 we describe the information available to characterize the daily and annual composition of PM_{2.5} constituents (sulfate, nitrate, elemental carbon, etc) at the various IMPROVE monitors in the CENRAP and adjoining Class I Areas. We also describe the method to relate the modeled deciview (dv) or extinction coefficient (Mm^{-1}) – derived from the most recent CENRAP visibility projection modeling – to the fine particulate component concentrations at each Class I area expressed in units of mass per unit volume (i.e., $\mu g/m^3$).

Section 5 presents the quantitative methods for converting these concentration increments (whose reductions will likely achieve the individual Class I areas visibility goals by 2108) to mass emissions rate reductions for the primary particulate aerosol precursors, NO_x and SO₂. In addition, the section describes the methods used to construct Area of Influence (AOI) domains surrounding each Class I area based on historical data analysis, statistical pattern recognition studies, and various photochemical and aerosol modeling studies performed throughout the eastern U.S. by Alpine, ENVIRON, state, tribal and federal regulatory agencies, the Southern

Appalachian Mountains Initiative (SAMI), the RPOs, and university scientists⁴. In Section 6, the information developed in the two preceding chapters is used, together with original analyses of the 2018 regional haze inventories and control technology cost-effectiveness information, to construct a series of curves from which quantitative estimates of suggested precursor emissions controls (within specific AOIs) are developed for each Class I Area in CENRAP projected above the reasonable progress glide path in 2018. Our summary and recommendations are presented in Section 7.

1.4 Technical Support Resources

Several technical appendixes and support documents are provided to accommodate the extensive tabular and graphical information underpinning our methodology. Some appendixes constitute simple tabular data or emissions summaries (in Excel format) while other appendixes contain information in PowerPoint or Adobe Acrobat formats. Finally, the study's Work Plan, Final Report, Technical Support Documents (i.e., the appendixes and other materials), and a compilation of science reports, professional papers and journal articles have been transferred to CENRAP for uploading to their project ftp site.

⁴ The AOI methodology was carried out by Dr. Jim Wilkinson of Alpine whose recent Ph.D. original research and Dissertation from Georgia Tech focused on the development of the AOI methodology for regional haze, ozone, and PM_{2.5} control strategy modeling in the eastern U.S.

2.0 CONTEXT FOR REGIONAL HAZE STRATEGY DEVELOPMENT

Section 169A of the Clean Air Act (CCA) sets forth a national goal for visibility which is the “prevention of any future, and the remedying of any existing, impairment of visibility in Class I areas which impairment results from manmade air pollution.” In 1999, EPA published a final rule to address a type of visibility impairment known as regional haze (64 FR 35714). The Regional Haze Rule (RHR) requires States to submit implementation plans (SIPs) to address regional haze visibility impairment in federally-protected parks and wilderness areas (i.e., the Class I scenic areas identified in the Clean Air Act). The 1999 rule was issued to fulfill a long-standing EPA commitment to address regional haze under the authority and requirements of sections 169A and 169B of the CAA. In essence, the RHR prescribes that states are to make efforts to improve visibility in 156 Class I areas at such rates that “natural conditions” would be achieved in each area by 2064. A ‘reasonable rate of progress’ corresponds to linear improvement in visibility, as characterized in units of deciview (dv), between current conditions during the base period of 2000-2004 and natural conditions at the end point of 2064. It is important to note that a modeled 2018 visibility condition at a Class I monitor – numerically equaling the monitor’s RPG goal – is not meant to imply ‘attainment’ of any standard nor is lesser modeled progress in reaching a particular RPG indicative of ‘nonattainment’. Indeed, as will be discussed later, progress in attaining visibility improvements at some CENRAP monitors (in Texas and Minnesota) may be thwarted by substantial contributions of visibility precursors from Mexico and Canada over which the States and Tribes have no direct control.

2.1 Role of CENRAP and the Other Regional Planning Organizations (RPOs)

CENRAP is one of five Regional Planning Organizations (RPOs) that have responsibility for coordinating development of State Implementation Plans (SIPs) and Tribal Implementation Plans (TIPs) in selected areas of the U.S. to address the requirements of the Regional Haze Rule (RHR). The RHR visibility SIPs/TIPs are due in 2007/2008. CENRAP modeling results may also form the regional component for 8-hour ozone and fine particulate (PM_{2.5}) SIPs/TIPs that are also expected to be due in 2007/2008. CENRAP is a regional partnership of states, tribes, federal agencies, stakeholders and citizen groups established to initiate and coordinate activities associated with the management of regional haze and other air quality issues within the CENRAP states. The CENRAP region includes states and tribal lands located within the boundaries of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma and Texas.

The regional emissions and fine particulate/visibility modeling for CENRAP is being performed by the Emissions and Air Quality Modeling Contractor that is comprised of staff from ENVIRON International Corporation (ENVIRON) and the University of California, Riverside (UCR). The ENVIRON/UCR team performs the emissions and air quality modeling simulations for states and tribes within the CENRAP region, providing analytical results used in developing implementation plans under the EPA Regional Haze Rule. Alpine Geophysics serves as the Technical Advisor to CENRAP, working interactively with the emissions and air quality modelers at ENVIRON and UCR.

2.2 Considerations in Designing Regional Haze Control Strategies

Where the year 2018 base case modeling does not show an acceptable regional haze or visibility glide slope for a Class I area within or adjacent to the CENRAP domain, additional (and possibly substantial) emission reductions will most likely be required to show reasonable progress in meeting 2108 visibility goals. Due to the unique location, meteorology, and emission sources within an area of influence to each Class I area, individualized control strategies reducing emissions from the remaining residual sources or source types are most likely to achieve required results. It is highly unlikely that a single cost effective “across-the-board” reduction strategy will achieve the visibility goals for every Class I area.

Although emissions located within areas of direct proximity to Class I area monitors will generally have the greatest influence on attaining visibility goals, these sources may not be the only ones with significant impact on the air quality. Using methods such as localized geography analysis (e.g., within 200km of Class I area boundaries) to initially identify source types and pollutants with the greatest influence will only provide part of the picture. In reality, other methods will also provide information related to transport sources impacting a Class I area. These other methods can include back trajectory analysis, residence time probability, source apportionment modeling (PSAT, OSAT, TSSA), and the cause of haze (COH) studies performed in the past two years by the various RPOs including CENRAP. Other geographic studies, such as identifying sources that have an impact on more than one Class I area are also warranted. These methods can also help to limit or refine geography, pollutants, or source categories of interest for additional reduction potential in each Class I area.

Using these techniques in addition to review of the future year base case emissions inventories and assigned control strategies will allow CENRAP and the ICS Workgroup to further define incremental reduction allowing for the attainment of Class I area air quality or visibility objectives.

2.3 Resources Available to this Study

The reference section of this report and the technical discussions in Sections 4 through 6 identify the major data bases, reports, modeling output files and other resources used in this study. Certain regional modeling and data analysis studies performed by the RPOs and their contractors were particularly useful in developing source-receptor relationships for the various Class I areas. These include: (a) the recent (25 April 2006) visibility projections for the CENRAP and adjoining RPOs recently described by Morris et al. (2006b), (b) monitoring information for the various Class I areas of interest, summarized on the IMPROVE website, and (c) the most recent 2018 SMOKE emissions inventory developed for CENRAP by various state, tribal and federal agencies and contractors.

3.0 TECHNICAL APPROACH

As described in the Work Plan (Tesche and Stella, 2006b), our technical approach consisted of six (6) tasks which are summarized briefly here to provide background for the more detailed technical discussions given in subsequent chapters.

Task 1: Synthesize Relevant Regional Haze Aerometric Analyses: The objective of Task 1 was to synthesize pertinent ‘attribution of haze’ documents, CENRAP CAMx/CMAQ visibility modeling results, and other technical reports, papers, and analyses bearing directly on the quantification of emissions-source/visibility-receptor impacts at the 10 CENRAP Class I areas and adjoining areas. This Task was aimed at quantifying what is known about source-receptor relationships at the 10 CENRAP Class I areas on the basis of emissions, air chemistry and meteorological statistical analyses and receptor modeling studies.

Task 2: Review Existing Inventories and Control Scenario Strategy Options: This involved a concise summarization of existing regional haze modeling inventories and associated local, State, Tribal and Federal control programs to determine available incremental controls on sources or source types affecting visibility increments (i.e., differences between the modeled 2018 visibility level and the RFP glide slope for the particular Class I Area). In addition, we attempted to confirm future year control plans and reduction scenarios necessary to accomplish incremental reduction analysis. The product of this effort was a set of suggestions for alternate incremental control strategies based on analysis of available emissions, monitoring, and modeled data.

The Task 2 review was conducted in a top down fashion starting with an analysis of the major source categories in the domains of interest (based on results from Tasks 1 and 3) to determine which major categories have the highest residual contribution to the area. Once the highest source types were identified, subcategories within those source types were reviewed. In addition to reviewing the residual emission categories in the future year base, we also identified reductions that have already occurred within each category or at specific units. This allows CENRAP to determine if certain source categories that have yet to be controlled under the base case have the potential for reduction or if source types already reduced have reached the full cost-effective potential. Finally, unit level tables of emission comparisons from 2002 to 2018 were developed that facilitate ICS’s review of existing emission reductions and the assignment of new cost-effective controls to units using the best control for the scenario.

Once the list of potential sources available for reduction were identified, we used relevant control strategy information extracted from EPA’s AirControlNET (Pechan, 2005) and other sources to further define the most cost-effective strategies for these sources. Since AirControlNET does not allow for the interactive processing of new inventories (it comes preconfigured with inventories and control strategies applied), this extract was performed outside of the AirControlNET model to assign incremental control programs. Finally, we ran every accessible control strategy against the identified source list to develop incremental cost curves necessary to design command and control or cost-effectiveness based control strategies by source or domain. This master list of controls was then used in the development of our final control strategy recommendations.

Task 3: Synthesize Relevant Regional Haze Source Attribution Modeling:

Complementing Task 1, work under Task 3 was aimed at synthesizing key results from recent regional modeling studies helpful relating emissions reductions of visibility precursors (e.g. SO₂, NO_x) in upwind source regions to the improvement in visibility (in deciviews or, alternatively, in Mm⁻¹) at downwind Class I. More specifically, we attempted to extract from available regional modeling studies useful ‘rules of thumb’ relating percentage or tonnage reductions in visibility reducing precursors (e.g., SO₂, NO_x, ammonia, and VOCs) on the expected impact on visibility downwind. These ‘rules of thumb’ or source-receptor relationships were essential in estimating the amounts of precursor emissions to be reduced in regions upwind of each of the various Class I areas.

Task 4: Develop CENRAP Control Strategy Plan: The objective of Task 4 was to assemble the findings and technical work products from Tasks 1 through 3, supplemented with any additional information provided by the ICS Workgroup or CENRAP Modeling contractors, and construct the CENRAP Control Strategy Plan. As described in subsequent chapters, this plan addresses feasible regional haze control strategies with each one including both regional and sub-regional elements.

More specifically, using the results of the most recent CENRAP visibility projection modeling (Morris et al., 2006b), we identified six Class I areas that potentially require additional regional and/or subregional incremental emission reductions to achieve reasonable progress visibility goals. Once an emissions reduction target was determined for each Class I area, we used the master list of controls developed in Task 2 to formulate the CENRAP Control Strategy plan, including cost-effectiveness as a key element. This plan identifies specific source categories (e.g., SIC, SCC, plant ID), and emissions reductions to be implemented. The specificity of the prescribed control scenarios recommended in the plan is sufficient to allow the CENRAP modeling contractors to readily implement the suggested changes through the SMOKE model input stream.

The CENRAP Control Strategy Plan is intended to identify the specific sources and/or source categories where additional control is available with emphasis on known incremental reductions first (e.g., BART). Using this plan as a starting point, CENRAP is equipped to assess the present strategy recommendations and identify any new assumptions (recent or new facility configurations, updated control strategy information from the states and tribes), emergent data sets (e.g., CAMx PSAT modeling; updated 2018 CMAQ visibility projections), corrected modeling inventories, and so on that were unavailable during the three-week time period when this plan was developed.

Task 5: Review Control Strategy Plan With ICS: The project team participated in a teleconference call on 13 April 2006 with the CENRAP ICS Workgroup to discuss the study methodology, findings, and recommendations.

Task 6: Final Report: To the maximum extent feasible within this project’s work scope, we incorporated written responses from CENRAP on the 10 April draft report, culminating in this final document.

4.0 ESTIMATION OF RESIDUAL VISIBILITY IMPROVEMENT NEEDS

The estimation of residual visibility improvement needs (i.e., the aerosol species concentration reductions [mass per unit volume] at each Class I monitor) was performed through three activities: (a) literature review and synthesis, (b) analysis of current CMAQ visibility projections and IMPROVE measurements at the Class I sites, and (c) integration of this information into a computational scheme for use in later tasks.

4.1 Literature Review and Synthesis of Pertinent Source-Receptor Information

Our synthesis of *existing* source-receptor information for the CENRAP and adjacent Class I area was guided by the following set of questions for which specific answers were sought in recent reports, papers, RPO and science meeting presentations, as well as recent one-atmosphere modeling studies. These core questions include:

- > **What aerosol components are responsible for haze?**
 - What are the major components for best, worst and average days visibility days across the CENRAP domain and how do they compare?
 - How variable are they episodically, seasonally, inter-annually?
 - What site characteristics best group sites with similar patterns of major components?
 - How do the relative concentrations of the major components compare with the relative emission rates nearby and regionally?

- > **What is meteorology's role in the causes of haze?**
 - How do meteorological conditions influencing the CENRAP Class I areas differ for best, worst and typical haze conditions?
 - What empirical relationships are their between meteorological conditions and haziness?
 - How well can haze conditions be predicted solely using meteorological factors?
 - What characteristics best group CENRAP Class I sites with similar relationships between meteorological conditions and haze?
 - How well can inter-annual variations in haze be accounted for by variations in meteorological conditions at the CENRAP Class I areas?

- > **What are the emission sources responsible for haze?**
 - What geographic areas are associated with transported air that arrives at sites on best, typical and worst haze days in the CENRAP region?
 - Are the emission characteristics of the transport areas consistent with the aerosol components responsible for haze?
 - What do the aerosol characteristics on best, typical and worst days indicate about CENERAP or upwind emissions sources?
 - What does the spatial and temporal pattern analysis indicate about the locations and time periods associated with sources responsible for haze?
 - What evidence is there for urban impacts on haze at the CENRAP Class I areas and what is the magnitude and frequency when evident?

- What connections can be made between sample periods with unusual species concentrations and activity of highly sporadic sources (e.g. major fires, dust storms)?
 - What can be inferred about impacts from sources in other states, other RPOs and other countries, particularly Mexico and Canada?
 - What refinements to default natural haze levels can be made using ambient monitoring and emission data?
- > **Are there detectable and/or statistically significant multi-year trends in the causes of haze?**
- Are the aerosol components responsible for haze changing?
Where changes are seen, are they the result of meteorological or emissions changes?
 - Where emissions are known to have changed, are there corresponding changes in haze levels?

With these questions in mind, we surveyed the literature relevant to the CENRAP Class I areas in order *to summarize*:

- > **Characteristics of Each CENRAP Monitoring Site**
- Their representation of the Class I area and nearby Class I areas;
 - Relationship to terrain features, bodies of water, etc;
 - Proximity to major point sources, cities, etc.
- > **Meteorological Characteristics of Each CENRAP Monitoring Site**
- Expected mesoscale flow patterns of interest (sea/land breeze, mountain/valley winds, convergence zones, nocturnal jets, etc.);
 - Orographic precipitation patterns (i.e. favored for precipitation, or in rain-shadow);
 - Inversion layers;
 - Potential for transport from cities and other significant sources/source areas.
- > **Visibility-Aerosol Related Data Analyses**
- Descriptive statistics and interpretation for aerosol data- individual components and reconstructed extinction
 - Key aerosol species component spatial and seasonal patterns (e.g., Best 20%, middle 60%, worst 20% reconstructed extinction days and seasonal patterns by site)
 - Spatial and seasonal patterns of aerosol components frequency distributions.
 - Aerosol component data in light of emissions sources, monitoring site settings, back trajectories
 - Results of cluster, CART, and other pattern-recognition analyses to group sites with similar patterns in aerosol component contributions to haze

- > **Back Trajectory Analyses**
 - Results of back trajectory end point data for each CENRAP Class I area;
 - Back trajectory summary statistics residence time by season, best 20% and worst 20% reconstructed extinction and aerosol components for all CENRAP Class I areas;
 - Conditional probability maps for high and low extinction and aerosol components.
 - Results of emissions density maps giving location information, site setting information, etc., and
 - Mesoscale meteorological analyses complementing back trajectories.

Of course, complete answers to all these questions could not be developed in the course of this three week study; however, sufficient information was available that, when distilled into key tabular and graphical summaries, provided a solid foundation for continued efforts in Task 1 and especially Task 2 (discussed in Section 5). Key reports and modeling summaries synthesized during this initial review were supplied to CENRAP for uploading onto the CENSARA project website for easy access by interested CENRAP workgroup members or stakeholders.

4.2 Preliminary Visibility Estimates for Class I Areas

The visibility projection estimates for 2018 available at the time this study was performed (Typ02a) were developed in early 2006 by ENVIRON/UCR and presented at the February CENRAP meetings in Baton Rouge, LA. Appendix B presents these preliminary visibility projections for the ten (10) CENRAP Class I areas and the twelve (12) outlying Class I areas in the WRAP, MRPO, and VISTAS domains. After the draft report had been prepared, Morris et al., (2006b) published an updated set of visibility projections (Typ02b). Given the importance of using the most up to date projections possible, where feasible we repeated our technical work using the updated projections (See Table 1-1 for a visual comparison of the differences). Table 4-1 lists the following information derived from these more recent CENRAP projections of Morris et al., (2006b).

- > Visibility (in dv) on the 20% worst days in 2002;
- > The 2000-2004 visibility baseline (in dv);
- > The 2018 visibility goal (in dv) based on the requirements of the Regional Haze Rule;
- > The CMAQ-forecasted 2018 visibility levels on the 20% worst days;
- > The ‘increment’ in visibility, expressed in dv (calculated as the difference between the 2018 goal and the 2018 forecast. Negative values (presented in red in Table 2) denote that additional visibility improvement needed to achieve the desired 2018 progress goal; and
- > The ‘increment’ in visibility, expressed in units of inverse mega-meters (Mm^{-1}).

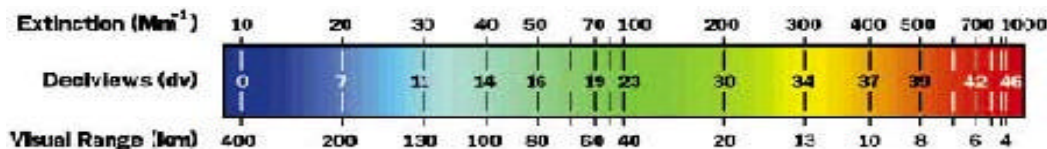
Table 4-1. Reasonable Progress Goal Estimates and ‘Increments’.

				W20%	2000/2004	2018	2018	Deciview	Ext	Annual
				Bkgrnd	Baseline	Goal	Forecast	Incre	Incre	f(RH)
RPO	Class I Area	ST	Name	DV	DV	DV	DV	DV	Mm-1	
CENRAP	Big Bend Nat'l Park	TX	BIBE	6.93	17.10	14.73	16.39	1.66	7.9	2.1
CENRAP	Boundary Waters	MN	BWCA	11.21	18.30	16.62	17.54	0.92	5.1	3.3
CENRAP	Breton Island	LA	BRET	11.53	25.59	22.31	22.45	0.14	1.3	3.8
CENRAP	Caney Creek	AR	CACR	11.33	25.34	22.07	20.91	-1.16	-10.0	3.2
CENRAP	Guadalupe Mountains	TX	GUMO	7.02	17.48	15.04	16.53	1.49	7.2	1.8
CENRAP	Hercules-Glades	MO	HEGL	11.27	25.63	22.28	21.94	-0.34	-3.1	3.1
CENRAP	Mingo	MO	MING	11.27	26.49	22.94	22.13	-0.81	-7.7	3.2
CENRAP	Upper Buffalo	AR	UPBU	11.28	25.31	22.03	21.33	-0.70	-6.1	3.1
CENRAP	Voyageurs	MN	VOYA2	11.09	18.46	16.74	17.43	0.69	3.8	3.4
CENRAP	Wichita Mountains	OK	WIMO	11.07	23.06	20.26	20.47	0.21	1.6	2.6
VISTAS	Mammoth Cave	KY	MACA	11.53	29.94	25.65	24.01	-1.64	-19.7	3.2
VISTAS	Sipsey Wilderness	AL	SIPS	11.39	27.71	23.91	22.72	-1.19	-12.3	3.3
MRPO	Isle Royale	MI	ISLE	11.22	20.28	18.16	18.74	0.58	3.7	3.5
WRAP	Badlands	SD	BADL	7.30	17.00	14.74	16.37	1.63	7.7	2.6
WRAP	Great Sand Dunes	CO	GRSA	7.10	13.20	11.78	12.96	1.18	4.1	2.0
WRAP	Lostwood Wilderness	ND	LOST	7.33	19.49	16.66	19.28	2.62	15.8	2.9
WRAP	Rocky Mtn Nat'l Park	CO	ROMO	7.05	14.15	12.49	13.51	1.02	3.7	2.1
WRAP	Salt Creek	NM	SACR	6.99	18.05	15.47	17.59	2.12	11.1	1.8
WRAP	Theodore Roosevelt	ND	THRO	7.31	17.66	15.24	17.40	2.16	11.1	3.7
WRAP	Wheeler Peak	NM	WHPE	7.04	11.26	10.27	11.14	0.87	2.5	1.9
WRAP	White Mountain	NM	WHIT	6.98	14.06	12.41	13.40	0.99	3.6	1.8
WRAP	Wind Cave	SD	WICA	7.24	15.81	13.81	15.30	1.49	6.4	2.5

The relationship between deciviews (dv) and inverse megameters (Mm^{-1}) is described in detail by Malm, (1999). Equation 4-1 defines the Haze Index (HI):

$$HI = 10 \ln(b_{ext}/10) \tag{4-1}$$

where *HI* is the haze index (deciviews [dv]) and b_{ext} is the light extinction coefficient (Mm^{-1}). Thus, one deciview is approximately equal to $11.05 Mm^{-1}$ and a change of one dv represents a change of approximately ten percent in b_{ext} , “which is a small but perceptible scenic change under many circumstances”. Malm (1999) provides the following graphical representation between the extinction (Mm^{-1}), deciviews, and visual range (km):



The measured light extinction at the Class I areas for the 20% worst days each year are available at <http://vista.cira.colostate.edu/views/web/AnnualSummaryDev/Composition.aspx>, the IMPROVE site. The most recent measured extinction values (in Mm^{-1}) for the various Class I monitors are listed in Table 4-2, presented in Figure 4-1, and also given in Appendix B. For the most part, IMPROVE extinction measurements for the 20% worst days are available for 2004, the most recent year analyzed. These data are presented as extinction totals for the individual visibility-impairing chemical species: sulfate; nitrate; organic mass; elemental carbon; soil; and

coarse mass. Table 4-3 lists the fractional extinction for each chemical species. Finally, the IMPROVE data for each species at the 22 Class I monitors are presented as a function of time in the appendices to this document. These time series plots reveal the seasonal and daily variation in the visibility-impairing components throughout the year at each site. Figures 4-2 and 4-3 present the absolute and fractional extinction values listed in Tables 4-2 and 4-3 in the form of stacked bar charts for ease of comparison.

Table 4-2. Measured Extinction at Class I Areas.

				Measured Extinction (Mm^{-1}) on 20% Worst Days in 2004						
				Amm	Organic	Elem	Soil	Coarse		
RPO	Class I Area	ST	Name	Sulfate	Nitrate	Mass	Carbon	Mass	Mass	Total
CENRAP	Big Bend Nat'l Park	TX	BIBE	25.86	1.57	5.85	1.80	2.21	4.55	41.84
CENRAP	Boundary Waters	MN	BWCA	28.09	24.78	7.76	2.94	0.44	2.10	66.11
CENRAP	Breton Island	LA	BRET	65.60	8.49	6.13	4.26	0.40	4.45	89.33
CENRAP	Caney Creek	AR	CACR	65.68	15.43	17.95	4.27	0.79	2.66	106.78
CENRAP	Guadalupe Mountains	TX	GUMO	15.92	4.98	5.51	1.30	2.83	9.99	40.53
CENRAP	Hercules-Glades	MO	HEGL	67.23	21.92	21.14	5.12	0.88	2.85	119.14
CENRAP	Mingo	MO	MING	80.44	35.11	26.10	8.95	1.55	8.40	160.55
CENRAP	Upper Buffalo	AR	UPBU	64.43	17.39	16.47	4.48	0.90	7.23	110.90
CENRAP	Voyageurs	MN	VOYA2	10.16	15.14	9.94	2.68	0.46	2.84	41.22
CENRAP	Wichita Mountains	OK	WIMO	40.78	28.25	16.64	4.67	0.70	4.06	95.10
VISTAS	Mammoth Cave	KY	MACA	146.48	10.78	15.58	5.33	1.04	1.76	180.97
VISTAS	Sipsey Wilderness	AL	SIPS	109.27	8.09	20.22	7.06	0.95	2.66	148.25
MRPO	Isle Royale	MI	ISLE	33.33	12.64	9.71	2.93	0.48	3.51	62.60
WRAP	Badlands	SD	BADL	20.05	6.58	7.53	1.55	0.75	3.60	40.06
WRAP	Great Sand Dunes	CO	GRSA	6.20	2.78	6.44	1.30	2.11	3.78	22.61
WRAP	Lostwood Wilderness	ND	LOST	28.44	26.00	9.02	2.22	0.41	2.73	68.82
WRAP	Rocky Mtn Nat'l Park	CO	ROMO	8.19	4.73	6.37	2.00	1.11	2.78	25.18
WRAP	Salt Creek	NM	SACR	17.74	12.42	7.04	2.24	4.18	6.08	49.70
WRAP	Theodore Roosevelt	ND	THRO	15.68	16.28	9.95	2.52	0.55	2.99	47.97
WRAP	Wheeler Peak	NM	WHPE	5.69	1.26	4.98	2.05	1.59	1.29	16.86
WRAP	White Mountain	NM	WHIT	8.77	2.49	8.52	2.11	1.58	3.81	27.28
WRAP	Wind Cave	SD	WICA	14.27	8.91	8.35	3.17	0.79	2.08	37.57

4.3 Estimation of Visibility-Impairing Concentration Increments

The information in Tables 4-1 through 4-3 as well as other data provided in the appendices of this document was used to estimate the extent to which additional visibility-impairing precursor emissions reductions might be needed on the basis of current estimates of the projected positive increments and the chemical composition of fine particulate aerosol at the six CENRAP Class I monitors on the worst 20% days. The next step was to transform the visibility increment estimates into concentration increment estimates based on current IMPROVE algorithms. Using the modeled visibility increment (Mm^{-1}) estimates and annual $f(RH)$ values (Table 4-1) together with the measured sulfate, nitrate, OC, EC, soil, and coarse mass fractions from the IMPROVE Class I monitors (Tables 4-2 and 4-3), we deduced the atmospheric concentrations of the six species groups ($\mu g/m^3$) using the standard IMPROVE equation (EPA, 2003). These concentrations were calculated assuming: (a) the required concentration reductions would be met by each precursor in proportion to the most recent IMPROVE distribution at each Class I monitor (Table 4-4); and (b) the concentration reductions would be met by each precursor individually (Table 4-5).

Table 4-3. Extinction Fraction for 20% Worst Days by Class I Area.

				Extinction Fraction for 20% Worst Days by Class I Area					
				Amm	Amm	Organic	Elem	Soil	Coarse
RPO	Class I Area	ST	Name	Sulfate	Nitrate	Mass	Carbon	Mass	Mass
CENRAP	Big Bend Nat'l Park	TX	BIBE	0.62	0.04	0.14	0.04	0.05	0.11
CENRAP	Boundary Waters	MN	BWCA	0.42	0.37	0.12	0.04	0.01	0.03
CENRAP	Breton Island	LA	BRET	0.73	0.10	0.07	0.05	0.00	0.05
CENRAP	Caney Creek	AR	CACR	0.62	0.14	0.17	0.04	0.01	0.02
CENRAP	Guadalupe Mountains	TX	GUMO	0.39	0.12	0.14	0.03	0.07	0.25
CENRAP	Hercules-Glades	MO	HEGL	0.56	0.18	0.18	0.04	0.01	0.02
CENRAP	Mingo	MO	MING	0.50	0.22	0.16	0.06	0.01	0.05
CENRAP	Upper Buffalo	AR	UPBU	0.58	0.16	0.15	0.04	0.01	0.07
CENRAP	Voyageurs	MN	VOYA2	0.25	0.37	0.24	0.07	0.01	0.07
CENRAP	Wichita Mountains	OK	WIMO	0.43	0.30	0.17	0.05	0.01	0.04
VISTAS	Mammoth Cave	KY	MACA	0.81	0.06	0.09	0.03	0.01	0.01
VISTAS	Sipsey Wilderness	AL	SIPS	0.74	0.05	0.14	0.05	0.01	0.02
MRPO	Isle Royale	MI	ISLE	0.53	0.20	0.16	0.05	0.01	0.06
WRAP	Badlands	SD	BADL	0.50	0.16	0.19	0.04	0.02	0.09
WRAP	Great Sand Dunes	CO	GRSA	0.27	0.12	0.28	0.06	0.09	0.17
WRAP	Lostwood Wilderness	ND	LOST	0.41	0.38	0.13	0.03	0.01	0.04
WRAP	Rocky Mtn Nat'l Park	CO	ROMO	0.33	0.19	0.25	0.08	0.04	0.11
WRAP	Salt Creek	NM	SACR	0.36	0.25	0.14	0.05	0.08	0.12
WRAP	Theodore Roosevelt	ND	THRO	0.33	0.34	0.21	0.05	0.01	0.06
WRAP	Wheeler Peak	NM	WHPE	0.34	0.07	0.30	0.12	0.09	0.08
WRAP	White Mountain	NM	WHIT	0.32	0.09	0.31	0.08	0.06	0.14
WRAP	Wind Cave	SD	WICA	0.38	0.24	0.22	0.08	0.02	0.06

Table 4-4. Required Concentration Reductions: All Species.

				Reduction in All Species (µg/m3) to Eliminate DV Increment					
				Assuming Controls in Proportion of Area-Specific Composition					
RPO	Class I Area	ST	Name	Sulfate	Nitrate	OC	EC	Soil	Coarse
CENRAP	Big Bend Nat'l Park	TX	BIBE	0.77	0.05	0.28	0.03	0.42	1.43
CENRAP	Boundary Waters	MN	BWCA	0.22	0.19	0.15	0.02	0.03	0.27
CENRAP	Breton Island	LA	BRET	0.08	0.01	0.02	0.01	0.01	0.11
CENRAP	Caney Creek	AR	CACR						
CENRAP	Guadalupe Mountains	TX	GUMO	0.53	0.16	0.25	0.02	0.50	2.97
CENRAP	Hercules-Glades	MO	HEGL						
CENRAP	Mingo	MO	MING						
CENRAP	Upper Buffalo	AR	UPBU						
CENRAP	Voyageurs	MN	VOYA2	0.09	0.14	0.23	0.02	0.04	0.44
CENRAP	Wichita Mountains	OK	WIMO	0.09	0.06	0.07	0.01	0.01	0.11
VISTAS	Mammoth Cave	KY	MACA						
VISTAS	Sipsey Wilderness	AL	SIPS						
MRPO	Isle Royale	MI	ISLE	0.19	0.07	0.14	0.02	0.03	0.34
WRAP	Badlands	SD	BADL	0.50	0.16	0.36	0.03	0.14	1.16
WRAP	Great Sand Dunes	CO	GRSA	0.19	0.08	0.29	0.02	0.38	1.13
WRAP	Lostwood Wilderness	ND	LOST	0.75	0.69	0.52	0.05	0.09	1.05
WRAP	Rocky Mtn Nat'l Park	CO	ROMO	0.19	0.11	0.24	0.03	0.17	0.69
WRAP	Salt Creek	NM	SACR	0.73	0.51	0.39	0.05	0.93	2.26
WRAP	Theodore Roosevelt	ND	THRO	0.33	0.34	0.57	0.06	0.13	1.15
WRAP	Wheeler Peak	NM	WHPE	0.15	0.03	0.19	0.03	0.24	0.32
WRAP	White Mountain	NM	WHIT	0.21	0.06	0.28	0.03	0.21	0.84
WRAP	Wind Cave	SD	WICA	0.32	0.20	0.36	0.05	0.13	0.59

Table 4-5. Required Concentration Reductions: One Specie.

				Reduction in One Specie ($\mu\text{g}/\text{m}^3$) to Eliminate DV Increment					
				Assuming Controls on Only 1 Specie					
RPO	Class I Area	ST	Name	Sulfate	Nitrate	OC	EC	Soil	Coarse
CENRAP	Big Bend Nat'l Park	TX	BIBE	1.25	1.25	1.97	0.79	7.88	13.13
CENRAP	Boundary Waters	MN	BWCA	0.51	0.51	1.27	0.51	5.08	8.46
CENRAP	Breton Island	LA	BRET	0.12	0.12	0.33	0.13	1.31	2.19
CENRAP	Caney Creek	AR	CACR						
CENRAP	Guadalupe Mountains	TX	GUMO	1.34	1.34	1.81	0.72	7.23	12.05
CENRAP	Hercules-Glades	MO	HEGL						
CENRAP	Mingo	MO	MING						
CENRAP	Upper Buffalo	AR	UPBU						
CENRAP	Voyageurs	MN	VOYA2	0.37	0.37	0.95	0.38	3.81	6.35
CENRAP	Wichita Mountains	OK	WIMO	0.21	0.21	0.40	0.16	1.61	2.68
VISTAS	Mammoth Cave	KY	MACA						
VISTAS	Sipsey Wilderness	AL	SIPS						
MRPO	Isle Royale	MI	ISLE	0.35	0.35	0.92	0.37	3.67	6.12
WRAP	Badlands	SD	BADL	0.99	0.99	1.93	0.77	7.73	12.88
WRAP	Great Sand Dunes	CO	GRSA	0.68	0.68	1.02	0.41	4.07	6.78
WRAP	Lostwood Wilderness	ND	LOST	1.82	1.82	3.96	1.58	15.85	26.41
WRAP	Rocky Mtn Nat'l Park	CO	ROMO	0.59	0.59	0.94	0.37	3.74	6.24
WRAP	Salt Creek	NM	SACR	2.05	2.05	2.77	1.11	11.09	18.49
WRAP	Theodore Roosevelt	ND	THRO	1.00	1.00	2.77	1.11	11.07	18.45
WRAP	Wheeler Peak	NM	WHPE	0.45	0.45	0.63	0.25	2.54	4.23
WRAP	White Mountain	NM	WHIT	0.67	0.67	0.90	0.36	3.60	6.00
WRAP	Wind Cave	SD	WICA	0.85	0.85	1.60	0.64	6.39	10.65

Following the IMPROVE methodology, the relationship between the extinction (Mm^{-1}) of an individual chemical species and the volumetric mass concentration is as follows:

$$b_{\text{Sulfate}} = 3 \cdot f(\text{RH}) \cdot [\text{SO}_4]$$

$$b_{\text{Nitrate}} = 3 \cdot f(\text{RH}) \cdot [\text{NO}_3]$$

$$b_{\text{EC}} = 10 \cdot [\text{EC}]$$

$$b_{\text{OM}} = 4 \cdot [\text{OM}]$$

$$b_{\text{Soil}} = 1 \cdot [\text{Soil}]$$

$$b_{\text{CM}} = 0.6 \cdot [\text{CM}]$$

$$b_{\text{Ray}} = 10 \text{ Mm}^{-1}$$

$$b_{\text{ext}} = b_{\text{Ray}} + b_{\text{Sulfate}} + b_{\text{Nitrate}} + b_{\text{EC}} + b_{\text{OM}} + b_{\text{Soil}} + b_{\text{CM}}$$

The numeric coefficient at the beginning of each equation is the dry scattering or absorption efficiency. The $f(\text{RH})$ term is a monthly-average relative humidity adjustment factor. The terms in the brackets are the concentrations in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) that will need to be reduced on the 20% worst days at the Class I monitor to make up for the projected visibility 'increment'.

Rearranging yields a solution for the aerosol concentrations as a function of the measured or modeled extinction:

$$[\text{SO}_4] = b_{\text{Sulfate}} / [3 \cdot f(\text{RH})]$$

$$[\text{NO}_3] = b_{\text{Nitrate}} / [3 \cdot f(\text{RH})]$$

$$[\text{EC}] = b_{\text{EC}} / 10$$

$$[\text{OM}] = b_{\text{OM}} / 4$$

$$[\text{Soil}] = b_{\text{Soil}}$$

$$[\text{CM}] = b_{\text{CM}} / 0.6$$

Note that the sulfate (SO_4) and nitrate (NO_3) components are hygroscopic because their extinction coefficients depend upon relative humidity. The concentrations, in square brackets, are in $\mu\text{g}/\text{m}^3$ and b_{ext} is in units of Mm^{-1} . The Rayleigh scattering term (b_{Ray}) has a default value of 10 Mm^{-1} , as recommended in EPA guidance for tracking reasonable progress (EPA, 2003). The effect of relative humidity variability on the extinction coefficients for SO_4 and NO_3 can be estimated in several ways, but given the scope of this analysis, we calculated annual average Class I areas-specific monthly $f(\text{RH})$ values (last column of Table 4-1) from the seasonal $f(\text{RH})$ data provided by EPA in the BART guidelines.

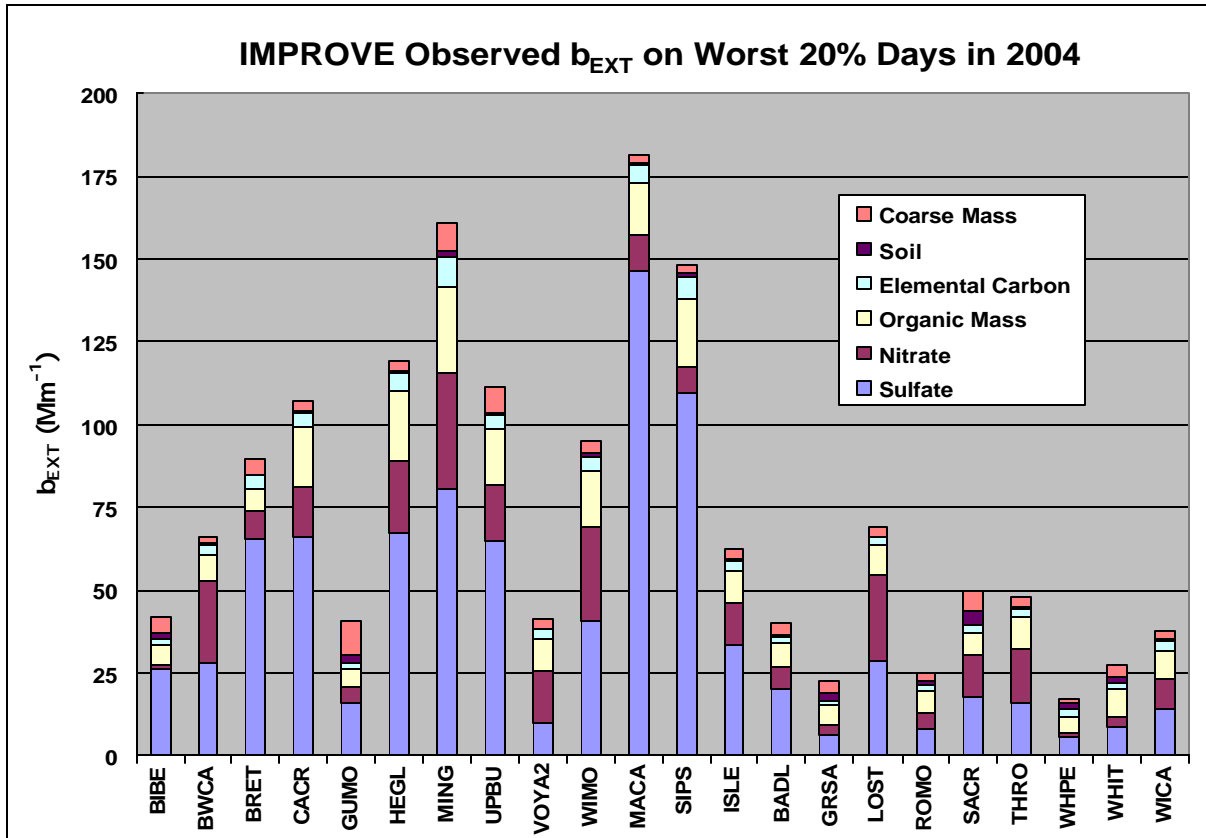


Figure 4-1. Measured Extinction Coefficients at Class I Areas Based on IMPROVE Data.

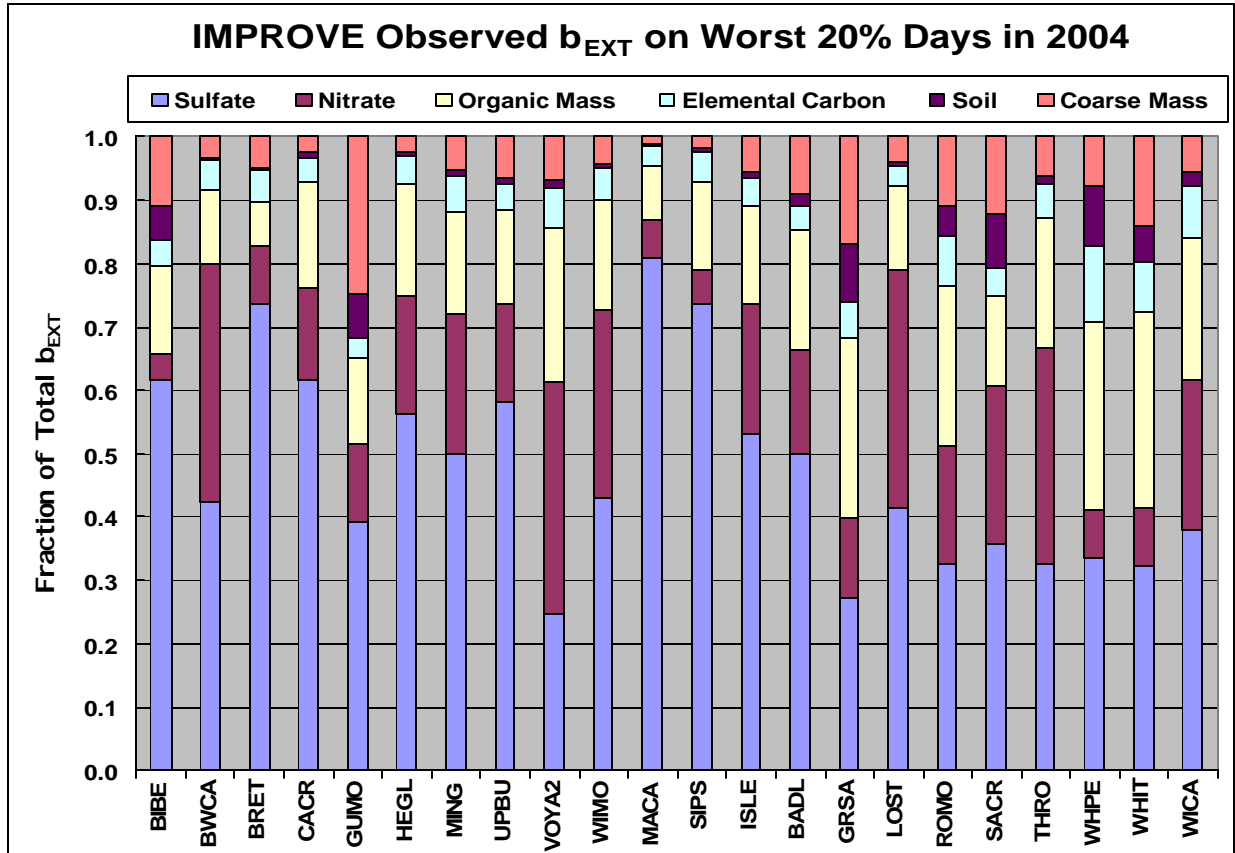


Figure 4-2. Measured Fractional Extinction at Class I Areas Based on IMPROVE Data.

5.0 ESTIMATION OF EMISSIONS REDUCTION NEEDS

5.1 Development of the Areas of Influence (AOI)

To quantify the incremental emissions reductions needed to ameliorate positive visibility increments at Class I areas, it was first necessary to identify those regions that adversely impact visibility at the Class I areas. These Areas of Influence (AOI) directly identify the source regions whose emissions impact a Class I area. Further, an AOI can also be constructed such that it provides a quantitative assessment of the impact of the emissions from a source region on such metrics as $PM_{2.5}$ concentration at a Class I area. This should not be confused with source apportionment where source regions are assigned quantitative culpability to an overall air quality metric such as sulfate concentration or light extinction. Instead, an AOI ideally describes geographically the emissions source regions and magnitude of, say, the impact that a one ton reduction in SO_2 emissions has on sulfate concentration ($\mu g/m^3$) at a Class I area.

An AOI can be constructed based on a variety of data such as: sensitivities derived from the Decoupled Direct Method (DDM) (Yang *et al.*, 1997; Mendoza *et al.*, 2000); brute force sensitivities; various forms of back trajectory analysis which examine air mass residence time (e.g., Schichtel *et al.*, 2006; DRI, 2005c); and methods that combine back trajectory analyses with such information as emissions impact potential (e.g., Raffuse *et al.*, 2005). Over the last two years, one or more of these methods has been used to construct AOIs or AOI-like diagrams for all the Class I areas of interest to this study. Therefore, it was necessary to identify, gather, and synthesize these data from the many sources so that a consistent set of AOIs could be constructed.

Appendix C is a compendium of AOI data for each Class I area of interest that could be extracted from the body of literature that is available. The first six slides of Appendix C provide examples of the data that were available to construct the AOIs – references are provided on each slide. Ultimately, the Residence Time Difference plots (DRI, 2005c), the Probability of Regional Source Contribution to Haze (PORSCH) plots (Raffuse *et al.*, 2005), the Tagged Species Source Apportionment (TSSA) results (Tonnesen and Wang, 2004; UCR, 2006), and a good deal of engineering judgment were used to construct a consistent set of AOIs for each Class I area.

Residence Time Difference (RTD) plots were constructed based on Back Trajectory Residence Time (BTRT) plots. Back trajectory analyses use meteorological fields to estimate the most likely geographical path an air mass traversed to end at a particular receptor. Of note, the meteorological field can be based on interpolation of observations, modeled (e.g., from a prognostic meteorological model such as MM5), or a hybrid field based on combined modeled and observed values. The method essentially reverses the wind field, moving an air mass backward in time. Back trajectories oversimplify actual atmospheric conditions in that dispersion is ignored. Further, the potential emissions source regions that impact a receptor are underestimated given that it is impossible to track every air parcel impacting the receptor.

The BTRT estimates that were developed by DRI (2005b) and used in this study were estimated using HYSPLIT (Draxler and Hess, 1997; NOAA, 2006). HYSPLIT uses archived three dimensional meteorological fields generated from observations and short-term meteorological forecasts. The model produces a series of endpoints representing longitude, latitude, and

elevation of the parcel at one-hour intervals. BTRT plots at each site were calculated for all days, by month, and by best and worst twenty percentile days (DRI, 2005c). BTRT plots give the fraction of total hours that an air parcel resided over each specific geographical area. RTD plots were created by subtracting the map for all days at a site from the map for the 20% worst days by pollutant. RTD plots were computed for the twenty percentile worst sulfate, nitrate, organic carbon, elemental carbon, fine soil, and coarse mass days.

The worst twenty percentile sulfate RTD plots, for example, shows the difference in residence time between the worst sulfate days and all days. If the number is positive, then the residence time on the worst sulfate days is greater than on all days. The residence time difference map simply shows the areas that air was more frequently (positive numbers) passing over on worst case days compared to all days.

The PORSCH system is a suite of GIS tools that combines modeled backward wind trajectories, monitored concentrations, meteorological conditions, and emissions estimates to estimate probable regions of influence. PORSCH combines ensemble backward trajectories with chemically speciated emissions data to estimate the trajectory-emissions density-weighted area likely to impact a receptor site. PORSCH can do this for a single day or a suite of days though for purposes of this study, only data relevant to the 20% worst haze days were extracted.

As the name implies Tagged Species Source Apportionment (TSSA) uses “Tagged Chemical Species,” or tracers, to track chemical transformations and transport of each chemical species or precursor species during an air quality model run. Key chemical species are identified for specific emissions source regions or emissions source categories. These tagged chemical species are tracked during all phases of the air quality modeling run (e.g., advection, diffusion, deposition, chemical transformation), and the end results are three dimensional fields in time showing source attribution of the chemical species for any grid cell in model domain. When chemical species are tagged by emissions source region, this provides valuable corroborative evidence for identifying key AOI regions.

Slides 8 through 82 of Appendix C contain the raw data that was extracted from the literature base, which served as the foundation to develop the AOIs for the ten CENRAP Class I areas. Slides 84 through 184 of Appendix C contain the raw data from which AOIs were synthesized for the nine WRAP and two VISTAS Class I areas that border the CENRAP states. Because RTD plots were available for the entire suite of twenty-one Class I areas, they served as the primary basis from which the AOIs were estimated. The RTD plots were manually examined to determine “natural break-points” in residence time difference (only positive values were considered in these plots as positive values indicate air mass residence was greatest in these geographical areas on the 20% worst haze days).

In many cases, these “natural break-points” were difficult to determine given that the scales on the RTD plots were not consistent; hence, engineering judgment was used to place a “break-point.” For virtually all Class I areas, it was possible to determine at least two “break-points” and in some instances, three and four “break-points” were determined. For purposes of this effort, a “break-point” was generally placed where the residence time difference transition was on the order of a factor of ten and over large geographical areas. Little pockets of large RTD transitions, such as might occur over Lake Michigan or the Gulf of Mexico, were merged into a

larger “break-point.” Once a “break-point” was determined, a hand drawn contour was placed on the plot to indicate the Level 1, 2, or greater “break-point.” This was done for each of the chemical species classes: sulfate; nitrate; organic carbon; elemental carbon; fine soils; and coarse material, at each Class I area. For clarification purposes, the Level 1 “break-point” is always the smallest polygon closest to the Class I area, and subsequent Level 2, 3, or greater “break-points” cover progressively larger areas.

Once the RTD “break-points” were determined, the plots were manually compared to the supporting PORSCH and TSSA data in order to determine if a “break-point” needed to be expanded, contracted, or moved. The PORSCH data were used primarily to determine if the spatial extent of a “break-point” was adequate and the TSSA data were used to determine if the areas of emissions impact potential were captured within the spatial extent of the RTD “break-points.” Based on this reconciliation effort, the Level 1, 2, or greater “break-point” contours were manually adjusted on the plots. Again, a great deal of engineering judgment was used in how these data were combined. This initial effort resulted in the development of 126 plots (six pollutants times twenty-one Class I areas) consisting of one or more “break-point” contours.

Next, each plot was manually compared to the remaining plots to determine if any of the Level 1, 2 or greater “break-point” contours were similar in their geographic placement. If a set of contours from different Class I areas had similar geographic placement, the plots were combined into a single set of contours. In many cases, the “break-point” contours were again manually adjusted so that different plots could be combined into a single set representing multiple Class I areas and multiple pollutants.

This final set of manually created, combined “break-point” contours is what is referred to as the Area of Influence (AOI) for each Class I area. However, these hand drawn AOIs are useless in their current form since it would have been far too time consuming to try to manually extract the counties over which an AOI passed – a step which is necessary if one is to determine the emissions impact potential from a geographic area (i.e., AOI) that impacts a Class I site. Therefore, it is necessary to convert the hand drawn AOIs into a geocoded, electronic file.

Geocoding of the hand drawn AOIs is accomplished by first scanning the image into an electronic file. The scanned image is then registered to a known set of geographical objects. In this case, the geographical objects are the political boundaries of the United States. The function of registering the scanned image, which itself is a political boundaries map of the United States with a set of hand drawn AOIs, is performed using a Geographic Information System (GIS). Secondly, the registered scanned image is rectified so that the image retains its geographic relationship to real world coordinates. Finally, the contours of the rectified image are digitized.

The final set of AOIs is shown in Slides 136 to 143 of Appendix C. These represent the geocoded AOIs that are used to extract a list of counties whose emissions sources have the greatest potential to impact the air quality at a Class I area. Again, ARC/Info was used to extract the counties within each AOI. Figure 5-1 is an example geocoded AOI for the Boundary Waters and Voyageurs Class I areas. Note the distinction between the Level 1 and Level 2 AOIs for both sulfate-to-SO₂ and nitrate-to-NO_x sensitivities.

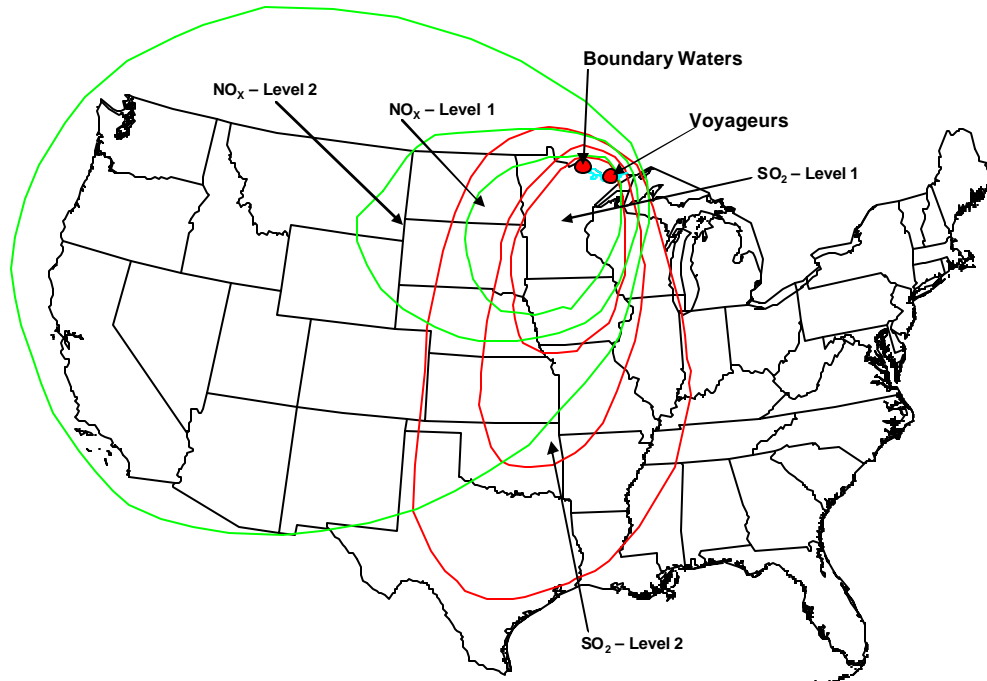


Figure 5-1. Example Geocoded AOI for Boundary Waters and Voyageurs Class I areas. Green contours delineate areas of influence where NO_x emissions impact aerosol nitrate at the Class I areas. Red contours delineate areas of influence where SO_2 emissions impact aerosol sulfate at Class I areas.

5.2 Development of Visibility Impairing Pollutant Concentrations to Precursor Emissions Sensitivity Coefficients

Though a list of counties can now be identified whose emissions sources have the greatest potential to impact air quality at a Class I area, this list has limited value until a quantitative value to associate emissions to air quality is estimated. Ideally, these associative values take the form of $\mu\text{g}/\text{m}^3$ of pollutant reduced per ton per day of precursor emissions reduced. For example, $-0.001 \mu\text{g}/\text{m}^3$ of sulfate per ton per day SO_2 reduced tells one that for each ton of SO_2 reduced within an AOI, the Class I area will exhibit a decrease of $0.001 \mu\text{g}/\text{m}^3$ in sulfate concentration. This value is referred to as a sensitivity value and is very powerful at informing efforts such as those pursued in this study. A great deal of work has been performed to ascertain such sensitivities, and it is from this body of knowledge that sensitivities specific to the current efforts have been derived.

Tesche *et al.* (2003c) conducted a suite of brute force sensitivity runs using the CAMx and CMAQ air quality modeling (AQM) systems over the eastern United States on behalf of VISTAS. By systematically perturbing the global inventory (e.g., reducing global NO_x emissions by 10%) and rerunning the AQM, they developed a suite of metrics that provided the maximum reduction to say the peak, modeled ammonium nitrate. By converting the 10% NO_x reduction to actual tons per day NO_x reduction, which is simply done by taking 10% of the

emissions in the AQM-ready emissions files, and dividing that into the peak concentration reduction, the sensitivity that is of most importance is realized. Though this value is a more global sensitivity, its use is still valid for our needs. Indeed, by assuming that such a sensitivity is valid across the domain, this general purpose sensitivity value can be extended to all the AOIs of interest by computing the value of a 10% reduction in each of the AOIs and dividing this number into the general sensitivity value derived from the average of all the sensitivities, by pollutant of course, estimated by Tesche *et al.* (2003c).

Appendix D shows an Excel workbook containing the summary data (i.e., worksheet named “General”) from Tesche *et al.* (2003c). The worksheet shows the results of the specific sensitivity analyses conducted, and the results of our efforts to compute a general purpose sensitivity value. Once a general purpose sensitivity value was computed, it was recast in a form specific to the Class I areas of interest. This was done by assuming that the general purpose sensitivity (e.g., $\mu\text{g}/\text{m}^3$ sulfate reduction per 10% reduction in SO_2 emissions) was valid across the domain and dividing this number by the tons per day value deduced from a 10% reduction of a precursor pollutant in the AOI of interest.

Though a general purpose sensitivity value was estimated for all Class I areas and AOIs of interest, other sensitivity information that was more specific to certain Class I areas was available from work done at the Georgia Institute of Technology (GIT, 2006). Researchers at GIT conducted numerous brute force sensitivity runs of the CMAQ AQM on behalf of VISTAS.

One component of these efforts was to conduct specific emissions source region and emissions source category sensitivity experiments to determine light extinction sensitivities to a reduction in one ton of precursor emissions at Mingo Wilderness, Upper Buffalo, Caney Creek, Hercules Glade, Breton Island, Sipsey, and Mammoth Cave. The emissions source regions for the GIT efforts (GIT, 2006) included the individual VISTAS states, the clustered CENRAP states, and the clustered MANE-VU states. The GIT (2006) results were extracted and summaries were prepared for the combined Mingo Wilderness-Upper Buffalo-Caney Creek-Hercules Glade AOIs, the Breton Island AOI, the Sipsey AOI, and the Mammoth Cave AOI. The results of these efforts were summarized in Appendix D, Excel worksheet “Class I Specific.”

Finally, the results of the sensitivity summary efforts were combined in order to prepare a consistent set of sensitivity values by AOI. This summary is presented in Appendix D, Excel worksheet “Summary” and in Table 5-1.

Table 5-1. Synthesis of Sensitivity Values for Each Class I Area by AOI level. Units should be interpreted as reduction in nitrate (sulfate) concentration ($\mu\text{g}/\text{m}^3$) per average daily ton reduction in NO_x (SO_2) emissions in the specified AOI Level (see Figure 4-5 for an example of the delineation of the AOI Level).

Abb	Class I	RPO	Level 1	Level 1	Level 2	Level 2
			NOX	SO2	NOX	SO2
			ug/m**3/ton	ug/m**3/ton	ug/m**3/ton	ug/m**3/ton
badl	Badlands	WRAP	-0.001	-0.008	-0.003	-0.002
bibe	Big Bend	CENRAP	-0.002	-0.004	-0.001	-0.001
bowa	Boundary Waters	CENRAP	-0.002	-0.006	-0.004	-0.002
bret	Breton Island	CENRAP	-0.00008	-0.002	-0.00005	-0.0007
cacr	Caney Creek	CENRAP	-0.0004	-0.003	-0.002	-0.002
grsa	Great Sand Dunes	WRAP	-0.003	-0.02	--	-0.0005
gumo	Guadalupe Mountains	CENRAP	-0.01	-0.004	-0.002	-0.001
herc	Hercules Glade	CENRAP	-0.0004	-0.003	-0.002	-0.002
lost	Lostwood Wilderness	WRAP	-0.01	-0.008	-0.003	-0.002
maca	Mammoth Cave	VISTAS	-0.001	-0.005	-0.0008	-0.005
ming	Mingo Wilderness	CENRAP	-0.0004	-0.003	-0.002	-0.002
romo	Rocky Mountain	WRAP	-0.007	-0.02	-0.003	-0.0005
sacr	Salt Creek	WRAP	-0.01	-0.08	-0.002	-0.0007
sips	Sipsey Wilderness	VISTAS	-0.001	-0.007	-0.0008	-0.005
thro	Theodore Roosevelt	WRAP	-0.01	-0.008	-0.003	-0.002
upbu	Upper Buffalo	CENRAP	-0.0004	-0.003	-0.002	-0.002
voya	Voyageurs	CENRAP	-0.002	-0.006	-0.004	-0.002
whmo	White Mountain	WRAP	-0.01	-0.08	-0.002	-0.0007
whpe	Wheeler Peak	WRAP	-0.01	-0.08	-0.002	-0.0007
wica	Wind Cave	WRAP	-0.001	-0.008	-0.003	-0.002
wich	Wichita Mountain	CENRAP	-0.005	-0.001	-0.003	-0.0004

5.3 Estimated Emissions Reductions Necessary to Attain 2018 Glide Path

Now that the visibility ‘increment’ (Table 4-4 [proportional species reduction] and Table 4-5 [single specie reduction]) and the chemical species-to-precursor emissions sensitivity coefficients (Table 5-1) are known by Class I area, it is a simple matter to compute the annualized, incremental emissions reductions that are needed at each Class I area to attain the 2018 glide path. This is accomplished by dividing the visibility ‘increment’ by the sensitivity coefficient and multiplying by 365.

Table 5-2 shows the required incremental reductions of SO_2 and NO_x emissions that are estimated to be required in order for the Class I areas to meet the glide slope by 2018. The estimated SO_2 and NO_x reductions in Table 5-2 are proportional to chemical species contributions during the 20% worst haze days. In contrast, Table 5-3 shows the estimated SO_2 and NO_x emissions reductions if only one chemical species is reduced. The emissions reductions requirements in Tables 5-2 and 5-3 are reported to two significant figures.

For example, in order for Big Bend to meet the 2018 visibility glide path, approximately 73,000 tons per year of incremental SO_2 emissions reductions (Table 5-2) from SO_2 emissions source

residing in the Level 1 AOI (Figure 5-2) are required assuming that incremental emissions reductions are developed based on a proportional reduction in the chemical species. Hence, in addition to the estimated incremental SO_2 emissions reductions of 73,000 tons per year, estimated incremental NO_x emissions reductions of 8,000 tons per year are also expected to be required. Additionally, incremental emissions reductions in coarse material, soil, elemental carbon, and organic compounds are also necessary if, again, emissions reductions are based on proportional reductions in the chemical species, though these reductions were not estimated given that reasonably available emissions control scenarios exist only for NO_x and SO_2 .

If only one chemical specie is controlled, for example sulfate, then precursor SO_2 incremental emissions reductions from emissions sources located within the SO_2 Level 1 AOI (Figure 5-2) are estimated to be 120,000 tons per year (Table 5-3). On the other hand, if only nitrate is controlled, precursor NO_x incremental emissions reductions from emissions sources located within the NO_x Level 1 AOI (Figure 5-2) are estimated to be 210,000 tons per year.

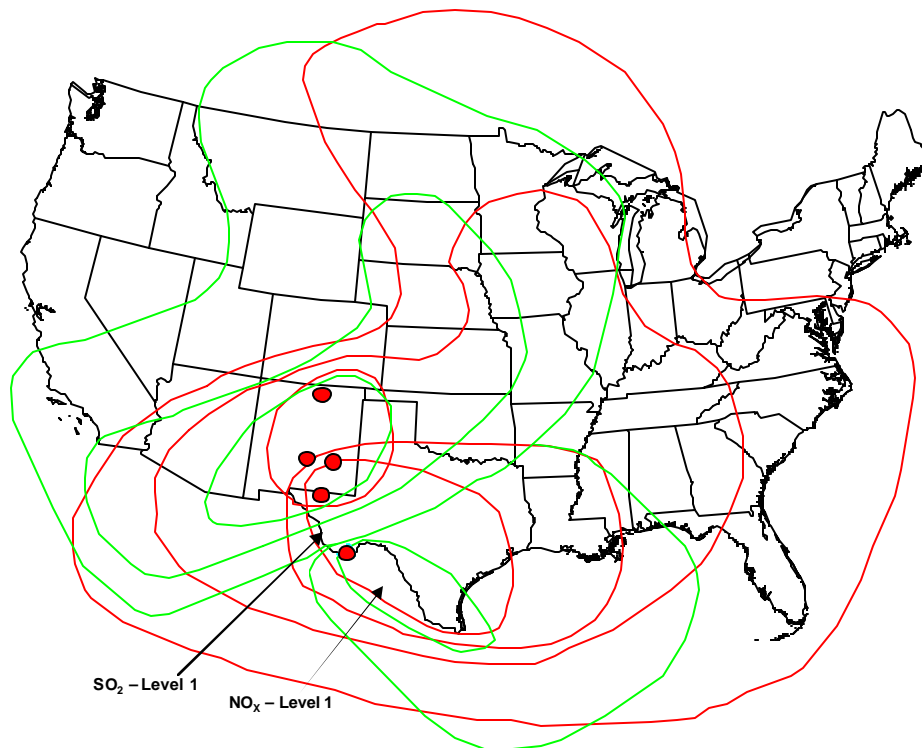


Figure 5-2. Geocoded AOIs for Big Bend, Guadalupe Mountain, Salt Creek, White Mountain, and Wheeler Peak. The Big Bend Level 1 AOI for SO_2 and NO_x are identified.

Table 5-2. SO₂ and NO_x Emissions Reduction Requirements (tons per year) Assuming Proportional Reductions in Sulfate and Nitrate.

Class I Area	ST	Proportional Reduction Requirements (ug/m3)						Level 1 AOI		Required SO ₂ Emissions Reductions (tons / year)	Required NO _x Emissions Reductions (tons / year)
		Sulfate	Nitrate	OC	EC	Soil	Coarse	sulfate-to-SO ₂ (ug/m3/ton reduced)	nitrate-to-NO _x (ug/m3/ton reduced)		
Big Bend Nat'l Park	TX	0.77	0.05	0.28	0.03	0.42	1.43	-0.004	-0.002	73,000	8,000
Boundary Waters	MN	0.22	0.19	0.15	0.02	0.03	0.27	-0.006	-0.004	13,000	19,000
Breton Island	LA	0.08	0.01	0.02	0.01	0.01	0.11	-0.0001	-0.00007	226,000	572,000
Caney Creek	AR							-0.0002	-0.00001		
Guadalupe Mountains	TX	0.53	0.16	0.25	0.02	0.50	2.97	-0.004	-0.01	50,000	4,000
Hercules-Glades	MO							-0.00019	0.0000		
Mingo	MO							-0.0002	-0.00001		
Upper Buffalo	AR							-0.0002	-0.00001		
Voyageurs	MN	0.09	0.14	0.23	0.02	0.04	0.44	-0.006	-0.004	5,700	14,000
Wichita Mountains	OK	0.09	0.06	0.07	0.01	0.01	0.11	-0.001	-0.005	32,000	4,500
Mammoth Cave	KY							-0.005	-0.001		
Sipsey Wilderness	AL							-0.007	-0.001		
Isle Royale	MI	0.19	0.07	0.14	0.02	0.03	0.34	-0.006	-0.004	11,000	7,000
Badlands	SD	0.50	0.16	0.36	0.03	0.14	1.16	-0.008	-0.001	23,000	45,000
Great Sand Dunes	CO	0.19	0.08	0.29	0.02	0.38	1.13	-0.02	-0.003	3,400	10,000
Lostwood Wilderness	ND	0.75	0.69	0.52	0.05	0.09	1.05	-0.008	-0.01	35,000	19,000
Rocky Mtn Nat'l Park	CO	0.19	0.11	0.24	0.03	0.17	0.69	-0.02	-0.007	3,500	5,800
Salt Creek	NM	0.73	0.51	0.39	0.05	0.93	2.26	-0.004	-0.01	68,800	13,000
Theodore Roosevelt	ND	0.33	0.34	0.57	0.06	0.13	1.15	-0.008	-0.01	15,000	12,000
Wheeler Peak	NM	0.15	0.03	0.19	0.03	0.24	0.32	-0.08	-0.01	690	800
White Mountain	NM	0.21	0.06	0.28	0.03	0.21	0.84	-0.08	-0.01	990	1,500
Wind Cave	SD	0.32	0.20	0.36	0.05	0.13	0.59	-0.008	-0.001	15,000	56,000

Table 5-3. SO₂ and NO_x Emissions Reduction Requirements (tons per year) Assuming a Single Chemical Species is Controlled.

Class I Area	ST	Reduction Requirement Assuming Single Species Control (ug/m ³)						Level 1 AOI		Required SO ₂ Emissions Reductions (tons / year)	Required NO _x Emissions Reductions (tons / year)
		Sulfate	Nitrate	OC	EC	Soil	Coarse	sulfate-to-SO ₂ (ug/m ³ /ton reduced)	nitrate-to-NO _x (ug/m ³ /ton reduced)		
Big Bend Nat'l Park	TX	1.25	1.25	1.97	0.79	7.88	13.13	-0.004	-0.002	120,000	210,000
Boundary Waters	MN	0.51	0.51	1.27	0.51	5.08	8.46	-0.006	-0.004	32,000	51,000
Breton Island	LA	0.12	0.12	0.33	0.13	1.31	2.19	-0.0001	-0.00007	308,000	6,010,000
Caney Creek	AR							-0.0002	-0.00001		
Guadalupe Mountains	TX	1.34	1.34	1.81	0.72	7.23	12.05	-0.004	-0.01	130,000	33,000
Hercules-Glades	MO							-0.00019	0.0000		
Mingo	MO							-0.0002	-0.00001		
Upper Buffalo	AR							-0.0002	-0.00001		
Voyageurs	MN	0.37	0.37	0.95	0.38	3.81	6.35	-0.006	-0.004	23,000	37,000
Wichita Mountains	OK	0.21	0.21	0.40	0.16	1.61	2.68	-0.001	-0.005	75,000	15,000
Mammoth Cave	KY							-0.005	-0.001		
Sipsey Wilderness	AL							-0.007	-0.001		
Isle Royale	MI	0.35	0.35	0.92	0.37	3.67	6.12	-0.006	-0.004	22,000	35,000
Badlands	SD	0.99	0.99	1.93	0.77	7.73	12.88	-0.008	-0.001	46,000	280,000
Great Sand Dunes	CO	0.68	0.68	1.02	0.41	4.07	6.78	-0.02	-0.003	12,000	82,000
Lostwood Wilderness	ND	1.82	1.82	3.96	1.58	15.85	26.41	-0.008	-0.01	84,000	52,000
Rocky Mtn Nat'l Park	CO	0.59	0.59	0.94	0.37	3.74	6.24	-0.02	-0.007	11,000	31,000
Salt Creek	NM	2.05	2.05	2.77	1.11	11.09	18.49	-0.004	-0.01	192,800	50,000
Theodore Roosevelt	ND	1.00	1.00	2.77	1.11	11.07	18.45	-0.008	-0.01	45,000	36,000
Wheeler Peak	NM	0.45	0.45	0.63	0.25	2.54	4.23	-0.08	-0.01	2,100	11,000
White Mountain	NM	0.67	0.67	0.90	0.36	3.60	6.00	-0.08	-0.01	3,100	16,000
Wind Cave	SD	0.85	0.85	1.60	0.64	6.39	10.65	-0.008	-0.001	39,000	240,000

6.0 PRIORITIZED CENRAP EMISSIONS REDUCTION SCENARIOS

6.1 Summary of Emission Inventories Used in Control Plan Development

A necessary component of the control strategy design is a thorough review of the emission inventories that are used in the modeling of the future year base case. This inventory can shed light on the residual emissions from sources or source categories defined to be within areas of transport or impact of a Class I area. We obtained and used the current CENRAP future year (2018) base case and 2002 base year emissions to conduct a review of the top emitting categories and pollutants within identified impact areas.

The SMOKE-ready modeling files for both 2002 and 2018 base year and base cases were obtained from CENRAP’s emissions modeling contractor (UCR) in addition to a supplementary county level summary of onroad source emissions produced from the gridded, temporalized MOBILE6-based emissions output. Using the annualization methods confirmed with UCR and identified in the SMOKE file headers, each SMOKE input file was converted to annual emissions and summed for the geography and domain of interest.

Tables 6-1 and 6-2 present the major source category breakdown of these emissions for the entire CENRAP domain. AOI-specific breakdowns are presented in Appendix E of this document for those CENRAP Class I areas projected to be above the reasonable progress glide slope. Because the SMOKE-ready files were used in this analysis, the particulate matter transport factor is included in the PM emission summaries. This factor is applied to account for the removal of a substantial portion of fugitive dust emissions near a source by surrounding vegetation and structures when such emissions are used in regional scale modeling analyses.

Table 6-1. CENRAP 2002 Base Year Annual Emissions Summary.

Source Category	CENRAP 2002 Base Year Annual Emissions (Tons)						
	VOC	NOx	CO	SO2	PM-10	PM-2.5	NH3
Fuel Comb. Elec. Util.	13,838	1,006,914	290,478	1,545,327	79,429	53,475	4,462
Fuel Comb. Industrial	74,226	907,445	387,579	568,270	118,626	78,412	6,243
Fuel Comb. Other	151,527	98,457	435,320	34,605	67,380	65,556	4,870
Chemical & Allied Product Mfg	56,154	37,002	117,918	140,403	10,946	8,503	13,254
Metals Processing	8,178	16,197	115,827	86,425	14,930	6,486	4
Petroleum & Related Industries	486,785	306,947	274,187	81,950	10,442	7,408	819
Other Industrial Processes	150,388	107,908	119,678	89,127	235,401	74,228	206,676
Solvent Utilization	799,050	392	248	21	1,338	1,110	17
Storage & Transport	200,946	9,023	39,075	2,416	17,321	5,294	220
Waste Disposal & Recycling	58,790	16,836	248,560	5,319	57,500	53,804	9,914
Highway Vehicles	985,527	1,780,289	13,178,713	51,829	100,256	94,514	51,512
Off-highway	660,216	966,296	4,358,200	95,522	83,090	76,924	1,365
Natural Sources	0	0	0	0	0	0	80,213
Miscellaneous	310,871	150,474	4,538,131	47,040	4,325,839	1,062,364	1,440,416
CENRAP Total	3,956,494	5,404,181	24,103,914	2,748,255	5,122,496	1,588,078	1,819,983

Table 6-2. 2018 Base Case Annual Emissions Summary.

Source Category	CENRAP 2018 Base Case Annual Emissions (Tons)						
	VOC	NOx	CO	SO2	PM-10	PM-2.5	NH3
Fuel Comb. Elec. Util.	15,963	800,509	231,161	1,397,945	125,999	106,402	12,188
Fuel Comb. Industrial	87,300	985,108	470,053	562,732	134,652	93,244	7,942
Fuel Comb. Other	139,826	93,527	348,628	33,555	57,292	55,498	4,932
Chemical & Allied Product Mfg	91,937	52,915	200,036	229,435	17,361	13,383	23,977
Metals Processing	14,600	24,603	200,166	154,071	23,811	10,838	6
Petroleum & Related Industries	519,225	320,126	287,198	106,536	13,818	9,753	1,077
Other Industrial Processes	215,126	162,931	163,154	133,203	316,220	100,922	285,113
Solvent Utilization	1,095,270	663	426	35	2,563	2,116	19
Storage & Transport	227,269	12,122	69,548	3,325	23,808	7,380	298
Waste Disposal & Recycling	73,117	19,379	296,493	7,704	67,637	63,084	14,019
Highway Vehicles	447,496	445,651	7,466,397	7,335	24,845	12,522	73,128
Off-highway	384,203	263,701	5,067,432	995	43,831	40,311	606
Natural Sources	0	0	0	0	0	0	80,213
Miscellaneous	212,436	107,761	3,200,076	57,923	3,968,055	903,434	1,921,843
CENRAP Total	3,523,767	3,288,994	18,000,769	2,694,795	4,819,893	1,418,889	2,425,360

As 2002 pre- and post-modeled emission summaries were provided on the input data files, we were able to verify the emission totals for each State and SCC in the modeling domain (Pechan, 2006). However, as 2018 summaries were not available in time to review the files for this analysis, we have not confirmed that these 2018 emission totals are as expected by the ICS.

Our review was conducted in a top down fashion starting with an analysis of the major source categories in the domains of interest to determine which major categories have the highest residual contribution to the area. Once the highest source types were identified, subcategories within those source types were reviewed. Again, a ranking of the highest residual sub source types was performed and additional analyses on these categories were conducted. Table 6-3 presents a percentage based contribution of residual emissions by major source category for the CENRAP domain. Tables for each CENRAP Class I AOI projected to be above the glide slope for reasonable progress are presented in Appendix E of this document.

In addition to reviewing the residual emission categories in the future year base, it was important to identify reductions that have already occurred within each category or at specific units. This will allow the ICS to determine if certain source categories that have yet to be controlled under the future year base case have the potential for reduction or if source types already reduced have reached the full cost-effective potential. Table 6-4 presents this information in annual tons for all sources in the CENRAP domain, while Table 6-5 presents the same information in terms of percent change from 2002.

Finally, once each subcategory was identified, unit level tables of emission comparisons from 2002 to 2018 were developed allowing the ICS to review existing emission reductions and providing the ability to assign new cost-effective controls to units using the best control for the scenario. These tables present comparisons of 2002 and 2018 emission levels, by pollutant, and future year control technology assignment (by IPM forecasting) for EGU sources. Since unit-

specific technology assignments were not identified in the SMOKE control packets nor in documentation obtained for use in this project, these units do not have associated future year technology identification data.

Ultimately, the ICS' final control strategy decisions will include the application of BART applicable source reductions in the future year base case. However, as these sources and their associated reductions were unavailable for this project, they too are not included in this analysis.

Table 6-3. CENRAP 2018 Base Case Annual Residual Emissions Contribution Summary.

Source Category	CENRAP 2018 Base Case Annual Emissions (Percent of Total)						
	VOC	NOx	CO	SO2	PM-10	PM-2.5	NH3
Fuel Comb. Elec. Util.	0%	24%	1%	52%	3%	7%	1%
Fuel Comb. Industrial	2%	30%	3%	21%	3%	7%	0%
Fuel Comb. Other	4%	3%	2%	1%	1%	4%	0%
Chemical & Allied Product Mfg	3%	2%	1%	9%	0%	1%	1%
Metals Processing	0%	1%	1%	6%	0%	1%	0%
Petroleum & Related Industries	15%	10%	2%	4%	0%	1%	0%
Other Industrial Processes	6%	5%	1%	5%	7%	7%	12%
Solvent Utilization	31%	0%	0%	0%	0%	0%	0%
Storage & Transport	6%	0%	0%	0%	0%	1%	0%
Waste Disposal & Recycling	2%	1%	2%	0%	1%	4%	1%
Highway Vehicles	13%	14%	41%	0%	1%	1%	3%
Off-highway	11%	8%	28%	0%	1%	3%	0%
Natural Sources	0%	0%	0%	0%	0%	0%	3%
Miscellaneous	6%	3%	18%	2%	82%	64%	79%
CENRAP Total	100%	100%	100%	100%	100%	100%	100%

Table 6-4. CENRAP Annual Emissions Change (Tons).

Source Category	CENRAP Annual Emissions Change -- 2002 to 2018 (Tons)						
	VOC	NOx	CO	SO2	PM-10	PM-2.5	NH3
Fuel Comb. Elec. Util.	2,125	-206,405	-59,317	-147,382	46,570	52,927	7,727
Fuel Comb. Industrial	13,075	77,663	82,475	-5,538	16,025	14,832	1,699
Fuel Comb. Other	-11,701	-4,930	-86,692	-1,050	-10,087	-10,058	62
Chemical & Allied Product Mfg	35,783	15,913	82,118	89,032	6,416	4,880	10,723
Metals Processing	6,422	8,405	84,338	67,647	8,882	4,352	3
Petroleum & Related Industries	32,441	13,179	13,011	24,587	3,377	2,346	258
Other Industrial Processes	64,738	55,023	43,475	44,076	80,819	26,694	78,437
Solvent Utilization	296,220	271	178	14	1,225	1,006	2
Storage & Transport	26,323	3,099	30,473	909	6,487	2,086	77
Waste Disposal & Recycling	14,328	2,542	47,933	2,385	10,137	9,281	4,105
Highway Vehicles	-538,032	-1,334,638	-5,712,316	-44,495	-75,411	-81,992	21,616
Off-highway	-276,012	-702,595	709,233	-94,527	-39,258	-36,612	-759
Natural Sources	0	0	0	0	0	0	0
Miscellaneous	-98,436	-42,714	-1,338,055	10,883	-357,784	-158,930	481,427
CENRAP Total	-432,727	-2,115,187	-6,103,145	-53,460	-302,603	-169,189	605,376

Table 6-5. CENRAP Annual Emissions Change (Percent).

Source Category	CENRAP Annual Emissions Change -- 2002 to 2018 (Percent)						
	VOC	NOx	CO	SO2	PM-10	PM-2.5	NH3
Fuel Comb. Elec. Util.	15%	-20%	-20%	-10%	59%	99%	173%
Fuel Comb. Industrial	18%	9%	21%	-1%	14%	19%	27%
Fuel Comb. Other	-8%	-5%	-20%	-3%	-15%	-15%	1%
Chemical & Allied Product Mfg	64%	43%	70%	63%	59%	57%	81%
Metals Processing	79%	52%	73%	78%	59%	67%	67%
Petroleum & Related Industries	7%	4%	5%	30%	32%	32%	31%
Other Industrial Processes	43%	51%	36%	49%	34%	36%	38%
Solvent Utilization	37%	69%	72%	66%	92%	91%	13%
Storage & Transport	13%	34%	78%	38%	37%	39%	35%
Waste Disposal & Recycling	24%	15%	19%	45%	18%	17%	41%
Highway Vehicles	-55%	-75%	-43%	-86%	-75%	-87%	42%
Off-highway	-42%	-73%	16%	-99%	-47%	-48%	-56%
Natural Sources	0%	0%	0%	0%	0%	0%	0%
Miscellaneous	-32%	-28%	-29%	23%	-8%	-15%	33%
CENRAP Total	-11%	-39%	-25%	-2%	-6%	-11%	33%

6.2 Process in Preparing Files for Control Plan Modeling

In addition to the SMOKE emission files, the 2018 growth and control packets were obtained from UCR for additional application and verification of future year scenario assignment. Since the CENRAP utilized version of the SMOKE processor does not replace control efficiency, rule effectiveness, and rule penetration values in the output files generated using the growth and control modules of the model, Alpine manually applied these values to the 2018 non-EGU and stationary area source files for which the packets were applied. This step was necessary to duplicate the inventories that went into the results of CENRAP's reasonable progress modeling and to ensure that any incremental assignment of control technologies did not duplicate emission reductions already assumed in the future year base case.

The 2018 IPM file used by CENRAP for EGU sources was also obtained and matched to the 2018 base case inventory of EGU sources. This step was conducted for reasons similar to those identified above for non-EGU and stationary area sources and to ensure that incremental controls assigned to these source types did not duplicate existing base case assumptions. Because IPM does not assign a control efficiency with each control device applied to SO₂ and NO_x, we made some assumptions, based on IPM documentation, as to what pollutant specific level of reduction was applied in the future year base case runs. These assumptions, by primary and secondary control device code combinations for SO₂ and NO_x, are presented in Tables 6-6 and 6-7, respectively.

Since many of the control technology control cost equations within AirControlNET require additional unit-level characteristic data, we also made matches of the SMOKE IDA files to CENRAP NIF, EPA NEI, or EPA CAMD CEM data sets to obtain these variables when missing.

Unit level boiler capacity (MMBtu/hr) or NETDC (MW) values are required for capital and operating and maintenance cost calculations for many of the EGU technologies. In cases where these nameplate capacity values could not be identified, emission weighted (based on the final EPA 2002 NEI) were assigned to boilers using a primary (highest emitting) SCC. Table 6-8 presents these weighted capacities. Additionally, stack flow, sulfur content, and primary SCC assignment were necessary to cross-reference available incremental control technologies to the base case emissions inventory data. These variables were obtained where matches could be found, in priority order of CENRAP, CAMD, and EPA datasets, respectively.

Table 6-6. IPM Post Processing Assigned Device Codes and Applied SO₂ Control Efficiencies.

Primary Device Code	Secondary Device Code	Description	CE	RE
0	0	No Control	0	0
119	0	Dry Scrubber	90	100
141	0	Wet Scrubber	90	100

Table 6-7. IPM Post Processing Assigned Device Codes and Applied NO_x Control Efficiencies.

Primary Device Code	Secondary Device Code	Description	CE	RE
0	0	UNCONTROLLED	0	0
26	0	FLUE GAS RECIRCULATION	35	100
26	29	FLUE GAS RECIRCULATION + LOW EXCESS AIR FIRING	35	100
26	204	FLUE GAS RECIRCULATION + OVERFIRE AIR	40	100
28	0	STEAM OR WATER INJECTION	65	100
28	32	STEAM OR WATER INJECTION + AMMONIA INJECTION	65	100
28	204	STEAM OR WATER INJECTION + OVERFIRE AIR	90	100
28	205	STEAM OR WATER INJECTION + LOW NOX BURNERS	90	100
29	0	LOW EXCESS AIR FIRING	35	100
32	0	AMMONIA INJECTION	55	100
32	28	AMMONIA INJECTION + STEAM OR WATER INJECTION	65	100
139	0	SCR (SELECTIVE CATALYTIC REDUCTION)	90	100
139	28	SCR (SELECTIVE CATALYTIC REDUCTION) + STEAM OR WATER INJECTION	95	100
139	71	SCR (SELECTIVE CATALYTIC REDUCTION) + FLUID BED DRY SCRUBBER	90	100
139	204	SCR (SELECTIVE CATALYTIC REDUCTION) + OVERFIRE AIR	90	100
139	205	SCR (SELECTIVE CATALYTIC REDUCTION) + LOW NOX BURNERS	94	100
140	0	NSCR (NON-SELECTIVE CATALYTIC REDUCTION)	90	100
140	29	NSCR (NON-SELECTIVE CATALYTIC REDUCTION) + LOW EXCESS AIR FIRING	90	100
140	71	NSCR (NON-SELECTIVE CATALYTIC REDUCTION) + FLUID BED DRY SCRUBBER	90	100
140	204	NSCR (NON-SELECTIVE CATALYTIC REDUCTION) + OVERFIRE AIR	90	100
140	205	NSCR (NON-SELECTIVE CATALYTIC REDUCTION) + LOW NOX BURNERS	90	100
204	0	OVERFIRE AIR	40	100
204	26	OVERFIRE AIR + FLUE GAS RECIRCULATION	40	100
204	205	OVERFIRE AIR + LOW NOX BURNERS	50	100
205	0	LOW NOX BURNERS	50	100
205	26	LOW NOX BURNERS + FLUE GAS RECIRCULATION	60	100
205	28	LOW NOX BURNERS + STEAM OR WATER INJECTION	50	100
205	32	LOW NOX BURNERS + AMMONIA INJECTION	50	100
205	204	LOW NOX BURNERS + OVERFIRE AIR	50	100

6.3 Application of AirControlNET Technologies

AirControlNET is a control technology analysis tool developed to support the U.S. EPA in its analyses of air pollution policies and regulations (Pechan, 2005). The tool provides data on emission sources, potential pollution control measures and emission reductions, and the costs of implementing those controls.

The core of AirControlNET is a relational database system in which control technologies are linked to sources within EPA emissions inventories. The system contains a database of control measure applicability, efficiency, and cost information for reducing the emissions contributing to ambient concentrations of ozone, PM₁₀, PM_{2.5}, SO₂, NO_x, as well as visibility impairment (regional haze) from point, area, and mobile sources. PM₁₀ and PM_{2.5} as included in AirControlNET represent primary emissions of PM. The control measure data file in AirControlNET includes not only the technology's control efficiency, and calculated emission reductions for that source, but also estimates the costs (annual and capital) for application of the control measure.

Since the existing version of AirControlNET contains the preprocessed application of control technologies to a predetermined set of EPA emission inventories, direct use of the model in this analysis was not possible. However, Alpine received approval from EPA's Innovative Strategies and Economics Group (ISEG) to modify the AirControlNET version 4.1 source code and data tables in order to make it useful to this study (Sorrels, 2006). The results of the application of this modified version of the code still retain the applicability, efficiency, and cost information from the unmodified version of the source code, but were applied to the CENRAP modeling inventories with updated price index scalars to reflect control costs in 2005-dollars.

Using the modified inventories identified in Section 6.2 above, we ran every available control strategy in AirControlNET against the EGU, non-EGU point, and stationary area source inventories to develop a master list of available, *incremental* control strategies for the entire CENRAP 36 km domain necessary for the ICS to design command-and-control or cost-effectiveness based control strategies by source or domain. Mobile source controls were not processed under this assignment as it would have required multiple iterative runs of the EPA NONROAD and MOBILE6 models to generate the appropriate information. This master list of controls was used in the final development of the control strategy plan as described in the following sections.

Since AirControlNET's control cost equations take into consideration the useful remaining life of installed equipment and estimate the costs of compliance with these measures, two of the four reasonable progress goal considerations (see Section 6.6) are directly met through the results of the model's output.

Table 6-8. Emissions Weighted NETDC (MW) Association.

SCC	Description	NETDC (MW)
10100201	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Pulverized Coal: Wet Bottom (Bituminous Coal)	200
10100202	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Pulverized Coal: Dry Bottom (Bituminous Coal)	500
10100203	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Cyclone Furnace (Bituminous Coal)	200
10100212	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Pulverized Coal: Dry Bottom (Tangential) (Bituminous Coal)	500
10100215	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Cell Burner (Bituminous Coal)	1300
10100218	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Atmospheric Fluidized Bed Combustion: Circulating Bed (Bitum. Coal)	200
10100222	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Pulverized Coal: Dry Bottom (Subbituminous Coal)	400
10100223	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Cyclone Furnace (Subbituminous Coal)	400
10100226	External Combustion Boilers; Electric Generation; Bituminous/Subbituminous Coal; Pulverized Coal: Dry Bottom Tangential (Subbituminous Coal)	500
10100401	External Combustion Boilers; Electric Generation; Residual Oil; Grade 6 Oil: Normal Firing	400
10100404	External Combustion Boilers; Electric Generation; Residual Oil; Grade 6 Oil: Tangential Firing	500
10100501	External Combustion Boilers; Electric Generation; Distillate Oil; Grades 1 and 2 Oil	400
10100601	External Combustion Boilers; Electric Generation; Natural Gas; Boilers > 100 Million Btu/hr except Tangential	400
10100701	External Combustion Boilers; Electric Generation; Process Gas; Boilers > 100 Million Btu/hr	200
10100801	External Combustion Boilers; Electric Generation; Petroleum Coke; All Boiler Sizes	600
10101204	External Combustion Boilers; Electric Generation; Solid Waste; Tire Derived Fuel : Shredded	200
10300811	External Combustion Boilers; Commercial/Institutional; Landfill Gas; Landfill Gas	200
20100101	Internal Combustion Engines; Electric Generation; Distillate Oil (Diesel); Turbine	200
20100109	Internal Combustion Engines; Electric Generation; Distillate Oil (Diesel); Turbine: Exhaust	200
20100201	Internal Combustion Engines; Electric Generation; Natural Gas; Turbine	200
	All other boilers	100

6.4 Development of AOI-Based Cost Curves

Each Class I area in the CENRAP modeling domain has an associated set of AOIs as identified in other areas of this document. In order to best determine where emission reduction has the greatest benefit, this geography was designed to limit the available source type list from including all sources within the entire domain.

Using a geocoded county list from these AOIs, we parsed the master list of incremental control measures from all non-mobile source types and sources located within the boundaries of the AOIs. This parsed list was then sorted on an incremental cost-effectiveness (marginal cost) basis to determine the most cost effective control suite necessary to attain emission reduction targets for specific pollutants within each AOI. Each individual source or source category (unit or county-SCC combination) had its own cost effectiveness curve generated. In aggregate, the results of these applications are cost curves for each visibility impairing pollutant for all EGU, non-EGU point, and stationary area source within the geographic domain of the AOI. Incremental controls on mobile sources were not considered in this analysis. An illustrative example of the steps involved with the cost effectiveness curve design can be found in the Appendix F of this document. Figures 6-1, 6-2 and Appendix G present actual cost curves for AOI-1 areas associated with the six CENRAP Class I areas projected to be above the reasonable progress glide path.

6.5 Application of Cost Curves to Emission Reduction Needs

Two sets of cost curves have been developed for each pollutant-Class I AOI-1 combination identified as of interest to the ICS. The first marginal cost curve includes the application of all available control measures to all applicable source types within the AOI. The second curve is the result of limiting the control measure application to only the top three residual emission subcategories identified in the 2018 base case for each AOI-pollutant combination. These two curves will allow the ICS to determine if limiting the control scenario to only the highest residual categories will attain reasonable glide path emission reduction objectives while presumably minimizing the number and type of controlled sources in each AOI.

Within each AOI, an emissions reduction target has been established based on the review of relevant and available regional haze aerometric analyses and source attribution modeling. Each emissions reduction target sets the “solve point” of the cost curve and allows us to identify the most cost effective sources of reduction for the pollutants of interest within each impacted AOI.

It is noted that each pollutant-based cost curve developed for this analysis is mutually exclusive of each other pollutant’s cost curve and does not consider the feasibility of multiple control technologies being applied to any one source. Additionally, the information provided in these cost curves is representative of the primary pollutant of control and does not reflect any co-control applicability or disbenefit as a result of the application of that control.

Wichita Mountain
SO4/EC/OC AOI-1

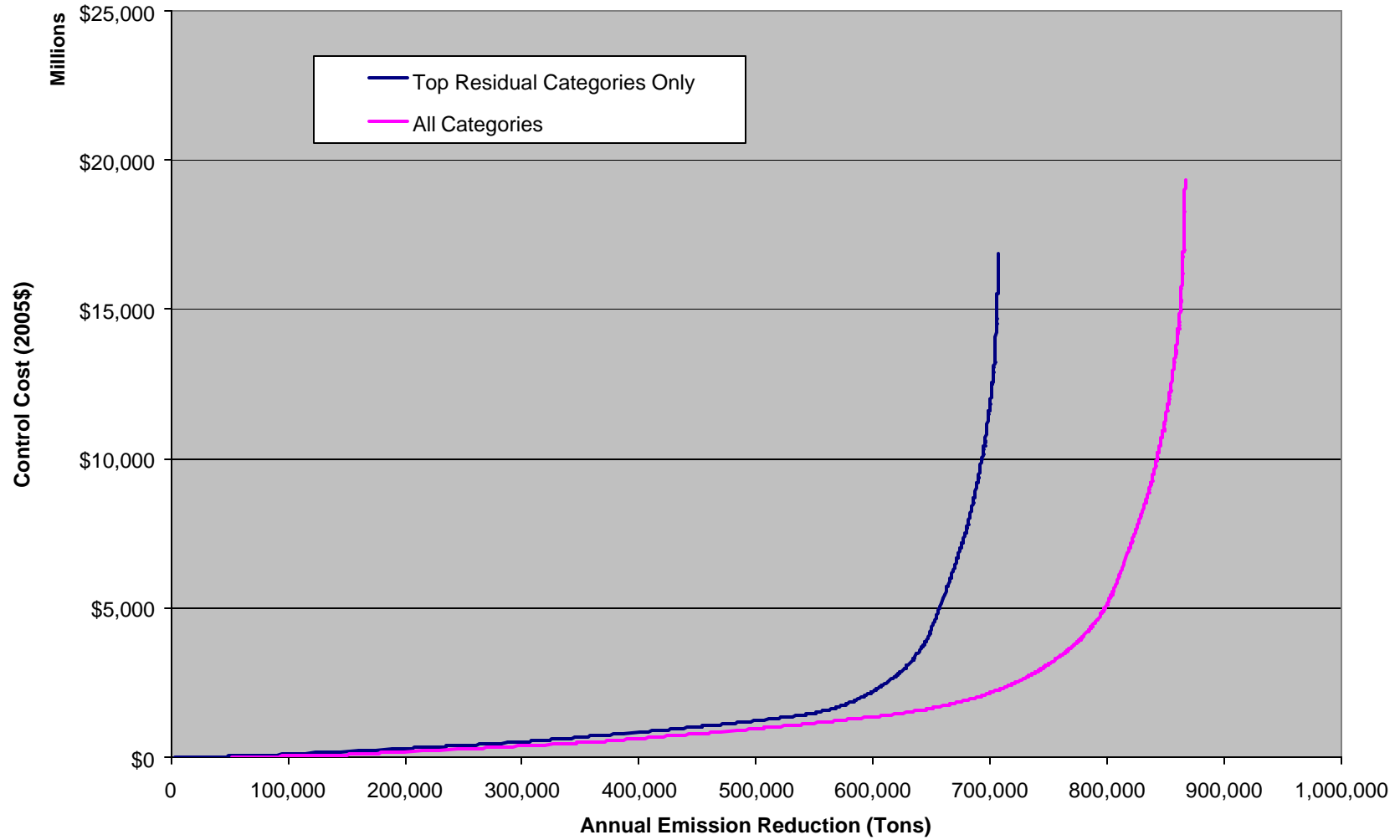


Figure 6-1. Marginal Cost Curve for Wichita Mountain SO4/EC/OC AOI-1.

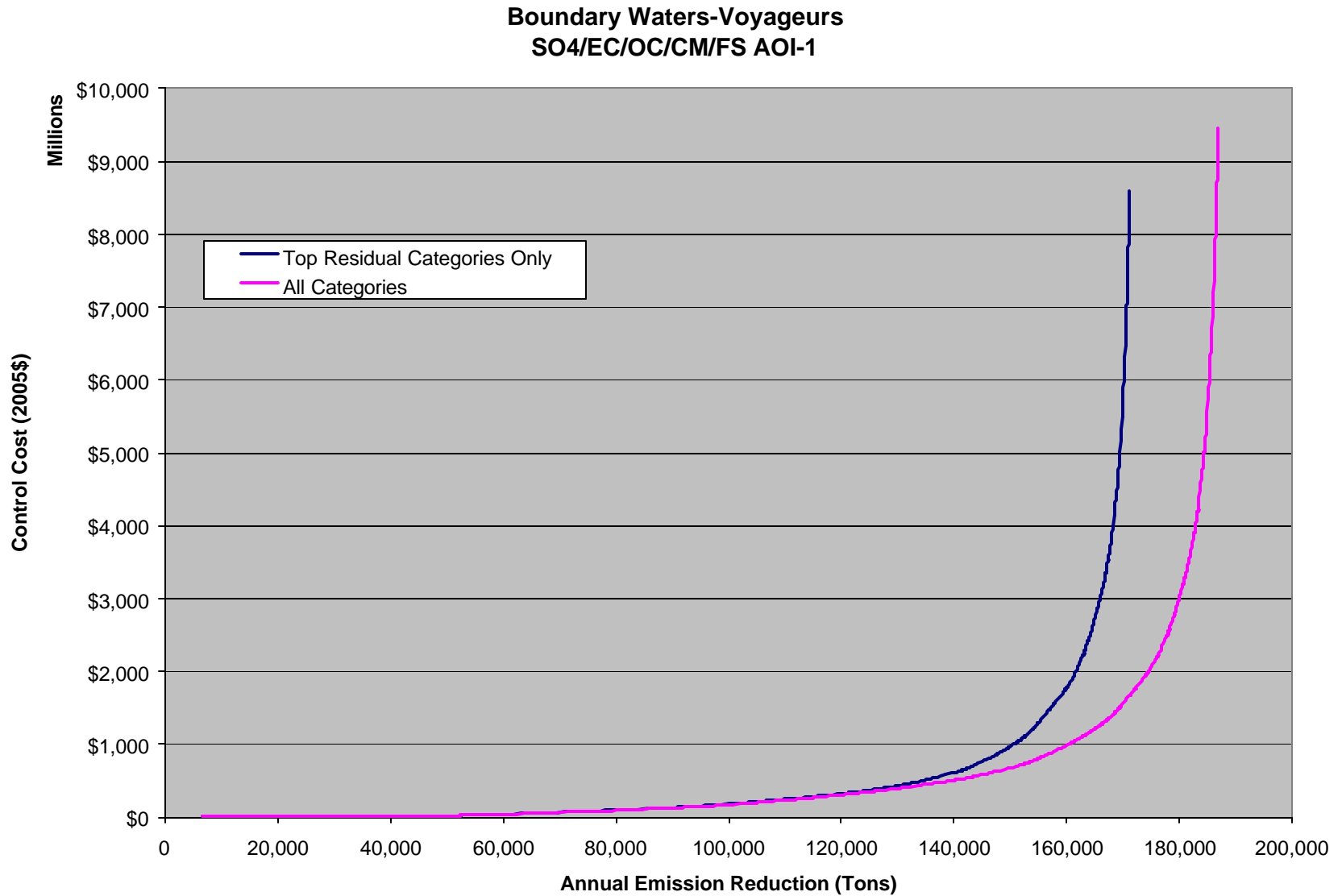


Figure 6-2. Marginal Cost Curve for Boundary Waters – Voyageurs SO4/EC/OC/CM/FS AOI-1.

6.6 Four Factor Analysis for RPG

As part of the regional haze program requirements outlined in 40 CFR 51.308, there are four factors which have been identified as mandatory for purposes of establishing a reasonable progress goal for any mandatory Class I area within a State.

40 CFR 51.308(d)(1)(i)(A) Consider the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected sources, and include a demonstration showing how these factors were taken into consideration in selecting the goal.

6.6.1 Cost of Compliance

The cost of compliance factor is used to determine whether compliance costs for sources are reasonable compared to the emission reductions and visibility improvement they will achieve. Costs should be determined for one-time capital costs and ongoing annual operation, maintenance, and upkeep costs.

Through the application of control technologies using the cost equations from the AirControlNET source code, we have identified individual units for control application, identified the design parameters for emission controls, and developed cost estimates based on those design parameters. An estimation of annualized cost of control, based on a one-time capital cost and continual operating and maintenance costs are included in this estimate, where parameters were available in the AirControlNET equations. This application of control cost analysis as applied to the incremental reduction sources defined in this study meets the application of the cost of compliance statutory factor.

6.6.2 Time Necessary for Compliance

The time necessary for compliance factor may be used to adjust the reasonable progress goals to reflect the degree of improvement achievable within the long term strategy period, as opposed to the improvement expected at full implementation of a control measure, if the time needed for full compliance exceeds the length of the long term strategy period. For example, if vendor availability within the period of the long term strategy could not meet the full requirements of the installation schedule outlined by the control strategy, the reasonable progress goals should reflect the visibility improvement anticipated from installation of controls at the percentage of sources that *could* be controlled within the strategy period.

In this particular analysis, a time necessary for compliance factor could not be determined simply based on the emissions inventory and a list of control measures applicable to controllable sources. An eventual SIP could include control strategies that extend beyond the 2018 milestone and the visibility improvement anticipated from installation of controls at the percentage of sources that *could not* be controlled within the first strategy period would have to be counted in a later SIP. Each of these elements would need to be determined on a unit by unit basis.

6.6.3 Energy and Non-Air Quality Environmental Impacts of Compliance

The energy and non-air impacts factor is meant to consider whether the energy requirements (the amount, type, and availability of energy) of the control technology result in energy penalties or benefits. For example, a particular control may require a fuel, water may be required for a cooling tower, or a landfill may be required for disposal of solid waste byproduct, each which are directly unavailable in the area. Since these impacts are State and site specific, they are not addressed in this analysis. Upon the final configuration of the control strategies by the ICS, each participating State, tribe and affected entity should review the control plan to determine whether significant energy burdens or benefits comes as a direct result of the application of a control technology. If determined to be so, the State should quantify this value and include it in the final submitted SIP.

6.6.4 Remaining Useful Life of Potentially Affected Sources

The statutory factor of the remaining useful life of the source is applicable only to those measures which would require retrofitting of control devices at *existing* sources. The remaining useful life of a source affects the annualized costs of retrofit controls and is included in the methods used for calculating annualized costs in the control cost equations modified from EPA's AirControlNET.

CENRAP's emission projections, as well as the control cost equations applied by Alpine, account for the remaining useful life between the year of the reasonable progress analysis and the date the facility permanently stops operations. Since source specific retirements are taken into consideration with the CENRAP forecasts (units are shut down in the year of their retirement) and average retirement rates are applied to control technologies within the control analysis equations, the statutory factor of the remaining useful life of the source has been considered.

In summary, the basis of our resulting control strategy recommendations provide a demonstration of those reasonable progress goal requirements which could be taken into consideration to meet visibility objectives with the data provided for this analysis. The remaining factors are State, tribal and site dependant and could not be addressed here.

7.0 SUMMARY AND RECOMMENDATIONS

7.1 Summary

Alpine’s review of all data discussed in the previous sections of this document have identified six Class I areas (Big Bend National Park, Breton Island, Boundary Waters, Guadalupe Mountains, Wichita Mountain, and Voyageurs) within the CENRAP domain, their particular AOIs, ICS defined emission reduction targets, and potential incremental emission reductions recommended for CENRAP modeling. For each area, sulfate and to a lesser extent, nitrate reductions were shown to be most beneficial during the 20 percent worst visibility days in 2002.

Alpine has configured subregional control strategies based on direction provided by the ICS to use single precursor emission reduction assumptions with a marginal cost per ton cutoff of \$5,000 per ton reduced. Emission targets were identified by the ICS for each Class I area AOI to exceed the reasonable progress glide slope. These targets were established as 25 percent more reduction than was identified in Table 5-3 and were to be taken from any available source, not just those identified as having the highest residual emissions contribution to the Class I area AOI. Table 7-1 presents a summary of each of these strategies.

Table 7-1. Subregional control strategy summary for single precursor emission reduction targets.

Class I Area	ST	SO ₂ Annual Emission Reduction (Tons)		Control Strategy Total Cost (\$2005)	Control Strategy Average Cost Per Ton (\$/ton reduced)
		ICS Established Reduction Target	Subregional Control Strategy Reductions		
Breton Island	LA	385,000	119,966	\$203,443,093	\$1,696
Boundary Waters	MN	40,000	46,301	\$107,233,124	\$2,316
Voyageurs	MN	28,750			
Wichita Mountains	OK	93,750	99,479	\$21,752,713	\$219
Guadalupe Mountains	TX	162,500	115,936	\$319,001,184	\$2,752
Big Bend Nat'l Park	TX	150,000			

For three of the six CENRAP Class I areas projected to be above the reasonable progress glide slope in 2018, control strategies have been prepared which meet the emission reduction targets recommended by the ICS. These areas (Boundary Waters, Wichita Mountains, and Voyageurs) all can meet the ICS defined targets while staying within the single precursor, \$5,000 per ton reduced limitations.

We also have determined that as a result of the implementation of the list of additional point and area source controls in each primary AOI the remaining three Class I areas within the CENRAP domain (Big Bend National Park, Breton Island, and Guadalupe Mountains) modeled to be above the reasonable progress glide slope will be unable to achieve a level of emissions reduction necessary to bring these areas under the glide slope by 2018 using the ICS identified control strategy definitions. Influences such as incrementally uncontrollable source categories, marginal cost effectiveness values greater than \$5,000 per ton reduced, and international and inter-RPO emission transport prevent strategies from being configured for these Class I areas.

In particular, recent BRAVO research (see, for example Barna et al. 2006) shows that Mexican SO₂ sources account for up to 23% of the observed annual sulfate levels at Big Bend. During the summer months, Mexican SO₂ emissions sources can account for as much as 70% of the sulfate at Big Bend. Barna et al. also show that SO₂ emission sources for the Eastern U.S. are the biggest culprit to high sulfate at Big Bend during the high PM_{2.5} summer days; and SO₂ from the Eastern US and Texas are the biggest contributor to high sulfate at Big Bend during the high PM_{2.5} fall days.

In both of these episode examples, regardless of the emissions reduction achieved by CENRAP with the available source category and technology applications, there still is an emissions component which is directly out of their control. Additional consultation with inter-RPO and international agencies may be required to adequately co-configure strategies to bring these areas into attainment.

7.2 Recommendations

7.2.1 Regional Controls

As each of the six Class I areas projected to be above the reasonable progress glide path (and all of the other Class I AOIs in the CENRAP domain) are dominated by EGU SO₂ and NO_x emissions and many of these area AOIs intersect with States currently excluded by the EPA CAIR rule, *we recommend that CENRAP consider a control scenario which would reduce EGU emissions in non-CAIR States to levels comparable to those promulgated by EPA in the final CAIR regulation.* In addition to this regional strategy proposal, *we further recommend that the ICS consider individual CENRAP States within Class I area AOIs projected above the reasonable progress glide slope to meet CAIR emissions budgets without the interstate trading aspect of the rule.* This nuance may prevent emission reductions from being transferred to areas outside of the influential zones of the affected Class I areas and focus the reductions in those upwind areas with greatest impact on meeting visibility objective goals.

These regional controls could be modeled in multiple ways. Two noted methods being to develop an additional IPM run configured to take into account the CAIR reductions within non-CAIR States with or without the constraint of trading noted above. The second method would be to determine an emission budget (following EPA methods in the CAIR final rule) to determine State level targets for emission reduction. Using these targets, CENRAP could then apply the marginal cost curves developed for this analysis, but limit the solution to only EGU sources identified as “CAIR eligible”. This approach would not take into account any trading or participation in the bank and trade system, but would give an estimate of the regional emission reductions associated with the strategy.

7.2.2 Subregional Controls

In lieu of a single regional control option applied consistently across the entire CENRAP domain, individual subregional controls could be applied to reduce emissions within certain Class I area AOIs. Based on the single precursor emission reduction target calculations defined elsewhere in this document, subregional control strategies can be defined for three of the Class I areas projected to be above the reasonable progress glide path. In each case, the marginal cost

curves (based on the application of all available control options on all controllable industries and source types) allow the selection of control technologies for sources within an AOI-1 that attains the ICS defined emission reduction targets. Details of these control strategies are presented in Tables 7-2 and 7-3. Note that as Boundary Waters and Voyageurs are associated within the same AOI-1, the larger of the two emission reduction targets was used to configure a control strategy that would meet both areas' needs.

However, as noted in this document, the application of incremental control on all controllable point and area sources within the AOIs still fails to meet the visibility objectives of three Class I areas modeled to be above the reasonable progress glide slope. For this reason, *we additionally recommend that the ICS consider applying the remaining reasonably cost effective control technologies to sources within States and tribal lands contained in the boundaries of the three target Class I area AOIs.* As part of the demonstration of reasonable progress, the application of reasonably cost effective controls to all emission sources and source types through a process as described in this document appears to provide support that the four reasonable progress goal considerations were taken into account where available. As is demonstrated for the Boundary Waters and Voyageurs AOI-1 above, the AOI-1 for Big Bend and Guadalupe Mountains share the same emission reduction target. In this case, however, the target cannot be fully achieved. Tables 7-4 and 7-5 present the details of these strategies.

For those Class I areas outside of CENRAP's domain who based on CENRAP modeling did not forecast below the reasonable progress glide slope, we submit to the ICS our data of incremental control strategy application and cost curves based on existing modeling and inventory assumptions provided by CENRAP to date for purposes of consultation with those States in which the affected Class I areas are located. We have not presented these non-CENRAP data as part of this document but much of the basic information is presented, where appropriate, in the supporting appendixes.

Table 7-2. Subregional control strategy defined for Boundary Waters / Voyageurs SO4 AOI-1.

EIPSSST	EIPSCNTY	State	County	Plant ID	Plant Name	Point ID	SIC	Control Measure	BOWA/VOYA SO2 Control Application		
									Ton Reduced	Cost (\$2005)	Marginal CPT
27	037	Minnesota	Dakota Co	2703700011	FLINT HILLS RESOURCES LP - PINE BEND	EU111	2911	Sulfur Recovery and/or Tail Gas Treatment	290	\$401,526	\$1,383
27	037	Minnesota	Dakota Co	2703700011	FLINT HILLS RESOURCES LP - PINE BEND	EU045	2911	Sulfur Recovery and/or Tail Gas Treatment	286	\$395,189	\$1,383
27	037	Minnesota	Dakota Co	2703700011	FLINT HILLS RESOURCES LP - PINE BEND	EU088	2911	Sulfur Recovery and/or Tail Gas Treatment	62	\$86,034	\$1,383
27	163	Minnesota	Washington Co	2716300003	MARATHON ASHLAND PETROLEUM LLC	EU019	2911	Sulfur Recovery and/or Tail Gas Treatment	11	\$14,854	\$1,383
55	123	Wisconsin	Vernon Co	663020930	DAIRYLAND POWER COOP GENOA STATION-EOP	B20	4911	FGD Wet Scrubber	16,904	\$28,492,444	\$1,686
19	179	Iowa	Wapello Co	90-07-001	IPL - OTTUMWA GENERATING STATION	143977	4911	FGD Wet Scrubber	15,897	\$28,492,444	\$1,792
19	113	Iowa	Linn Co	57-01-004		0	0	FGD	2,042	\$4,302,128	\$2,107
55	123	Wisconsin	Vernon Co	663020930	DAIRYLAND POWER COOP GENOA STATION-EOP	B20	4911	FGD Wet Scrubber	12,569	\$28,492,444	\$2,267
31	109	Nebraska	Lancaster Co	0005	NPPD SHELDON STATION	001	4911	FGD Wet Scrubber	6,079	\$16,556,061	\$2,724
19	193	Iowa	Woodbury Co	97-04-010	MIDAMERICAN ENERGY CO. - GEORGE NEAL NOR	148780	4911	FGD Wet Scrubber	9,065	\$28,492,444	\$3,143
Overall Control Strategy									46,301	\$107,233,124	\$2,316

Duplicate entry in 2018d modeling inventory.

Table 7-3. Subregional control strategy defined for Wichita Mountains SO4 AOI-1.

EIPSSST	EIPSCNTY	State	County	Plant ID	Plant Name	Point ID	SIC	Control Measure	WIMO SO2 Control Application		
									Ton Reduced	Cost (\$2005)	Marginal CPT
29	093	Missouri	Iron Co	0008	DOE RUN COMPANY-GLOVER SMELTER	8390	3339	FGD	51,834	\$4,351,167	\$84
48	201	Texas	Harris Co	37	HOUSTON PLANT	000008	2819	Increase % Conversion to Meet NSPS (99.7)	3,486	\$670,008	\$192
22	033	Louisiana	East Baton Rouge Par	0033	RHODIA INC/BR FAC	02	2869	Increase % Conversion to Meet NSPS (99.7)	7,090	\$1,884,093	\$266
22	005	Louisiana	Ascension Par	0007	DUPONT CHEMICALS/BURNSIDE PLANT	01	2819	Increase % Conversion to Meet NSPS (99.7)	11,284	\$3,896,018	\$345
29	099	Missouri	Jefferson Co	0003	DOE RUN COMPANY-HERCULANEUM SMELTER	11722	3339	FGD	10,653	\$4,320,204	\$406
48	201	Texas	Harris Co	37	HOUSTON PLANT	000011	2819	Increase % Conversion to Meet NSPS (99.7)	5,953	\$2,510,908	\$422
22	005	Louisiana	Ascension Par	0028	PCS NITROGEN FERTILIZER,L.P./GEISMAR	01	2873	Increase % Conversion to Meet NSPS (99.7)	9,179	\$4,120,315	\$449
Overall Control Strategy									99,479	\$21,752,713	\$219

Table 7-4. Subregional control strategy defined for Breton Island SO4 AOI-1.

FIPSST	FIPSCNTY	State	County	Plant ID	Plant Name	Point ID	SIC	Control Measure	BRET SO2 Control Application		
									Ton Reduced	Cost (\$2005)	Marginal CPT
22	033	Louisiana	East Baton Rouge Par	0033	RHODIA INC/BR FAC	02	2869	Increase % Conversion to Meet NSPS (99.7)	7,090	\$1,884,093	\$266
22	005	Louisiana	Ascension Par	0007	DUPONT CHEMICALS/BURNSIDE PLANT	01	2819	Increase % Conversion to Meet NSPS (99.7)	11,284	\$3,896,018	\$345
22	005	Louisiana	Ascension Par	0028	PCS NITROGEN FERTILIZER.L.P./GEISMAR	01	2873	Increase % Conversion to Meet NSPS (99.7)	9,179	\$4,120,315	\$449
22	033	Louisiana	East Baton Rouge Par	0033	RHODIA INC/BR FAC	03	2869	Increase % Conversion to Meet NSPS (99.7)	2,693	\$1,884,093	\$700
01	097	Alabama	Mobile Co	5009	AKZO NOBEL CHEMICALS INC	004	2819	Increase % Conversion to Meet NSPS (99.7)	2,183	\$1,817,521	\$832
12	113	Florida	Santa Rosa Co	1130005	EXXONMOBIL PRODUCTION COMPANY	34	1311	Sulfur Recovery and/or Tail Gas Treatment	1,702	\$2,354,901	\$1,383
22	033	Louisiana	East Baton Rouge Par	0015	EXXONMOBIL REF & SUPPLY CO/B R REFINERY	68	2911	Sulfur Recovery and/or Tail Gas Treatment	64	\$88,364	\$1,383
22	033	Louisiana	East Baton Rouge Par	0015	EXXONMOBIL REF & SUPPLY CO/B R REFINERY	69	2911	Sulfur Recovery and/or Tail Gas Treatment	64	\$88,364	\$1,383
22	095	Louisiana	St. John The Baptist	0013	MARATHON ASHLAND PETROLEUM LLC/LA REFINI	14	2911	Sulfur Recovery and/or Tail Gas Treatment	47	\$64,441	\$1,383
22	095	Louisiana	St. John The Baptist	0013	MARATHON ASHLAND PETROLEUM LLC/LA REFINI	70	2911	Sulfur Recovery and/or Tail Gas Treatment	31	\$42,396	\$1,383
22	095	Louisiana	St. John The Baptist	0013	MARATHON ASHLAND PETROLEUM LLC/LA REFINI	V2	2911	Sulfur Recovery and/or Tail Gas Treatment	26	\$35,613	\$1,383
22	077	Louisiana	Pointe Coupee Par	0005	LA GENERATING LLC/BIG CAJUN 2 PWR PLNT	01	4911	FGD Wet Scrubber	16,126	\$28,492,444	\$1,767
22	077	Louisiana	Pointe Coupee Par	0005	LA GENERATING LLC/BIG CAJUN 2 PWR PLNT	02	4911	FGD Wet Scrubber	15,618	\$28,492,444	\$1,824
12	033	Florida	Escambia Co	0330045	GULF POWER COMPANY CRIST ELECTRIC GENERA	6	4911	FGD Wet Scrubber	11,179	\$20,964,424	\$1,875
22	077	Louisiana	Pointe Coupee Par	0005	LA GENERATING LLC/BIG CAJUN 2 PWR PLNT	03	4911	FGD Wet Scrubber	15,022	\$28,492,444	\$1,897
01	097	Alabama	Mobile Co	1001	ALABAMA POWER COMPANY - BARRY	004	4911	FGD Wet Scrubber	8,396	\$18,827,395	\$2,242
28	059	Mississippi	Jackson Co	2805900058	CHEVRON PRODUCTS COMPANY, PASCAGOULA REF	051	2911	FGD	1,638	\$4,349,179	\$2,655
22	051	Louisiana	Jefferson Par	0004	CYTEC INDUSTRIES,INC/FORTIER PLNT	57	2821	Increase % Conversion to Meet NSPS (99.7)	1,087	\$3,027,047	\$2,784
01	097	Alabama	Mobile Co	1001	ALABAMA POWER COMPANY - BARRY	003	4911	FGD Wet Scrubber	4,712	\$13,574,846	\$2,881
01	097	Alabama	Mobile Co	1001	ALABAMA POWER COMPANY - BARRY	002	4911	FGD Wet Scrubber	4,631	\$13,522,645	\$2,920
01	047	Alabama	Dallas Co	0003	INTERNATIONAL PAPER COMPANY	003	2611	FGD	1,971	\$7,156,048	\$3,630
12	033	Florida	Escambia Co	0330045	GULF POWER COMPANY CRIST ELECTRIC GENERA	4	4911	FGD Wet Scrubber	2,734	\$10,069,644	\$3,683
12	033	Florida	Escambia Co	0330045	GULF POWER COMPANY CRIST ELECTRIC GENERA	5	4911	FGD Wet Scrubber	2,489	\$10,198,414	\$4,097
Overall Control Strategy									119,966	\$203,443,093	\$1,696

Table 7-5. Subregional control strategy defined for Big Bend / Guadalupe Mountains SO4 AOI-1.

FIPSST	EIPSCNTY	State	County	Plant ID	Plant Name	Point ID	SIC	Control Measure	BIBE/GUMO SO2 Control Application		
									Ton Reduced	Cost (\$2005)	Marginal CPT
48	201	Texas	Harris Co	37	HOUSTON PLANT	000008	2819	Increase % Conversion to Meet NSPS (99.7)	3,486	\$670,008	\$192
48	201	Texas	Harris Co	37	HOUSTON PLANT	000011	2819	Increase % Conversion to Meet NSPS (99.7)	5,953	\$2,510,908	\$422
48	039	Texas	Brazoria Co	10	SWEENEY REFINERY PETROCHEM	000203	2911	FGD	883	\$429,763	\$487
48	355	Texas	Nueces Co	3	CORPUS CHRISTI REFINERY	000174	2911	Sulfur Recovery and/or Tail Gas Treatment	1,430	\$1,978,038	\$1,383
48	167	Texas	Galveston Co	1	TEXAS CITY REFINERY	000239	2911	Sulfur Recovery and/or Tail Gas Treatment	478	\$660,954	\$1,383
48	039	Texas	Brazoria Co	10	SWEENEY REFINERY PETROCHEM	000205	2911	Sulfur Recovery and/or Tail Gas Treatment	374	\$518,052	\$1,383
48	161	Texas	Freestone Co	9	EMBRIDGE ENERGY TEAGUE PL	000004	1311	Sulfur Recovery and/or Tail Gas Treatment	324	\$448,705	\$1,383
48	355	Texas	Nueces Co	3	CORPUS CHRISTI REFINERY	000174	2911	Sulfur Recovery and/or Tail Gas Treatment	63	\$86,977	\$1,383
48	201	Texas	Harris Co	39	DEER PARK PLANT	001295	2911	Sulfur Recovery and/or Tail Gas Treatment	56	\$77,549	\$1,383
48	355	Texas	Nueces Co	3	CORPUS CHRISTI REFINERY	000174	2911	Sulfur Recovery and/or Tail Gas Treatment	49	\$67,251	\$1,383
48	355	Texas	Nueces Co	20	CORPUS CHRISTI EAST PLANT	000156	2911	Sulfur Recovery and/or Tail Gas Treatment	27	\$37,762	\$1,383
48	201	Texas	Harris Co	39	DEER PARK PLANT	000208	2911	FGD	4,942	\$8,474,217	\$1,715
48	175	Texas	Goliad Co	2	COLETO CREEK PLANT	000001	4911	FGD Wet Scrubber	14,490	\$28,492,444	\$1,966
48	389	Texas	Reeves Co	2	WAHA PLANT	000031	4922	FGD	3,653	\$8,153,168	\$2,232
48	167	Texas	Galveston Co	5	TEXAS CITY REFINERY	000068	2911	FGD	2,293	\$5,993,771	\$2,614
48	029	Texas	Bexar Co	63	SOMMERS DEELY SPRUCE PWR	000002	4911	FGD Wet Scrubber	9,755	\$28,492,444	\$2,921
48	029	Texas	Bexar Co	63	SOMMERS DEELY SPRUCE PWR	000004	4911	FGD Wet Scrubber	9,595	\$28,492,444	\$2,970
48	029	Texas	Bexar Co	63	SOMMERS DEELY SPRUCE PWR	000004	4911	FGD Wet Scrubber	9,128	\$28,492,444	\$3,121
48	331	Texas	Milam Co	1	ALCOA SANDOW PLANT	000011	3334	FGD	14,306	\$49,048,714	\$3,429
48	331	Texas	Milam Co	1	ALCOA SANDOW PLANT	000010	3334	FGD	14,305	\$49,048,714	\$3,429
48	331	Texas	Milam Co	1	ALCOA SANDOW PLANT	000012	3334	FGD	14,143	\$49,048,714	\$3,468
48	349	Texas	Navarro Co	11	STREETMAN PLANT	000015	3295	FGD	2,443	\$9,903,980	\$4,054
48	227	Texas	Howard Co	1	BIG SPRING REFINERY	000267	2911	FGD	2,060	\$9,638,812	\$4,679
48	135	Texas	Ector Co	22	GOLDSMITH GASOLINE PLANT	000133	1321	FGD	1,700	\$8,235,351	\$4,844
Overall Control Strategy									115,936	\$319,001,184	\$2,752

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July 15, 2015

Mr. Guy Donaldson, Chief
Air Planning Section (6PD-L)
Environmental Protection Agency, Region 6
1445 Ross Ave, Suite 1200
Dallas, Texas 75202-2733

**Re: Promulgation of Air Quality Implementation Plans; State of Arkansas;
Regional Haze and Interstate Visibility Transport Federal Implementation Plan;
Docket No. EPA-R06-OAR-2015-0189**

Dear Mr. Donaldson:

Arkansas prides itself on being the Natural State and its ongoing efforts to maintain excellent air quality. The Environmental Protection Agency ("EPA") published on April 8, 2015, a proposed Federal Implementation Plan covering Regional Haze and Interstate Visibility Transport for the State of Arkansas ("Proposed FIP"). The Arkansas Department of Environmental Quality ("ADEQ") has reviewed the Proposed FIP and has determined that it contains significant flaws and does not accurately reflect the real progress the State has made to fulfill the requirements of the Clean Air Act pertaining to Regional Haze and Visibility. EPA failed to use the proper methodology used in portions of the Proposed FIP. Moreover, the Proposed FIP is lacking in its legal precedence and its analysis appears to be incomplete or lacking in clarity. Furthermore, EPA acted arbitrarily in developing a proposal which is inconsistent with the approach taken in other states.

As a primary example of the Proposed FIP's infirmity, the Entergy Independence Plant is not currently identified as being subject to Best Available Retrofit Technology ("BART"). Despite this fact, EPA improperly performed its own reasonable progress analysis. EPA indicated this was performed by applying the reasonable progress factors set forth in the Regional Haze Rule to require specific emissions controls for Entergy Independence Units One and Two. This type of improper and unlawful analysis has no basis in the Regional Haze Rule or other relevant law. Moreover, EPA's proposed additional control measures for the Entergy Independence Plant are both unnecessary and arbitrary. The State of Arkansas has demonstrated that it is on track to meet the uniform rate of progress in its Five-Year Regional Haze Progress Report for the first planning period, which ends in 2018. EPA singled out the Entergy Independence Plant through a cursory evaluation of the National Emissions Inventory data, not a reasoned evaluation utilizing the established framework that takes into account, among other factors, the costs of compliance and progress made to date.

Under the Proposed FIP, certain entities that are already complying with portions of the Clean Air Act aimed at reducing interstate transport of air pollution under the Cross-State Air Pollution Rule ("CSAPR") would also have to install additional emissions controls to achieve the same goal. This is the case despite EPA's own assertions that CSAPR is more effective in reducing particular emissions during ozone season. Based on EPA's statements that CSAPR provides for greater reasonable progress than source-specific nitrogen oxides ("NO_x") controls, EPA should determine that facilities

included in the Proposed FIP which are already subject to requirements under the CSAPR FIP satisfy BART for NO_x and therefore should not be required to install additional controls.

Additionally, ADEQ finds that EPA's Proposed FIP is inconsistent with the approaches proposed in other states. For example, in developing the Proposed FIP, EPA used a simpler modeling method ignoring crucial factors that would provide a more representative accounting of the emissions in Arkansas. In support of this simpler method, EPA cites to its use in developing reasonable progress goals ("RPGs") for Hawaii and Arizona. EPA's decision to utilize this simpler method is not supported in the Proposed FIP. EPA used the CAMx photochemical model in its analysis to develop RPGs for the Texas-Oklahoma FIP. For Arkansas, EPA chose a method of determining RPGs that is admittedly inferior and less sophisticated than the CAMx approach. EPA's inconsistency in methodology is not fully explained and represents arbitrary decision-making that leads to unjustified disparities in treatment among the states.

Furthermore, EPA's metrics used throughout the Proposed FIP are misleading and not supported on a legal or technical basis. For instance, the cumulative visibility effects metric lacks a sound scientific basis and is not supported in the Regional Haze Rule or EPA guidelines. The metric combines slight incremental increases from different locations that do not reflect actual visibility improvement in any single location differently. Ultimately, the metric provides no meaningful information on progress toward meeting visibility goals.

Perhaps most troubling, EPA failed to appropriately assess the costs of the overall impact of the Proposed FIP. Recent concerns have been raised by the United States Supreme Court in the case of *Michigan v. EPA* regarding the rationality of imposing billions of dollars in economic costs in return for a few dollars in health or environmental benefits. Accordingly, EPA should have performed an analysis to properly determine the extent of the impacts of the Proposed FIP in the State of Arkansas.

Finally, it is arbitrary and capricious for EPA to force an emissions source to invest millions, much less billions, of dollars for new technology that will have no appreciable effect on the haze in any Class I Federal area ("Class I area"). In a recent decision that is further discussed in the attached comments, the United States Court of Appeals for the Ninth Circuit recently issued a decision that called into question the use and reliability of the CALPUFF visibility model as a means of identifying affected facilities when those facilities are more than 200 kilometers from a Class I area and the simulated visibility improvements are both within the margin of error of the model and imperceptible. The Clean Air Act does not require an improvement that cannot be reasonably anticipated.

Because of the issues addressed in this letter, ADEQ strongly urges EPA to withdraw the Proposed FIP. In support of this request, ADEQ submits the following comments and asks that EPA pay them the utmost consideration.

Sincerely,



Becky Keogh
Director, ADEQ

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Introduction

In 1977, Congress amended the Clean Air Act (“CAA”) to include the national goal of preventing any future and remedying any existing impairment of visibility at mandatory Class I Federal areas (“Class I areas”). EPA promulgated the Regional Haze Rule in July 1999 to further this national goal and established regulations to eliminate man-made visibility impairment in those areas by 2064. Nationally, there are 156 Class I areas. There are two Class I areas in Arkansas: Upper Buffalo and Caney Creek Wilderness areas.

The Regional Haze Rule and related regulations contain provisions that encourage state, local, and tribal agencies to work cooperatively within regional planning organizations to address visibility impairment. In accordance with the regional haze program requirements outlined in 40 C.F.R. § 51.308, the Arkansas Department of Environmental Quality (“ADEQ”) submitted the Arkansas Regional Haze State Implementation Plan (“Regional Haze SIP”) to EPA on September 23, 2008. On March 12, 2012, EPA partially approved and partially disapproved the Regional Haze SIP (“the Arkansas Regional Haze Approval/Disapproval”).¹

ADEQ submitted on June 2, 2015, the Five-year Regional Haze Progress Report, which is intended to fulfill the requirement in 40 C.F.R. § 51.308(g) that Arkansas provide periodic reports to EPA evaluating progress towards the Reasonable Progress Goals (“RPGs”).

On April 8, 2015, EPA promulgated the Proposed FIP for Arkansas.² On May 1, 2015, EPA extended the public comment period for the Proposed FIP until July 15, 2015.³ ADEQ

¹ Approval and Promulgation of Implementation Plans; Arkansas; Regional Haze State Implementation Plan; Interstate Transport State Implementation Plan To Address Pollution Affecting Visibility and Regional Haze, 77 FR 14604.

² Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan, 80 FR 18944.

³ Approval and Promulgation of Implementation Plans; Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Extension of Comment Period and Notice of Availability, 80 FR 24872.

comments on that Proposed FIP. Comments are generally presented in the same sequence as the relevant content appears in the Proposed FIP.

The cumulative visibility metrics used throughout the Proposed FIP are misleading and without legal basis in the Regional Haze Rule.

The cumulative visibility effects metric used in many tables and discussions in the Proposed FIP is not scientifically sound, has no legal basis in the Regional Haze Rule, and is grossly misleading. On page 18951 of the Proposed FIP, EPA first uses the term “cumulative visibility benefits” and indicates that this was a factor in its deliberations.⁴ In Tables 8, 10, 11, 13, 18, 20, 21, 23, 27, 29, 37, 38, 42, 47, 49, 51, and 53, EPA adds visibility improvement values at one Class I area to the visibility improvement values at other Class I areas to arrive at a “cumulative visibility improvement.”⁵ This “improvement” referenced in the tables refers to the “cumulative visibility benefits.” EPA does not discuss any purpose for calculating the “cumulative visibility benefits” in the Proposed FIP. Similarly, EPA adds the visibility impacts at individual Class I areas to arrive at a “total visibility impact” in Tables 34, 35, 62, 63, 64, and 66.⁶ EPA also provides no discussion of the origin or purpose of a “total visibility impact” metric. In fact, EPA does not provide a sound scientific explanation for either the “total visibility impact” metric or the “cumulative visibility improvement” metric anywhere in the Proposed FIP.

There is no basis in the Regional Haze Rule or EPA guidelines for either a cumulative visibility metric or a total visibility impact metric. In the “Guidelines for BART (“Best Available Retrofit Technology”) Determinations under the Regional Haze Rule,” EPA only requires an evaluation of the change at each receptor located “at the *nearest* Class I area with sufficient

⁴ 80 FR 18944 at 18951.

⁵ *Id.*

⁶ *Id.*

density to identify the likely visibility effects of the source.”⁷ (*emphasis added*). This requirement is clearly intended to help “identify the likely visibility effects” of the specific visibility improvement of a particular source. Using data from these receptors to create a global visibility increase metric is improper.

Given that the purpose of the Regional Haze Rule is to provide improved visibility in individual and unique Class I areas, adding together slight improvements in visibility from separate areas is not a useful method for measuring overall increased visibility improvement. EPA’s chosen measurement of visibility impairment is a “deciview,” which is defined in part as “uniform incremental changes in perception.”⁸ Many small separate incremental changes in perception in various locations do not create one large uniform incremental change in perception when added together. These metrics simply do not convey any meaningful information related to progress toward reaching the ultimate goal of restoring background visibility conditions at Class I areas.

It is grossly misleading to provide cumulative numbers as a measurement of overall improvement when the incremental changes may only be slight, barely perceptible, and separated by large distances. The methodology behind these metrics lacks any scientific basis. Due to the misleading nature of the cumulative visibility metric and the total visibility impact metric, EPA should withdraw the Proposed FIP and remove all references to either of these metrics in any subsequently proposed plan.

⁷ 40 C.F.R. § Pt. 51, App. Y, § IV, D.5, Step 5

⁸ 40 C.F.R. § 51.301

ADEQ concurs with EPA’s determination that the Georgia Pacific Crossett Mill 6A and 9A Power Boilers are not subject-to-BART.

Chapter III.A.1 of the Proposed FIP contains an analysis of whether BART controls will be required at the Georgia Pacific Crossett Mill 6A and 9A Power Boilers.⁹ In the Arkansas Regional Haze Approval/Disapproval, EPA disagreed with ADEQ’s assertion that the 6A Power Boiler was not BART-eligible and proposed to find that it is BART-eligible.¹⁰

In the Proposed FIP, EPA conducts a further analysis of these boilers and determines that, whether BART-eligible or not, neither boiler has visibility impacts sufficient to be considered subject-to-BART.¹¹ ADEQ concurs that neither of these boilers should be subject-to-BART.

EPA is acting arbitrarily and inconsistently with its own past positions in requiring sources that are subject to the Cross-State Air Pollution Rule (CSAPR) to also control nitrogen oxides (NO_x) emissions as BART.

Presently, Arkansas is subject to a Cross-State Air Pollution Rule Federal Implementation Plan (“CSAPR FIP”) for ozone-season NO_x. Despite EPA’s own guidance stating that CSAPR makes greater reasonable progress than BART for ozone-season NO_x,¹² EPA makes no mention of CSAPR emissions controls in the Proposed FIP and requires BART for Electricity Generating Units (“EGUs”) that are subject to CSAPR. EPA should not require sources that are subject to the CSAPR FIP to also install BART or additional emissions controls based on a reasonable progress analysis, such as is the case with the Entergy Independence Plant.

On May 12, 2005, EPA published the Clean Air Interstate Rule (“CAIR”), which was intended to address interstate transport of air pollution as required by §110(a)(2)(D) of the

⁹ 80 FR 18944 at 18947.

¹⁰ 77 FR 14604 at 14605.

¹¹ 80 FR 18944 at 18948.

¹² See Regional Haze: Revisions to Provisions Governing Alternatives to Source-Specific Best Available Retrofit Technology (BART) Determinations, Limited SIP Disapprovals, and Federal Implementation Plans, 77 FR 33642 at 3365-33651.

CAA.¹³ The rule affected 28 states and the District of Columbia and included a cap-and-trade program targeting sulfur dioxide (“SO₂”) and NO_x.¹⁴ The rule required 25 states, including Arkansas, to reduce their state-wide emissions of NO_x for the purposes of the 8-hour ozone National Ambient Air Quality Standard (“NAAQS”) by specifying ozone-season NO_x emissions budgets.¹⁵ The emission limitations were intended to reduce or eliminate each state’s contributions to ozone air quality in other states, which would thereby help downwind states meet the 1997 ozone NAAQS. EPA approved Arkansas’s CAIR SIP submission on August 04, 2009.¹⁶ CAIR was heavily litigated and eventually remanded to EPA. However, CAIR remained in effect until EPA could promulgate a replacement, the result of which was CSAPR.

EPA published CSAPR as a replacement to CAIR on August 8, 2011.¹⁷ Similar to CAIR, CSAPR requires certain states to reduce annual SO₂ emissions, annual NO_x emissions and ozone season NO_x emissions to assist with other states’ attainment of the 1997 ozone NAAQS, the 1997 fine particulate matter with an aerodynamic diameter less than or equal to a nominal two and one-half (2.5) micrometers (PM_{2.5}) NAAQS, and the 2006 fine particulate matter with an aerodynamic diameter less than or equal to a nominal ten (10) micrometers PM_{2.5} NAAQS. Initially, CSAPR addressed emissions from Electric Generating Units (“EGUs”) beginning in the year 2012. However, CSAPR was also subject to litigation, which prompted a stay of the rule until litigation was concluded. The Supreme Court upheld CSAPR,¹⁸ and EPA published an

¹³ See Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule); Revisions to Acid Rain Program; Revisions to the NO_x SIP Call, 70 FR 25162.

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ 74 FR 38536.

¹⁷ See Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 FR 48208.

¹⁸ See *E.P.A. v. EME Homer City Generation, L.P.*, 134 S. Ct. 1584, 1587, 188 L. Ed. 2d 775 (2014).

interim final rule on December 3, 2014 revising the CSAPR compliance deadlines.¹⁹ CSAPR became effective on January 1, 2015.²⁰

The Regional Haze Rule allows states to implement an alternative program in lieu of BART so long as the alternative program has been demonstrated to achieve greater reasonable progress toward the national visibility goal than would BART.²¹ EPA proposed that a state in the CAIR trading program would be allowed to rely on EPA's determination that CAIR makes greater reasonable progress than source-specific NO_x controls.²² In the final Transport rule, EPA demonstrated that CSAPR, which replaced CAIR, would make greater reasonable progress toward national visibility goals than would BART.²³

Consistent with the requirements of the Regional Haze Rule, EPA found that the CSAPR trading program did not cause degradation in any affected Class I area.²⁴ In addition, EPA found that CSAPR implementation combined with implementation of BART elsewhere achieved greater visibility improvement on both the 20% best and 20% worst days.²⁵ As a result, EPA found that CSAPR met all requirements under 40 C.F.R. § 51.308(e)(4) to qualify as a substitute for BART.

EPA concluded in the final rule that a state in the CSAPR region whose EGUs are subject to the requirements of the CSAPR trading program for ozone season NO_x may rely on its determination that CSAPR makes greater reasonable progress than source-specific BART. EPA specifically noted that “[t]he states to which this aspect of our final rule applies are *Arkansas*,

¹⁹ Rulemaking To Amend Dates in Federal Implementation Plans Addressing Interstate Transport of Ozone and Fine Particulate Matter, 79 FR 71663.

²⁰ 79 FR 71663.

²¹ 40 C.F.R. § 51.308(e); 77 FR 33642.

²² Regional Haze: Revisions to Provisions Governing Alternatives to Source-Specific Best Available Retrofit Technology (BART) Determinations, Limited SIP Disapprovals, and Federal Implementation Plans” proposed rule, 76 FR 82219.

²³ See 77 FR 33642.

²⁴ *Id.* at 33652.

²⁵ 77 FR 33642 at 33648.

Florida, Louisiana, Mississippi and Oklahoma.”(emphasis added).²⁶ Despite EPA’s demonstration that CSAPR makes greater reasonable progress than source-specific BART, EPA has nevertheless proposed NO_x BART for certain units covered by CSAPR in the Proposed FIP.

The approach that EPA has proposed for Arkansas is inconsistent with that taken for other States. EPA promulgated FIPs to replace reliance on CAIR with reliance on CSAPR for the following states: Georgia, Indiana, Iowa, Kentucky, Michigan, Missouri, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia and West Virginia.²⁷ Similarly, Virginia is revising the Virginia Regional Haze SIP to rely on the Virginia CSAPR FIP to meet BART and reasonable progress requirements for SO₂ and NO_x.²⁸

Perhaps most noteworthy, EPA has proposed reliance on CSAPR in states that border Arkansas. The Texas-Oklahoma Regional Haze Plan does not require BART for sources that are subject to CSAPR.²⁹ In that plan, EPA reiterates its position that “CSAPR, like CAIR, provides for greater reasonable progress towards the national goal than would BART.”³⁰ EPA proposes replacing reliance on CAIR with reliance on the trading programs of CSAPR as an alternative to BART for SO₂ and NO_x emissions from EGUs.³¹

Not only is EPA requiring sources subject to CSAPR to control emissions as BART in the Proposed FIP, but EPA has not even considered CSAPR as an option for making reasonable progress. Even if EPA ultimately rejected CSAPR as a means to meet the reasonable progress requirements under the Regional Haze Rule, EPA is required to “cogently explain why it has

²⁶ 77 FR 33642.

²⁷ *Id.*

²⁸ Virginia Dep’t of Env. Quality, Commonwealth of Virginia State Implementation Plan, *available at* <http://www.deq.state.va.us/Portals/0/DEQ/Air/PublicNotices/Drafts/mspro.pdf>

²⁹ Approval and Promulgation of Implementation Plans; Texas and Oklahoma; Regional Haze State Implementation Plans; Interstate Transport State Implementation Plan To Address Pollution Affecting Visibility and Regional Haze; Federal Implementation Plan for Regional Haze and Interstate Transport of Pollution Affecting Visibility, 79 FR 74818.

³⁰ 79 FR 74818 at 74851.

³¹ 79 FR 74853 at 74818 (the proposed [Texas-Oklahoma] FIP ... substitutes Texas' reliance on the Clean Air Interstate Rule (CAIR) to satisfy BART requirements at its EGUs with reliance on CAIR's successor, the Cross-State Air Pollution Rule (CSAPR))”

exercised its discretion in a given manner.”³² EPA’s failure to consider CSAPR is arbitrary and capricious in light of its treatment of other states.

As a result of EPA’s position that CSAPR provides for greater reasonable progress than source-specific NO_x, facilities subject to the CSAPR FIP should not also be required to install, operate, or maintain BART for NO_x. In Arkansas, the following units should not be required to install the NO_x BART proposed by EPA in the Proposed FIP because they are also subject to CSAPR for ozone-season NO_x: (1) AEP Flint Creek Unit One; (2) Entergy White Bluff Unit One; (3) Entergy White Bluff Unit Two; and (4) Entergy Lake Catherine Unit Four.³³ Accordingly, EPA should withdraw the Proposed FIP and remove the requirements that the aforementioned units be subject to BART in addition to CSAPR emissions controls for ozone season NO_x in any subsequently proposed plan.

EPA failed to perform the analysis required to establish Reasonable Progress Goals and instead arbitrarily required emissions controls for Entergy Independence Units One and Two.

EPA improperly performed its own reasonable progress analysis by applying the reasonable progress factors set forth in the Regional Haze Rule to require specific emissions controls for Entergy Independence Units One and Two. Despite Entergy’s Independence Plant not being identified as subject-to-BART, EPA requires specific emissions controls for the plant in the Proposed FIP under an analysis using four factors intended to aid in establishing unenforceable numerical goals for reducing Regional Haze called “reasonable progress goals.”

³² *Nat'l Parks Conservation Ass'n v. E.P.A.*, No. 12-73710, 2015 WL 3559149, at *3 (9th Cir. June 9, 2015); (citing *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 48, (1983)); *Greater Yellowstone Coalition, Inc. v. Servheen*, 665 F.3d 1015, 1030 (9th Cir.2011) (requiring “a rational connection between the data before [the agency] and its conclusion”); *Nw. Env'tl. Def. Ctr. v. Bonneville Power Admin.*, 477 F.3d 668, 691 (9th Cir.2007)

³³ EPA has included Independence as a “Reasonable Progress Source” in the Proposed FIP rather than a source that is subject-to-BART. This distinction is important as there is no definitive process that EPA has described for determining the degree of control it might require for a specific “Reasonable Progress Source.” Independence, being already subject to CSAPR should not be included in any discussion of BART controls.

This type of analysis has no basis in the Regional Haze Rule or other relevant law. The additional control measures for the Entergy Independence Plant are especially unnecessary in light of Arkansas being on track to meet the Uniform Rate of Progress (“URP”) for the first planning period, which ends in 2018.³⁴

EPA is required to engage in “reasoned decision-making.”³⁵ Not only must an agency's decreed result be within the scope of its lawful authority, “but the process by which it reaches that result must be logical and rational.”³⁶ In *Michigan v. E.P.A.*, the Supreme Court of the United States explained that “agency action is lawful only if it rests ‘on a consideration of the relevant factors.’”³⁷ In the Proposed FIP, EPA has disregarded the framework in the Regional Haze Rule and failed to consider the factors required for establishing Arkansas’s Reasonable Progress Goals (“RPGs”).

EPA’s Regional Haze Rule primarily addresses visibility impairment from point sources by requiring BART for certain existing stationary sources.³⁸ In contrast to the BART requirements, which are specific to point sources, EPA also requires states to develop broad RPGs to be expressed in deciviews that each state must set based on the URP and the following four factors (“reasonable progress factors”): (1) the costs of compliance; (2) the time necessary for compliance; (3) the energy and non-air quality environmental impacts of compliance; and (4) the remaining useful life of any potentially affected sources.³⁹

³⁴ See State of AR, ADEQ, State Implementation Plan Review for the Five-Year Regional Haze Progress Report (April 2014) attached as Exhibit 1, at 56.

³⁵ *Michigan v. E.P.A.*, No. 14-46, 2015 WL 2473453, at *6 (U.S. June 29, 2015)(citing *Allentown Mack Sales & Service, Inc. v. NLRB*, 522 U.S. 359, 374, 118 S.Ct. 818, 139 L.Ed.2d 797 (1998) (internal quotation marks omitted).

³⁶ *Id.*

³⁷ *Id.* (citing *Motor Vehicle Mfrs. Assn. of United States, Inc. v. State Farm Mut. Automobile Ins. Co.*, 463 U.S. 29, 43, 103 S.Ct. 2856, 77 L.Ed.2d 443 (1983) (internal quotation marks omitted)).

³⁸ 40 C.F.R. § 51.308

³⁹ 40 C.F.R. § 51.308(d)(1)(i)

Notably, the Regional Haze Rule uses the imperative “must” in reference to consideration of both the URP and the reasonable progress factors.⁴⁰ Based on these considerations, either the state, or EPA in the case of a FIP, must set specific numerical goals in deciviews - the RPGs- which are intended to ensure that a state is making progress toward achieving natural visibility conditions.⁴¹

The Regional Haze Rule requires a state, or EPA, to consider both the reasonable progress factors and the URP in setting the RPGs.⁴² However, EPA completely disregards its own framework in the Proposed FIP. Instead of utilizing the four reasonable progress factors in conjunction with the URP to set numerical goals measured in deciviews, EPA applies the reasonable progress factors in order to require emissions controls for Independence Plant Units One and Two, which it refers to as a “reasonable progress source.” Effectively, EPA has applied the reasonable progress factors to the Independence Plant as if it were a BART analysis. Rather than considering the URP in conjunction with the reasonable progress factors, EPA completely dismisses the URP, which Arkansas is on track to meet in the first planning period, by stating that “the URP does not establish a ‘safe harbor’ for the state in setting its progress goals.”⁴³

Furthermore, EPA fails to explain how factors required to be considered in setting specific numerical targets, which are themselves not enforceable, could somehow be used to require specific enforceable limits for a single plant. In 40 C.F.R. § 51.308(d)(1)(v), the Regional Haze Rule states that “[t]he reasonable progress goals established by the State are not directly enforceable.” There is simply no legal justification for the analysis EPA has performed using the

⁴⁰ 40 C.F.R. § 51.308 (d)(1)(i)(A)(“ the State *must*: ... (A) consider the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected sources” (emphasis added)); 40 C.F.R. § 51.308 (d)(1)(i)(A) (“In establishing the reasonable progress goal, the State *must* consider the uniform rate of improvement in visibility and the emission reduction measures needed to achieve it for the period covered by the implementation plant” (emphasis added))

⁴¹ 40 C.F.R. § 51.308(d)(1)

⁴² 40 C.F.R. § 51.308(d)(1)(i)

⁴³ See Exhibit 1.

reasonable progress factors set out in 40 C.F.R. § 51.308(d)(1)(A). EPA cites no legal authority for identifying and requiring emissions controls for “reasonable progress sources.” The term “reasonable progress source” does not itself appear in the Regional Haze Rule or related guidance documents.

The state, or EPA in the case of a FIP, is required to “include a demonstration showing how these [reasonable progress] factors were taken into consideration in selecting the goal.”⁴⁴ EPA has not performed this task in the Proposed FIP. EPA meticulously presents its analysis under headings with each reasonable progress factor clearly marked, but this analysis does not explain how those factors were taken into consideration in selecting numerical goals in deciviews as required by the Regional Haze Rule. In fact, EPA makes no mention of the factors required for consideration under 40 C.F.R. § 51.308(d)(1)(A) except in relation to the analysis of “Entergy Independence Plant Units 1 and 2.”⁴⁵

EPA’s arbitrary use of the reasonable progress factors to evaluate the Entergy Independence Plant resulted in EPA foregoing a proper analysis of the reasonable progress factors in relation to the RPGs. Critically, EPA has failed to consider the “costs of compliance” with the RPGs in the Proposed FIP. Although all of the reasonable progress factors are required to be considered in setting the RPGs, the Supreme Court of the United States recently reiterated the importance of considering cost in relation to electric generating units such as the two units at the Entergy Independence Plant. In *Michigan v. E.P.A.*, the Supreme Court held that it was unreasonable for EPA to interpret the phrase “appropriate and necessary” as not including an analysis of costs in implementing the Mercury and Air Toxics Standards for power plants.⁴⁶ In doing so, the Supreme Court stated that “[o]ne would not say that it is even rational, never mind

⁴⁴ 40 C.F.R. § 51.308(d)(1)(i)(A).

⁴⁵ 80 FR 18944 at 18992-18998

⁴⁶ *Michigan v. E.P.A.*, No. 14-46, 2015 WL 2473453, at *7 (U.S. June 29, 2015)

‘appropriate,’ to impose billions of dollars in economic costs in return for a few dollars in health or environmental benefits.”⁴⁷ EPA’s decision to forego any type of analysis involving the reasonable progress factors in relation to setting the RPGs is particularly troublesome in light of the Supreme Court’s concerns about costs in *Michigan v E.P.A.*

EPA asserts that it is appropriate to evaluate Entergy’s Independence Plant “because it is a significant source of SO₂ and NO_x ... even though Arkansas’s Class I areas and those outside of Arkansas most significantly impacted by Arkansas sources are projected to meet URP for the first planning period.”⁴⁸ In fact, Arkansas is projected to meet the URP despite none of the controls specified in the SIP or the Proposed FIP having been installed to date.

EPA singled out Entergy’s Independence Plant through a cursory evaluation of the National Emissions Inventory data that ADEQ provides to EPA annually, which EPA then used in modeling for potential visibility impacts.⁴⁹ In doing so, EPA has ignored its own framework for establishing reasonable progress goals and requiring specific emissions controls for a point source. EPA should have considered the four factors in 40 C.F.R. § 51.308(d)(1)(A) along with the URP as set forth in 40 C.F.R. § 51.308(d)(1)(B) in setting numerical RPGs.

In the Arkansas Regional Haze Approval/Disapproval, EPA rejected Arkansas’s RPGs because the state relied on the URP rather than both the URP and the reasonable progress factors to propose its RPGs. EPA stated that “[u]ntil the State conducts a proper evaluation of the four statutory factors ... we will not know whether different RPGs are appropriate for Arkansas’s Class I areas.”⁵⁰ Just as EPA was unable to determine whether Arkansas’s RPGs were appropriate, ADEQ cannot determine whether the RPGs presented by EPA are appropriate

⁴⁷ *Id.*

⁴⁸ 80 FR 18944 at 18992.

⁴⁹ *Id.* at 18991-18992.

⁵⁰ 77 FR 14604 at 14621.

because EPA has failed to perform an analysis of its RPGs using the factors in 40 C.F.R. § 51.308(d)(1) and instead applied those factors to an assessment of controls for Entergy's Independence Plant. Therefore, EPA should withdraw the Proposed FIP, and ensure a proper analysis is included in any subsequently plan.

The Reasonable Progress Goals chosen by EPA are based on admittedly flawed methods that reject the refined modeling approach used by EPA in states such as Texas.

Not only did EPA improperly perform the reasonable progress analysis necessary to establish RPGs, but EPA also used an admittedly inferior method to model Arkansas's RPGs. In supporting the RPGs in the Proposed FIP, EPA substituted a method that relies on "a scaling of visibility extinction components in proportion to emission changes."⁵¹ In support of this method, EPA cites to its use in developing RPGs for Hawaii and Arizona.⁵² EPA offers little in the way of positive support for its choice in the Proposed FIP. Rather, EPA chose a method of determining RPGs that is admittedly inferior and less sophisticated than the alternative approach, which EPA rejected in Arkansas but used in Texas: CAMx photochemical modeling.

EPA admits that it has not performed its own modeling in a manner adequate to develop "refined numerical RPGs."⁵³ EPA seems to acknowledge the infirmity in its modeling by explaining its methodology as follows: "Development of refined numerical RPGs for Arkansas's Class I areas would require photochemical grid modeling of a multistate area, involving thousands of emission sources, unlike the comparatively simple single-source CALPUFF modeling used for individual BART assessments."⁵⁴ EPA further explains that "[d]eveloping all of the necessary input files, running the photochemical model, and post-processing the model

⁵¹ 80 FR 18944 at 18997.

⁵² *Id.*

⁵³ *Id.*

⁵⁴ *Id.*

outputs would take several months at a minimum.”⁵⁵ EPA cites additional reasons for rejecting the approach using photochemical grid modeling such as the part that it is requiring an “update of the emission inventory for Arkansas and surrounding states,” which would include the effects of all EPA and state regulatory actions on point, area, and mobile sources.⁵⁶ EPA states this approach would require “specialized and extensive computing hardware and expertise.”⁵⁷

Despite the additional complexity and time needed, EPA chose to use the more refined CAMx photochemical model in the Texas-Oklahoma FIP.⁵⁸ As evidenced by EPA’s actions in the Texas-Oklahoma FIP, EPA certainly possesses the “specialized and extensive computing hardware and expertise” needed to perform modeling using the CAMx photochemical model. EPA fails to justify this disparate treatment in Arkansas’s Proposed FIP. Instead, EPA arbitrarily used an alternative algorithm to develop RPGs that resulted in admittedly inferior numerical goals.

In fact, the only modelling EPA performed for the Proposed FIP was “comparatively simple single-source CALPUFF modeling used for individual BART assessments.”⁵⁹ EPA used this modeling only to justify additional emissions controls on Entergy’s Independence Plant outlined in the reasonable progress analysis and not in support of the proposed state-wide RPGs.

Given the substantial impact on Arkansas businesses and rate-payers that the potential differences in RPGs would make, ADEQ is troubled by EPA’s decision to forego methods that would ensure the same degree of accuracy for RPGs in Arkansas’s Proposed FIP as in the Texas-

⁵⁵ *Id.*

⁵⁶ 80 FR 18944 at 18997.

⁵⁷ *Id.*

⁵⁸ Approval and Promulgation of Implementation Plans; Texas and Oklahoma; Regional Haze State Implementation Plans; Interstate Transport State Implementation Plan To Address Pollution Affecting Visibility and Regional Haze; Federal Implementation Plan for Regional Haze and Interstate Transport of Pollution Affecting Visibility, 79 FR 74818.

⁵⁹ 80 FR 18944 at 18997.

Oklahoma FIP. EPA should withdraw the Proposed FIP, and any subsequent plan should include a method of analysis sufficient to establish “refined numerical RPGs.”

EPA’s revisions to Arkansas’s proposed Reasonable Progress Goals are unnecessary and outside of EPA’s statutory authority to regulate impairment of visibility.

EPA’s revisions to Arkansas’s proposed RPGs are unnecessary and beyond the authority granted by Congress. EPA’s own estimates of the effects of the Proposed FIP are reductions for the 20% worst days of -0.21 deciviews for Caney Creek and -.19 deciviews for the Upper Buffalo.⁶⁰ These reductions would not be visible to the naked eye and are beyond the scope of regulatory regime specifically designed to address “the impairment of visibility.”

The CAA only provides EPA with the authority to regulate the “impairment of visibility.”⁶¹ Visibility extends only to things that humans can see with their naked eyes.⁶² By extension, EPA only has authority to regulate the impairments of visibility that are perceptible to the human eye. A “deciview” is a haze index derived from calculated light extinction, such that uniform changes in haziness correspond to uniform incremental changes in perception across the entire range of conditions, from pristine to highly impaired.⁶³ The human eye can only detect a change in haziness of 1.0 or more deciviews.⁶⁴ Measurements of 0.21 and 0.19 deciviews are both well below amount of haze discernable to the naked eye. Under both the plain language and dictionary definitions of “visibility,” the statute does not provide EPA with the authority to regulate haze below a single deciview, which would be invisible to the naked eye.

⁶⁰ 80 FR 18944 at 18998.

⁶¹ 42 U.S.C.A. § 7491 (“Congress hereby declares 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.”)(emphasis added).

⁶² *E.g.* Webster’s Third New International Dictionary 2557 (1981)(“visible” means “capable of being seen”; “visibility” means “the degree or extent to which something is visible ... [by] the observer’s eye unaided by special optical devices”).

⁶³ 40 C.F.R. § 51.301.

⁶⁴ *e.g.* 79 FR 58302 at 58,303.

EPA's proposed RPGs are more stringent than Arkansas's proposed RPGs in its 2008 Regional Haze State Implementation Plan, which would have ensured that Arkansas is on track to achieve natural visibility conditions by 2064. Arkansas is reducing regional haze in its Class I areas at a higher rate than both the URP, which was approved by EPA, and Arkansas's initial proposed RPGs.⁶⁵ EPA's RPGs in the Proposed FIP are only about 0.2 deciviews lower than those developed by Arkansas.⁶⁶ Even if EPA's RPGs were the result of proper analysis and modeling, the difference between the State-established and EPA-proposed RPGs is insignificant and below the range of human perceptibility. As indicated by the URP, Arkansas is well on track to reaching natural visibility conditions by 2064 and more stringent RPGs than those in Arkansas's 2008 Regional Haze State Implementation Plan are not necessary. EPA should withdraw the Proposed FIP and ensure that revised RPGs in any subsequent plan are within the scope of EPA's authority to address impairment of visibility.

It would be premature for EPA to finalize its proposed Reasonable Progress Goals when the Agency intends to significantly revise the manner in progress is determined under the Regional Haze Rule.

For some time now, EPA has been considering changes to the Regional Haze program's metrics for tracking progress as well as a possible three-year extension of the schedule for submitting updated SIPs currently due in 2018. Just this month, the Air Quality Policy Division of the EPA Office of Air Quality Planning and Standards announced a series of conference calls with representatives of the U.S. Department of Agriculture, the Department of the Interior, and regional, state, local and tribal governments with the following items on the agenda:

- Rulemaking activities including the proposal to delay of the State Implementation Plan (“SIP”) submission deadline to 2021 from 2018, options for the process and schedule for

⁶⁵ See Exhibit 1.

⁶⁶ 77 FR 14604 at 18998, Table 67.

submitting progress reports, and options for revising Reasonably Attributable Visibility Impairment rule provisions;

- Guidance to refocus the visibility tracking metric and framework on the controllable fraction of visibility impairment;
- Guidance to determine what constitutes a long-term strategy providing for reasonable progress

As indicated by the items on this agenda, it is apparent that EPA intends to reconsider the manner in which rates of progress toward the visibility goals of the Regional Haze Rule are determined and calculated. These changes would likely be made through a combination of guidance documents and rulemaking. Due to the EPA's intent to significantly revise the manner in which these metrics are considered, it is premature and unnecessary to revise the RPGs that Arkansas has determined to be appropriate. Accordingly, EPA should withdraw the proposed FIP.

EPA's proposed Reasonable Progress Goals reflect an arbitrary and disparate treatment of Arkansas in comparison to surrounding states.

As pointed out in the Five-Year Progress Report State SIP revision, Arkansas is making substantial progress in addressing regional haze in its Class I areas and is on schedule to meet its own proposed RPGs and the URP for the first planning period.⁶⁷ This means that Arkansas is well on track to reaching background visibility conditions by 2064. Despite this progress, EPA proposed RPGs that are more aggressive than that necessary to achieve the program's goal, which is inconsistent with surrounding states that have wide-ranging RPGs placing them on a path to achieve background visibility conditions well beyond 2064.

⁶⁷ Exhibit 1, at 56.

Arkansas is making considerable progress in reducing regional haze based on its own RPGs. The most recent data from 2011 and the current five-year rolling average shows that visibility impairment is decreasing more rapidly than the URP and Arkansas's proposed 2018 RPGs.⁶⁸ In fact, CENRAP modelling indicates that Arkansas may reach its own 2018 RPGs without additional control measures beyond those described in Arkansas's now-disapproved SIP.⁶⁹ The Upper Buffalo Wilderness area is expected to achieve its 2018 RPG of an improvement of 3.75 deciviews for the 20% worst days without any additional controls on sources.⁷⁰ Similarly, the Caney Creek Wilderness area is on track to achieve its 2018 RPG of 3.88 deciviews of visibility improvement for the 20% worst days.⁷¹ Based on Arkansas's proposed RPGs, Arkansas may reach background conditions in Caney Creek by 2062 and in the Upper Buffalo by 2063.⁷² Any further controls or more stringent RPGs are simply unnecessary to achieve the goal of reaching background visibility conditions by 2064.

⁶⁸ Exhibit 1, at 56.

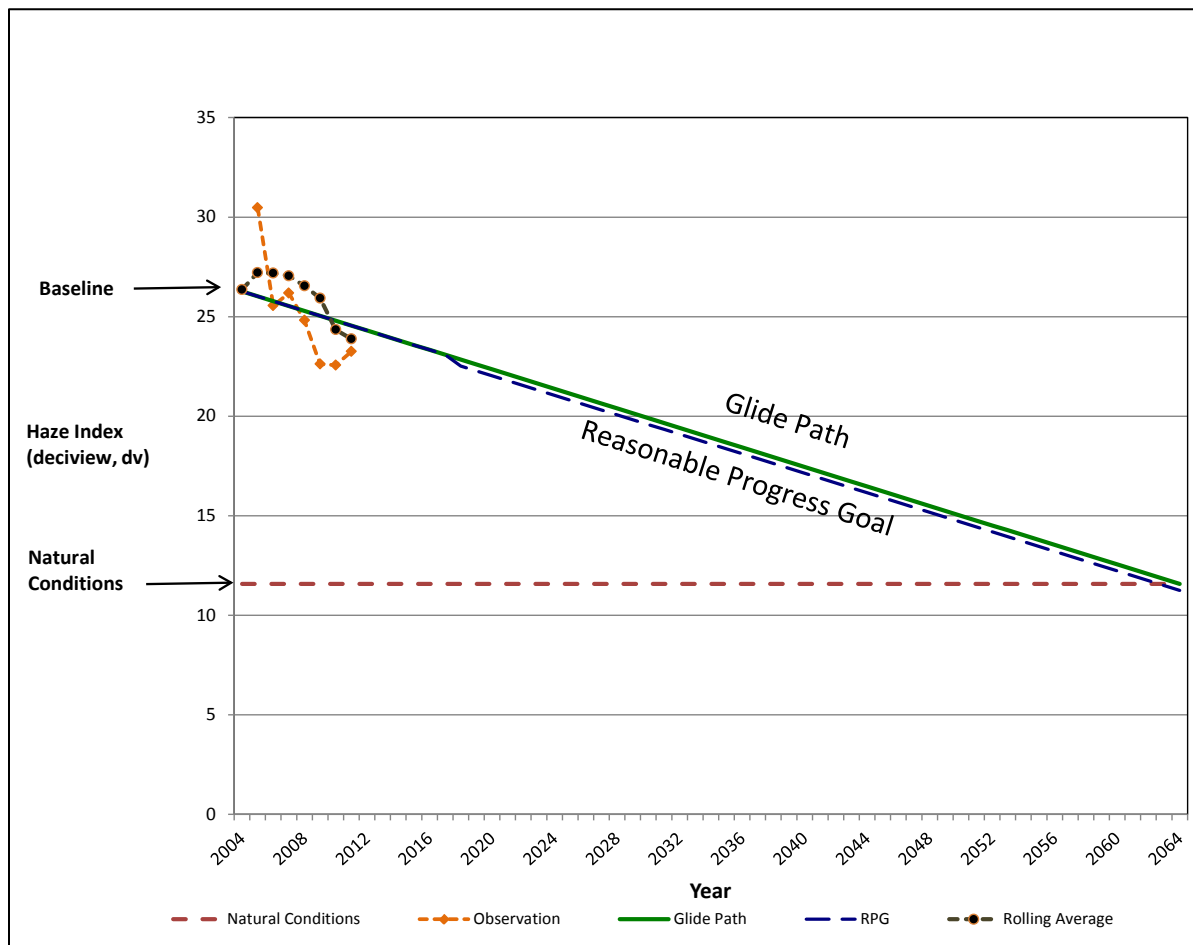
⁶⁹ *Id.*

⁷⁰ *Id.* at 55.

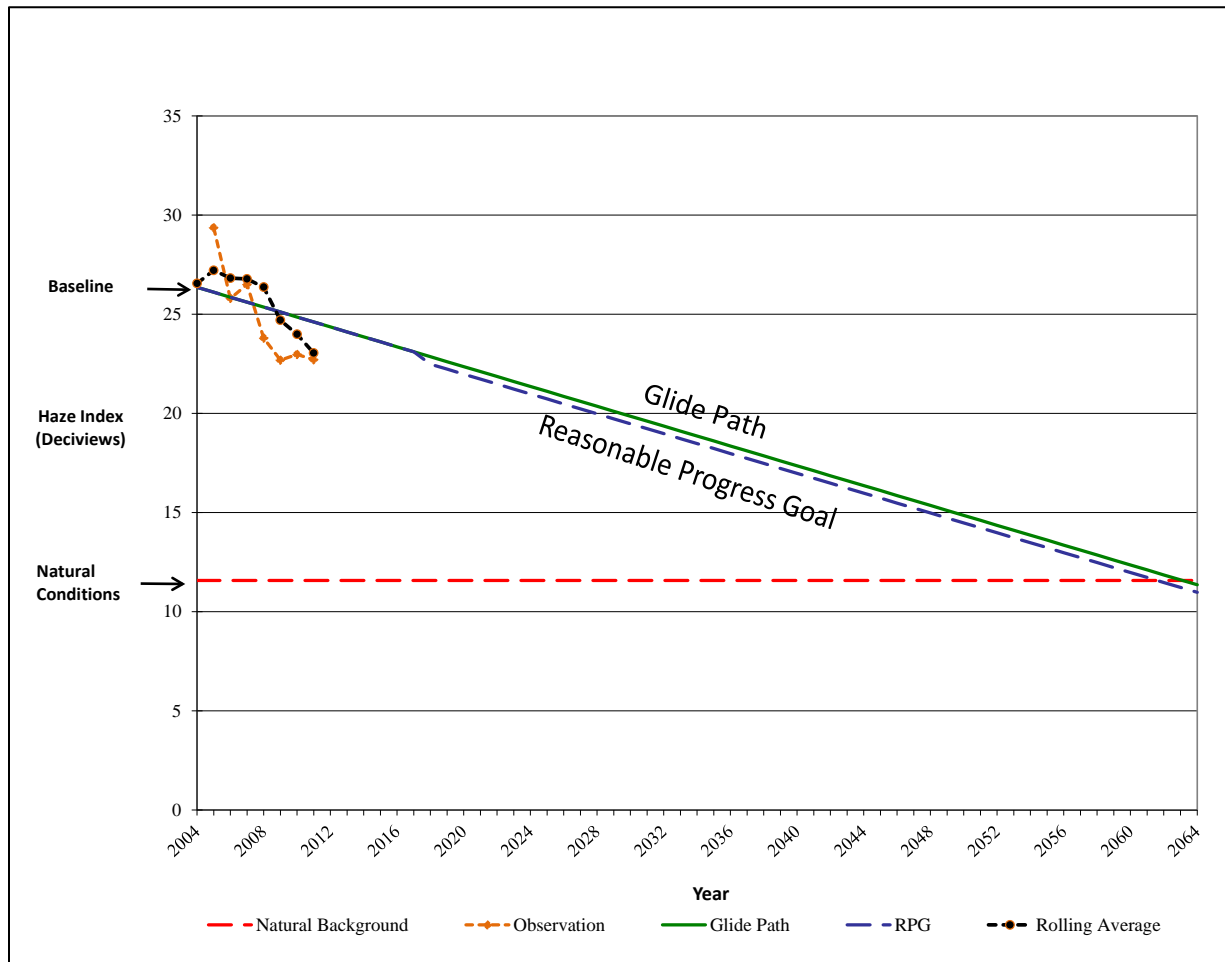
⁷¹ *Id.*

⁷² *Id.*

Figure 1 Reasonable Progress Assessment Upper Buffalo Wilderness Area, Arkansas 20% Worst Days



**Figure 2 Reasonable Progress Assessment Caney Creek
Wilderness Area, Arkansas: 20% Worst Days**



Despite Arkansas being on schedule to meet or beat the trajectory needed to achieve background visibility conditions by 2064, EPA is proposing more stringent RPGs that would require unnecessary additional controls. Specifically, EPA is requiring additional controls on Entergy Independence Units 1 and 2.⁷³ EPA’s proposed RPGs are more aggressive, which is inconsistent with EPA’s approach in certain other states that allow RPGs that would improve visibility over a much longer timeframe.⁷⁴

⁷³ 80 FR 18944 at 18992.

⁷⁴ 80 FR 18944 at 18997. (“These RPG’s reflect rates of progress that are faster than the rates projected by Arkansas.”)

EPA has proposed or accepted RPGs for other states that would allow those states to meet background visibility conditions well into the next century. In Texas, EPA proposed RPGs that would allow that state to achieve natural visibility conditions for the 20% worst days in Big Bend Wilderness Area in 194 years and in the Guadalupe Mountains in 159 years.⁷⁵ In Oklahoma, EPA proposed a 2018 RPG for the 20% worst days that put that state on track to attain natural visibility in the Wichita Mountains in 92 years.⁷⁶ For Arkansas, EPA has required RPGs that would be even more stringent than those needed to reach background visibility conditions in 49 years, which is the program's target.

In states farther geographically removed from Arkansas, EPA's treatment disparity becomes even more profound. In California, EPA approved that state's RPGs even though many of its Class I areas would not reach natural background conditions until well into the 2100's and beyond. For example, California's RPGs will not achieve background conditions in Desolation Wilderness Area until 2307, in Yosemite National Park until 2160, and in Ansel Adams Wilderness Area until 2200.⁷⁷

There is no justification for EPA arbitrarily setting RPGs that are stricter than those proposed by Arkansas and include controls on Entergy's Independence Plant. EPA's dramatically disparate approach to Arkansas's RPGs in comparison to other states is unreasonable and unnecessary to achieve "reasonable progress" towards reaching background conditions. EPA should withdraw the Proposed FIP and any subsequent plan should contain goals that are reasonable in light of EPA's treatment of other states.

⁷⁵ 79 FR 74853 at 74887.

⁷⁶ *Id.*

⁷⁷ Approval and Promulgation of Air Quality Implementation Plans; State of California; Regional Haze State Implementation Plan and Interstate Transport Plan; Interference With Visibility Requirement, 76 FR 13944, at 13951.

EPA arbitrarily chose the options for emissions control for Entergy Independence Units One and Two.

EPA arbitrarily chose the two options it presented for emissions controls at Entergy Independence Units One and Two as evidenced by EPA's failure to discuss a third option, which EPA presented to ADEQ for consideration prior to the promulgation of the Proposed FIP.⁷⁸ ADEQ received a technical support document dated February 11, 2015 within which EPA Region 6 presented three options for Entergy Independence: "Option 1: Propose No Additional Controls under Reasonable Progress"; "Option 2: Propose Only SO₂ Controls under Reasonable Progress"; and "Option 3: propose Both SO₂ and NO_x Controls Under Reasonable Progress."⁷⁹

Although ADEQ received this document on February 12, 2015, EPA never included it in the Rulemaking Docket.⁸⁰ When EPA published the Proposed FIP on April 8, 2015, the option to "Propose No Additional Controls under Reasonable Progress" had been inexplicably removed as an option from the proposed Regional Haze FIP. EPA completely excluded this option from consideration and no mention of it was made in the Proposed FIP.

While EPA has considerable discretion interpreting its own regulations, the law requires EPA to "cogently explain why it has exercised its discretion in a given manner."⁸¹ Whether or not EPA ultimately chose to reject the option, it is legally obligated to consider and explain its decision to or not to include it. The decision to provide ADEQ with a certain set of options prior to promulgation of the Proposed FIP and simply excise one of those options from the Proposed FIP without due consideration is arbitrary and capricious. EPA should withdraw the Proposed

⁷⁸ E.P.A., Arkansas Regional Haze FIP Update, (February 11, 2015) attached as Exhibit 2.

⁷⁹ *Id.*

⁸⁰ E.P.A. Docket Number EPA-R06-OAR-2015-0189

⁸¹ *Nat'l Parks Conservation Ass'n v. E.P.A.*, No. 12-73710, 2015 WL 3559149, at *3 (9th Cir. June 9, 2015); (citing *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 48, (1983)); *Greater Yellowstone Coalition, Inc. v. Servheen*, 665 F.3d 1015, 1030 (9th Cir.2011) (requiring "a rational connection between the data before [the agency] and its conclusion"); *Nw. Env'tl. Def. Ctr. v. Bonneville Power Admin.*, 477 F.3d 668, 691 (9th Cir.2007).

FIP and any subsequent plan that might include emissions controls for Entergy Independence Units One and Two should include a proper consideration of the available options.

EPA failed to include the substantial contributions of Federal Land Managers to regional haze in the State’s Class I Areas from within the Class II Areas themselves.

As set forth in 40 C.F.R. § 51.308(i), the Regional Haze Rule requires states such as Arkansas to coordinate in various ways with Federal Land Managers. For example, states are required to provide Federal Land Managers with notice of the identified visibility impairment and an opportunity for consultation.⁸² However, despite EPA requiring this coordination, the actions of the Land Managers themselves are responsible for a disproportionate and unmeasured impact on the visibility of Arkansas’s Class I areas. States such as Arkansas are required to identify the impairment and elements for inclusion in the visibility monitoring strategy.

In 2007, the Arkansas Forestry Commission approved a Smoke Management Program that was developed, among other reasons, as a means of assuring that land managers throughout the State use specific techniques designed to ensure that burns conducted for the purpose of forest management (prescribed burns) do not interfere with air quality management goals. Prescribed burning is widely recognized as a wildfire prevention technique and is also used to revitalize forest ecosystems. When properly conducted, prescribed burning is a useful technique for various forest management purposes.

A Federal Land Manager is “the Secretary of the department with authority over the Class I areas.”⁸³ While several state agencies and private-sector entities practice prescribed burning, the United States Forest Service (“USFS”) is the largest practitioner. The USFS uses prescribed burns from within the very Class I areas that are meant to be protected by the

⁸² 40 C.F.R. § 51.308 (i).

⁸³ 40 C.F.R. § 51.301

Regional Haze Rule. For example, in 2006 the USFS was responsible for as much as 60% of the 30,000 acres of prescribed burns that were reported in the State.⁸⁴ In 2011, federal agencies were responsible for most of the burns that were conducted in violation of the procedures described in the State's Smoke Management Plan in which voluntary participants including the USFS agree to meet certain air-quality related criteria before initiating prescribed burns.⁸⁵ Most of burns conducted by federal agencies such as the USFS in Arkansas were conducted within the boundaries of designated National Forests.⁸⁶

There is currently no accepted regulatory procedure for isolating the visibility impacts of prescribed burning from other anthropogenic sources of haze. However, prescribed burns continue to be a significant source of the haze in the Class I areas that are meant to be protected by the Regional Haze program. As a result, the actions of Federal Land Managers practicing prescribed burning should be given due consideration. Therefore, EPA should withdraw the Proposed FIP, and any subsequent plan should include consideration of the substantial impacts of Federal Land Managers to haze conditions.

EPA has failed to comply with additional requirements under Executive Order 12866 and Executive Order 13211, and EPA should withdraw the proposed FIP until such time as it complies with those orders.

EPA asserts that its Proposed FIP is not a “significant regulatory action” within the meaning of Executive Order 12866 (“E.O. 12866”).⁸⁷ However, the proposed FIP would result in substantial and material costs being transferred onto Arkansas communities through increased electricity rates due to the installation of costly control equipment at affected EGUs. This is a

⁸⁴ Dr. Lynne C. Thompson, Presentation to the Arkansas Prescribed Fire Council (May 18, 2015) attached as Exhibit 3.

⁸⁵ Exhibit 3.

⁸⁶ *Id.*

⁸⁷ 80 FR 18944 at 19000.

material adverse effect, which renders the Proposed FIP subject to the requirements of E.O. 12866. EPA has not complied with the requirements of E.O. 12866, and the Proposed FIP should be withdrawn until such time as requirements of this executive order have been met.

Under E.O. 12866, a “significant regulatory action” is subject to certain review requirements by the Office of Information and Regulatory Affairs (“OIRA”), which is a subdivision the Office of Management & Budget (“OMB”).⁸⁸ For each significant regulatory action under E.O. 12866, OIRA must be provided with a copy of the draft regulation, together with a reasonably detailed description of the need for the regulatory action, and an explanation of how that action will meet that need.⁸⁹ In addition, the relevant agency must provide OIRA with an assessment of the costs and benefits of the regulatory action as well as the costs and benefits of reasonably feasible alternatives for each significant regulatory action.⁹⁰ By issuance of E.O. 13563 on January 18, 2011, the sitting President reaffirmed “the principles, structures, and definitions governing contemporary regulatory review that were established in Executive Order 12866 of September 30, 1993, were re-affirmed.”⁹¹

In this instance, EPA’s Proposed FIP falls within the definition of significant regulatory action as set out in E.O. 12866 and reaffirmed in E.O. 13563. A “Significant regulatory action” means any regulatory action that is likely to result in a rule that may: (1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations

⁸⁸ Exec. Order No. 12866, 58 FR 51735, (Sept. 30, 1993).

⁸⁹ *Id.* at Sec. 6(a)(1)(B)

⁹⁰ Exec. Order No. 12866, 58 FR 51735, Sec. 6(c), (Sept. 30, 1993).

⁹¹ Exec. Order No. 13563, 76 FR 3821, (Jan. 18, 2011)

of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.⁹²

The Proposed FIP would adversely affect in a material way Arkansas communities by causing increased electricity rates that would be passed on to Arkansas consumers. Specifically, the following facilities owned by electric utilities engaged in interstate commerce were determined to be subject-to-BART or otherwise required to install emissions controls: the Arkansas Electric Cooperative (“AECC”) Carl E. Bailey Generating Station; the AECC John L. McClellan Generating Station; the American Electric Power (“AEP”) Flint Creek Power Plant; the Entergy White Bluff Plant; the Entergy Lake Catherine Plant; and the Entergy Independence Plant.

These facilities are operated by public utilities with the ability to shift the costs of these controls from the utilities to the consumers of the electricity generated by these plants and generators. Under Arkansas law, a public utility such as those operating the aforementioned plants, may petition to the Arkansas Public Service Commission to recover costs for emissions control costs through a surcharge for those expenses so long as specific statutory elements have been met.⁹³ This statute specifically provides for the recovery of costs that “[r]elate to the protection of the public health, safety of the environment” so long as other elements have been met.⁹⁴ That surcharge would allow the affected utilities to transfer costs of compliance with the Proposed FIP onto Arkansas ratepayers. These costs would place a substantial burden on Arkansas communities. This burden constitutes a material adverse impact that renders this action subject to requirements of E.O. 12866.

⁹² *Id.* at Sec.3(f).

⁹³ Ark. Code Ann. § 23-4-501.

⁹⁴ Ark. Code Ann. § 23-4-501(a)(1)(E).

In addition, a significant regulatory action under E.O. 12866 is considered a “significant energy action” and subject to yet further review by OIRA under E.O. 13211 if that action is also ‘likely to have a significant adverse impact on the supply, distribution, or use of energy.’⁹⁵ The Proposed FIP will likely have a significant adverse impact on use of energy through decreased use by electricity consumers responding to increased rates as a result of the emissions controls required. As a result of this adverse impact, the Proposed FIP is a “significant energy action.” In order to comply with E.O. 13211, EPA is required to submit to OIRA a “Statement of Energy Effects,” which describes the effects of certain regulatory actions on energy supply, distribution, or use.⁹⁶

ADEQ disagrees with EPA that the Proposed FIP is not subject to E.O. 13211 and E.O. 12866. The impacts of the Proposed FIP render it subject to both executive orders, and ADEQ is troubled that the EPA has not provided OIRA with the statements and other information required to comply with those orders. ADEQ is greatly concerned that EPA has not provided OIRA with the cost-benefit analysis required by E.O. 12866. This is a particular concern because EPA failed to perform a proper analysis of the costs of meeting EPA’s proposed RPGs.

As a result of EPA’s failure to analyze the “cost of compliance” factor in relation to the RPGs,⁹⁷ EPA has not performed any analysis of the costs of the overall impact of the Proposed FIP. Without EPA complying with the required additional review by OIRA, there would be no oversight of the costs of the Proposed FIP at all. Given the recent concerns by the Supreme Court in *Michigan v. EPA* about the rationality of imposing billions of dollars in economic costs in return for a few dollars in health or environmental benefits,⁹⁸ EPA should strictly comply with

⁹⁵ Exec. Order No. 13211, 66 FR 28355, (May 18, 2001).

⁹⁶ *Id.*

⁹⁷ *See Supra* pp. 14-15.

⁹⁸ *Michigan v. E.P.A.*, No. 14-46, 2015 WL 2473453, at *7 (U.S. June 29, 2015) (“[o]ne would not say that it is even rational, never mind ‘appropriate,’ to impose billions of dollars in economic costs in return for a few dollars in health or environmental benefits.”).

E.O. 12866 and 13211 in order to properly determine the extent of the impacts of the Proposed FIP on the state of Arkansas. Since EPA has failed to do so, ADEQ requests that EPA withdraw the Proposed FIP.⁹⁹

ADEQ reserves its right to comment on whether EPA properly made a BART determination for Arkansas facilities, including the Domtar-Ashdown Mill, in light of the Ninth Circuit's recent opinion in *Nat'l Parks Conservation Ass'n v. E.P.A.*

In determining what specific controls are BART, EPA is required to take into consideration a number of factors including “the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.”¹⁰⁰ In *Nat'l Parks Conservation Ass'n v. E.P.A.*, PPL Montana, a part-owner of a coal-fired power plant, objected to EPA's use of the CALPUFF visibility model in determining BART for two units at one of its coal-fired power plants.¹⁰¹

The basis of PPL Montana's objection was that the maximum potential incremental visibility benefit of emissions control technology chosen by EPA fell within the model's margin of error, meaning such improvement cannot be “reasonably ... anticipated” as required by the Act.¹⁰² The Ninth Circuit Court of Appeals recently held that EPA had not “considered the relevant factors and articulated a rational connection between the facts found and the choice made.”¹⁰³ As a result, EPA acted in an arbitrary and capricious manner by failing to provide an adequate explanation as to how the degree of visibility improvement could be reasonably anticipated.¹⁰⁴

⁹⁹ Ark. Code Ann. § 23-2-304.

¹⁰⁰ 42 U.S.C.A. § 7491.

¹⁰¹ See generally, *Nat'l Parks Conservation Ass'n v. E.P.A.*, No. 12-73710, 2015 WL 3559149, at *13 (9th Cir. June 9, 2015).

¹⁰² See 42 U.S.C. § 7491(g)(2); *Nat'l Parks Conservation Ass'n v. E.P.A.*, No. 12-73710, 2015 WL 3559149, at *8 (9th Cir. June 9, 2015).

¹⁰³ *Nat'l Parks Conservation Ass'n v. E.P.A.*, No. 12-73710, 2015 WL 3559149, at *13 (9th Cir. June 9, 2015).

¹⁰⁴ *Id.*

At least one facility affected by the Proposed FIP has conducted an analysis to determine whether or not the maximum potential incremental visibility benefit of emissions control technology chosen by EPA fell within the margin of error. Specifically, ADEQ is aware that Domtar is currently performing modeling to determine whether or not predicted visibility improvements fell within the margin of error at its Ashdown Mill.¹⁰⁵ Other facilities are likely performing modeling to make similar determinations. Accordingly, ADEQ reserves the right to comment on this issue until such time as Arkansas's facilities have had adequate time to make those determinations.

As the D.C. Circuit explained in vacating a portion of the Regional Haze Rule itself, it is arbitrary and capricious for EPA to force an emissions source "to spend millions of dollars for new technology that will have no appreciable effect on the haze in any Class I area."¹⁰⁶ In its Proposed Rule, EPA dictates the imposition of control equipment for emissions reduction under BART in instances where CALPUFF predicted minor visibility improvements. EPA did so without first undertaking any site specific analytical analysis to determine if the visibility improvements were in fact within the CALPUFF margin of error.

Specifically, it appears from the Proposed FIP that the highest modeled visibility improvement after EPA's BART determinations for any of the three Arkansas EGUs at any Class I area is 0.813 deciviews attributed to SO₂ controls at the Entergy White Bluff Unit I at Caney Creek, which is below the 1 deciview threshold of visibility perception. Furthermore, EPA required the installation of low-NO_x burners and over fire air at SWEPCO's Flint Creek Unit, even though the highest modeled visibility improvement was 0.081 deciviews for NO_x. Given the acknowledged over-prediction of the CALPUFF model and its inaccuracy at these low

¹⁰⁵ Letter from Annabeth Reitter, Corporate Manager, Domtar, to Guy Donaldson, Chair of the Air Planning Section, E.P.A., (July 6, 2015) attached as Exhibit 4.

¹⁰⁶ *Nat'l Parks Conservation Ass'n v. E.P.A.*, No. 12-73710, 2015 WL 3559149, at *10 (9th Cir. June 9, 2015)(citing *Am. Corn Growers Ass'n v. EPA*, 291 F.3d 1, 7 (D.C.Cir.2002))

levels, the actual visibility impact for the State's EGUs (and most likely the other subject-to-BART sources as well) would be much lower.

The CAA does not require visibility improvements that cannot be reasonably anticipated. Conversely, visibility improvements that are less than the margin of error were expressly found to be invalid. Until such time as EPA can provide assurance that the CALPUFF model is a reliable indicator of visibility projections, many of the numerical projections contained in the Proposed FIP are themselves, unreliable. For this reason, the Proposed FIP is flawed and is overly expansive and should be withdrawn.

Conclusion

Consideration of the comments above should make it apparent that the Proposed FIP is not a viable option for implementation of the Regional Haze program in Arkansas. The Proposed FIP contains misleading cumulative visibility metrics. EPA arbitrarily requires sources that are subject to the CSAPR Rule to also control NO_x emissions as BART. EPA improperly performed the reasonable progress analysis required by the Regional Haze Rule, which resulted in requiring unneeded emissions controls for the Entergy Independence Plant. EPA also chose to forego CAMx photochemical modelling such as that used in Texas in favor of a less accurate algorithm that resulted in inferior RPGs. In addition, EPA has not complied with E.O 12866 and E.O. 13211.

EPA should withdraw the Proposed FIP, and any subsequent plan should address the issues presented in this letter. While ADEQ will continue to work to develop an acceptable SIP for approval by EPA, the harsh deadline of December 15, 2015 proposed in a recently proposed consent decree between EPA and Sierra Club may stifle those efforts. Nonetheless, ADEQ will diligently continue to work towards the resolution of all of the issues raised during the public comment period.

STATE OF ARKANSAS

State Implementation Plan Review for the Five-Year Regional Haze Progress Report

Prepared by the
Arkansas Department of Environmental Quality
Air Division
Planning Branch

Revised May 2015

Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118-5317

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STATE OF ARKANSAS
ASA HUTCHINSON
GOVERNOR

June 2, 2015

Mr. Ron Curry
Regional Administrator
U.S. Environmental Protection Agency, Region VI
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Dear Regional Administrator Curry:

In accordance with the provisions of 40 C.F.R. § 51.308, this letter and enclosures constitute the submittal of the Arkansas State Implementation Plan (SIP) for the Regional Haze five-year review. The enclosed documents are intended to address the requirements of 40 C.F.R. § 51.308(g) requiring periodic reports evaluating progress towards the Reasonable Progress Goals established for mandatory Class I areas where visibility may be impacted by Arkansas sources.

The Arkansas Regional Haze SIP was submitted on July 29, 2008. The enclosed SIP submittal addresses actions the Arkansas Department of Environmental Quality (ADEQ) has taken to fulfill the requirements under 40 C.F.R. § 51.308(g) for periodic progress reports. In accordance with 40 C.F.R. § 51.308(h)(1), the State is submitting a "Negative Declaration" that further revision of the existing implementation plan is not needed at this time. However, ADEQ is cognizant of its obligation and the associated timeframe to address the disapproved components of the 2008 Arkansas Regional Haze SIP submittal.

The Regional Haze five-year review SIP was provided to Federal Land Managers on April 21, 2014. The notice of public hearing and comment period was published in a statewide newspaper on January 2, 2015 and a link to the SIP submittal was posted on the ADEQ website with details regarding the public comment period on January 2,

2015. A public hearing was held on February 2, 2015, at the ADEQ headquarters in North Little Rock, Arkansas. The public comment period ended on February 17, 2015. Responses to public comments are contained in Appendix F: Compilation of Public Comments and Response to Comments within the enclosed SIP submittal.

Arkansas respectfully requests timely review and approval of the enclosed documents as an element of the official Regional Haze program for the State. If you have any questions regarding information contained herein, please contact Stuart Spencer, Legal Policy Advisor, ADEQ, by electronic mail at spencer@adeq.state.ar.us, or by phone at 501-682-6347.

Sincerely,



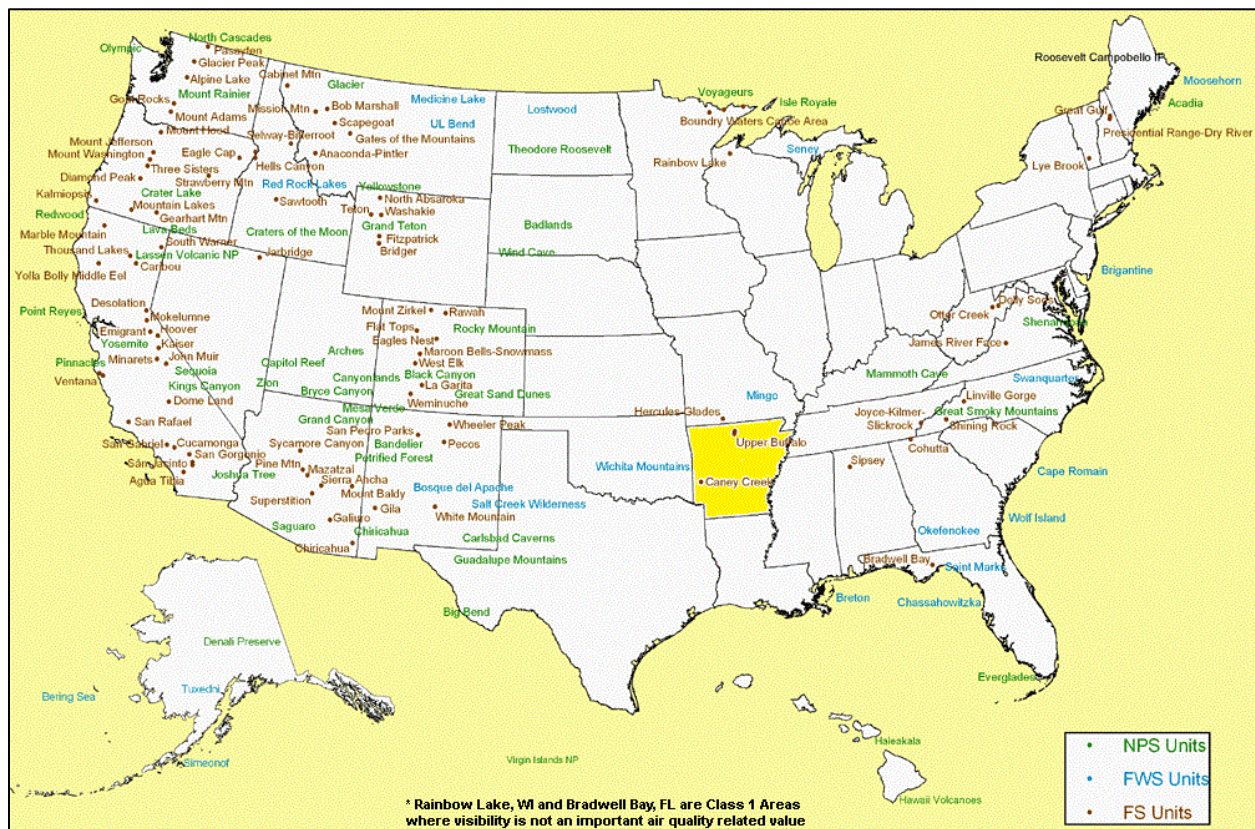
Asa Hutchinson

Enclosure: Arkansas State Implementation Plan for the Regional Haze Five-Year Review

Executive Summary

Congress added the national goal of preventing any future and remedying any existing impairment of visibility at mandatory Class I Federal areas in the 1977 Clean Air Act (C.A.A.) Amendments. The Regional Haze Rule (RHR) was promulgated in July 1999 (64 Fed. Reg. 35714, July 1, 1999) to further Congress's national goal, and established regulations to eliminate man-made visibility impairment in Class I areas by 2064. Nationally, there are 156 mandatory Class I Federal areas (Class I areas). There are two Class I areas in Arkansas: Upper Buffalo and Caney Creek Wilderness areas. See Figure 1.

Figure 1. Mandatory Class I Areas



Regional haze is a form of visibility impairment not directly attributable to a single source but occurs as a result of emissions of air pollutants from numerous sources located over a wide geographic area. The RHR and related regulations (40 C.F.R. § 51.308 and Appendix Y to Part 51) contain provisions that encouraged state, local, and tribal agencies to work cooperatively within regional planning organizations (RPOs) to address visibility impairment. Five RPOs were created for this purpose. Arkansas was part of the Central Regional Air Planning Association (CENRAP), originally comprised of nine states in the central U.S.

In accordance with the requirements of 40 C.F.R. § 51.308, the State of Arkansas submitted its Regional Haze SIP to EPA on September 23, 2008. On March 12, 2012, EPA took action and partially approved and partially disapproved the Arkansas Regional Haze SIP (2008 Arkansas Regional Haze SIP), as published in the Final Rule “*Approval and Promulgation of Implementation Plans; Arkansas; Regional Haze State Implementation Plan; Interstate Transport State Implementation Plan To Address Pollution Affecting Visibility and Regional Haze*” (77 Fed. Reg. 14604). The following is a brief summary of EPA’s decision:

Approved: Certain core elements

- Identification of affected Class I areas;
- Determination of baseline and natural visibility conditions;
- Determination of Uniform Rate of Progress (URP);
- Reasonable progress goal (RPG) consultation and long-term strategy (LTS) consultation;
- Coordination of Regional Haze and reasonably attributable visibility impairment (RAVI);
- Regional haze monitoring strategy and other SIP requirements under 40 C.F.R. § 51.308(d)(4);
- Commitment to submit periodic regional haze SIP revisions and periodic progress reports describing progress towards RPGs;
- Commitment to make a determination of the adequacy of the existing SIP at the time a progress report is submitted; and
- Consultation and coordination with Federal Land Managers (FLMs).

Partially approved and partially disapproved:

- Approved Arkansas’s identification of sources found in the Arkansas Pollution Control and Ecology Commission (APC&EC), Regulation of the Arkansas Plan of Implementation for Air Pollution Control, Regulation No. 19, Chapter 15 that are best available retrofit technology (BART) eligible, with the exception of 6A Boiler at the Georgia-Pacific Crossett Mill, which EPA found to be BART-eligible.
- Approved Arkansas’s identification of subject-to-BART sources, with the exception of the 6A and 9A Boilers at Georgia-Pacific Crossett Mill, which EPA found to be subject-to-BART.
- Approved portions of the BART compliance provision that require each Arkansas subject-to-BART source to install and operate BART as expeditiously as practicable, but within five years of approval of Arkansas Regional Haze SIP by EPA. Arkansas’s inclusion of the compliance provision that would require Arkansas subject-to-BART sources to install and operate BART no later than six years after the effective date of the State’s regulation (if such date takes place before five years from EPA approval of the Arkansas Regional Haze SIP) is not a required element of the Regional Haze SIP, pursuant to Section 169 of the C.A.A., and therefore was disapproved.

- Partially disapproved Arkansas’s submitted LTS because it relies on portions of the Arkansas Regional Haze SIP that EPA disapproved, including some of Arkansas’s BART emission limits. In addition, Arkansas did not show that the strategy will adequately achieve the RPGs set by Arkansas and by other nearby states.

Disapproved:

- Arkansas’s RPGs required under 40 C.F.R. § 51.308(d)(1);
- Arkansas’s sulfur dioxide (SO₂), nitrogen oxides (NO_x) and particulate matter (PM) BART determinations; and
- Portion of the BART compliance provision found in APC&EC Reg. 19.1504(B), which requires each source subject-to-BART to install and operate BART no later than six years after the effective date of the Arkansas RHR (found in APC&EC Regulation No. 19) for the Regional Haze SIP.

The Regional Haze Program has been the subject of litigation, making it difficult to determine what control measures could be included in SIPs and, consequently, to complete the SIPs in a timely manner. The litigation includes the following.

On May 24, 2002, the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit issued a ruling vacating the RHR in part and sustaining it in part, based on a finding that EPA’s prescribed methods for determining BART were inconsistent with the C.A.A. (*American Corn Growers Assn. v. EPA*, 291 F.3d 1 (D.C. Cir. 2002)).

On February 18, 2005, the D.C. Circuit decided another case dealing with BART and a BART alternative program, *Center for Energy and Economic Development v. EPA*, No. 03–1222, (D.C. Cir. Feb. 18, 2005) (“*CEED*”). *CEED* affirmed EPA’s interpretation of C.A.A. 169A(b)(2) as allowing for non-BART alternatives where those alternatives make greater progress than BART. EPA promulgated a rule on July 6, 2005, entitled “Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations” (“the BART Rule”) (70 Fed. Reg. 39104) to assist states in identifying which of their BART-eligible sources should undergo a BART analysis (i.e., which are “sources subject-to-BART”) and selecting appropriate controls (“the BART determination”).

Around the same time, EPA issued the Clean Air Interstate Rule (CAIR) on May 12, 2005, (70 Fed. Reg. 25162), which states could implement in lieu of BART. The rule affected 28 states and the District of Columbia and included a cap and trade program targeting SO₂ and NO_x. In July 2008, the Court found CAIR and EPA’s CAIR Federal Implementation Plans (FIPs) unlawful (*North Carolina v. EPA*, 531 F.3d 896 (D.C. Cir. 2008)), modified on rehearing (*North Carolina v. EPA*, 550 F.3d 1176, 1178 (D.C. Cir. 2008)). The ruling remanded CAIR to the EPA, leaving existing CAIR programs in place while directing EPA to replace them as rapidly as possible with a new rule consistent with the C.A.A.

EPA proposed a new rule, the Cross-State Air Pollution Rule (CSAPR), on July 6, 2010. The Program applied to 31 states and the District of Columbia to improve air quality significantly by reducing power plant emissions that contribute to ozone and fine particle emissions in other states, particularly SO₂ and NO_x emissions. Some states were included for ozone season (via NO_x reductions) or PM_{2.5} (via SO₂ and NO_x reductions) or both ozone and PM_{2.5}. EPA quantified in this rule the ozone season NO_x emission reductions that are necessary—but may not be sufficient—to eliminate all significant contribution to nonattainment and interference with maintenance in other states. Arkansas is included as one of the states that significantly contribute to nonattainment or interfere with maintenance of (the 1997 Ozone) National Ambient Air Quality Standard (NAAQS) downwind in the final CSAPR.

The final rule on CSAPR was published on August 8, 2011 (76 Fed. Reg. 48208). To make technical adjustments to the CSAPR based on new information, EPA proposed a rule revision on October 6, 2011. The CSAPR was scheduled to replace CAIR starting January 1, 2012. However, on December 30, 2011, the U.S. Court of Appeals for the D.C. Circuit issued a ruling that vacated the CSAPR and reinstated the CAIR program.

On October 5, 2012, EPA filed a petition for rehearing of the Court's decision on CSAPR. On November 19, 2012, EPA sent a Memo to Regions: Next Steps for Pending Redesignation Requests and State Implementation Plan Actions Affected by the Recent Court Decision Vacating the 2011 CSAPR. On January 24, 2013, the U.S. Court of Appeals declined the rehearing petition. On March 29, 2013, EPA petitioned the U.S. Supreme Court to review the judgment of the U.S. Court Appeals on CSAPR. On June 24, 2013, the U.S. Supreme Court granted EPA's petition.

On April 29, 2014, the Supreme Court reversed the D.C. Circuit opinion on CSAPR. On June 26, 2014, EPA filed a motion in the U.S. Court of Appeals for the D.C. Circuit to lift the stay of CSAPR. While the Court considered the motion, CAIR remained in effect. EPA's request for a three-year delay in the compliance deadlines would make the Phase 1 emissions budgets applicable in 2015 and 2016 (versus 2012 and 2013) and the Phase 2 emissions budgets applicable in 2017 and beyond (versus 2014 and beyond).

On October 23, 2014, the U.S. Court of Appeals for the D.C. Circuit ordered that EPA's motion to lift the stay of the CSAPR be granted. CSAPR Phase 1 implementation went into effect in 2015 with Phase 2 beginning in 2017. As of May 1, 2015, states are required to implement the requirements of CSAPR.

On April 8, 2015, EPA issued a proposed Federal Implementation Plan (FIP) for Arkansas (Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Proposed Rule – 80 Fed. Reg.

18944, April 8, 2015) and solicited comments on the approach to Regional Haze implementation described therein. ADEQ is evaluating the proposed FIP.

List of Acronyms and Abbreviations

ACI	Activated Carbon Injection
ADEQ, Department	Arkansas Department of Environmental Quality
ADF	Agriculture Derived Fuel
AECC	Arkansas Electric Cooperative Corporation
AEP	American Electric Power
AFIN	Arkansas Facility Identification Number
AL	Alabama
APC&EC	Arkansas Pollution Control and Ecology Commission
AR	Arkansas
Ark. Code Ann.	Arkansas Code Annotated
BART	Best Available Retrofit Technology
b_{ext}	Light extinction
C.A.A.	Clean Air Act
CAIR	Clean Air Interstate Rule
CAMD	Clean Air Markets Division
CENRAP	Central Regional Air Planning Association
C.F.R.	Code of Federal Regulations
CenSARA	Central States Air Resource Agencies
CO	Carbon Monoxide
CSAPR	Cross-State Air Pollution Rule
CSN	Chemical Speciation Network
dv	Deciview
EC	Elemental Carbon
EGU	Electric Generating Unit
EI	Emission Inventories
EIQ	Emission Inventory Questionnaire
EPA	United States Environmental Protection Agency
Fed. Reg.	Federal Register
FETS	Fire Emissions Tracking System
FIP	Federal Implementation Plan
$f(RH)$	A water growth factor for sulfate, nitrate, and sea salt based on relative humidity
FLM	Federal Land Manager
FS	Forest Service, United States Department of Interior
FWS	Fish and Wildlife Service
FY	Fiscal Year
G-P	Georgia-Pacific
GCVTC	Grand Canyon Visibility Transport Commission
Go RED!	Reduce Emissions from Diesels
HAP	Hazardous Air Pollutant
IMPROVE	Interagency Monitoring of Protected Visual Environments

LAC	Light Absorbing Carbon
LADCO	Lake Michigan Air Directors Consortium
lb/hr	Pound(s) per hour
lb/MMBtu	Pound(s) per million British thermal units
LEV	Low Emissions Vehicle
LTS	Long-term strategy
MACT	Maximum Achievable Control Technology
MANE-VU	Mid-Atlantic/Northeast Visibility Union
MARAMA	Mid-Atlantic Regional Air Management Association
MATS	Mercury and Air Toxics Standards
MEK	Methyl ethyl ketone
METRO4, Inc.	Southeastern Local Air Pollution Control Agencies
MJO	Multi-Jurisdictional Organization
Mm ⁻¹	Inverse Mega meter
MMBtu	Million British Thermal Units
MO	Missouri
MOA	Memorandum of Agreement
MOBILE6	The sixth version of an emission factor model for predicting gram per mile emissions, replaced by MOVES
MON	Miscellaneous Organic Chemical Production and Processes
MOVES	Motor Vehicle Emission Simulator
MRPO	Midwest Regional Planning Organization
msl	Mean sea level
NAAQS	National Ambient Air Quality Standards
NaOH	Sodium hydroxide
NCDC	National Clean Diesel Campaign
NCG	Non-condensable Gases
NEI	National Emissions Inventory
NESCAUM	Northeast States for Coordinated Air Use Management
NESHAP	National Emission Standards for Hazardous Air Pollutant
NH ₃	Ammonia
NID	Novel Integrated Desulphurization
NPS	National Park Service
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
NSPS	New Source Performance Standards
OAQPS	Office of Air Quality Planning and Standards
OAR	Office of Air and Radiation
OC	Organic Carbon
OTC	Ozone Transport Commission
PM	Particulate matter
PM _{2.5}	Particulate matter of diameter of 2.5 micrometers or smaller
PM ₁₀	Particulate matter of diameter of 10 micrometers or smaller
ppb	Part(s) per billion
PPF	Pelletized Paper Fuel

ppm	Part(s) per million
PSD	Prevention of Significant Deterioration
psig	Pound(s) per square inch [gauge]
PTE	Potential to Emit
RAVI	Reasonably Attributable Visibility Impairment
RDF	Refuse Derived Fuel
RH	Relative Humidity
RHR	Regional Haze Rule
RICE	Reciprocating Internal Combustion Engines
RPO	Regional Planning Organization
RPG	Reasonable Progress Goals
SAMI	Southern Appalachian Mountains Initiative
SESARM	Southeastern States Air Resource Managers
SIP	State Implementation Plan
SLEIS	State and Local Emissions Inventory System
SMP	Smoke Management Plan
SO ₂	Sulfur dioxide
STN	Speciation Trends Network
TDF	Tire Derived Fuel
tpd	Tons per day
tpy	Tons per year
TRS	Total Reduced Sulfur
µg/m ³	Micrograms per cubic meter
ULSD	Ultra Low Sulfur Diesel
URP	Uniform Rate of Progress
VEWS	Visibility Information Exchange Web System
VMT	Vehicle Miles Traveled
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	Volatile Organic Compound
WESP	Wet Electrostatic Precipitator
WESTAR	Western States Air Resource Council
WRAP	Western Regional Air Partnership

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Chapter 1: Introduction to the Federal Regional Haze Program Requirements

1. Background

In amendments to the C.A.A. in 1977, Congress added Section 169 (42 U.S.C. § 7491) setting forth the following national visibility goal of restoring pristine conditions in national parks and Wilderness areas:

“Congress hereby declares 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 man-made air pollution.”

When the C.A.A. was amended in 1990, Congress added Section 169B (42 U.S.C. § 7492), authorizing further research and regular assessments of the progress made so far. In 1993, the National Academy of Sciences concluded that “current scientific knowledge is adequate and control technologies are available for taking regulatory action to improve and protect visibility.”

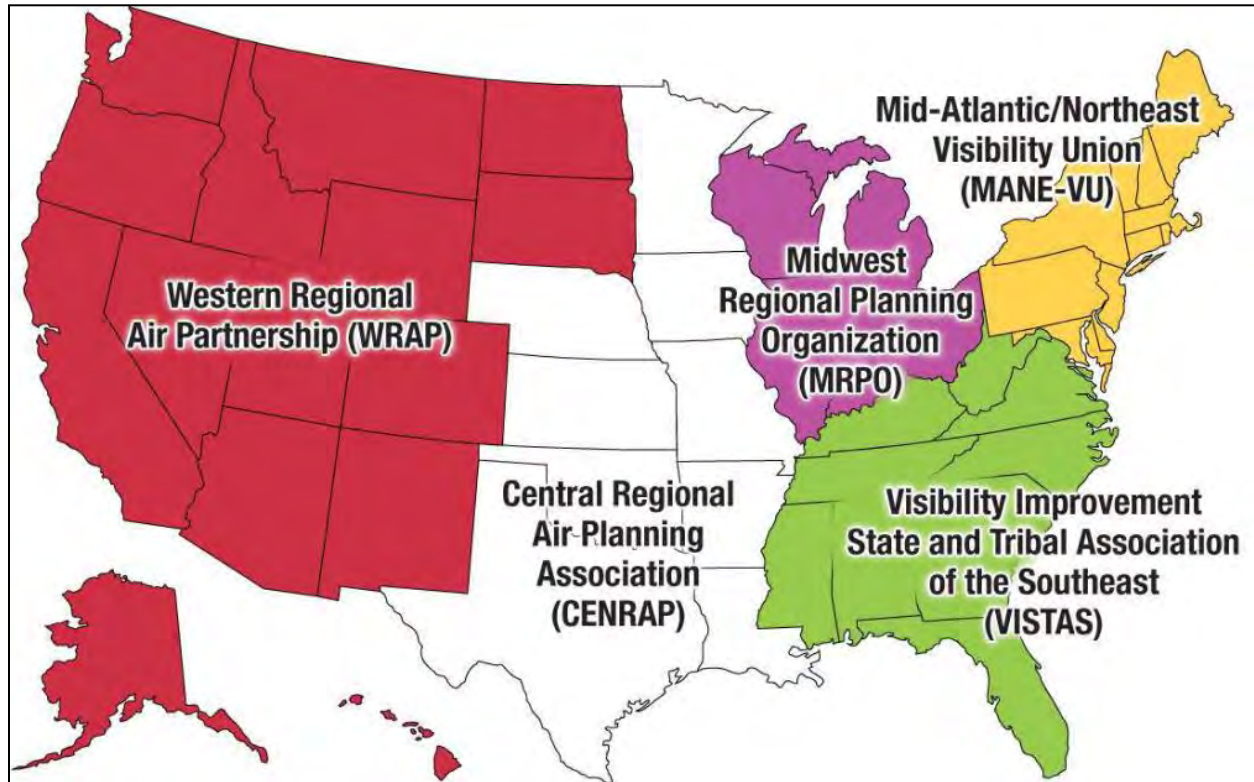
In addition to authorizing creation of visibility transport commissions and setting forth their duties, Section 169B(f) of the C.A.A. specifically mandated creation of the Grand Canyon Visibility Transport Commission (GCVTC) to make recommendations to the EPA for the region affecting the visibility of the Grand Canyon National Park. In June 1996, following four years of research and policy development, the GCVTC submitted its report to EPA. This report, as well as the many research reports prepared by GCVTC, contributed invaluable information to EPA in its development of the federal regional haze rule.

EPA’s RHR was adopted July 1, 1999, (64 Fed. Reg. 35714) and aims to reach natural background conditions by 2064. This rulemaking addressed the combined visibility effects of various pollution sources over a wide geographic region. EPA concluded that this meant that many states—even those without Class I areas—would be required to participate in haze reduction efforts.

2. Regional Planning

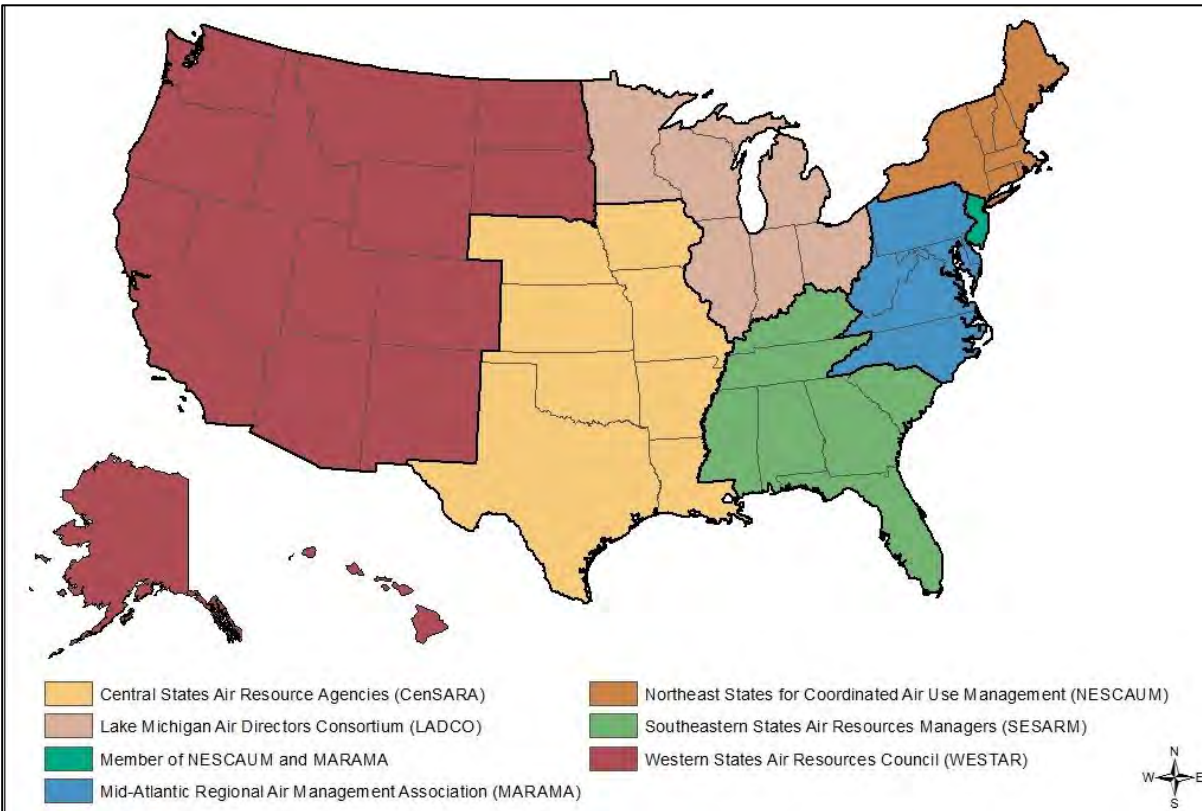
EPA designated five RPOs to assist with the coordination and cooperation needed to address the visibility issues that states in the five regions share or have in common. Those states that make up the midsection of the contiguous United States were designated as the Central Regional Air Planning Association (CENRAP). CENRAP subsequently ceased to function and Arkansas is communicating through the Central States Air Resource Agencies (CenSARA) with the other states that were part of CENRAP . Figure 1.1 is a map depicting the five RPO regions.

Figure 1.1. Regional Planning Organizations



Using federal funds available to them, the RPOs developed a wide array of technical products for their member and non-member states, including updated emissions inventories, additional monitoring to help answer questions related to visibility impacts, and modeling to help determine which pollutants should be the focus for control measures. The RPOs were also key to coordination and consultation efforts among states, tribes, federal land managers, and EPA. The products and efforts of the RPOs culminated in the SIPs submitted to EPA. RPO funding ceased in 2011 and, currently, multi-jurisdictional organizations (MJOs), such as CenSARA, manage and coordinate multi-state air quality technical projects. Figure 1.2 is a map depicting the six MJO regions. Because of directed funding, tribes and FLMs are not members of MJOs, though communication and coordination is still an important component of regional haze work.

Figure 1.2. Multi-Jurisdictional Organizations



3. Requirements for Periodic Reports Describing Progress towards Reasonable Progress Goals

Pursuant to the requirements of 40 C.F.R. § 51.308(g), (h), and (i), Arkansas submits this Progress Report as a SIP revision. Arkansas has adopted this SIP revision in accordance with State laws and rules.

The requirements addressed in the following sections include the status of implementing committed control measures, summaries and analyses of emissions and monitoring changes, and assessments of impacts on Class I areas identified in the 2008 Arkansas Regional Haze SIP.

Per 40 C.F.R. § 51.308(g), this submittal also complies with 40 C.F.R. §§ 51.102 and 51.103 to offer the public the opportunity to request a hearing and/or comment on a proposed SIP revision and to submit the SIP revision to EPA. Arkansas provided public notice of the opportunity to comment on the SIP revision on January 2, 2015. Arkansas held a public hearing regarding the SIP revision on February 2, 2015. Public comments received were addressed and are summarized under Appendix F: Compilation of Public Comments and Response to Comments found within this report.

Chapter 2: Progress Report Elements—40 C.F.R. § 51.308(g)

1. Introduction

As stated in 40 C.F.R. § 51.308(g), the RHR, final rule published July 1, 1999, (64 Fed. Reg. 35714) requires states to submit progress reports five years following the submission of the 2008 Regional Haze SIP and every five years following submission of a comprehensive regional haze SIP revision. The general purpose of the five-year review is to evaluate progress towards the reasonable progress goals of each mandatory Class I area which may be affected by emissions from within the State. Arkansas has two Class I areas: Upper Buffalo and Caney Creek Wilderness areas. This document fulfills 40 C.F.R. § 51.308(g) requirements. This reasonable progress report evaluates the progress made towards RPG for Caney Creek and Upper Buffalo Class I areas, as well as each mandatory Class I area located outside Arkansas that may be affected by emissions from Arkansas sources.

As suggested by EPA¹, the following is a brief description of the overall nature of the visibility problem in the two Class I areas affected by the State. As shown in Figure 2.1 and Figure 2.2, ammonium sulfate is the largest contributor to visibility impairment at Upper Buffalo and Caney Creek Wilderness areas on the 20% worst days. As evidenced by Figure 2.3 and Table 2.1, EGUs are the largest emitter of SO₂. After ammonium sulfate, the next largest fraction of regional haze at these two Class I areas is organic carbon. In 2004, Drs. Tom Moore and Brooke Hemming² suggested if the ratio of organic carbon to elemental carbon (OC/EC) was seven or greater, this may be associated with vegetation fires. The OC/EC³ for the 20% worst days at Upper Buffalo and Caney Creek Wilderness area is 11. Therefore, the data seem to suggest the source of organic carbon at these two Class I areas was due to vegetation fires.

¹ U.S. EPA. (2013). *General Principles for the 5-Year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans (Intended to Assist States and EPA Regional Offices in Development and Review of the Progress Reports)*.

² Moore, Tom & Hemming, Brooke. (2005). *The Importance of Carbonaceous Aerosol in Air Quality Planning: Bridging the Gap between Researched Application, International Workshop on Organic Speciation Summary Report*.

³ Data used to calculate the ratio was from the VIEWS website.

Figure 2.1. Percent Contribution of Major Haze Components to 20% Worst Days at Caney Creek Wilderness Area, Arkansas, for the Current Five-Year Average (2007-2011)

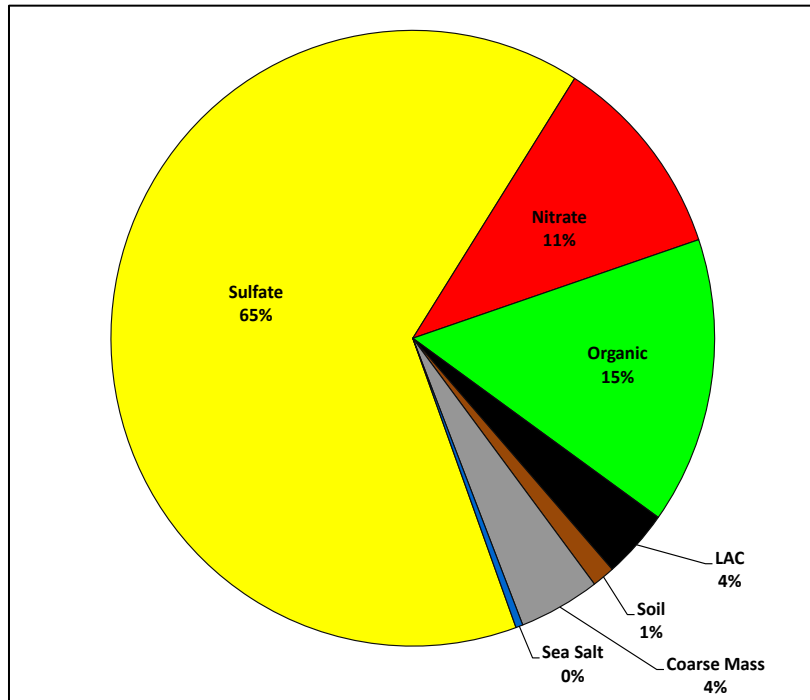
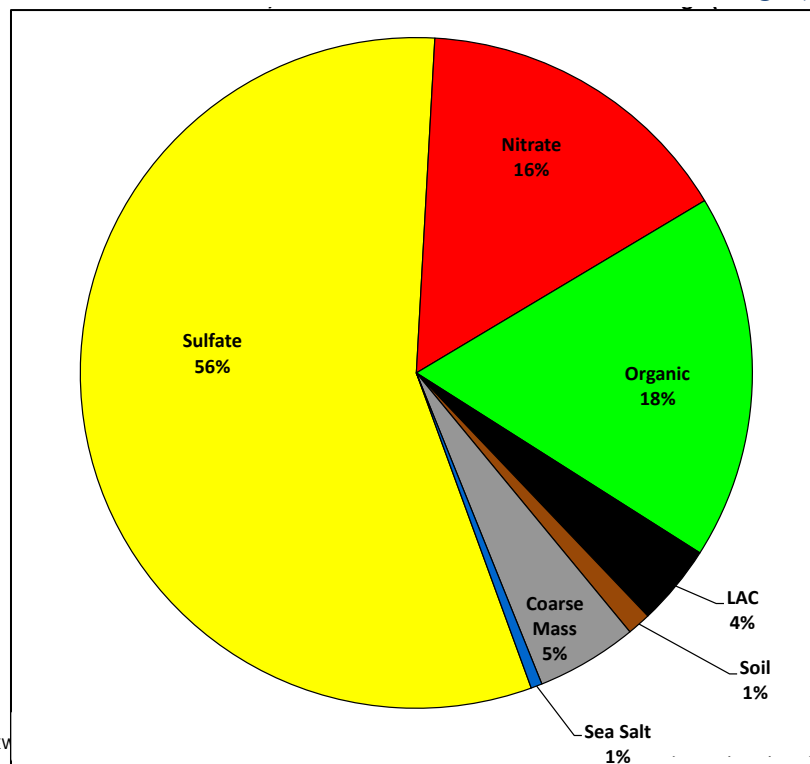


Figure 2.2. Percent Contribution of Major Haze Components to 20% Worst Days at Upper Buffalo Wilderness Area, Arkansas, for the Current Five-Year Average (2007-2011)



Source: VIEV

John, Epidemiologist

As evidenced by Figure 2.3, the largest emitters of SO₂ in Arkansas are EGUs.

Figure 2.3. Percent Contribution by Source to SO₂ Emissions in Arkansas for 2011

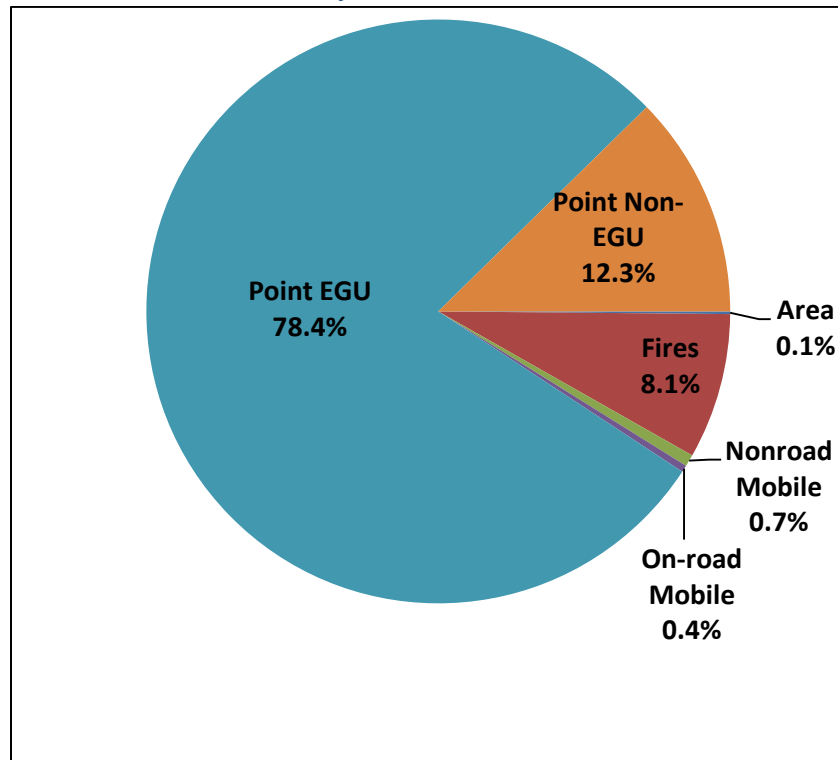


Table 2.1. Arkansas's 2011 SO₂ Emissions by Source Category⁴

Area (tpy)	Fires (tpy)	Nonroad Mobile (tpy)	On-road Mobile (tpy)	Point EGU (tpy)	Point Non-EGU (tpy)
137	7,572	618	357	73,629	11,587

2. Status of Control Measures

40 C.F.R. § 51.308(g)(1) requires that the five-year periodic report contain: “A description of the status of implementation of all measures included in the implementation plan for achieving reasonable progress goals for mandatory Class I Federal areas both within and outside the State.”

The long-term strategy (LTS) developed for the 2008 Arkansas Regional Haze SIP was to include all measures relied upon by a state to achieve the reasonable progress goals of Class I areas affected by their emissions. Arkansas’s LTS was broad in scope to ensure it encompassed all ongoing state and federal programs reducing the types of air pollutants that might be associated with visibility impairment. Additional factors listed in 40 C.F.R. § 51.308(d)(3)(v)

⁴ Source: U.S. EPA, 2011 NEI version 1.

such as smoke management plans, source retirements and replacements, emissions limits, and the net effect upon visibility from projected changes in emissions from anthropogenic emissions over the period addressed by the long-term strategy, were also required components of the long-term strategy. Not all items included in Arkansas's LTS are expected to significantly influence visibility impairment in a Class I area but were included for completeness. A review of all applicable measures, either specifically identified by the 2008 Arkansas Regional Haze SIP or other measures of greatest relevance to the reasonable progress goals (RPGs) of the Arkansas Class I areas, is provided below.

i. Best Available Retrofit Technology

As stated in the Executive Summary, EPA partially approved and partially disapproved on March 12, 2012⁵, the 2008 Arkansas Regional Haze SIP. This rule partially approved and partially disapproved Arkansas's identification of BART-eligible sources and subject-to-BART sources; requirements for BART, Chapter 15 of the APC&EC Regulation No. 19, the LTS, and the RPG.

EPA disapproved Arkansas's BART determinations for the following sources:

- SO₂, NO_x, and PM for Arkansas Electric Cooperative Corporation (AECC) Bailey Plant Unit 1 and the AECC McClellan Plant Unit 1;
- SO₂ and NO_x for American Electric Power (AEP) Flint Creek Plant Boiler No. 1;
- NO_x for the natural gas firing scenario and the SO₂, NO_x, and PM for the fuel oil firing scenario for Entergy Lake Catherine Plant Unit 4;
- SO₂ and NO_x for both the bituminous and sub-bituminous coal firing scenarios for Entergy White Bluff Plant Units 1 and 2;
- BART determination for the Entergy White Bluff Plant Auxiliary Boiler;
- SO₂ and NO_x for Domtar Ashdown Mill Power Boiler No. 1; and
- SO₂, NO_x and PM for Domtar Ashdown Mill Power Boiler No. 2.

As a result of the disapproval of the aforementioned BART elements, ADEQ had a meeting with the subject-to-BART sources (listed above) to inform them of EPA's final decision. As a follow up, ADEQ sent certified return receipt letters dated May 14, 2012⁶, to the individual subject-to-BART sources informing them of ADEQ's decision to revise the SIP and comply with the statutory five-factor analysis requirements. This decision required the sources to prepare new BART-related analyses. Specifically, ADEQ requested the facilities to submit an analysis of the five factors specified in C.A.A. Section 169A(g)(2) for the affected subject-to-BART unit/units and pollutants. Each five-factor analysis was to be conducted in accordance with 40 C.F.R. Part 51, Appendix Y and the guidance provided by ADEQ. ADEQ has been working closely with the

⁵ 77 Fed. Reg. 14604 (2012).

⁶ See **Error! Reference source not found.**

sources through phone calls, meetings, and other correspondence. In addition, ADEQ and sources are working with EPA, Region 6, on their five-factor analyses. EPA is reviewing these analyses and providing comments. These comments are forwarded to the sources for response. At the time of this document development, ADEQ is unable to determine when revisions to the disapproved portions of the SIP will be submitted to EPA.

ii. Subject-to-BART Sources and Class I Areas Affected

BART determination modeling performed by the Department indicated there were six Arkansas facilities with subject-to-BART units whose emissions caused or contributed to visibility impairment at four Class I areas. However, EPA disapproved ADEQ’s BART exemption finding of Georgia-Pacific Paper’s 6A and 9A Boilers and found these units to be subject-to-BART. Table 2.2 lists the facilities, subject-to-BART units, and pollutants that were not approved. A short description of the facilities with subject-to-BART units and the Class I areas affected follows.

Table 2.2. Facilities with Subject-to-BART Units in the State of Arkansas

Facility Name	Unit ID - Description	BART Pollutants
American Electric Power - Flint Creek Plant	SN-01 - Boiler	SO ₂ , NO _x
AR Electric Cooperative - Bailey Generating Station	SN-01 - Boiler	SO ₂ , NO _x , PM
AR Electric Cooperative - John L. McClellan Generating Station	SN-01 - Boiler	SO ₂ , NO _x , PM
Entergy - Lake Catherine	SN-02 - Unit 4 Boiler Natural Gas Firing	NO _x
	SN-02 - Unit 4 Boiler Oil Firing	SO ₂ , NO _x , PM
Entergy - White Bluff	SN-01 - Unit 1 Bituminous and Sub-bituminous Coal Firing	SO ₂ , NO _x
	SN-02 - Unit 2 Bituminous and Sub-bituminous Coal Firing	SO ₂ , NO _x
	SN-05 - Auxiliary Boiler	
Domtar - Ashdown	SN-03 – No. 1 Power Boiler	SO ₂ , NO _x
	SN-05 – No. 2 Power Boiler	SO ₂ , NO _x , PM
Georgia-Pacific Paper - Crossett	6A Boiler	SO ₂ , NO _x , PM
	9A Boiler	SO ₂ , NO _x , PM

American Electric Power - Flint Creek Power Plant (Arkansas Facility Identification Number (AFIN) 04-00107)

is located in Gentry, Benton County, AR, and is currently permitted to operate under ADEQ Operating Air Permit Number 0276-AOP-R6. It produces power using a 6324 million British thermal units (MMBtu) per hour, dry bottom, wall fired Boiler (SN-01) to produce sufficient steam to operate the turbine generator at the 558 MW gross electrical output capability of the unit. The boiler burns primarily low sulfur western coal, but can also combust fuel oil and tire derived fuels (TDF). Fuel oil firing is only allowed during startup and shutdown of the boiler, startup and shutdown of the pulverizer mills, for flame stabilization when the coal is frozen, fuel oil tank maintenance, to prevent boiler tube failure in extreme cold weather, and when the unit is offline for maintenance. Fly ash resulting from the coal combustion process is collected by two hot side electrostatic precipitators. BART determination modeling indicated SN-01 affects Caney Creek and Upper Buffalo Wilderness areas, AR, and Hercules-Glades Wilderness area, MO.

Arkansas Electric Cooperative Corporation - Carl E. Bailey Generating Station (AFIN 74-00024)

is located in Augusta, Woodruff County, AR, and is currently permitted to operate under ADEQ Operating Air Permit Number 0154-AOP-R4. It produces power using a 1350 MMBtu per hour Riley Stoker Boiler (SN-01) to drive a 122 MW generator. The primary fuel is natural gas but the facility is also permitted to use any grade fuel oil with a sulfur content equal to or below 2.3%. Preliminary modeling of this unit showed emissions affect visibility in Upper Buffalo and Caney Creek Wilderness areas, AR, and Hercules-Glades and Mingo Wilderness areas, MO.

Arkansas Electric Cooperative Corporation - John L. McClellan Generating Station (AFIN 52-00055)

is located in Camden, Ouachita County, AR, and is currently permitted to operate under ADEQ Operating Air Permit Number 0181-AOP-R5. The plant produces power using a 1436 MMBtu per hour Riley Stoker Boiler (SN-01) to drive a 134 MW generator. The primary fuel is natural gas but the facility is also permitted to use any grade fuel oil with a sulfur content equal to or below 2.8%. Emissions from this source affect Upper Buffalo and Caney Creek Wilderness areas' visibility.

Entergy - Lake Catherine (AFIN 30-00011)

is located in Malvern, Hot Spring County, AR, and is currently permitted to operate under ADEQ Operating Air Permit Number 1717-AOP-R6. Lake Catherine is a single unit electric generating station which generates electric energy for sale. Three units that were previously in operation were retired in 2014. Unit 4 (SN-03) is the only remaining unit. Electricity for sale is produced by burning natural gas. The burning of No. 6 fuel oil as a secondary fuel has been discontinued. The subject-to-BART source is Unit 4 (SN-03) which is a Combustion Engineering tilting tangential fired 5,850 MMBtu per hour Boiler powering a 552 MW generator. BART determination modeling indicated emissions from this unit affect the visibility at Hercules-Glades, MO, and the Upper Buffalo and Caney Creek Class I areas, AR. The

discontinuance of fuel oil use will result in significant reductions of SO₂ emissions from this source.

Entergy - White Bluff (AFIN 35-00110)

is located in Redfield, Jefferson County, AR, and is currently permitted to operate under ADEQ Operating Air Permit Number 0263-AOP-R7. Units Nos. 1 (SN-01) and 2 (SN-02) are identical Combustion Engineering tilting tangential 8950 MMBtu per hour coal fired Boilers with a maximum power rating of 850 MW each. The Boilers use sub-bituminous or bituminous coal as the primary fuel and No. 2 fuel oil as a start-up fuel. Particulate matter is controlled by an electrostatic precipitator on each Boiler. The Auxiliary Boiler (SN-05) is a 183 MMBtu per hour Boiler burning No. 2 fuel oil as its only fuel type. The purpose of the Auxiliary Boiler is to provide steam for the start-up of the two primary Boilers, SN-01 and SN-02. Results from the BART determination modeling indicated emissions from Units 1 and 2 and the Auxiliary Boiler affect visibility at Hercules-Glades, MO, and Upper Buffalo and Caney Creek, AR.

Domtar - Ashdown (AFIN 41-00002)

is located in Ashdown, Little River County, AR, and is currently permitted to operate under ADEQ Operating Air Permit Number 0287-AOP-R14. Domtar is a paper mill facility and has two Power Boilers, No. 1 Power Boiler (SN-03) and No. 2 Power Boiler (SN-05), that are subject-to-BART. The No. 1 Power Boiler was installed in 1968 as part of the original construction of the Ashdown Mill. It has a heat input rating of 580 MMBtu per hour and an average steam generating rate of 120,000 pounds per hour (lb/hr) of steam at 850 pounds/square inch [gauge] (psig). It combusts primarily bark, but it is also permitted to burn wood chips, wood waste, recycled sanitary products composed of cellulose and polypropylene, pelletized paper fuel (PPF), TDF, municipal yard waste, No. 6 fuel oil, reprocessed fuel oil, used oil generated on site, and natural gas. Natural gas is only used to supplement other fuels during high steam demand periods. The No.1 Power Boiler is equipped with a traveling grate and a combustion air system. To meet applicable Boiler Maximum Achievable Control Technology (MACT) PM emissions standard of 0.07 lb/MMBtu Domtar Industries installed a wet electrostatic precipitator (WESP) during the spring of 2007. The No. 2 Power Boiler started operation in February 1976. It has a heat input rating of 820 MMBtu per hour and an average steam generating rate of approximately 600,000 lb/hr. It combusts primarily bituminous coal (over 80% of the heat input is supplied by coal), but it is also permitted to burn bark, bark and wood chips used to absorb oil spills, wood waste, petroleum coke, recycled sanitary products based on cellulose and polypropylene, PPF, TDF, municipal waste, No. 6 fuel oil, reprocessed fuel oil, used oil generated on site, natural gas, and non-condensable gases (NCGs). The NCGs are produced in the pulp and evaporator areas. It consist of nitrogen, total reduced sulfur (TRS) compounds, methanol, SO₂, and minor quantities of other compounds such as methyl ethyl ketone (MEK). Under normal conditions, natural gas is not combusted. The No. 2 Power Boiler is equipped with a traveling grate, combustion air system including overfire air, multi-clones, and two parallel venturi scrubbers. The SO₂ loading to the Boiler is significant since it burns

coal and NCGs. Therefore, the scrubbing fluid includes water and a source of alkali, such as sodium hydroxide (NaOH) and/or pulp mill extraction stage filtrate. BART determination modeling indicated emissions from the two Power Boilers affect visibility at Upper Buffalo and Caney Creek, AR.

Georgia-Pacific Paper (AFIN 02-00013)

is located in Crossett, Ashley County, AR, and is currently permitted under ADEQ Operating Air Permit Number 0597-AOP-R15. Georgia-Pacific is a Kraft paper mill that has two subject-to-BART sources, 6A (SN-19) and 9A (SN-22) boilers. The 6A Boiler is a 357 MMBtu per hour boiler. The boiler burns natural gas and specification grade oil. Specification grade oil consists of new oil, used oil, and pitch from the production of tall oil. The 6A Boiler was installed in 1962 and there are no emissions controls associated with it. The 9A Boiler is a 720 MMBtu per hour combination fuel boiler that is used to generate steam for general use throughout the facility. It was installed in 1973. This Boiler may serve as a backup combustion unit when the incinerator (SN-83) is offline. The combination of fuels permitted for this Boiler are TDF, agriculture derived fuel (ADF), refuse derived fuel (RDF), NCGs, wood waste, specification grade oil, natural gas, and sludge. The 9A Boiler is equipped with a wet Venturi scrubber to control sulfur compound emissions. The scrubber was installed in 1980. ADEQ determined 6A Boiler was pre-BART and emissions from 9A Boiler do not cause or contribute to visibility impairment at Caney Creek Wilderness area, AR. However, in the final rule on the 2008 Arkansas Regional Haze SIP, EPA found the 6A Boiler to be BART eligible. EPA also found both the 6A and 9A Boilers to be subject-to-BART and a full BART analysis is required (77 Fed. Reg. 14606). However, Georgia-Pacific (G-P) voluntarily reduced 9A Boiler's permitted SO₂ emission rate to 484.6 tons per year (a 64% reduction). However, permitted PM₁₀ rates increased to 339.0 tpy (from 243.3 tpy). Modeling performed by G-P indicates the current emission rate affects Caney Creek below 0.5 deciview (dv). Based on a call on March 20, 2013, with EPA Region 6 staff and G-P, the current permit limit for the 9A Boiler exempts this facility from the requirement to perform a five-factor analysis.

3. Additional Control Measures – Federal and State Programs

i. Clean Air Interstate Rule (CAIR) and Cross-State Air Pollution Rule (CSAPR)

On May 30, 2012, EPA finalized the rule: “Regional Haze: Revisions to Provisions Governing Alternatives to Source-Specific BART Determinations, Limited SIP Disapprovals, and Federal Implementation Plans” (77 Fed. Reg. 33643, June 7, 2012). This rule allows the trading programs in the CSAPR Rule to serve as an alternative to determining source-by-source BART. This rule provides that states in the CSAPR region can substitute participation in CSAPR for source-specific BART for SO₂ and/or NO_x emissions from power plants. This determination is commonly referred to as CSAPR being “better-than-BART.” EPA also determined “that a state in the Transport Rule region whose EGUs are subject to the requirements of the Transport Rule trading program only for ozone season NO_x is allowed to rely on our determination that the Transport Rule makes greater reasonable progress than source-specific BART for NO_x” (77 Fed.

Reg. 33652). Arkansas is included in this determination, which did not require the state's subject-to-BART EGUs to perform a five-factor analysis of NO_x emissions. However, in light of the U.S. Court of Appeals decision as previously discussed in the Executive Summary to vacate CSAPR and reinstate CAIR, a five-factor analysis of NO_x emissions was developed in Arkansas. On October 12, 2014, the stay of CSAPR was revoked. Beginning May 1, 2015, CSAPR is in effect and being implemented in Arkansas. ADEQ is currently reevaluating the NO_x emission limits that are in the disapproved SIP and considering appropriate revisions. See Table 2.3 for information regarding CAIR sources in Arkansas.

Arkansas's participation in the CAIR NO_x Ozone season only cap and trade program was also a significant component of the State's LTS and was expected to yield EGU NO_x emissions reductions. While CAIR was remanded by the D.C. Circuit Court of Appeals, as previously discussed in the Executive Summary, CAIR remains in effect and sources in Arkansas continue to comply with the state and federal requirements associated with CAIR. Also, as mentioned on the Executive Summary, EPA's request for a three-year delay in the compliance deadline as well as EPA's motion to lift the stay of the CSAPR were granted by the Courts. Until EPA provides guidance to the states, Arkansas will continue its participation in the CAIR NO_x Ozone season only cap and trade program.

Table 2.3. CAIR NO_x Ozone Season Allocations for Arkansas (2009–2017) as Allocated per APC&EC Reg. No. 19.1404.
Listed by Vintage Year.

Facility Name	Unit ID	2017	2016	2015	2014	2013	2012	2011	2010	2009
Hot Spring Generating Station (Magnet Cove)	SN-01	299	305	***	1	22	13	29	28	37
Hot Spring Generating Station (Magnet Cove)	SN-02	312	317	***	1	20	11	36	25	32
Carl E. Bailey Generating Station	1	21	17	15	35	69	70	92	93	94
Cecil Lynch Plant	Unit 2	2	3	3	5	5	2	19	19	19
Cecil Lynch Plant	Unit 3	27	30	16	11	11	8	35	36	36
Dell Power Plant	1	99	78	***	4	12	11	13	4	2
Dell Power Plant	2	105	90	***	3	12	15	13	7	3
Thomas B. Fitzhugh Generating Station	2	39	37	49	88	85	86	34	21	21
Flint Creek Power Plant	SN-01	774	800	872	1099	1089	1062	1363	1382	1384
Fulton Generating Station	1	22	21	23	30	29	24	8	4	3
Hamilton Moses Plant	Unit 1	0	0	0	0	0	0	24	24	24
Hamilton Moses Plant	Unit 2	0	0	0	0	0	0	23	23	23

Facility Name	Unit ID	2017	2016	2015	2014	2013	2012	2011	2010	2009
Harry D. Mattison Power Plant	SN-01	16	***	***	3	0	17	9	2	11
Harry D. Mattison Power Plant	SN-02	12	***	***	2	0	11	7	1	5
Harry D. Mattison Power Plant	SN-03	8	11	***	3	0	10	3	1	4
Harry D. Mattison Power Plant	SN-04	6	10	***	4	0	6	3	0	1
Harvey Couch Plant	Unit 1	4	5	6	8	7	2	13	13	13
Harvey Couch Plant	Unit 2	22	24	28	29	28	29	57	58	58
Hot Spring Energy Facility (Formerly KGen)	CT-1	210	218	234	221	214	216	16	28	15
Hot Spring Energy Facility (Formerly KGen)	CT-2	195	202	224	231	223	226	16	21	12
Independence Plant	1	1224	1314	1473	1913	1863	1844	2029	2057	2060
Independence Plant	2	1150	1230	1436	1783	1800	1823	2073	2102	2105
Jonesboro City Water and Light	3	0	0	0	0	0	0	12	12	12
Jonesboro City Water and Light	SN04	11	11	8	6	6	6	0	0	0
Jonesboro City Water and Light	SN06	13	12	8	7	7	0	12	2	2
Jonesboro City Water and Light	SN07	15	13	***	***	9	15	15	3	3
Lake Catherine Plant	Unit 1	0	0	0	0	0	0	28	29	29
Lake Catherine Plant	Unit 2	0	0	0	0	0	0	24	24	24
Lake Catherine Plant	Unit 3	0	0	0	0	0	0	52	53	53
Lake Catherine Plant	Unit 4	111	63	71	62	70	107	546	554	554
John L. McClellan Generating Station	1	60	60	63	91	112	114	147	149	149
Harry L. Oswald Generating Station	1	23	24	19	22	20	18	13	5	8
Harry L. Oswald Generating Station	2	20	21	18	21	19	19	10	6	6
Harry L. Oswald Generating Station	3	24	23	21	19	18	15	14	5	9
Harry L. Oswald Generating Station	4	19	19	20	24	23	20	12	6	10
Harry L. Oswald Generating Station	5	22	22	20	23	22	20	12	6	9
Harry L. Oswald Generating Station	6	22	25	23	24	24	20	17	5	10

Facility Name	Unit ID	2017	2016	2015	2014	2013	2012	2011	2010	2009
Harry L. Oswald Generating Station	7	48	49	51	57	53	45	15	7	10
Pine Bluff Energy Center	CT1	365	361	386	378	382	368	74	80	71
Plum Point Energy Station	Unit 1	***	***	***	381	501	467	0	0	0
Robert E. Ritchie Plant	Unit 1	0	0	0	0	0	2	189	192	192
Robert E. Ritchie Plant	Unit 2	0	0	0	0	0	0	217	220	220
Union Power Station	CTG-1	178	155	169	189	182	185	24	20	18
Union Power Station	CTG-2	175	148	167	193	187	189	24	20	15
Union Power Station	CTG-3	188	167	166	163	158	172	29	21	11
Union Power Station	CTG-4	184	164	167	195	188	191	25	18	8
Union Power Station	CTG-5	180	158	180	218	211	205	23	20	20
Union Power Station	CTG-6	174	155	171	214	207	196	22	20	24
Union Power Station	CTG-7	199	164	175	213	205	208	25	19	16
Union Power Station	CTG-8	200	173	180	224	217	220	24	19	14
John W. Turk Jr. Plant	SN-01	***	***	***	173	0	0	0	0	0
White Bluff Plant	Unit 1	1144	1184	1293	1536	1563	1585	2007	2035	2038
White Bluff Plant	Unit 2	1194	1233	1361	1607	1642	1642	1988	2016	2018
Total Allocations per Year		9116	9116	9116	11514	11515	11515	11515	11515	11515
KEY: <i>(Italics)</i> NEW SOURCE ALLOCATIONS (Plain Text) EXISTING SOURCE ALLOCATIONS *** to be determined										

The following federal rules (40 C.F.R. Part 80, Subpart H; 40 C.F.R. Part 85, 40 C.F.R. Part 86, Subpart P) have offered significant air quality improvement and reductions in visibility-related pollutants.

ii. Tier 2 Vehicle and Gasoline Sulfur Programs

EPA's Tier 2 fleet averaging program for on-road vehicles, modeled after the California LEV (Low Emissions Vehicle) II standards, became effective in the 2005 model year. The Tier 2 program allows manufacturers to produce vehicles with emissions ranging from relatively dirty to very clean, but the mix of vehicles a manufacturer sells each year must have average NO_x emissions below a specified value. Mobile emissions continue to decline as a result of these programs as motorists replace older, more polluting vehicles with newer, cleaner vehicles.

iii. Nonroad Diesel and Ultra-Low Sulfur Diesel (ULSD) Rules

EPA adopted standards for emissions of NO_x, hydrocarbons, and carbon monoxide (CO) from several groups of nonroad engines, including industrial spark-ignition engines and recreational nonroad vehicles. Industrial spark-ignition engines power commercial and industrial applications and include forklifts, electric generators, airport baggage transport vehicles, and a variety of farm and construction applications. Nonroad recreational vehicles include snowmobiles, off-highway motorcycles, and all-terrain vehicles. These rules were initially effective in 2004 and were fully phased in by 2012.

The nonroad diesel rule set standards that reduced emissions by more than 90% from nonroad diesel equipment and, beginning in 2007, the rule reduced fuel sulfur levels by 99% from previous levels. The reduction in fuel sulfur levels applied to most nonroad diesel fuel in 2010 and applied to fuel used in locomotives and marine vessels in 2012.

The low sulfur content mandated by the Ultra-Low Sulfur Diesel (ULSD) Rule resulted in better control particulate emissions from diesel engines. The transition to ULSD for highway vehicles began in June 2006. EPA regulations required that at least 80% of highway diesel fuel in the United States be ULSD, and by 2010, all highway diesel fuel became ULSD. EPA standards also required a major reduction in the sulfur content of diesel fuel intended for use in locomotive, marine, and nonroad engines and equipment including construction, agricultural, industrial, and airport equipment.

iv. 2007 Heavy-Duty Highway Rule

The 2007 Heavy-Duty Highway Rule, also referred as the "Clean Air Highway Diesel Rule," was adopted on January 18, 2001, by EPA as a part of the National Clean Diesel Campaign (NCDC) with the objective of reducing emissions from diesel engines by setting a PM emission standard for new heavy-duty engines, which took effect with the 2007 model year. The rule also required reduction of sulfur in diesel fuel to facilitate the use of modern pollution control technology on these engines. EPA established a goal of reducing emissions from over 11 million diesel engines in the existing fleet by 2014, especially in the sectors of school buses, ports, construction, freight, and agriculture.

ADEQ has undertaken several initiatives to obtain reductions from on-road and nonroad engines, including construction equipment throughout the State. ADEQ offers these funds

annually as a competitive funding assistance opportunity for fleet managers and equipment suppliers entitled “Reduce Emissions from Diesels (Go RED!),” as a means of subsidizing diesel retrofits and the biodiesel market. Although ADEQ cannot provide SIP-quality quantification of the reduction of emissions due to these programs, it is important to note that these efforts have contributed to the state’s improvement of air quality and visibility.

v. Source Retirement and Replacement Schedules

40 C.F.R. § 51.308(d)(3)(v)(B) requires the State of Arkansas to consider measures to mitigate the impacts of construction activities. In accordance with Subchapter 11.4.1.6 of the 2008 Arkansas Regional Haze SIP, ADEQ tracked Prevention of Significant Deterioration (PSD) new sources, source retirements, and replacements. Since 2002, five new PSD facilities have been permitted.

As shown in Table 2.4, these facilities’ total potential to emit (PTE) of NO_x is 5,833 tons per year (tpy) and for SO₂ the total PTE is 7,373.7 tpy. However, as shown by Table 2.5, the total actual emissions, as reported by the facilities in their Annual Emissions Inventory Report, for 2012 for NO_x was lower at 1,740.8 tpy and for SO₂ it was 3,303.2 tpy.

Table 2.4. Arkansas New PSD Facilities

Facility Name	AFIN	PTE (tpy)		Permit Number	Start Date
		NO _x	SO ₂		
Harry D. Mattison Power Plant	72-00695	242.6	3.2	2114-AOP-R5	02/13/07
Riceland Foods, Inc. - Soy Division	01-00008	542.7	232.9	0908-AOP-R6	02/14/08
Big River Steel, LLC.	47-00991	1,067.7	350.3	2305-AOP-R0	Pending
Plum Point Energy Station	47-00461	2,645.7	4,684.6	1995-AOP-R5	08/20/03
SWEPCO / AEP - John W. Turk, Jr. Plant	29-00506	1,334.3	2,102.7	2123-AOP-R2	11/05/08
Total PTE		5,833.0	7,373.7		

Table 2.5. Actual NO_x and SO₂ Emissions from the New PSD Facilities Listed in Table 2.4

Facility Name	AFIN	Reported Emissions (tpy)									
		2008		2009		2010		2011		2012	
		NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂
Harry D. Mattison Power Plant	72-00695	7.0	0.7	-	-	-	-	65.9	0.5	-	-
Riceland Foods, Inc. - Soy Division	01-00008	-	-	377.3	97.4	369.8	95.6	335.7	86.8	146.8	100.4
Big River Steel, LLC.	47-00991	-	-	-	-	-	-	-	-	-	-

Plum Point Energy Station	47-00461	-	-	-	-	<i>1,387.7</i>	<i>2,424.2</i>	<i>1,525.4</i>	<i>2,830.4</i>	<i>1,540.8</i>	<i>3,153.5</i>
SWEPSCO / AEP - John W. Turk, Jr. Plant	29-00506	-	-	-	-	-	-	-	-	53.3	49.4
	Total	7.0	0.7	377.3	97.4	1,757.5	2,519.8	1,927.0	2,917.7	1,740.8	3,303.2

- Note: the emissions shown in *italics* are from the State and Local Emissions Inventory System (SLEIS) and the emissions in plain font are from EPA's National Emissions Inventory (NEI) database.

Sixteen PSD facilities have shut down in Arkansas since 2008, resulting in a total reduction of 15,892.5 tpy in permitted NO_x emissions and of 1,125.8 tpy in permitted SO₂ emissions. Table 2.6 shows the actual emissions reductions from these facilities.

Table 2.6. Closed Arkansas PSD Facilities Since 2008

Facility Name	AFIN	PTE (tpy)		Closure Date	Reported Actual Emissions (tpy)							
					2005		2008		2009		2011	
					NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂
Entergy - Moses	62-00010	1,789.6	93.0	03/11/13	-	-	0.0	0.0	-	-	-	-
Enterprise Refined Products	54-00110	10.4	0.0	02/19/13	-	-	2.852	0.0	-	-	-	-
Huntington Foam	66-00701	8.8	0.2	01/22/13								
Georgia Pacific - Fordyce Plywood	20-00004	194.0	21.5	01/01/11			297.3	29.4	188.1	16.3		
Pinnacle Frames and Accents	11-00075	3.6	0.1	01/25/11	0.446	0.0027	0.5	0.0			0.4	0.0
Potlatch Land and Lumber	50-00001	189.1	18.9	08/06/11	93.85	15.24	26.1	4.7	26.1	4.7	162.8	26.5
CenterPoint Energy - Hobbs	66-00640	201.4	0.3	08/09/10	131.9	0.05	31.74	0.04	1,103	0.1	-	-
Progressive Foam	23-00006	3.7	0.1	05/04/10			0.47	0.003			-	-
White Rodgers/Emerson Electric	32-00007	4.8	0.3	03/15/10	4.522	0.0273					-	-
Riverside Plant #5	58-00050	43.5	2.3	06/29/09	1.5	0.1					-	-
Allied Tube and Conduit	35-00117	16.0	0.0	10/22/08	1.465	0.005	0.014	0.0	-	-	-	-
G-P Wood Products	70-00032	71.5	10.5	04/18/08			83.5	10.7	-	-	-	-
Spang and Company-Magnetics	42-00064	0.3	0.1	01/25/08					-	-	-	-
GDX Automotive	32-00038	25.8	0.2	01/13/08					-	-	-	-
Entergy - Ritchie SN-01	54-	13,140.1	787.9	02/06/13	-	-	-	-	-	-	-	-

Facility Name	AFIN	PTE (tpy)		Closure Date	Reported Actual Emissions (tpy)							
					2005		2008		2009		2011	
					NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂
	00017											
Entergy - Lynch	60-00087	682.0	312.4	05/01/13	-	-	0.7	0.1	-	-	1.7	0.0
Entergy – Couch SN-02	37-00004	1786.2	71.3	12/18/13	112.5	.3	36.4	.127			22.7	.09
Entergy – Lake Catherine –SN-01	30-0001	3504.2	154.6	12/19/13	6.360	0.006	4.60	0.004	-	-	2.131	0.002
Entergy – Lake Catherine –SN-02	30-0001	2902.0	133.7	12/19/13	1.520	0.005	1.3	0.003	-	-	1.875	0.002
Total PTE (tpy)		24,577	1,607.1	Total Actual (tpy)	354.06	15.74	485.5	45.1	1,317	21.1	191.6	26.6

Note: the emissions shown in *italics* are from the State and Local Emissions Inventory System (SLEIS) and the emissions in plain font are from EPA’s National Emissions Inventory (NEI) database.

vi. Agricultural and Forestry Smoke Management

40 C.F.R. § 51.308(d)(3)(v)(E) requires Arkansas to consider smoke management techniques for the purposes of agricultural and forestry management.

The Arkansas Forestry Commission approved revisions to the Arkansas Smoke Management Plan (SMP) in 2007, which is designed to assure that prescribed fires are planned and executed in a manner designed to minimize impacts associated with the smoke produced by prescribed fires.

4. Maximum Achievable Control Technology (MACT) (40 C.F.R. Part 63)

Since the development of the 2008 Arkansas Regional Haze SIP, EPA has promulgated standards that are anticipated to yield new emissions reductions and have the potential to further reduce emissions associated with visibility impairment in the federal and state Class I areas.

CENRAP estimated emissions reductions from the MACT standards for source categories with post-2002 compliance data⁷. MACT standards not expected to achieve significant VOC emission reductions were excluded. See Table 2.7. This table also provides the associated C.F.R. subpart containing the regulations, the compliance date for existing sources, and the pollutants considered in the 2018 inventory. The list is based upon the data developed by E. H. Pechan and Associates⁸. It is likely that the MACT standards did not significantly impact visibility impairment in Class I areas. CENRAP’s review is provided only as a courtesy and for future reference.

Table 2.7 below describes the MACTs used as control strategies for the non-EGU point source emissions. The table notes the pollutants for which controls were applied as well as the promulgation dates and the compliance dates for existing sources.

Table 2.7. Post-2002 MACT Standards Considered in the 2018 Emissions Inventory

MACT Standard - Source Category	40 C.F.R. Part 63 Subpart	Promulgation (Publication in Federal Register)	Compliance Date (existing sources)	Pollutants Affected
Asphalt (Roofing Manufacturing and Asphalt Processing)	LLLLL	4/29/2003	5/1/2006	VOC
Auto and Light Duty Trucks	IIII	4/26/2004	4/26/2007	VOC
Coke Ovens: Pushing, Quenching and Battery Stacks	CCCCC	4/14/2003	4/14/2006	VOC

⁷ The CENRAP modeling emissions inventory consists of several distinct datasets: the 2002 base case for model performance evaluation, 2002 typical, 2018 base case, and the 2018 control strategy scenario.

⁸ Pechan, E.H. & Associates. (2005). *Development of Growth and Control Inputs for CENRAP 2018 Emissions, Draft Technical Support Document*. Durham, North Carolina. Carolina Environmental Program, University of North Carolina, Chapel, Hill, North Carolina. May.

MACT Standard - Source Category	40 C.F.R. Part 63 Subpart	Promulgation (Publication in Federal Register)	Compliance Date (existing sources)	Pollutants Affected
Fabric Printing, Coating and Dyeing	OOOO	5/29/2003	5/29/2006	VOC
Friction Products Manufacturing	QQQQQ	10/18/2002	10/18/2005	VOC
Integrated Iron and Steel	FFFFF	5/20/2003	5/20/2006	VOC,
Large Appliances	NNNN	7/23/2002	7/23/2005	VOC
Leather Finishing Operations	TTTT	2/27/2002	2/27/2005	VOC
Lime Manufacturing	AAAAA	1/5/2004	1/5/2007	PM
Manufacturing Nutritional Yeast	CCCC	5/21/2001	5/21/2004	VOC
Metal Can (Surface Coating)	KKKK	11/13/2003	11/13/2006	VOC
Metal Coil (Surface Coating)	SSSS	6/10/2002	6/10/2005	VOC
Metal Furniture	RRRR	5/23/2003	5/23/2006	VOC
Miscellaneous Coating Manufacturing	HHHHH	12/11/2003	12/11/2006	VOC
Miscellaneous Metal Parts and Products (Surface Coating)	MMMM	1/2/2004	1/2/2007	VOC
Miscellaneous Organic Chemical Production and Processes (MON)	FFFF	10/11/2003	10/11/2006	VOC
Paper and Other Web	JJJJ	4/12/2002	4/12/2005	VOC
Pesticide Active Ingredient Production	MMM	6/23/1999	12/23/2003	VOC
Petroleum Refineries	UUU	11/4/2002	11/4/2005	VOC
Plastic Parts	PPPP	4/19/2004	4/19/2007	VOC
Plywood and Composite Wood Products	DDDD	7/30/2004	1/10/2007	VOC
Polymers and Resins III	OOO	1/20/2000	1/20/2003	VOC
Reciprocating Internal Combustion Engines (RICE)	ZZZZ	6/15/2004	6/15/2007	VOC, NO _x
Rubber Tire Manufacturing	XXXX	9/7/2002	11/7/2005	VOC
Secondary Aluminum Production	RRR	3/23/2000	3/24/2003	PM
Site Remediation	GGGGG	8/10/2003	8/10/2006	VOC
Solvent Extraction for Vegetable Oil Production	GGGG	12/4/2001	12/4/2004	VOC
Stationary Combustion Turbines	YYYY	5/3/2004	5/3/2007	VOC
Taconite Iron Ore Processing	RRRRR	10/30/2003	10/30/2006	PM
Wet Formed Fiberglass Mat Production	HHHH	11/4/2002	11/4/2005	VOC
Wood Building Products (Surface Coating)	QQQQ	5/28/2003	5/28/2006	VOC

5. [Mercury and Air Toxics Rule](#)

On December 16, 2011, the EPA finalized national C.A.A. standards to reduce mercury and other toxic air pollution from coal and oil-fired power plants. The final rule established power plant emission standards for mercury, acid gases, and non-mercury metallic toxic pollutants that will prevent 90% of the mercury in coal burned in power plants from being emitted to the air; reduce by 88% the acid gas emissions from power plants; and cut power plant SO₂ emissions by 41% beyond the reductions expected from CSAPR. Existing EGUs have to comply with this rule by April 16, 2015; however, an additional one-year extension may be granted for compliance if additional time is needed to install controls. Although reductions cannot be quantified at this time, Arkansas anticipates that some reductions in SO₂ emissions from the state's coal-fired EGUs will occur as a result of the MATS rule. Flint Creek plans to install a NID (Novel Integrated Desulfurization) system, while the two Entergy facilities (White Bluff and Independence) currently plan to control mercury by activated carbon injection (ACI). The NID system will control SO₂ and other acid gases, the ACI will not. The remaining coal fired plants in the State (Plum Point and Turk) were constructed with dry flue gas desulfurization and will not be modified.

6. [New NAAQS since the 2008 Arkansas Regional Haze SIP submittal](#)

On January 22, 2010, EPA strengthened the health-based NAAQS for NO₂, establishing a new 1-hour standard at a level of 100 ppb. On January 20, 2012, EPA designated all areas of the country as “unclassifiable/attainment” for the 2010 NO₂ NAAQS.

On June 3, 2010, the EPA promulgated a new 1-hour SO₂ NAAQS at a level of 75 ppb. On August 5, 2013, EPA designated 29 areas in 16 states as nonattainment, none of which are located in Arkansas.

On December 14, 2012, EPA strengthened the PM_{2.5} NAAQS, reducing the level of the annual standard from 15 µg/m³ to 12 µg/m³. EPA is expected to finalize attainment designations by December 14, 2014. Projections provided by EPA suggest 99% of counties with monitors will meet the revised standard by 2020.

ADEQ initiated rulemaking to adopt these standards, except for the 2012 PM_{2.5} NAAQS, into Arkansas's State regulations. APC&EC adopted this rulemaking on August 22, 2014, and ADEQ will incorporate these standards, for PSD sources only, into the SIP.

Chapter 3: Emissions Reductions-40 C.F.R. § 51.308(g)(2)

1. Summary of Emission Reductions Achieved

40 C.F.R. § 51.308(g)(2) requires, “A summary of the emissions reductions achieved throughout the State through implementation of the measures in paragraph (g)(1).”

To meet this requirement, states are required to identify and estimate emissions reductions primarily in NO_x, SO₂, and PM from SIP measures that were discussed in 40 C.F.R. § 51.308(g)(1). As stated in Chapter 2, the BART portion of the 2008 Arkansas Regional Haze SIP was partially approved and partially disapproved. (Please refer to Chapter 2 for the list of disapproved and approved BART elements.) Therefore, as of the submittal date of this report, there have not been any reductions from subject-to-BART sources due to BART limits.

Additional control measures included in the SIP were federal and state programs. Qualitatively, the continued implementation of those federal and state measures discussed in Chapter 2 not affecting point sources are expected to reduce emissions.

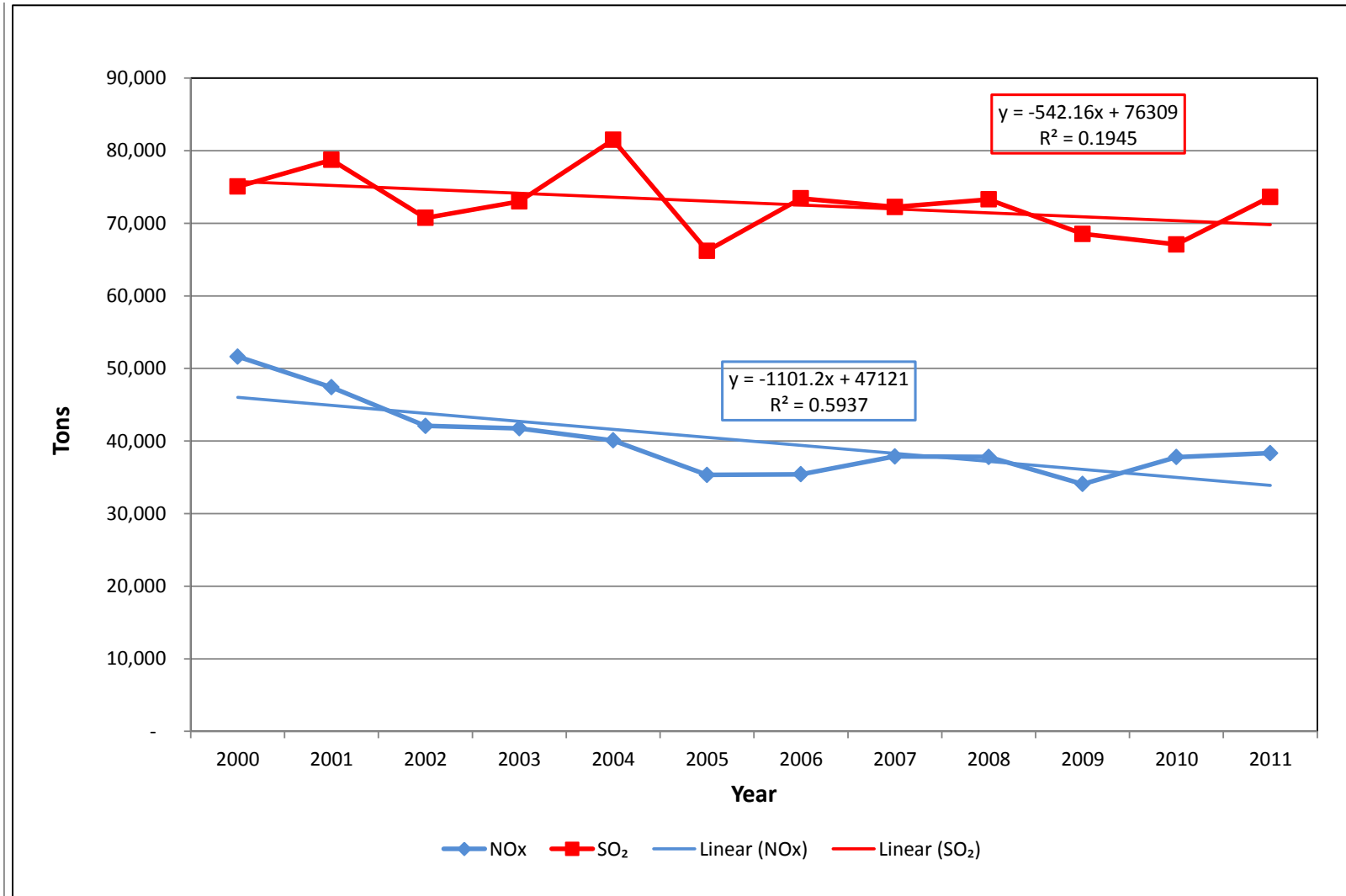
Emission data containing annual EGUs SO₂ and NO_x emissions in Arkansas were obtained from EPA’s Clean Air Markets Division (CAMD). (See Table 3.1.)

Table 3.1. Annual NO_x and SO₂ emissions (Arkansas, 2000–2011)⁹

Year	NO _x (tpy)	SO ₂ (tpy)
2000	51,624	75,057
2001	47,398	78,729
2002	42,079	70,738
2003	41,749	73,007
2004	40,083	81,483
2005	35,333	66,190
2006	35,414	73,432
2007	37,877	72,247
2008	37,800	73,289
2009	34,081	68,535
2010	37,785	67,084
2011	38,338	73,623

⁹ Source: U.S. EPA Clean Air Market Division www.epa.gov/airmarkt/

Figure 3.1. Emissions Trends for Arkansas Electric Generation Units (2000–2011)



Looking at the long term (2000–2011), the overall SO₂ and NO_x emissions from Arkansas EGUs are trending downward. (Table 3.1 and Figure 3.1.) Although there was an uptick in 2011, these emissions are less than the 2000 emissions.

2. EGU SO₂ Emission Reductions and Utilization

Figure 3.2 shows a comparison of heat input to observed and projected SO₂ and NO_x emissions for Arkansas EGUs reported to CAMD. As of 2011, SO₂ emissions have increased by 2,885 tpy and NO_x emissions have decreased by 3,741 tpy since 2002. Annual SO₂ emissions are projected to increase by an additional 125 tpy in 2018 from 2011 observed emissions. Annual NO_x emissions are projected to decrease by an additional 10,167 tpy in 2018 from 2011 observed emissions. Although SO₂ emissions from Arkansas EGUs have increased from baseline years 2001–2004 and are projected to continue to do so through 2018, the rate of SO₂ emissions in lb/MMBtu at EGUs has actually decreased. The decrease in emissions rates of SO₂ and NO_x in pounds per MMBtu by Arkansas EGUs, as demonstrated in Figure 3.2, indicates that control efficiencies have improved since 2002 and that projected SO₂ emissions are due to increased activity by EGUs.

Additionally, on June 12, 2013, public notice was issued on SWEPCO/Flint Creek Power Plant's (AFIN 04-00107, Permit No. 027-AOP-R6) draft permit and the final permit was issued on August 25, 2013. This permit was necessary for the installation and operation of new control equipment on source number 01 (SN-01). The installation of this control will reduce the permitted SO₂ emissions by 87.5%. Further SO₂ emission reductions will be realized from existing subject-to-BART sources once the 2008 Arkansas Regional Haze SIP is approved.

Figure 3.2. Arkansas EGU Emissions and Heat Input (2000-2011)

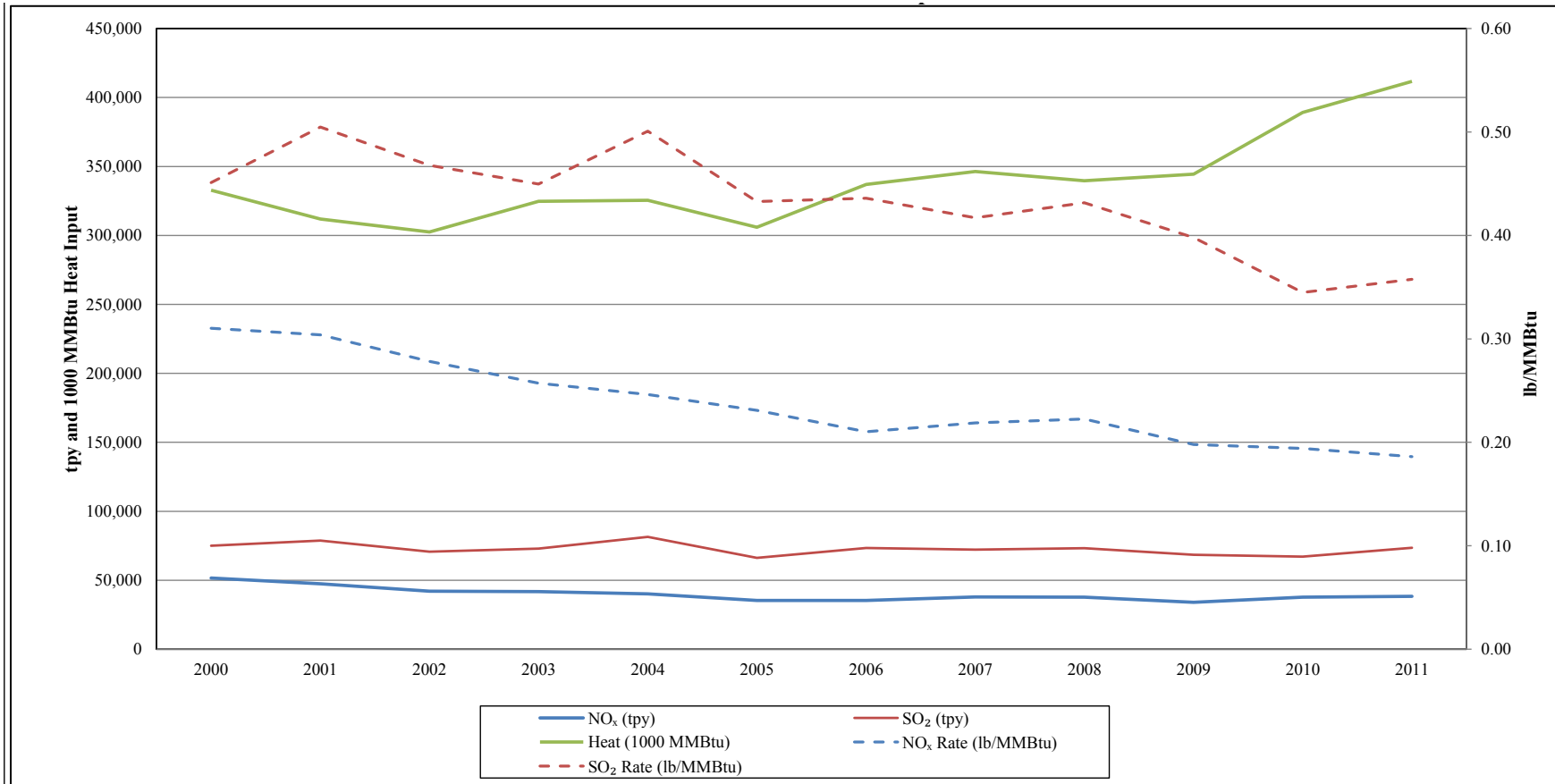


Figure 3.2 shows the rate of SO₂ and NO_x emitted per MMBtu is declining. Although Arkansas’s SO₂ and NO_x emissions have not dropped significantly, the plants are operating more efficiently as shown by ratio of emissions to heat input.

Chapter 4: Assessment of Visibility Conditions—40 C.F.R. § 51.308(g)(3)

1. Introduction

40 C.F.R. § 51.308(g)(3) of the RHR requires for each mandatory Class I area in the state, an assessment of the following visibility conditions and changes, with values for most impaired and least impaired days expressed in terms of five-year averages of these annual values:

- 40 C.F.R. § 51.308(g)(3)(i): *Current visibility conditions for the most and least impaired days.*
- 40 C.F.R. § 51.308(g)(3)(ii): *Difference between current visibility conditions for the most impaired and least impaired days and baseline visibility conditions.*
- 40 C.F.R. § 51.308(g)(3)(iii): *Change in visibility impairment for the most impaired and least impaired days over the past 5 years.*

The goal of the RHR is to restore natural visibility conditions to the mandatory Class I federal areas by 2064. The regional haze SIP must contain measures that make "reasonable progress" toward this goal by reducing anthropogenic emissions that cause haze. Subchapter 2, Assessment of Reasonable Progress Goals, found within this Chapter, will address Arkansas's reasonable progress in detail. For each Class I area, there are three metrics of visibility that are part of the determination of reasonable progress:

- baseline conditions;
- natural conditions; and
- current conditions.

Each of the three metrics includes the concentration data of the visibility impairing pollutants as different terms in the light extinction equation, with respective extinction coefficients and relative humidity factors. The Speciation Trends Network (STN) was later transitioned into the Chemical Speciation Network (CSN) with 50 long-term trend sites and approximately 150 sites operated by state, local, and tribal agencies, primarily in urban/suburban settings.

The primary system used to measure air quality improvements for visibility purposes is the Interagency Monitoring of Protected Visual Environments (IMPROVE¹⁰) program, a cooperative effort between the EPA, federal land management agencies, and state agencies. Air quality measurements in the IMPROVE network began in 1988; as of June 2011, there were 212 sites (170 current and 42 discontinued). In addition, the EPA's STN of 84 sites was originally included to expand the spatial and seasonal aerosol and reconstructed light extinction coefficient

¹⁰ IMPROVE is a network of monitors in various Class I areas, established to assess visibility impairment and its causes.

trends to include urban areas and to investigate the differences in urban and rural aerosol concentrations.

The RHR stipulates use of the IMPROVE algorithm for calculating light extinction in Class I areas. The algorithm uses measured ambient concentrations of light scattering aerosols and humidity to estimate light extinction. The 2011 IMPROVE¹¹ report describes in detail how visibility impairment is calculated. Total light extinction when converted to deciviews is calculated for the average of the 20% least impaired and 20% most impaired visibility days.

The IMPROVE equation¹² is used to convert monitored concentrations into extinction, a measure of visibility. The original IMPROVE equation converts PM species concentrations to light extinction (b_{ext}) as follows:

$$b_{ext} = 3 * f(RH) * [sulfate] + 3 * f(RH) * [nitrate] + 4 * [organic carbon] + 10 * [elemental carbon] + 1 * [fine soil] + 0.6 * [coarse mass] + 10$$

The $f(RH)$ is a water growth factor for sulfate and nitrate; its value depends on relative humidity (RH), ranging from one at low humidity to 18 at 98% humidity. Brackets ([]) represent the concentrations of the PM species measured in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The constants are the individual component's extinction efficiency. The 10 that is added accounts for Rayleigh scattering, which is due to the interaction of light with molecules of air itself with no pollutants and is measured in inverse megameters (Mm^{-1}).

In 2007, the IMPROVE workgroup published a more robust algorithm for calculating background visibility.¹³ The revised IMPROVE light extinction equation is expressed as follows:

$$b_{ext} = 2.2 * f_s(RH) * [small sulfate] + 4.8 * f_L(RH) [large sulfate] + 2.4 * f_s(RH) * [small nitrate] + 5.1 * f_L(RH) * [large nitrate] + 2.8 * [small organic mass] + 6.1 * [large organic mass] + 10 * [elemental carbon] + 1 * [fine soil] + 1.7 * f_{ss}(RH) * [sea salt] + 0.6 * [coarse mass] + Rayleigh scattering (site-specific) + 0.33 * [NO₂(ppb)]$$

Sulfate, nitrate, and organic mass are each split into two fractions representing small and large distributions of those species. Though not explicitly shown in the equation, the organic mass concentration used in this new algorithm is 1.8 times the organic carbon mass concentration, changed from 1.4 times carbon mass concentration as used for input for the original IMPROVE

¹¹ *Interagency Monitoring of Protected Visual Environments (IMPROVE) Report V* (2011).

¹² See: <http://vista.cira.colostate.edu/improve/>

¹³ Pitchford, M. L., W. C. Malm, B. A. Schichtel, N. Kumar, D. Lowenthal, and Hand, J. L. (2007). Revised algorithm for estimating light extinction from IMPROVE particle speciation data, *Journal of the Air and Waste Management Association*, 57, 1326-1336.

algorithm. Sea salt and light absorption by nitrogen dioxide (NO₂) which is measured in parts per billion (ppb) have been added. Distinct water growth curves for small sulfates and nitrates, large sulfates and nitrates, and sea salt have also been added. Site-specific Rayleigh scattering is calculated for the elevation and annual average temperature of each of the IMPROVE monitoring sites compared to the original equation that assumed extinction due to Rayleigh scattering was 10 Mm⁻¹.

2. Assessment of Visibility Conditions for Arkansas Class I Areas

The annual average visibility for 2001–2011 for the 20% best (least impaired) and 20% worst (most impaired) days at Caney Creek and Upper Buffalo Wilderness areas is displayed in Figure 4.1 and Figure 4.2. Visibility conditions have varied from year to year at each Wilderness area. The 2011 data for the least and most impaired days at Caney Creek and Upper Buffalo Wilderness areas shows an improvement in visibility for both areas since 2001.

Figure 4.1. Annual Average Visibility for 20% Best and 20% Worst Days at Caney Creek Wilderness Area, Arkansas (2001–2011)

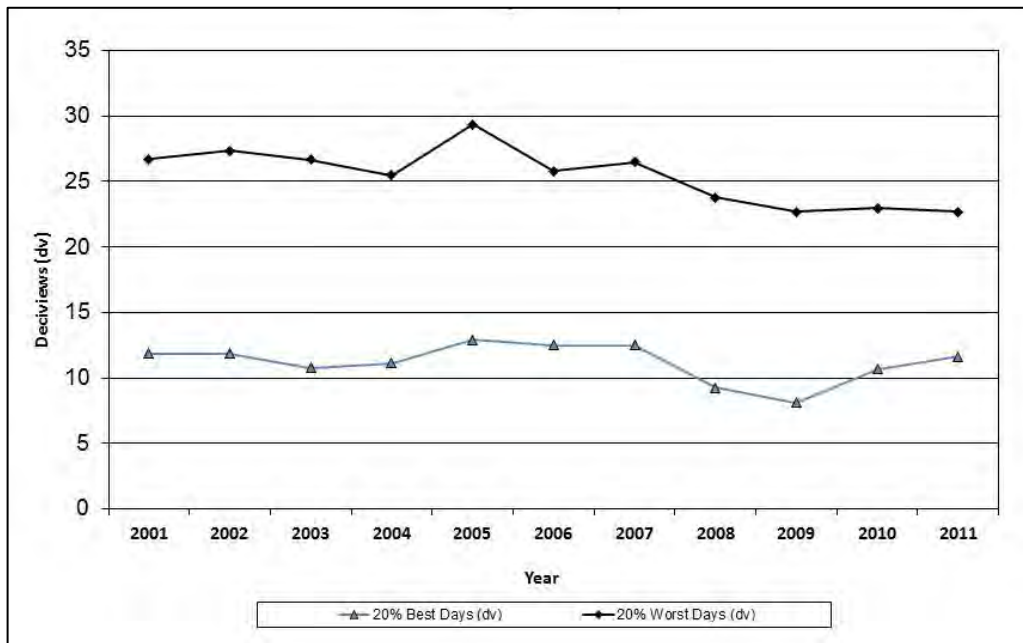


Figure 4.2. Annual Average Visibility for 20% Best and 20% Worst Days at Upper Buffalo Wilderness Area, Arkansas (2000–2011)

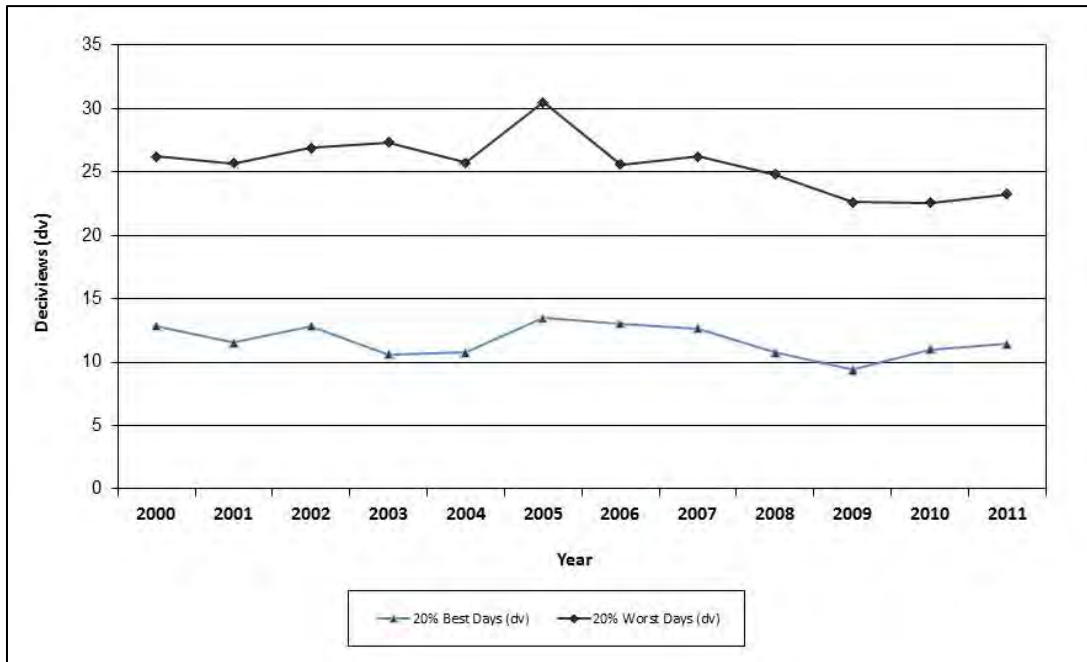


Table 4.1 demonstrates the change in visibility on the 20% worst days at Caney Creek and Upper Buffalo Wilderness areas based on observed data collected between 2001 and 2011 at Caney Creek Wilderness area and collected between 2000 and 2011 at Upper Buffalo Wilderness area. Both areas showed improved visibility from the baseline average in the periods of 2005–2009 and 2007–2011. The current five-year average shows that as of 2011, Caney Creek Wilderness area has achieved 73% of its visibility impairment reduction goal of 3.88 dv and Upper Buffalo Wilderness area has achieved 66% of its visibility impairment reduction goal of 3.75 dv by 2018.

Table 4.1. Visibility at Arkansas Class I Areas on the 20% Worst Days

Class I Area	Monitor ID	Baseline 5-Year Average 2000 – 2004 *(dv)	Current 5-Year Average 2007 – 2011 (dv)	Past 5-Year Average 2005 – 2009 (dv)	Current minus Baseline (dv) 5-Year Average
Caney Creek	CACR	26.55	23.73	25.63	-2.82
Upper Buffalo	UPBU	26.36	23.88	25.93	-2.47

*Data collection at Caney Creek Wilderness area began in 2001; therefore, only four years of data (2001–2004) were used to calculate the baseline.

Table 4.2 shows the five-year averages that were calculated for the 20% best days at Caney Creek and Upper Buffalo Wilderness areas. It also demonstrates the change in visibility on the 20% best days at Caney Creek and Upper Buffalo Wilderness areas based on observed data collected between 2001 and 2011 at Caney Creek Wilderness area and between 2000 and 2011 at Upper Buffalo Wilderness area. Caney Creek Wilderness area showed improved visibility from the baseline average for the periods of 2005–2009 and 2007–2011. Upper Buffalo Wilderness area showed degraded visibility from the baseline average in the average visibility impairment from 2005–2009 and improved visibility from the baseline average for the average of the years 2007–2011.

Table 4.2. Visibility at Arkansas Class I Areas on the 20% Best Days

Class I Area	Monitor ID	Baseline 5-Year Average 2000 – 2004 *(dv)	Current 5-Year Average 2007 – 2011 (dv)	Past 5-Year Average 2005 – 2009 (dv)	Current minus Baseline (dv) 5-Year Average
Caney Creek*	CACR	11.39	10.43	11.06	-0.97
Upper Buffalo	UPBU	11.71	11.04	11.85	-0.67

*Data collection at Caney Creek Wilderness area began in 2001; therefore, only four years of data (2001–2004) were used to calculate the baseline.

3. [Summary](#)

Caney Creek and Upper Buffalo Wilderness areas have both shown improved visibility for the most impaired and least impaired days since 2001 and are projected to continue to improve. Based on the five-year rolling averages and projected data, both Wilderness areas are on schedule to achieve their 2018 RPGs for the 20% worst days. Data from Caney Creek and Upper Buffalo Wilderness areas show that the goal of no visibility degradation on the 20% best days will be achieved and that visibility has and will continue to improve.

Chapter 5: Emissions Inventory Progress—40 C.F.R. § 51.308(g)(4)

The RHR 40 C.F.R. § 51.308(g)(4) requires: “*An analysis tracking the change over the past 5 years in emissions of pollutants contributing to visibility impairment from all sources and activities within the State. Emissions changes should be identified by type of source or activity. The analysis must be based on the most recent updated emissions inventory, with estimates projected forward as necessary and appropriate, to account for emissions changes during the applicable 5 year period.*”

1. Background

The 1990 C.A.A. Amendments require that an Emission Inventory (EI) be prepared statewide for point, nonpoint (area), on-road, and nonroad mobile emissions categories statewide. ADEQ maintains an EI of up-to-date information on emissions of SO₂, VOC, CO, NO_x, lead and lead compounds, ammonia (NH₃), particulate matter less than 2.5 micrometers (PM_{2.5}), and particulate matter less than 10 micrometers (PM₁₀). The EI identifies the types of emissions sources present in an area, the amount of each pollutant emitted, the type of processes occurring, and any control devices employed at each plant or source category. The EI provides data for a variety of air quality planning tasks that include establishing baseline emission levels, calculating emission reduction targets, developing control strategy development for reducing emissions, providing emission inputs into air quality simulation models, and the tracking of emissions over time. These EIs are critical for the efforts of state, local, and federal agencies to demonstrate attainment of the NAAQS.

This chapter discusses general EI development for each of the anthropogenic source categories and compares actual emission trends with modeled projections for the State as a whole (all sources) as well as for electric generating utilities within the State.

2. Industrial Point Sources

Stationary point source emission data is collected annually from those sources that meet reporting requirements outlined in the Air Emissions Reporting Requirements (40 C.F.R. Part 51). These sources include, but are not limited to, refineries, chemical plants, bulk terminals, and utilities. Facilities are required to report emissions data to ADEQ. Reporting of information characterizing the process equipment, the abatement units, and the emission points is also required. All data submitted is reviewed for quality assurance purposes and then stored in the State and Local Emissions Inventory System (SLEIS) database. At the end of the annual reporting cycle, point source emission data is reported each year to the EPA for inclusion in the National Emissions Inventory (NEI).

3. Area Sources

Stationary sources that do not meet the reporting requirements for point sources are classified as area sources. Area sources are small-scale industrial, commercial, and residential sources that use materials or perform processes that generate emissions. Area sources can be characterized by the mechanism in which emissions are released into the atmosphere: evaporative or combustion. Evaporative emission sources include the following: oil and gas production facilities, printing processes, industrial coating and degreasing operations, gasoline service station underground tank filling, and vehicle refueling operations. Combustion sources include the following small facilities with less than 100 tons per year of emissions: oil and gas production facilities, stationary source fossil fuel combustion at residences and businesses, outdoor burning, structural fires, and wildfires.

Arkansas accepts EPA emission estimates for the Area Sources category.

4. On-Road Mobile Sources

On-road mobile sources consist of passenger cars, passenger trucks, motorcycles, buses, heavy-duty trucks, and other motor vehicles traveling on public roadways. Combustion-related emissions are estimated for vehicle engine exhaust, and evaporative hydrocarbon emissions are estimated for the fuel tank and other non-tailpipe sources from the vehicle. To calculate pollution from on-road mobile sources, emission rates are estimated as a function of county, vehicle type, roadway type, hour, and operating speed. These rates are then matched with appropriate activity from transportation data sources such as vehicle miles traveled (VMT), number of vehicles parked, hours spent in extended idle mode, etc.

Arkansas accepts EPA emission estimates for sources in the On-Road Mobile category.

5. Nonroad Mobile Sources

Nonroad mobile sources include vehicles, engines, and equipment used for construction, agriculture, transportation, recreation, and many other purposes. Nonroad vehicles are also referred to as off-road or off-highway vehicles and do not normally operate on roads or highways. This broad category is composed of a diverse collection of machines, many of which are powered by diesel engines. Examples of nonroad mobile sources include, but are not limited to: agricultural equipment, commercial and industrial equipment, construction and mining equipment, lawn and garden equipment, aircraft, locomotives, and commercial marine vessels.

Arkansas accepts EPA emission estimates for sources in the Nonroad Mobile category.

6. Emissions Data

Table 5.1 shows the consolidated 2002, 2005, 2008, and 2011 NEI emissions data as well as the 2018 projected inventory from the 2008 Arkansas Regional Haze SIP. Please note that the Emissions Data for 2011 was obtained from the 2011 NEI version 1.

Table 5.1. Consolidated 2002, 2005, 2008, and 2011 NEI Emissions Data as well as the 2018 Projected Inventory from the 2008 Arkansas Regional Haze SIP

Category	NO _x					SO ₂				
	2002	2005	2008	2011	2018	2002	2005	2008	2011	2018
Agri/Bio	0	0	19,752	19,060	16,412	0	0	0	0	0
Area	20,596	31,184	6,848	30,173	1,474	27,232	41,811	477	2,005	159
Fires	405	405	11,347	14,640	2,443	1,071	819	4,741	7,571	1,581
Fugitive Dust	0	0	0	0	0	0	0	0	0	0
Nonroad Mobile	64,942	64,942	46,685	43,367	34,305	5,540	5,540	814	320	211
On-road Mobile	83,722	83,722	88,416	82,448	33,640	3,078	3,078	819	357	443
Point EGU	42,220	35,431	37,911	38,606	10,882	70,759	66,352	73,292	73,629	39,194
Point Non-EGU	27,602	23,803	36,775	32,443	10,556	19,027	9,107	13,970	11,241	7,471
Road Dust	0	0	0	0	0	0	0	0	0	0
TOTAL	239,487	239,487	247,734	260,737	97,552	126,707	126,707	94,113	95,123	49,059

Category	PM _{2.5}					PM ₁₀				
	2002	2005	2008	2011	2018	2002	2005	2008	2011	2018
Agri/Bio	4,743	4,743	28,964	27,134	0	31,657	31,657	144,820	135,672	0
Area	7,216	66,389	6,767	8,027	3,215	8,875	78,279	10,324	10,910	2,858
Fires	18,350	13,718	51,905	72,256	24,663	19,320	13,848	59,941	86,432	16,596
Fugitive Dust	237	237	1,979	1,518	940	1,717	1,717	19,792	15,184	5,480
Nonroad Mobile	4,145	1,043	3,139	2,953	3,387	4,367	1,165	3,416	3,134	3,678
On-road Mobile	1,612	1,386	2,818	2,885	949	2,202	1,988	3,647	3,707	949
Point EGU	2,124	1,797	1,332	1,091	74	2,512	2,058	2,195	2,643	218
Point Non-EGU	9,220	4,191	6,244	5,505	347	13,598	6,313	8,657	7,592	861
Road Dust	14,858	14,858	21,681	22,822	10,302	159,124	159,124	190,421	202,253	52,722
TOTAL	62,505	108,362	124,829	144,191	43,877	243,372	296,149	443,213	467,527	83,362

Category	VOC					NH ₃				
	2002	2005	2008	2011	2018	2002	2005	2008	2011	2018
Agri/Bio	0	0	1,124,476	1,303,104	0	111,187	111,187	120,201	117,710	45,179
Area	76,164	233,647	74,620	79,601	59,313	7,384	18,498	413	426	155
Fires	25,581	11,838	125,592	182,379	99,829	1,082	128	8,410	12,271	3,161
Fugitive Dust	0	0	0	0	0	0	0	0	0	0
Nonroad Mobile	37,258	1,657	33,830	30,634	31,475	42	19	35	37	49
On-road Mobile	56,465	46,267	40,952	25,871	19,924	3,001	3,254	1,464	1,236	3,412
Point EGU	527	481	529	551	119	346	281	312	324	4
Point Non-EGU	32,037	18,758	27,041	21,839	6,069	1,255	789	875	936	11
Road Dust	0	0	0	0	0	0	0	0	0	0
TOTAL	228,032	312,648	1,427,040	1,643,979	216,728	124,297	134,156	131,710	132,940	51,972

Note: The 2018 Point and Area source emissions were broken down by percentages relative to the 2008 NEI data.
Source: EPA EIS

7. Statewide Emissions Data Comparison

In the 2008 Arkansas Regional Haze SIP, actual 2002 inventory data was used to forecast 2018 emissions. Projected 2018 emission data, the approach used to develop the projections, and the modeling data were summarized in two chapters of the 2008 Arkansas Regional Haze SIP: Chapter 7 Emissions Inventory and Chapter 8 Modeling Assessment.

CENRAP-sponsored regional haze SIP modeling predicted that emissions of both NO_x and PM₁₀ would decrease between 2002 and the projected 2018 inventory. Increases in statewide emissions were predicted between 2002 and 2018 for both SO₂ and PM_{2.5}.

Emission changes were seen in the on-road mobile source inventory between 2008 and 2011 as a result of the transition from EPA's MOBILE6 model to the Motor Vehicle Emission Simulator (MOVES) model for estimation of emissions. Increases in on-road mobile source PM₁₀ and PM_{2.5} emissions have been documented¹⁴ as part of the new model's estimation methodology. The transition to MOVES model estimation methodology also resulted in increased NO_x emissions for on-road mobile sources¹⁵. These modeling changes may account for the increased emission estimates for PM₁₀, PM_{2.5}, and NO_x as EPA estimates were accepted by Arkansas for the 2011 NEI. EPA modeling figures for fires accounted for a major portion of the estimated emission increase for PM_{2.5} from 2008 to 2011. EPA figures for fires were also responsible for much of the estimated emission increase for NO_x from 2005 to 2008. EPA estimates (mainly

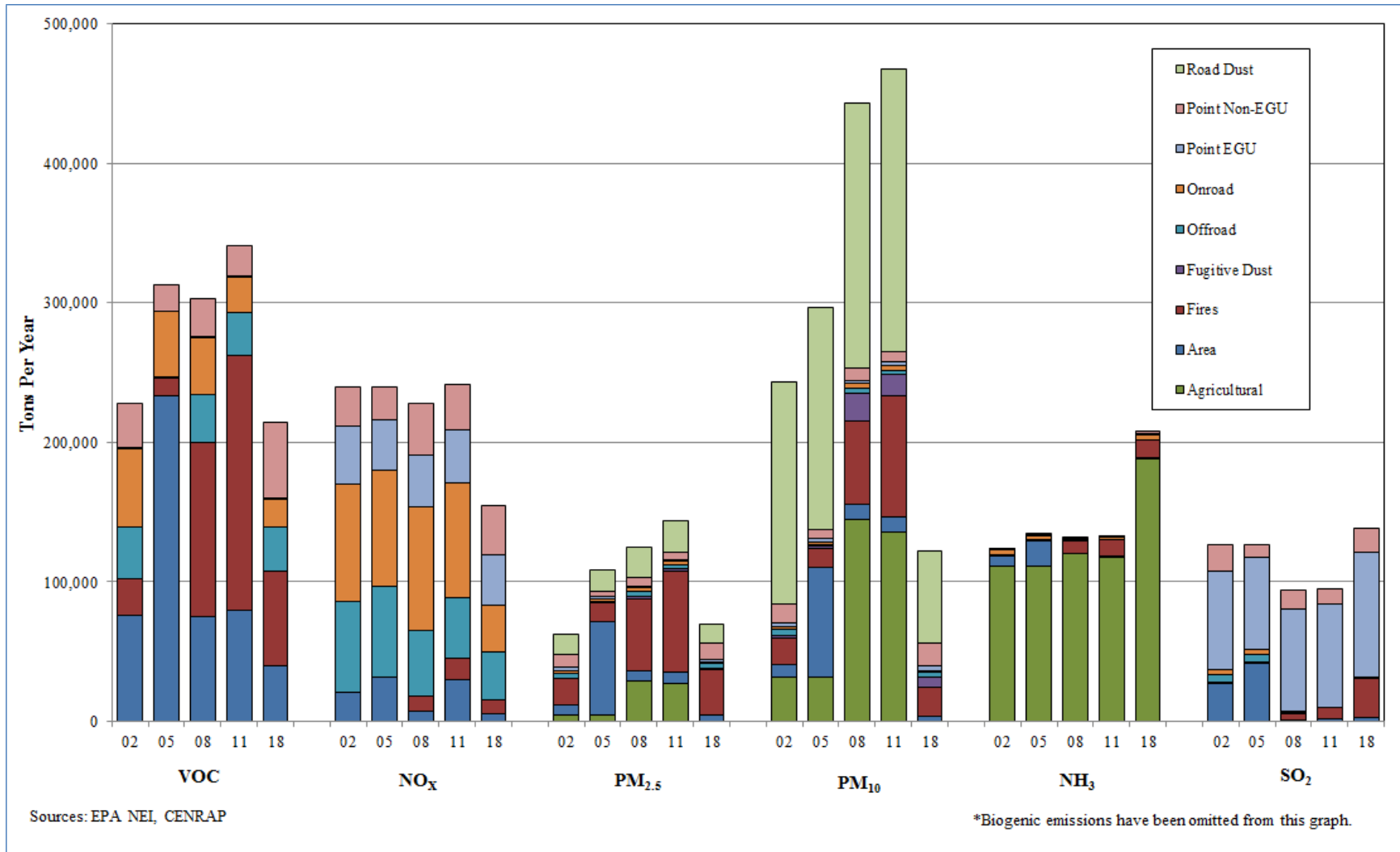
¹⁴ U.S. EPA. (2009). "Draft MOVES2009" for Comment: Questions and Answers. April.

¹⁵ Simon, Heather, et al. (2012). Analysis of US NO_x Emissions from Two Mobile Source Emissions Model: Magnitude, Spatial and Temporal Patterns, and Effects on Photochemical Modeling Outputs, Regional, State and Local Modeling Workshop Presentation.

fugitive dust, road dust, agriculture, and fires) accounted for a major portion of the estimated emission increase for PM₁₀ from 2005 to 2011.

The SO₂ emissions decreased between 2005 and 2011 as a result of phasing in low sulfur [500 parts per million (ppm)] ULSD fuels for nonroad, locomotive, and marine engines beginning in 2007. These lower sulfur fuel requirements, coupled with advanced emission control technologies, are expected to decrease emissions from these engines between 2007 and 2014.

Figure 5.1. Comparison of Arkansas's Actual Emissions for 2002, 2005, 2008, and 2011 with the 2018 CENRAP Projected Emissions



Emissions from 2002 are compared to 2011 emissions in Tables 5.2, 5.3, and 5.4.

Table 5.2. Summary of Arkansas Emissions from the 2002 NEI (tons)

Category	VOC	NO _x	PM _{2.5}	PM ₁₀	NH ₃	SO ₂
Agri/Biogenics	0	0	4,743	31,657	111,187	0
Area	76,164	20,596	7,216	8,875	7,384	27,232
Fires ^b	25,581	405	18,350	19,320	1,082	1,071
Fugitive Dust ^a	0	0	237	1,717	0	0
Nonroad Mobile	37,258	64,942	4,145	4,367	42	5,540
On-road Mobile	56,465	83,722	1,612	2,202	3,001	3,078
Point EGU	527	42,220	2,124	2,512	346	70,759
Point Non-EGU	32,037	27,602	9,220	13,598	1,255	19,027
Road Dust ^a	0	0	14,858	159,124	0	0
TOTAL	228,032	239,487	62,505	243,372	124,297	126,707

^aFugitive dust and road dust emission rates reflect what remains after the application of transport factors.

^bRepresents the sum of the 2002 “Area Fire,” “Point Fire,” and “Wildfire” categories.

Table 5.3. Summary of Arkansas Emissions from the 2011 NEI (tons)

Category	VOC	NO _x	PM _{2.5}	PM ₁₀	NH ₃	SO ₂
Agri/Biogenics	1,303,104	19,060	27,134	135,672	117,710	0
Area	79,601	30,173	8,027	10,910	426	2,005
Fires	182,379	14,640	72,256	86,432	12,271	7,571
Fugitive Dust ^a	0	0	1,518	15,184	0	0
Nonroad Mobile	30,634	43,367	2,953	3,134	37	320
On-road Mobile	25,871	82,448	2,885	3,707	1,236	357
Point EGU	551	38,606	1,091	2,643	324	73,629
Point Non-EGU	21,839	32,443	5,505	7,592	936	11,241
Road Dust ^a	0	0	22,822	202,253	0	0
TOTAL	1,643,979	260,737	144,191	467,527	132,940	95,123

^aTransport factors were not applied to the 2011 fugitive dust or road dust emissions

Table 5.4. Changes in Emissions from 2002 to 2011 (tons)

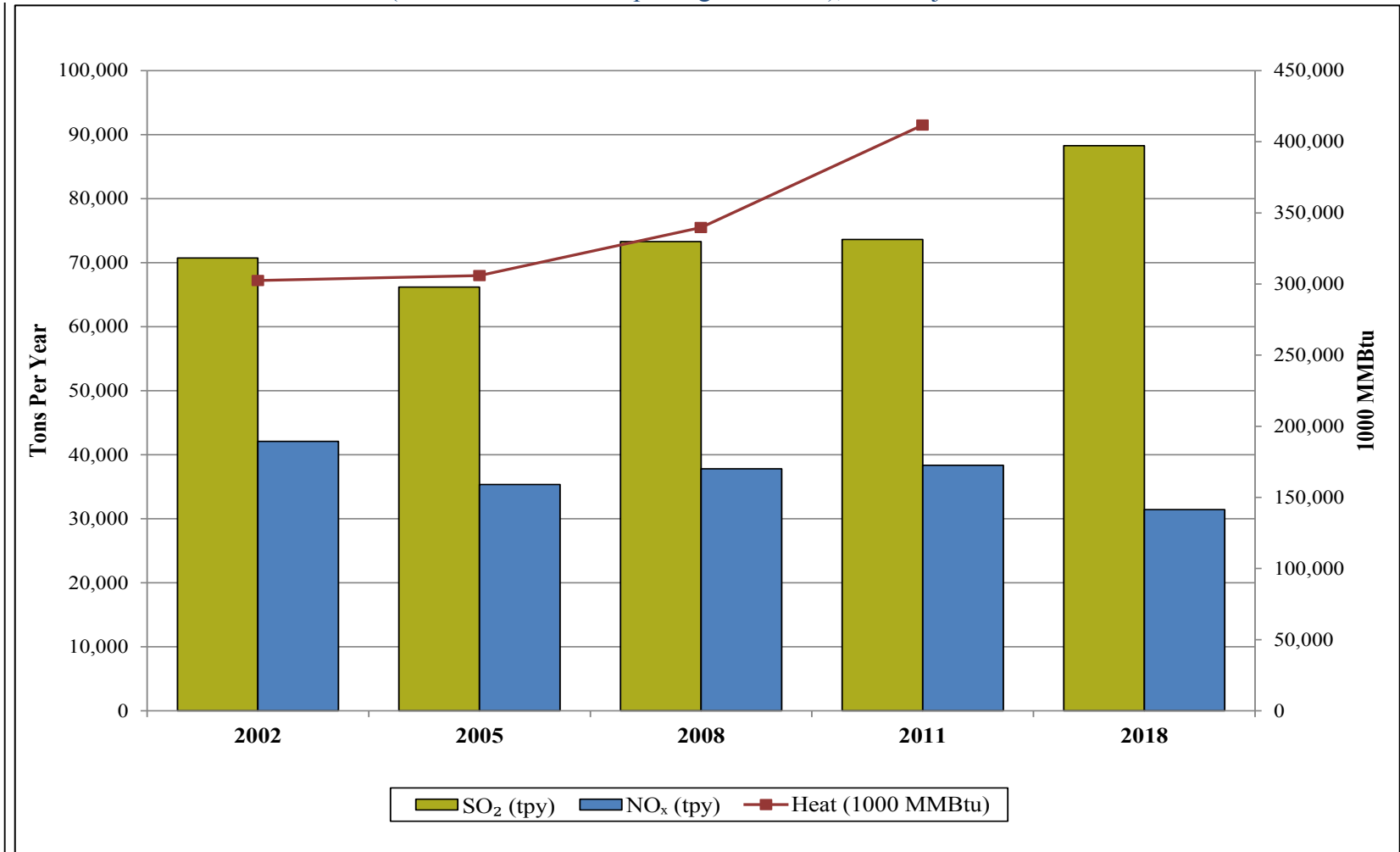
Positive values indicate growth.

Category	VOC	NO _x	PM _{2.5}	PM ₁₀	NH ₃	SO ₂
Agri/Biogenics	1,303,104	19,060	22,391	104,015	6,523	0
Area	3,437	9,577	811	2,035	-6,958	-25,227
Fires	156,798	14,235	53,906	67,112	11,189	6,500
Fugitive Dust ^a	0	0	1,281	13,467	0	0
Nonroad Mobile	-6,624	-21,575	-1,192	-1,233	-5	-5,220
On-road Mobile	-30,594	-1,274	1,273	1,505	-1,765	-2,721
Point EGU	24	-3,614	-1,033	131	-22	2,870
Point Non-EGU	-10,198	4,841	-3,715	-6,006	-319	-7,786
Road Dust ^a	0	0	7,964	43,129	0	0
Total Change	1,415,947	21,250	81,686	224,155	8,643	-31,584

^a Apparent increases in PM₁₀ and PM_{2.5} emissions from the fugitive dust and road dust categories are predominantly, if not wholly attributable to the 2011 emissions not being reduced by transport factors.

It was also noted that overall efficiency of EGU facilities has been increasing. This conclusion was based on the observation that the rate of heat input has increased at a higher rate than the rate of SO₂ and NO_x emissions. (See Figure 5.2.)

Figure 5.2. Actual Annual Emissions of SO₂ and NO_x and Heat Input (in 1000 MMBtu) in 2002, 2005, 2008 and 2011 as Reported to CAMD (Includes All Units Reporting to CAMD), and Projected 2018 Emissions



As predicted in the CENRAP-sponsored regional haze SIP modeling projections for 2018, estimated PM_{2.5} emissions have increased from 2002 to 2011. Estimated emissions of PM₁₀ and NO_x have also increased from 2002 to 2011. The increase in estimated emissions for both PM₁₀ and NO_x may be due to the use of newer modeling methodologies that have been developed since the 2018 projections were made. The reported PM₁₀ emissions from Point Source EGUs generally increased between 2002 and 2011; however, these emissions are projected to decrease by 2018. Although overall emissions for both NO_x and PM_{2.5} have increased from 2002 to 2011, the reported PM_{2.5} emissions from Point Source EGUs generally decreased between 2002 and 2011 while NO_x emissions from Point EGU sources were also lower in 2011 than in 2002. The majority of the NO_x, PM₁₀ and PM_{2.5} emission estimates referenced in Figure 5.1 for Point Source EGUs were obtained from NEI reports, which included data obtained directly from the reporting facilities. Those emission values therefore represent the most accurate data available at the time this document was developed. The remaining NO_x, PM_{2.5}, and PM₁₀ emissions that contributed to the overall increases were the results of EPA modeling. EPA-modeled emissions may have seen increases resulting from the use of newer modeling methodologies between 2005 and 2011. There was a decrease in estimated SO₂ emissions between 2002 and 2011 and this is likely due to phasing in of low sulfur fuels that may not have been factored into the original 2018 predictions.

8. Summary

As required in 40 C.F.R. § 51.308(g)(4), Arkansas analyzed changes in emissions of pollutants contributing to visibility impairment from sources within the State. Table 5.4 indicates that total SO₂ emissions have decreased since 2002. Although NEI emission figures for NO_x, PM₁₀, and PM_{2.5} have shown a general increase from 2002 to 2011, much of the increase for these pollutants is based on emission modeling/estimates from EPA. These modeled emissions may have shown increases due to the use of newer modeling methodologies that were not available when the baseline projections were developed in 2002. It was also observed, as shown on Table 5.1 and Table 5.4, NO_x, PM₁₀ and PM_{2.5} are trending down in the Point EGU category.

Chapter 6: Assessment of Changes Impeding Visibility Progress—40 C.F.R. § 51.308(g)(5)

1. Introduction

40 C.F.R. § 51.308(g)(5) requires: “*An assessment of any significant changes in anthropogenic emissions within or outside the State that have occurred over the past five years that have limited or impeded progress in reducing pollutant emissions and improving visibility.*”

To address 40 C.F.R. § 51.308(g)(5), Arkansas is explicitly indicating there were no significant changes in the anthropogenic emissions of concern that have limited or impeded progress in reducing pollutant emissions and improving visibility. Further information on how Arkansas is assessing visibility emissions in both of its Class I areas can be found in Chapter 4, Assessment of Visibility Conditions, which addresses Arkansas’s reasonable progress in detail, and Chapter 5, Emissions Inventory Progress, which provides the general EI development for each of the anthropogenic source categories.

Chapter 7: Assessment of Current Strategy to Meeting Reasonable Progress Goals–40 C.F.R. § 51.308(g)(6)

1. Introduction

40 C.F.R. § 51.308(g)(6) of the RHR requires: “*An assessment of whether the current implementation plan elements and strategies are sufficient to enable the State, or other States with mandatory federal Class I areas affected by emissions from the State, to meet all established reasonable progress goals.*”

EPA, as discussed in the Executive Summary, disapproved the RPGs set forth in the 2008 Arkansas Regional Haze SIP. The evaluation set forth in this chapter is based on the RPGs as established in the 2008 Arkansas Regional Haze SIP. ADEQ is presently working on revisions to the SIP to address the portions that EPA disapproved.

ADEQ has assessed the current SIP elements and strategies and determined that, based upon relevant data (i.e. projected emissions and modeling results), they are sufficient to enable Arkansas and other states with Class I areas affected by emissions from Arkansas to meet all established reasonable progress goals.

2. Control Measures in the 2008 Arkansas Regional Haze SIP

As stated in the 2008 Arkansas Regional Haze SIP, the CENRAP modeling showed that Arkansas’s Class I areas could achieve the 2018 RPGs without additional control measures beyond those described in the SIP.

The 2008 Arkansas Regional Haze SIP described emission reductions that would produce a 2018 outcome that could show progress toward the goal of natural background conditions and therefore it was concluded that there was not an immediate need to evaluate additional control measures beyond BART. This portion of the SIP was disapproved by EPA. Arkansas will reevaluate the need for additional control measures by performing the four-factor analysis described in 40 C.F.R. § 51.308(d)(1)(i)(A) and submit its findings as part of the responses to the disapproved portions of the 2008 Arkansas Regional Haze SIP. During this reevaluation process, ADEQ will work with EPA.

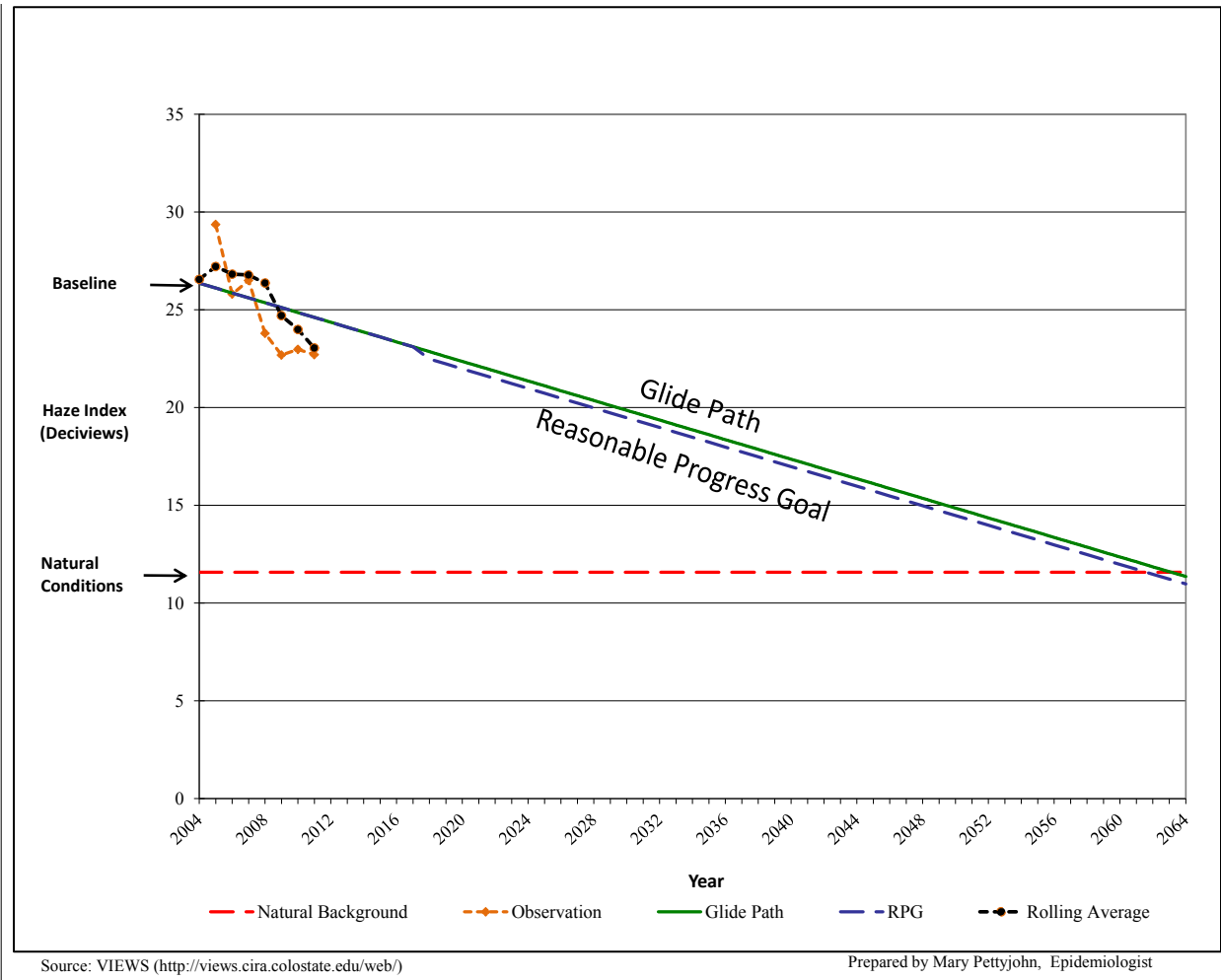
3. Assessment of Reasonable Progress Goals

The RHR at 40 C.F.R. § 51.308(d)(1) requires states to establish RPGs (in dv) for each Class I area within the state that provide for reasonable progress towards achieving natural visibility. In the 2008 Arkansas Regional Haze SIP, the Department established RPGs for reduction of visibility impairment by 2018 to demonstrate consistency with the uniform rate of progress needed to achieve natural background conditions by 2064 in Caney Creek and Upper Buffalo Wilderness areas. For Caney Creek Wilderness area, the Department established a RPG of 3.88

dv reduction in visibility impairment by 2018 for the 20% worst days. A 2018 RPG of 3.75 dv reduction in visibility impairment on the 20% worst days was established for Upper Buffalo Wilderness area. These RPGs should result in visibility improvement that exceeds the uniform rate of progress needed to achieve natural background conditions by 2064. The Department also established a goal of no visibility degradation for the 20% best days for Caney Creek and Upper Buffalo Wilderness areas. Based on the RPGs established by the Department, visibility at Caney Creek and Upper Buffalo Wilderness areas could achieve background conditions by 2062 and 2063, respectively.

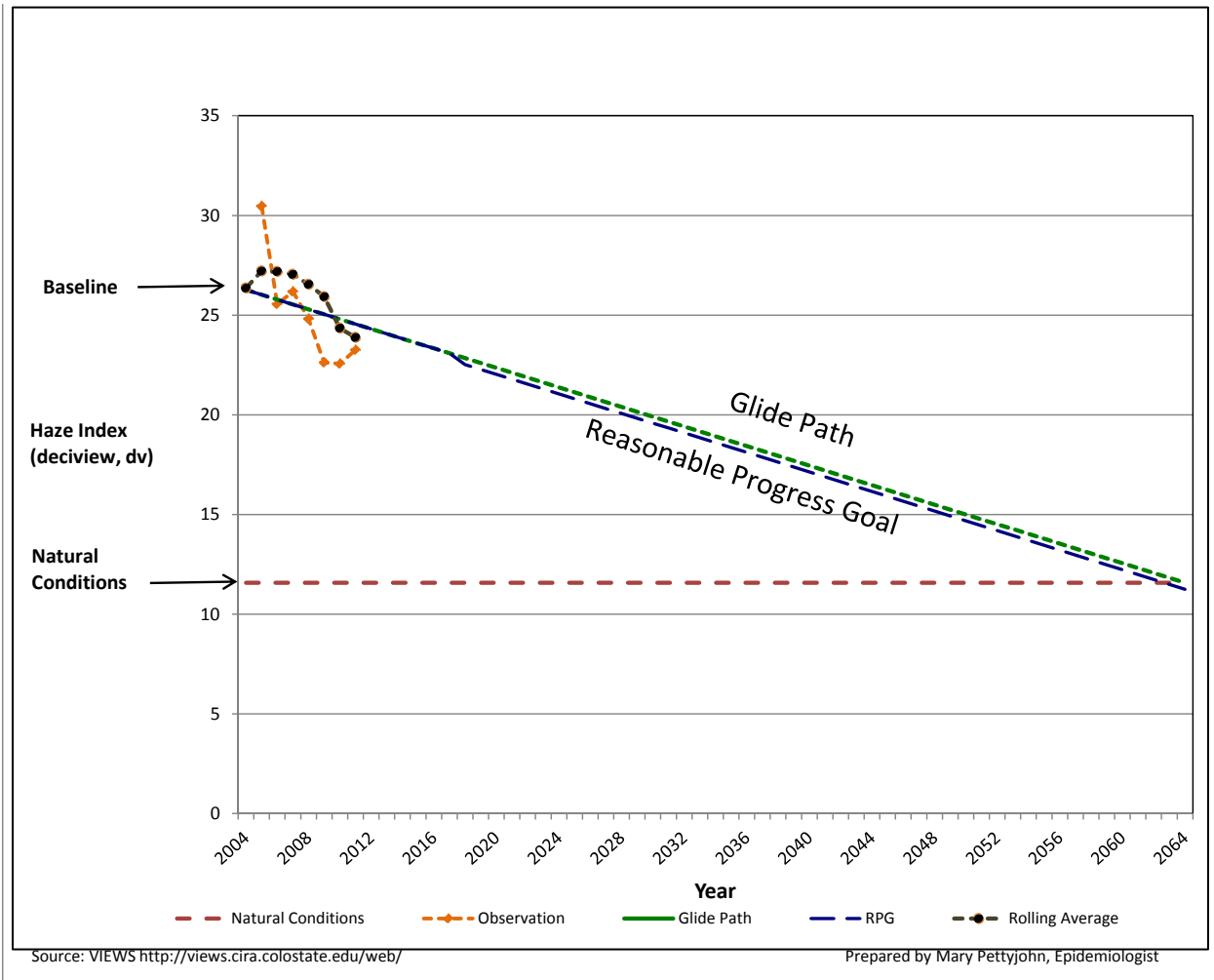
An assessment of visibility improvement progress for the 20% worst days at Caney Creek Wilderness area is depicted in Figure 7.1. A glide path has been drawn to indicate the uniform rate of visibility improvement required to reach the goal of natural conditions by 2064. The most recent data from 2011 and the current five-year rolling average (2007–2011) show that visibility impairment is decreasing more rapidly than the glide path and the RPG. Based on current data and without additional controls on sources, Caney Creek Wilderness area is expected to achieve its 2018 RPG of 3.88 dv of visibility improvement for the 20% worst days.

Figure 7.1. Reasonable Progress Assessment Caney Creek Wilderness Area, Arkansas: 20% Worst Days



An assessment of visibility improvement progress for the 20% worst days at Upper Buffalo Wilderness area is depicted in Figure 7.2. A glide path has been drawn to indicate the uniform rate of visibility improvement required to reach the goal of natural conditions by 2064. The most recent data from 2011 and the current five-year rolling average show that visibility impairment is decreasing more rapidly than the glide path and the RPG. Based on current data, and without additional controls on sources, Upper Buffalo Wilderness area is expected to achieve its 2018 RPG of 3.75 dv of visibility improvement for the 20% worst days.

Figure 7.2. Reasonable Progress Assessment Upper Buffalo Wilderness Area, Arkansas 20% Worst Days



An assessment of visibility improvement progress for the 20% best days at Caney Creek Wilderness area is depicted in Figure 7.3. A glide path has been drawn to indicate the uniform rate of visibility improvement required to reach natural visibility conditions by 2064. Although the most recent observed data collected in 2011 shows that visibility impairment on the 20% best days was greater than the baseline, the five-year rolling average shows a reduction in visibility impairment from the baseline.

Figure 7.3. Reasonable Progress Assessment Caney Creek Wilderness Area, Arkansas 20% Best Days

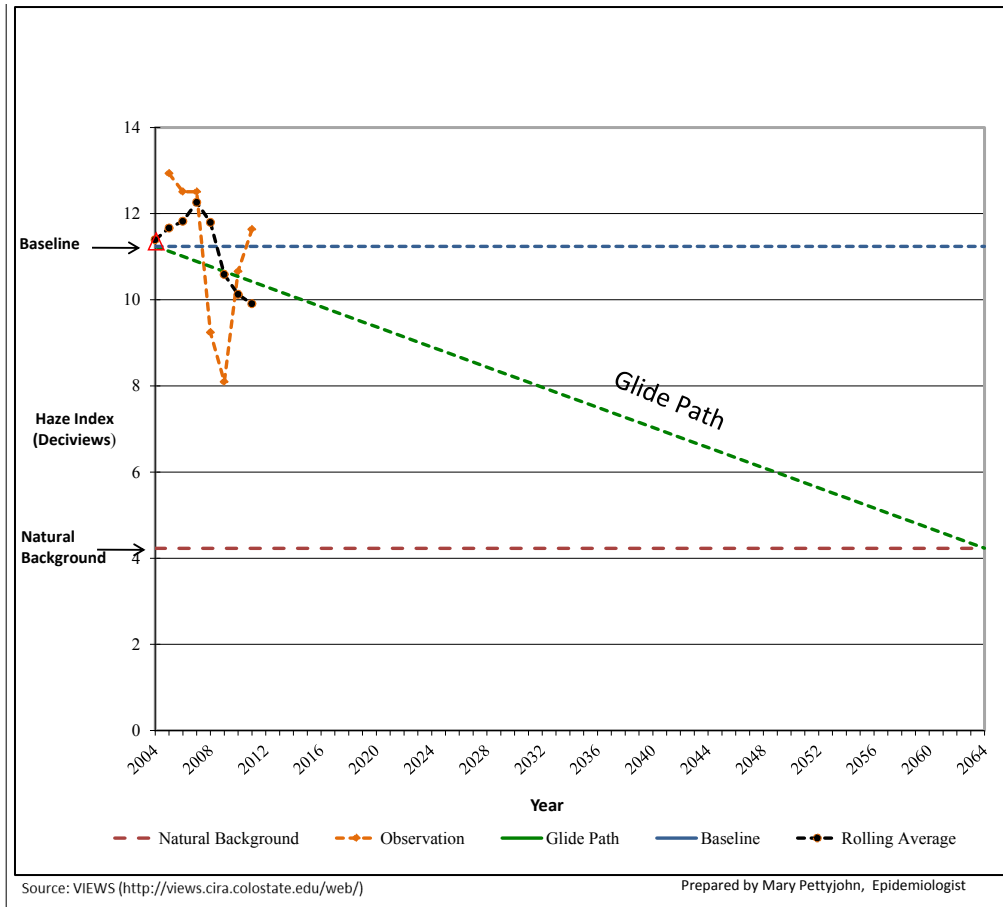
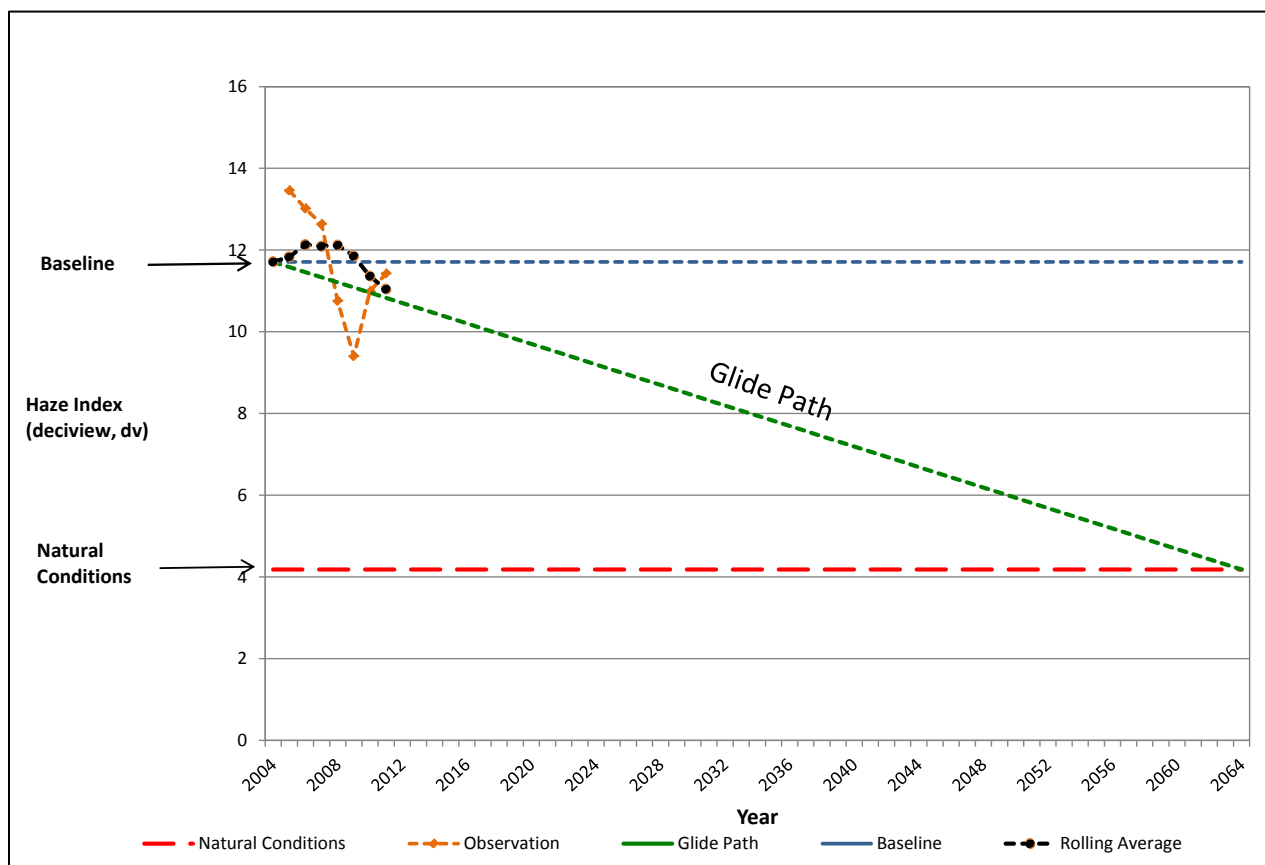


Figure 7.4 depicts an assessment of visual improvement progress for the 20% best days at Upper Buffalo Wilderness area. The five-year rolling average and the most recent observed data (2011) for visual impairment for the 20% best days are below the baseline.

Figure 7.4. Reasonable Progress Assessment Upper Buffalo Wilderness Area, Arkansas 20% Best Days



Source: VIEWS, <http://views.cira.colostate.edu/web/>

Prepared by Mary Pettyjohn, Epidemiologist

4. Visibility Improvements at Class I Areas in Other States

As indicated in the above subchapter, Assessment of Regional Progress Goals, Caney Creek and Upper Buffalo Wilderness areas show an improvement in visibility for both areas from the baseline average in the 2005–2009 and 2007–2011 periods. The current five-year average indicates that as of 2011, Caney Creek Wilderness area has achieved 73% of its visibility impairment reduction goal of 3.88 dv and Upper Buffalo Wilderness area has achieved 66% of its visibility impairment reduction goal of 3.75 dv by 2018.

Also indicated in the RPG assessment, the two Class I areas in another state which may be impacted by facilities in Arkansas (Hercules Glade, MO and Mingo, MO) have demonstrated visibility improvement for the least and most impaired days between 2000 and 2011 as shown in Table 7.1 and Table 7.2.

Table 7.1 demonstrates the change in visibility on the 20% worst days at Hercules Glade and Mingo Wilderness areas based on observed data collected between 2001 and 2011. Table 7.2 demonstrates the change in visibility on the 20% best days at Hercules Glade and Mingo Wilderness areas based on observed data collected between 2001 and 2011.

Table 7.1. Visibility at Nearby Class I Areas for the 20% Worst Days

Class I Area	Monitor ID	Baseline 5-Year Average 2000 – 2004 (dv)	Current 5-Year Average 2007 – 2011 (dv)	Past 5-Year Average 2005 – 2009 (dv)	Current minus Baseline	Past minus Baseline
Hercules-Glade, MO	HEGL	26.90	24.62	26.15	-2.28	-0.75
Mingo, MO	MING	28.40	26.48	27.10	-1.92	-1.30

Table 7.2. Visibility at Nearby Class I Areas for the 20% Best Days

Class I Area	Monitor ID	Baseline 5-Year Average 2000 – 2004 (dv)	Current 5-Year Average 2007 – 2011 (dv)	Past 5-Year Average 2005 – 2009 (dv)	Current minus Baseline	Past minus Baseline
Hercules-Glade, MO	HEGL	12.82	11.71	12.55	-1.11	-0.27
Mingo, MO	MING	14.30	13.47	13.90	-0.83	-0.40

Chapter 8: Visibility Monitoring Strategy Review – 40 C.F.R. § 51.308(g)(7)

1. Introduction

40 C.F.R. § 51.308(g)(7) requires: “*A review of the State’s visibility monitoring strategy and any modifications to the strategy, as necessary.*”

The monitoring strategy for regional haze in Arkansas relies upon participation in the IMPROVE network, which is the primary monitoring network for regional haze nationwide. The IMPROVE network provides the only long-term record for tracking visibility improvement or degradation, therefore, Arkansas intends to rely on data collected through the IMPROVE network to satisfy the regional haze monitoring requirement as specified in 40 C.F.R. § 51.308(d)(4) of the RHR.

EPA’s approval (77 Fed. Reg. 14604) of several core elements of the 2008 Arkansas Regional Haze SIP included the SIP’s proposed regional haze monitoring strategy.

2. Monitoring at Class I Areas in Arkansas

In Arkansas, IMPROVE sites are located at the 14,460 acre Caney Creek Wilderness area in the Ouachita National Forest in Polk County, and the 11,801 acre Upper Buffalo Wilderness area in the Ozark National Forest in Newton County. Upper Buffalo Wilderness area includes the original Wilderness and the additions to it. It does not include the Buffalo National River. In addition to the IMPROVE monitor, the Upper Buffalo Wilderness area monitor site also includes a nephelometer and a meteorological monitor. The applicable FLM for these areas is the Forest Service under the U.S. Department of Agriculture (USDA).

The IMPROVE measurements are critical to Arkansas’s regional haze monitoring strategy, and it is difficult to visualize how the objectives listed above could be met without the monitoring and sample analysis provided by IMPROVE. Any reduction in the scope of the IMPROVE network in Arkansas would jeopardize the State’s ability to demonstrate reasonable progress toward visibility improvement in its Class I areas. In the event of such reduction affecting Arkansas’s ability to track regional haze impacts in Class I areas, Arkansas, in consultation with EPA and relevant FLM, will develop an alternative approach for meeting the tracking goal (e.g., relying on nearby urban monitoring sites or seeking contingency funding for limited monitoring).

Additionally, Upper Buffalo Wilderness area’s visibility is monitored by a webcam serviced by the U.S. Forest Service. Real-time images can be viewed at <http://www.fsvisimages.com>.

3. Reporting Visibility Monitoring Data to EPA

Arkansas is committed to meeting the requirements under 40 C.F.R. § 51.308(d)(4)(iv), and reports to EPA visibility data for each of the Arkansas Class I areas annually. For the Five-Year Regional Haze Progress Report, Arkansas has evaluated its monitoring network and found there have not been any changes from the 2008 Arkansas Regional Haze SIP network.

Table 8.1. Arkansas Class I Areas Identification and Operational Dates

Class I Area	Monitor ID	State	Latitude	Longitude	Elevation Mean Sea Level (msl)	Dates of Operation
Caney Creek Wilderness	CACR1	AR	34.4544	-94.1429	683.00	6/22/2000 to present
Upper Buffalo Wilderness	UPBU1	AR	35.8258	-93.203	722.75	12/18/1991 to present

The filter samples from the IMPROVE monitors are sent for analysis to the Crocker Nuclear Laboratory of the University of California in Davis and the data is posted to the IMPROVE website at <http://vista.cira.colostate.edu/improve> and the Visibility Information Exchange Websystem (VIEWS) website at <http://views.cira.colostate.edu/web/>.

Data produced by the IMPROVE monitoring network will be used nearly continuously for preparing the five-year progress reports and the 10-year SIP revisions, each of which relies on analysis of the preceding five years of data. Consequently, the monitoring data from the IMPROVE sites needs to be readily accessible and to be kept up-to-date.

See Chapter 5 for monitoring data and assessment of changes impending visibility progress from 2000 to the latest quality assured IMPROVE data.

Chapter 9: Determination of Adequacy—40 C.F.R. § 51.308(h): Recommendations for Five-Year Progress Report

1. Introduction

40 C.F.R. § 51.308(h) or the RHR requires, “...*At the same time the State is required to submit any 5-year progress report to EPA in accordance with paragraph (g) of this section, the State must also take one of the following actions based upon the information presented in the progress report:*

- (1) ...provide to the Administrator a negative declaration that further revision of the existing implementation plan is not needed at this time;*
- (2) If the State determines that the implementation plan is or may be inadequate to ensure reasonable progress...the State must provide notification to the Administrator and to the other States which participated in the regional planning process...must also collaborate with the other States through the regional planning process for the purpose of developing additional strategies to address the plan’s deficiencies;*
- (3) Where...the implementation plan is or may be inadequate ...due to emissions from sources in another country, the State shall provide notification, along with available information, to the Administrator; or*
- (4) Where the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources within the State, the State shall revise its implementation plan to address the plan’s deficiencies within one year.”*

2. Negative Declaration

Based on the options above and the evidence presented herein, ADEQ is providing a negative declaration to the EPA Administrator, specifying that no additional controls are necessary during this first five-year progress report period. ADEQ is committed to correcting the portions of the 2008 Arkansas Regional Haze SIP that EPA disapproved.

In keeping with the EPA’s recommendations related to consultation, ADEQ enlisted the support of appropriate state, local and tribal air pollution agencies, as well as the corresponding FLMs to formulate this report. As part of this commitment, the Department made an advanced, draft copy of this report available to the aforementioned agencies and sought their input. Comments received, along with the Department’s responses can be found under Appendix A: Interagency Consultation. Those comments seen as germane were taken into account in developing this progress report.

In addition, the Department also published a Notice of Public Hearing and Comment Period in the *Arkansas Democrat Gazette* on January 2, 2015, and provided a 30-day public comment period. A public hearing, was held on February 2, 2015. A copy of the public notice and Response to Comments can be found under Appendix D: Evidence Public Notice Was Given, and under Appendix F: Compilation of Public Comments and Response to Comments.

ADEQ remains committed to continued consultation with other relevant states and FLMs for this SIP revision and/or the implementation of other programs having the potential to contribute to visibility impairment in much the same fashion as did the pre-hearing meetings, comments, and responses, as required by 40 C.F.R. § 51.308(i)(3) and included under Appendix A: Interagency Consultation.

Chapter 10: Consultation with Federal Land Managers—40 C.F.R. § 51.308(i)(2)-(3)

1. Introduction

The state must provide the FLM with an opportunity for consultation, in person and at least 60 days prior to holding any public hearing on an implementation plan (or plan revision) for regional haze required by this subpart. This consultation must include the opportunity for the affected Federal Land Managers to discuss their:

- (i) *Assessment of impairment of visibility in any mandatory Class I Federal area; and*
- (ii) *Recommendations on the development of the reasonable progress goal and on the development and implementation of strategies to address visibility impairment.*

In developing any implementation plan (or plan revision), the state must include a description of how it addressed any comments provided by the FLM.

2. Consultations

CenSARA arranged conference calls, which took place on February 27, 2012, April 30, 2013, July 30, 2013, August 13, 2013, and September 12, 2013, for the central states with the FLM who would be reviewing the five-year regional haze SIPs. The FLM offered suggestions on the content of the five-year SIP revisions as no further guidance had been provided by the EPA since the 1999 RHR at the time of this document development. The FLM representative suggested that states focus on the data in the 2011 Interagency Monitoring of Protected Visual Environments (IMPROVE) report, which analyzed the Class I area network data for five years, charted trends for each Class I area, and presented national trends. On April 12, 2013, the EPA released a guidance document to assist states in addressing the requirements for a five-year regional haze SIP revision, titled *General Principles for the 5-Year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans (Intended to Assist States and EPA Regional Offices in Development and Review of the Progress Reports)*.

The RHR requires that this SIP revision be reviewed by the appropriate FLMs and EPA before the SIP goes to public comment. The rule requires that FLMs be given 60 days to comment on Arkansas's SIP and that these comments be available to the public during the public comment period. As with the previous Regional Haze SIP revision, after the State receives comments from the federal agencies, ADEQ and FLMs and/or the EPA may confer on the federal comments for intent, clarification, or other reasons.

To enhance interstate consultation efforts, ADEQ submitted a draft SIP to the State of Missouri concurrently with the FLM review period. ADEQ has been and continues to be available for consultation concerning the Class I areas located in Arkansas.

3. FLM Comment Period

The FLM comment period opened on April 25, 2014, and closed on June 24, 2014, but it was extended until June 27, 2014, per FLM request. Comments were submitted to Tony Davis at the Arkansas Department of Environmental Quality, 5301 Northshore Dr., North Little Rock, AR 72118-5317.

Appendix A: Interagency Consultation

This is where Appendix A information will be inserted.



ARKANSAS
Department of Environmental Quality

April 21, 2014

Guy Donaldson
U.S. EPA Region 6
1445 Ross Avenue, Suite 1200
Mailcode: 6PD-L
Dallas, TX 75202-2733

Re: Arkansas Five-Year Regional Haze Progress Report State Implementation Plan (SIP)
Revision Draft

Dear Mr. Donaldson:

This letter serves to notify you that the Arkansas Department of Environmental Quality (ADEQ) has prepared the Five-Year Regional Haze Progress Report draft SIP and we would appreciate your review. For your convenience, a hard copy of the draft SIP and a disc with an electronic copy are enclosed.

We also would like to inform you, in accordance with 40 C.F.R. § 51.308(i), ADEQ is to consult with the Federal Land Managers (FLMs) responsible for Class I areas where visibility may be impacted by Arkansas sources, and we have submitted to them also a copy of this draft SIP for their revision. We expect to receive their formal comments by June 24, 2014, prior to ADEQ holding a public hearing to solicit public comments.

Should you have any questions, please contact Mark McCorkle at 501-682-0736 or by email at mac@adeq.state.ar.us.

Sincerely,

A handwritten signature in black ink, appearing to read "Mike Bates", with a long horizontal flourish extending to the right.

Mike Bates
Air Division Chief

Enclosure

ADEQ

ARKANSAS
Department of Environmental Quality

April 21, 2014

Ms. Wendy Vit
Air Quality Planning Section
Air Pollution Control Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

Re: Arkansas Five-Year Regional Haze Progress Report State Implementation Plan (SIP)
Revision Draft

Dear Ms. Vit:

This letter serves to notify you that the Arkansas Department of Environmental Quality (ADEQ) has prepared the Five-Year Regional Haze Progress Report draft SIP.

We also would like to inform you, in accordance with 40 C.F.R. § 51.308(i), ADEQ is to consult with the Federal Land Managers (FLMs) responsible for Class I areas where visibility may be impacted by Arkansas sources, and we have submitted to them also a copy of this draft SIP for their review. We requested their formal comments to be submitted by June 24, 2014, prior to ADEQ holding a public hearing to solicit public comments.

In order to enhance interstate consultation, we are submitting this draft SIP for your information. For your convenience, a hard copy of the draft SIP and a disc with an electronic copy are enclosed. We would appreciate if you could send us any comments by June 24, 2014.

Should you have any questions, please contact Mark McCorkle at 501-682-0736 or by email at mac@adeq.state.ar.us.

Sincerely,



Mike Bates
Air Division Chief

Enclosure



ARKANSAS
Department of Environmental Quality

April 21, 2014

Tim Allen, Meteorologist / Modeler
U.S. Fish and Wildlife Service
National Wildlife Refuge System
Branch of Air Quality
7333 W Jefferson Ave., Suite 375
Lakewood, CO 80235-2017

Re: Arkansas Five-Year Regional Haze Progress Report State Implementation Plan (SIP)
Revision Draft

Dear Mr. Allen:

This letter serves to notify you that the Arkansas Department of Environmental Quality (ADEQ) has prepared the Five-Year Regional Haze Progress Report draft SIP. In accordance with 40 C.F.R. § 51.308(i), ADEQ is to consult with the Federal Land Managers (FLMs) responsible for Class I areas where visibility may be impacted by Arkansas sources. We believe that such consultation can be sufficiently accomplished via phone or written communication, including email and/or letter. However, if your agency desires an in-person consultation or teleconference, please advise us as soon as practicable, but no later than 30 days after receipt of this submittal. For your convenience, a hard copy of the draft SIP and a disc with an electronic copy are enclosed.

As part of the consultation process, FLMs have 60 days to review the draft SIP revision, prior to ADEQ holding a public hearing to solicit public comments. Therefore, ADEQ requests you to acknowledge April 25, 2014, as the formal commencement of the required 60-day review period. We would appreciate your formal comments by June 24, 2014, via conventional mail, express courier or by email to the address below. Should you have any questions, please contact Mark McCorkle at 501-682-0736 or by email at mac@adeq.state.ar.us.

Sincerely,

A handwritten signature in black ink that reads "Mike Bates". The signature is written in a cursive, flowing style.

Mike Bates
Air Division Chief

Enclosure

ADEQ

ARKANSAS
Department of Environmental Quality

April 21, 2014

Norm Wagoner, Forest Supervisor
U.S. Forest Service
Ouachita: Caney Creek Wilderness Area
P.O. Box 1270
Hot Springs, AR 71902

Re: Arkansas Five-Year Regional Haze Progress Report State Implementation Plan (SIP)
Revision Draft

Dear Mr. Wagoner:

This letter serves to notify you that the Arkansas Department of Environmental Quality (ADEQ) has prepared the Five-Year Regional Haze Progress Report draft SIP. In accordance with 40 C.F.R. § 51.308(i), ADEQ is to consult with the Federal Land Managers (FLMs) responsible for Class I areas where visibility may be impacted by Arkansas sources. We believe that such consultation can be sufficiently accomplished via phone or written communication, including email and/or letter. However, if your agency desires an in-person consultation or teleconference, please advise us as soon as practicable, but no later than 30 days after receipt of this submittal. For your convenience, a hard copy of the draft SIP and a disc with an electronic copy are enclosed.

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Sincerely,



Mike Bates
Air Division Chief

Enclosure



ARKANSAS
Department of Environmental Quality

April 21, 2014

Reggie Blackwell, Acting Forest Supervisor
U.S. Forest Service
Ozark/St. Francis: Upper Buffalo Wilderness Area
605 West Main Street
Russellville, AR 72801

Re: Arkansas Five-Year Regional Haze Progress Report State Implementation Plan (SIP)
Revision Draft

Dear Mr. Blackwell:

This letter serves to notify you that the Arkansas Department of Environmental Quality (ADEQ) has prepared the Five-Year Regional Haze Progress Report draft SIP. In accordance with 40 C.F.R. § 51.308(i), ADEQ is to consult with the Federal Land Managers (FLMs) responsible for Class I areas where visibility may be impacted by Arkansas sources. We believe that such consultation can be sufficiently accomplished via phone or written communication, including email and/or letter. However, if your agency desires an in-person consultation or teleconference, please advise us as soon as practicable, but no later than 30 days after receipt of this submittal. For your convenience, a hard copy of the draft SIP and a disc with an electronic copy are enclosed.

As part of the consultation process, FLMs have 60 days to review the draft SIP revision, prior to ADEQ holding a public hearing to solicit public comments. Therefore, ADEQ requests you to acknowledge April 25, 2014, as the formal commencement of the required 60-day review period. We would appreciate your formal comments by June 24, 2014, via conventional mail, express courier or by email to the address below. Should you have any questions, please contact Mark McCorkle at 501-682-0736 or by email at mac@adeq.state.ar.us.

Sincerely,

A handwritten signature in black ink that reads "Mike Bates". The signature is written in a cursive style with a long, sweeping underline.

Mike Bates
Air Division Chief

Enclosure

ADEQ

ARKANSAS
Department of Environmental Quality

April 21, 2014

Reggie Blackwell, Acting Forest Supervisor
U.S. Forest Service
Ozark/St. Francis: Upper Buffalo Wilderness Area
605 West Main Street
Russellville, AR 72801

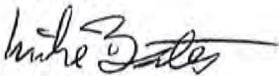
Re: Arkansas Five-Year Regional Haze Progress Report State Implementation Plan (SIP)
Revision Draft

Dear Mr. Blackwell:

This letter serves to notify you that the Arkansas Department of Environmental Quality (ADEQ) has prepared the Five-Year Regional Haze Progress Report draft SIP. In accordance with 40 C.F.R. § 51.308(i), ADEQ is to consult with the Federal Land Managers (FLMs) responsible for Class I areas where visibility may be impacted by Arkansas sources. We believe that such consultation can be sufficiently accomplished via phone or written communication, including email and/or letter. However, if your agency desires an in-person consultation or teleconference, please advise us as soon as practicable, but no later than 30 days after receipt of this submittal. For your convenience, a hard copy of the draft SIP and a disc with an electronic copy are enclosed.

As part of the consultation process, FLMs have 60 days to review the draft SIP revision, prior to ADEQ holding a public hearing to solicit public comments. Therefore, ADEQ requests you to acknowledge April 25, 2014, as the formal commencement of the required 60-day review period. We would appreciate your formal comments by June 24, 2014, via conventional mail, express courier or by email to the address below. Should you have any questions, please contact Mark McCorkle at 501-682-0736 or by email at mac@adeq.state.ar.us.

Sincerely,



Mike Bates
Air Division Chief

Enclosure

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY

5301 NORTHSHORE DRIVE / NORTH LITTLE ROCK / ARKANSAS 72118-5317 / TELEPHONE 501-682-0744 / FAX 501-682-0880

www.adeq.state.ar.us



ARKANSAS
Department of Environmental Quality

April 21, 2014

Bill Nightingale
U.S. Forest Service
Mark Twain Forest: Hercules Glade Wilderness Area
401 Fairgrounds Road
Rolla, MO 65401

Re: Arkansas Five-Year Regional Haze Progress Report State Implementation Plan (SIP)
Revision Draft

Dear Mr. Nightingale:

This letter serves to notify you that the Arkansas Department of Environmental Quality (ADEQ) has prepared the Five-Year Regional Haze Progress Report draft SIP. In accordance with 40 C.F.R. § 51.308(i), ADEQ is to consult with the Federal Land Managers (FLMs) responsible for Class I areas where visibility may be impacted by Arkansas sources. We believe that such consultation can be sufficiently accomplished via phone or written communication, including email and/or letter. However, if your agency desires an in-person consultation or teleconference, please advise us as soon as practicable, but no later than 30 days after receipt of this submittal. For your convenience, a hard copy of the draft SIP and a disc with an electronic copy are enclosed.

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Sincerely,

A handwritten signature in black ink, appearing to read "Mike Bates".

Mike Bates
Air Division Chief

Enclosure

ADEQ

ARKANSAS
Department of Environmental Quality

April 21, 2014

Pat Brewer
Regulatory, Policy, Smoke Management
NPS Air Resources Division
P.O. Box 25287
Denver, CO 80225-0287

Re: Arkansas Five-Year Regional Haze Progress Report State Implementation Plan (SIP)
Revision Draft

Dear Mr. Brewer:

This letter serves to notify you that the Arkansas Department of Environmental Quality (ADEQ) has prepared the Five-Year Regional Haze Progress Report draft SIP. In accordance with 40 C.F.R. § 51.308(i), ADEQ is to consult with the Federal Land Managers (FLMs) responsible for Class I areas where visibility may be impacted by Arkansas sources. We believe that such consultation can be sufficiently accomplished via phone or written communication, including email and/or letter. However, if your agency desires an in-person consultation or teleconference, please advise us as soon as practicable, but no later than 30 days after receipt of this submittal. For your convenience, a hard copy of the draft SIP and a disc with an electronic copy are enclosed.

As part of the consultation process, FLMs have 60 days to review the draft SIP revision, prior to ADEQ holding a public hearing to solicit public comments. Therefore, ADEQ requests you to acknowledge April 25, 2014, as the formal commencement of the required 60-day review period. We would appreciate your formal comments by June 24, 2014, via conventional mail, express courier or by email to the address below. Should you have any questions, please contact Mark McCorkle at 501-682-0736 or by email at mac@adeq.state.ar.us.

Sincerely,



Mike Bates
Air Division Chief

Enclosure



United States Department of the Interior

NATIONAL PARK SERVICE

Air Resources Division

P.O. Box 25287

Denver, CO 80225-0287

TRANSMITTED VIA ELECTRONIC MAIL - NO HARDCOPY TO FOLLOW

N3615 (2350)

June 23, 2014

Mike Bates
Air Division Chief
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118-5317

Dear Mr. Bates:

Thank you for the opportunity to review and comment on Arkansas's draft State Implementation Plan Review for the Five-Year Regional Haze Progress Report. While the draft report demonstrates that visibility is improving at Class I areas in Arkansas and Missouri, there is no demonstration that Arkansas is implementing all the reasonable control measures necessary to meet the 2018 reasonable progress goals for Class I areas in Arkansas and neighboring states. In March 2012, EPA disapproved portions of Arkansas' 2008 Regional Haze State Implementation Plan (SIP) that addressed Best Available Retrofit Technology, the long term strategy, and reasonable progress goals. Arkansas has not revised the 2008 Regional Haze SIP to resolve the deficiencies identified by EPA. For reasons outlined below, we do not agree with Arkansas' conclusion that the requirements of 40 CFR 51.308(g) have been met, nor can we support Arkansas' determination that no further actions are required.

Our specific comments follow:

Chapter 2.1: The description of pollutant contributions to haze on the 20% worst days at Caney Creek and Upper Buffalo Wilderness Areas (WAs) is good. Figures 2.1 and 2.2 demonstrate that sulfate is the largest contributor to haze of the 20% worst days. Figure 2.3 demonstrates that Electric Generating Units (EGU) and non-EGU point sources are the largest contributors to sulfur dioxide (SO₂) emissions in Arkansas. Therefore we would expect Arkansas to concentrate on reducing point source SO₂ emissions in the long-term strategy.

Chapter 3.1: Table 3.1 indicates that annual emissions of SO₂ from EGU in Arkansas actually increased between 2002 and 2011, while nitrogen oxide (NO_x) emissions decreased slightly. No information is presented about expected emissions reductions from existing EGU between 2011 and 2018 to support the 2018 emissions projections in Table 5.1. The information presented does not demonstrate reasonable progress in reducing point source emissions. Please identify any source specific controls planned and CAIR or CSAPR caps that have yet to be met that would require controls on these sources.

Chapter 5: There is a typo in sentence on top of page 50: Tables 5.2, 5.3, and 5.4 compare 2002 and 2011 emissions, not 2018 emissions. We recognize that emissions from area, non-road, and on-road sectors are calculated by EPA. Our concerns focus on point EGU and non-EGU facilities that are directly permitted by Arkansas and the lack of information supporting 2018 emissions projections.

Chapter 7: In 2012 EPA disapproved Arkansas's BART determinations and reasonable progress goals for 2018. Arkansas has not yet corrected the deficiencies in the 2008 SIP. Arkansas' draft 5-year progress report addresses goals that have been disapproved.

Arkansas commits on page 50 to work with EPA as it performs the required 4-factor analyses. We ask that Arkansas also consult with the affected Federal Land Managers.


Arkansas has not demonstrated that it is reducing emissions contributing to visibility impairment at Class I areas in neighboring states. Section 7.4 does not explain why Hercules Glade and Mingo WAs in Missouri were the only Class I areas reviewed. Arkansas should cite the CENRAP source apportionment analyses that show the contribution of Arkansas point, area, and mobile sources at neighboring Class I areas, compared to sources in other states.

For the reasons above, we disagree with Arkansas' conclusion that no additional actions are needed as part of this five year review. We encourage Arkansas to complete revisions to the 2008 Regional Haze SIP before requesting EPA approval of the 5-year regional haze progress report. If you have questions about our comments, please contact Pat Brewer of my staff at (303) 969-2153.

Sincerely,



Susan Johnson,
Chief, Policy, Planning, and Permit Review Branch

 **United States
Department of
Agriculture**

**Forest
Service**

**Ozark National Forest
P.O. Box 1270
Hot Springs, AR 71902
501-321-5202**

**Ozark-St. Francis
National Forests
605 West Main
Russellville, AR 72801
479-964-7200**

File Code: 2580
Date: June 23, 2014

Teresa Marks
Director
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Dear Ms. Marks:

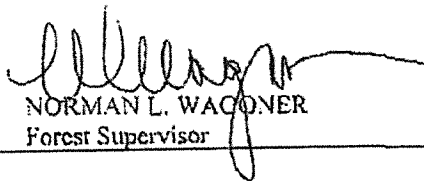
The U.S. Forest Service (FS) appreciates the opportunity to review and comment on the State Implementation Plan Review for the Five-Year Regional Haze Progress Report prepared by the Arkansas Department of Environmental Quality (ADEQ).

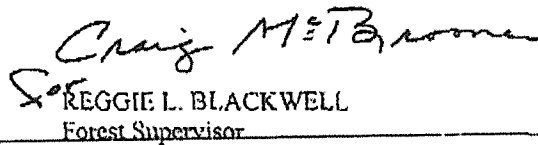
We are providing these comments to ADEQ, and ask that they be placed in the official public record. We look forward to your response as per section 40 CFR §51.308 (i)(3) and are willing to work with ADEQ staff towards addressing any of the issues discussed in this letter.

Again, we appreciate the opportunity to work closely with ADEQ to improve Arkansas's air quality and visibility. We thank you for the good working relations we have with you in our prescribed burning program.

If you have any questions, need clarification, or would like to discuss our comments, please feel free to contact Judy Logan at 501-321-5341. You may also contact Mr. Blackwell or Mr. Wagoner at the numbers listed above.

Sincerely,


NORMAN L. WAGONER
Forest Supervisor


REGGIE L. BLACKWELL
Forest Supervisor

Enclosure

cc: Mark McCorkle, Guy Donaldson, Joe Kordzi, Mike Bates
Meredith Bond
7333 W. Jefferson Ave., Suite 375
Lakewood, CO 80235
Meredith_Bond@fws.gov

RECEIVED
JUN 25 2014
BY: PM #188 FAX

FS Comments regarding ADEQ's Proposed Regional Haze Implementation Plan Revision of June 23, 2014

The Forest Service (FS) appreciated the opportunity to comment on the proposed Regional Haze plan revision.

Arkansas Department of Environmental Quality (ADEQ) submitted a Regional Haze (RH) plan to the Environmental Protection Agency (EPA) on September 23, 2008. On March 12, 2012, EPA took action and partially approved and partially disapproved the Arkansas Regional Haze State Implementation Plan (SIP). The FS submitted comments on June 6, 2008. We had several areas of concern in 2008 that we again bring forward. Specifically, we are still concerned how Best Available Retrofit Technology (BART) decisions are being handled as well as the treatment of Reasonable Progress and Long Term Strategy. As you know, the inclusion of the compliance provision that would require Arkansas subject-to-BART sources to install and operate BART no later than six years after the effective date of the State's regulation was not approved by EPA and should be enforced as written in the Clean Air Act under Sec. 169A (g)(4).¹

We would like to request that ADEQ summarize, on a facility-by-facility basis, levels of controls considered, final control selected, and information on how the "five factors" were considered in making its decisions. Detailed information can be placed in an Appendix, but BART information submitted by the owner or operator of a pollutant source is not a substitute for the State decision processes.

We request that ADEQ look at our previous comments on the Draft SIP dated June 6, 2008 as some of these are still pertinent.

The original Reasonable Progress discussion in the Draft SIP had several content deficiencies. It does not appear that ADEQ has made the needed correction. The SIP or the SIP review for the 5-year Regional Haze Progress Report (5-year review) does not identify any procedure to address single sources, or combinations of sources, that are predicted to continue to significantly impact visibility conditions in the future after implementing BART, CSAPR, (Cross State Air Pollution Rule) and any other on-the-books and on-the-way programs. Although the State concludes that additional controls are not necessary, we feel the following areas need further consideration:

- Summarize or offer clarity on what controls the Central Regional Air Planning Association (CENRAP)² Regional Planning Organization (RPO) utilized within Arkansas in their analyses. (See comment letter dated June 6, 2008, Page 7, #17).

¹ "Sec. 169A (g)(4) the term "as expeditiously as practicable" means as expeditiously as practicable but in no event later than five years after the date of approval of a plan revision under this section (or the date of promulgation of such a plan revision in the case of action by the Administrator under section 110(c) for purposes of this section);"

² Central Regional Air Planning Association CENRAP is an organization of states, tribes, federal agencies and other interested parties that identifies regional haze and visibility issues and develops strategies to address them. CENRAP

- A discussion of why model performance evaluation for the base year indicated significant under predictions of visibility impacts from sulfate at the two Class I areas located within Arkansas (See comment letter dated June 6, 2008, page 3, #7), and
- A discussion of the significance of 2002 to 2018 projections of increased point source sulfur emission within Arkansas. Although the model is used in a relative sense, no additional discussion or clarification is provided to address how model performance or model response is adequately addressing issues that may arise from impacts from sulfates, (See comment letter dated June 6, 2008, page 3, #8).
- New Prevention of Significant Deterioration permits (PSDs) that are not represented in the emissions inventory (i.e. John W. Turk and Plum Point II) should be considered as part of the Reasonable Progress Goals (RPG). Table 2.3 appears to have a number of gaps in the data. Please clarify if these sources were considered in the inventory presented.
- The Draft SIP and the 5-year review document omitted the required four factors analysis for establishing the Reasonable Progress Goals. Meeting the uniform rate of progress glide slope does not eliminate the need to analyze the four statutory factors of Reasonable Progress. (See comment letter dated June 6, 2008, page 9, #20).

Again, we wish to express our appreciation for the opportunity to comment on the proposed Regional Haze plan revision. If you have any questions or would like to further discuss or clarify our comments please feel free to contact Judy Logan (501) 321-5341, Mr. Blackwell (479)-964-7200, or Mr. Wagoner (501)-321-5202. We look forward to continuing to work closely with you at improving Arkansas's valuable air resources.



Forest Service

Ozark National Forest
P.O. Box 1270
Hot Springs, AR 71902
501-321-5202

Ozark-St. Francis
National Forests
605 West Main
Russellville, AR 72801
479-964-7200

File Code: 2580-2
Date: June 6, 2008

Ms. Teresa Marks
Director,
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Dear Ms. Marks:

On February 25, 2008, the State of Arkansas submitted a draft Regional Haze Rule State implementation plan (SIP), pursuant to the requirements codified in federal rule at 40 CFR 51.308(i)(2), describing its proposal to improve air quality regional haze impacts at mandatory Class I areas across your region. We appreciate the opportunity to work closely with the State through the initial evaluation, development, and, now, subsequent review of this plan. Cooperative efforts such as these ensure that, together, we will continue to make progress toward the Clean Air Act's goal of natural visibility conditions at all of our most pristine National Parks and Wilderness Areas for future generations.

The U.S. Department of Agriculture, U.S. Forest Service, received and has conducted a substantive review of your draft Regional Haze Rule implementation plan, which you are preparing in fulfillment of your requirements under the federal regulations 40 CFR 51.308(i)(2). Please note the U.S. Environmental Protection Agency (EPA) makes the final determination regarding the document's completeness and approval.

As outlined in a letter sent to each State in October, 2006, our review focused on eight basic content areas. The content areas reflect priorities for the Federal Land Manager agencies, and we have enclosed comments associated with these priorities. Note that we have highlighted comments in bold face that discuss what we consider to be major concerns of the proposed SIP that we believe warrant additional consultation prior to final adoption of the Arkansas Regional Haze Plan. The Forest Service air quality staffs stand ready to work with you towards resolution of these issues. We look forward to your response, as per section 40 CFR 51.308(i)(3). For further information, please contact Judith Logan at (501) 321-5341.



Arkansas State Implementation Plan
11/12/2009

Again, we appreciate the opportunity to work closely with the State of Arkansas and compliment you on your hard work and dedication to significant improvement in our nation's air quality values and visibility.

Sincerely,

MILBURN BREWSTER

RON KLOUZEK

for
NORMAN L. WAGONER
Forest Supervisor

for
JUDITH L. HENRY
Forest Supervisor

Enclosure

cc:
Mark McCorkle
Environmental Programs Manager
ADEQ
5301 Northshore Drive
North Little Rock, AR 72118-5317

Annette Sharp, Executive Director
CENRAP
10005 S. Pennsylvania, Ste. C
Oklahoma City, Oklahoma 73159

Guy Donaldson, Chief
Air Planning Section
U.S. EPA Region 6, 6PD-L
1445 Ross Avenue, Suite 1200
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Joe Kordzi
Air Planning Section
US EPA Region 6, 6PD-L
1445 Ross Avenue, Suite 1200
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Forest
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Enclosure

Forest Service Technical Comments on Arkansas' Department on Environmental Quality (ADEQ) Draft Regional Haze State Implementation Plan (SIP)

Overall Comment

The Forest Service has a significant concern that the information provided in the Arkansas' Draft Regional Haze SIP fails to describe or address content elements required by the Regional Haze Rule. In particular, the State relies on numerous appendices in lieu of sufficient summary descriptions to adequately address the content areas identified by the Act or rule.

Two specific content areas are lacking sufficient analysis, description, or comparison to the mandatory factors identified by the Act and subsequent rules. These are the presentation of Best Available Retrofit Technology (BART) decisions made by Arkansas, as well as the treatment of Reasonable Progress and Long Term Strategy. Detailed discussions of these issues are explained in the technical comments that follow.

We are concerned that the apparent lack of sufficient summary and reasonable progress or analyses of the statutory factors may make this draft un-approvable. The Forest Service respectfully requests that the State of Arkansas reconsider the Draft SIP in its present form before release to the public. We ask that the State review the eight elements identified by the Forest Service letter (October, 2006) and expand its discussion in the document regarding how ADEQ approached, evaluated, and drew conclusions on these important rule elements.

The remaining comments provided here are organized according to the priorities that we presented in our October, 2006, letter. Many of the following comments will also provide direction towards building the narrative of the Draft SIP to satisfy the documentation and content area deficiencies noted above.

Baseline, Natural Conditions, Uniform Rate

1. Sections 5.1 states that baseline visibility conditions for the Caney Creek Wilderness Area was established using three years of IMPROVE data, and notes that this "does not meet EPA completeness criteria for the five year averaging period." Section 6 indicates that the Caney Creek IMPROVE site was installed between 2000 and 2003, which is the reason for not having five years of monitoring data at the time baseline was set. Please note that the Regional Haze Rule requires three of five years for baseline calculations, and thus the Caney Creek monitoring site does have sufficient years of valid data to meet the completeness criterion.
2. Sections 5.1 and 5.2 of the Draft SIP discuss baseline and natural visibility conditions for the Caney Creek and Upper Buffalo Class I areas. One minor discrepancy that we noted was with



Arkansas State Implementation Plan
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the baseline 20% worst B_{cat} Nitrate value in Appendix 5.2, table 5.2a – it should be 13.78 rather than 13.76.

3. Figures 10.2 and 10.4 present a "Uniform Rate of Progress for the Twenty Percent Best Days" for both Arkansas Class I areas. Table 10.2 presents the information from those figures in tabular form. The Regional Haze Rule requires that visibility impairment on the worst 20% days be restored to natural conditions over the 60 year timeframe; however, the Rule requires that at a minimum the cleanest 10% days cannot be degraded. The figures 10.6 and 10.8 showing the Reasonable Progress Goals for the Best Days, which appear in the following section, address the Regional Haze Rule Best-Days goal appropriately. Figures 10.2, 10.4, and table 10.2 should be deleted from the Draft SIP because they are not pertinent to the SIP. In addition, the actual deciview Reasonable Progress Goals for both worst- and best-days at each of the Arkansas Class I areas need to be explicitly stated in the SIP narrative, not just shown in the graphics accompanying the discussion.
4. Generally, Regional Planning Organization (RPO) future projections were based on applying relative response factors (RRF) to the modeled results. However, the Draft SIP does not mention RRFs in conjunction with the future year visibility predictions. Please identify whether "Uniform Rate of Reasonable Progress Glide Paths" presented in section 10.1 of the Draft SIP were produced using actual model outputs or the results of applying a relative response factor. If these numbers were the result of a relative reduction, please provide a discussion in the SIP of how they were generated.

Emission Inventories

5. Section 7.0 – Tables 7.1 and 7.2 list 2002 and 2018 emission estimates by basic source category, respectively. This very brief chapter provides reference to two appendices – the first is a lengthy technical report prepared by a contractor, and the second is a "Short Summary of the 2002 Emission Inventories Methodology Utilized by Arkansas." The chapter then indicates that the 2018 emissions inventory will be further discussed in the next chapter. Chapter 8 covers the modeling assessments conducted for this SIP development, with section 8.4.1 providing a one-paragraph description of the basis for the "2018 base case."

Throughout all of these discussions, there is too much burden placed on the reader to review large reports in the appendices, with no discussion or conclusions provided by ADEQ except for the unsupported numerical data in the chapter 7 tables. For instance, we were unable to determine whether the "2018 Emissions Inventory Summary" presented in Table 7.2 represents the future base case without additional controls, the future projection utilizing CAIR and/or BART controls, or possibly some other future control scenario. This Chapter should identify and describe the differences between the various emissions scenarios that ADEQ employed for its Regional Haze SIP analyses and decisions, including Base/Performance, Typical 2002, Base 2018, and any Alternate 2018, emissions inventories, and how it is utilizing each scenario.

6. There are inconsistent emission discussions starting with section 8.1 leading into section 8.4. Model performance should not use typical base or future emission inventory data. Section 8.3 provides non-related information on emission development for other purposes in the middle of

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a performance discussion. No information is provided to describe the performance inventory. Section 8.4 also skips from one topic to another, with discussions of future inventory, typical inventory, and model performance intermingled.

7. Section 8.4.2 presents the results of model performance evaluations for the Arkansas Class I areas. The discussions for Caney Creek and Upper Buffalo suggest significant underestimation of impacts due to sulfur, in the range of 30%-50%. These data are simply stated, but their implications and ADEQ's conclusions based upon the information are not explained. RPO final projections are generally based on relative response factors (RRF) corrections, which allow that, while the model may be "off" in absolute terms, it still responds to increases or decreases in impact. There is no mention of RRFs or appropriate model response analyses.
8. There is significant uncertainty with the future projection of sulfur dioxide emissions from the Electric Generating Utility (EGU) sector. As currently drafted, the SIP projects an overall increase in SO₂ emissions between the baseline and 2018, despite inclusion of BART controls on a significant amount of current emissions. The SIP should commit the State to review and revise emissions projections from 2012 to 2018 as part of a 5-year review required by the regional haze rule. This commitment will assure that the projected improvements represented by the reasonable progress goals set in Section 10 will be achieved. The commitment to review must include a commitment to seek further controls or adjust the reasonable progress goals though a SIP revision should the emissions projections vary substantially from those projected at this time. Those revisions may result in additional improvement in visibility if the current projection of new power generation in Arkansas does not materialize, or if such generation does not yield the expected amount of new emissions.

Section 12 briefly provides a broad commitment to periodic review and revision of the SIP as a whole. The Emission Inventory sections should discuss the uncertainty and then point to the Section 12 commitment as ADEQ's plan of action on that front, and ensure that the statement provided in Section 12 adequately encompasses the scope described in this comment.

9. Section 8.5 presents a short discussion and a few figures about the "2018 Base G C1 Control Strategy" that CENRAP generated. This scenario involved examining the pollution sources within the "areas of influence" of the nearby Class I areas, and assuming that controls would be applied up to a cost of \$5,000/ton level for all such facilities that had a ratio of emissions-to-distance-from-Class-I-area of 5 or more (tons per year/kilometers). Resulting reductions to visibility impacts are described as significant, yet nowhere does the Draft SIP explain whether Arkansas or any other State identified in that scenario, has committed to or will benefit from such an inventory. Thus, we do not understand the context in which ADEQ is discussing the 2018 Base G C1 scenario.

Best Available Retrofit Technology (BART)¹

¹ BART-eligible sources are those sources that have the potential to emit 250 tons or more of a visibility-impairing air pollutant, were not in place or under construction between August 7, 1962 and August 7, 1977, and whose operations fall within one of more of 26 specifically listed source categories. Under CAA section 169A(b)(2)(A), BART is required for any BART-eligible source which "emits any air pollutant that may reasonably be anticipated to cause or contribute to any impairment of visibility in any such area."

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10. BART, although partially described, does not offer a sufficient summary of process, source identification, impacts, controls associated with exemption or subsequent determinations. In Arkansas's own statement, the Clean Air Interstate Rule (CAIR) does not constitute sufficient controls to be better than BART. This statement places an additional burden on Arkansas, as compared to a typical CAIR State, to develop and describe a BART process that clearly identifies, evaluates, and decides levels of control or exemption for eligible single sources. The State appears to have conducted much of the necessary steps. However, the SIP document does not adequately describe the analyses and how alternatives associated with controls were considered by the State.

11. Specifically regarding the BART exemption process, we have the following comments:

- a. On page 46, at the end of section 9.2, Arkansas explains that, since it's EGU sources are only required to participate in ozone-season NOx reductions under CAIR, that meeting CAIR requirements does not satisfy BART for these facilities. We concur with this decision. It would be helpful to the reader if this paragraph was relocated earlier in the chapter, prior to BART exemption discussions, to explain why so many EGU emission sources are included in the subsequent BART determination/exemption process in Arkansas.
- b. Section 9.2 does not provide sufficient summary of ADEQ's BART exemption process or results, including the reasons why remaining BART sources were not exempt.
- c. Section 9.2, says that the State will exempt BART-eligible through source-by-source evaluation (that is, in accordance with option 1 listed on page 42). Yet, the text that follows suggests that a cumulative visibility analysis was performed on the six remaining subject-to-BART sources. Readers are referred to Appendix 9.2C for description and methodology. Appendix 9.2C does not include information from ENVIRON or Alpine, nor does it offer another cumulative analysis. It is not clear what purpose or application a cumulative analysis serves for the State.

12. Section 9.4 (together with Appendix 9.2C) of the Draft SIP present a discussion relating to post-control visibility improvement at ten Class 1 areas as a result of BART controls on several subject-to-BART facilities. It demonstrates significant improvement which is to be commended, but also shows that very significant visibility impairment still exists after BART controls are in place. This issue is to be addressed in the Reasonable Progress portion of the Draft SIP. However, some consideration might be given as to whether some of the BART control technology chosen by the sources specifically to satisfy the BART requirements might preclude possibly more effective technology that could have been deployed in an overall more cost-effective manner as part of the Reasonable Progress phase. The ADEQ might determine if a much higher level of control (beyond BART) by a BART source at this time might allow the ADEQ to not require further controls from that particular source as part of its Reasonable Progress determination.

The attachment to this comment document provides source-specific recommendations regarding control technology options that ADEQ should consider for its six "subject-to-BART" sources.

Arkansas State Implementation Plan
 11/12/2009

13. Specifically regarding the Draft SIP's presentation of BART control determinations, we have the following comments:

- a. Section 9.3 is where the Draft SIP should provide a summary of the BART determinations for the Subject-to-BART sources. However, the few paragraphs and tables presented are insufficient. ADEQ should summarize, on a facility-by-facility basis, levels of controls considered, final control selected, and information on how the "five factors" were considered in making its decisions. Detailed information can be placed in an Appendix, but company submitted BART information is not a substitute for State decision processes.
- b. The information presented in the tables 9.3a through 9.3d is difficult to follow. Earlier in this chapter, the BART-eligible units are identified by name, with Facility ID, AFIN, and Unit ID noted (table 9.1). Subsequently, the Subject-to-BART source subset is listed, again by name with Facility ID and Emission Unit descriptions, but no AFIN numbers (table 9.2). But, tables 9.3a thru 9.3d omit the source names, list the units apparently with the AFIN number (but in the column titled "Source and Unit"), and include what appears to be a reference to a State-issued operating permit number that presumably contains the emission limits provided in those tables. It would be very helpful for the tables throughout this chapter to be consistent in the syntax of referencing the specific BART units. We suggest that the tables do include the source names to help those unfamiliar with the syntax of the air pollution source ID listings and ADEQ's permit number assignments.
- c. Tables 9.3a thru 9.3d appear to have some errors, and/or information that may need further explanation:
 - Table 9.3a, sixth data row: we believe that this source's AFIN number should be "30-00011," for the Entergy-Lake Catherine facility, instead of "30-00110." The latter does not appear on the BART-eligible list of Table 9.1. But, note that the unit listed for this entry in table 9.3a, "SN-03 bit" does not match any BART-eligible unit for the Entergy-Lake Catherine facility, per table 9-1; it does match the unit description for this facility in table 9-2.
 - We do not understand the information presented in these tables across the following columns: "Baseline Peak 24-hour Emissions (lb/hr)," "BART Level of Control %," and "Future Peak 24-hour Emission Rate (lb/hr)." The first several entries in table 9.3a, the calculation of Future Peak 24-hour Emission Rate is consistent with applying the listed BART Level of Control to the Baseline Peak 24-hour Emissions values. But, the listings for three units with "0%" control are confusing! The footnote indicates that the BART Level of Control is "only listed if facility is adding controls or taking limits that will reduce emission per BART requirements. Facilities which are not adding controls or using controls which are already installed have a 0% BART control efficiency." Yet, one of these three units shows that, after applying a 0% BART control level, its emission will still be reduced by nearly half. In addition, there are two entries that state the BART Level of Control will be "up to 95%," but that only calculate a Future Peak 24-hour Emission Rate representing approximately 80% control each. Similar confusing data are presented in tables 9.3b (for the four units with 69% NOX BART control), and for the entries of table 9.3c. The single footnote under table 9.3a does not adequately explain the

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data that ADEQ includes in these tables. The added discussion of the BART determinations that we recommend earlier in this comment (see paragraph a, above) will help a lot, but ADEQ should ensure that the meaning of the data in the tables is clear to the reader.

- d. Section 9.4 introduces a statistically based test (TTEST in Excel) as a way for the State to evaluate BART control significance. This test or cumulative modeling is not a substitute for the 5 factor analysis.

Area of Influence (AOI)

- 14. The Consultation Plan and associated information that is included as Appendix 10.2 to the Draft SIP contains a general AOI map for the combined Arkansas-Missouri Class I areas, and several assorted graphics for each Class I area of interest. However, the results of these studies, concepts, and graphics, are not presented in the Draft SIP text. They should be integral to the discussions of attribution of regional haze causing pollution, identification of reasonable progress goals, and development of long term strategies for this Regional Haze Plan.

Figures 9.1 and 9.2 of the Draft SIP present geographic representations of Arkansas' BART-eligible and BART-subject sources with relation to the Arkansas and Missouri Class I areas. However, instead of overlaying AOI information, the diagrams use "300 km buffers" about those Class I areas.

In contrast, CENRAP conducted extensive AOI analyses, and produced graphic representations for each of the Class I areas within and near to the CENRAP region. However, the Draft SIP does not provide any of these graphics for the local Class I areas of concern, nor does it discuss any of the work or results from those analyses.

- 15. *Arkansas Sources' Impacts on Out-of-State Class I Areas:* Section 1.2 identifies Class I areas affected by visibility impairing emissions originating from the State of Arkansas. Specifically, two such Class I areas are located within Arkansas (the Caneys Creek and Upper Buffalo Wilderness Areas, both managed by the Forest Service), and two are located in Missouri (the Mingo Wilderness Area managed by FWS, and the Hercules Glades Class I area managed by the Forest Service). Although this section states that emissions from Arkansas are likely to cause or contribute to regional haze in the identified out-of-State areas, little to no consideration is afforded to the Missouri Class I areas and Arkansas sources' impacts to visibility impairment in them, for the remainder of the Draft SIP:

~~Overall, the Draft SIP fails to utilize appropriate Area of Influence (AOI) information generated by CENRAP and the other RPOs in its analyses of both contributions of other States' sources to Arkansas' Class I areas, visibility impairment as well as contributions of Arkansas' sources emissions to out-of-state Class I areas.~~

The documents provided with appendix 10.2 of the Draft SIP include an August 17, 2007, letter from ADEQ Air Division Chief Mike Bates to Oklahoma Department of Environmental Quality (ODEQ) Air Quality Division Director Eddie Terrill. This letter responds to ODEQ's initial consultation meeting regarding the Regional Haze planning for its Wichita Mountains

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Wilderness Area. In this letter, Arkansas disagrees with ODEQ's "assertion that sources in Arkansas contribute significantly to an inability to achieve reasonable progress [at Wichita Mountains]." It is unclear whether ODEQ has accepted Arkansas' opinion in this matter. As an additional note, while the discussion in Section 11.3 of Arkansas' Draft SIP (quoted below in comment #19) says that visibility projections for outside-of-Arkansas Class I areas will meet or exceed the uniform rate of progress, this letter to ODEQ indicates that the projections for Wichita Mountains "will not meet the glidepath representing a return to natural conditions by 2064." In addition, one of the BART appendices identifies the Sipsey Wilderness Area (Forest Service managed) in Alabama as potentially being impacted by that source's emissions.

The State should discuss in more detail how analysis of its sources' impact became limited to only the Arkansas and Missouri Class I areas, and why the areas outside Arkansas itself did not appear to be part of the consideration when ADEQ evaluated emission controls for its sources.

16. *Other States' Sources Impacts on Arkansas' Class I areas:* As an example, the data contained within both the Draft CENRAP TSD and ADEQ's Consultation Plan (appendices 8.1 and 10.2 to the Draft SIP, respectively), indicate that the areas of influence that affect the Arkansas and Missouri Class I areas extend across several surrounding States. In fact, the CENRAP "PSAT" source apportionment modeling results for the Upper Buffalo Class I area, show that sulfur emissions from elevated point sources in Illinois, Missouri, Indiana, Kentucky, and the collective states to the east beyond those, are all more significant than Arkansas' sulfate sources in contribution to the 2018 projected 20% worst visibility days. And, for the Caney Creek Wilderness Area, the impact of all pollutant emissions originating in Texas outweighs Arkansas' own impacts to visibility impairment in the 2018 worst 20% projections. The Draft SIP needs to discuss the attribution of haze-causing pollution and the results of ADEQ's consultations with neighboring States regarding achieving Reasonable Progress Goals at its local Class I areas.

Reasonable Progress Goals and Long Term Strategy

17. The Reasonable Progress discussion in the Draft SIP is a major content deficiency. The SIP document does not identify any procedure to address single sources, or combinations of sources, that are predicted to continue to significantly impact visibility conditions in the future after implementing BART, CAIR, and any other on-the-books and on-the-way programs. Although the State concludes that additional controls are not necessary, Arkansas does not summarize or offer any level of clarity on what controls the CENRAP² Regional Planning Organization (RPO) utilized within Arkansas in their analyses. Model evaluation at the two Class I areas located within Arkansas indicates significant under-predictions of visibility impacts with regard to sulfates, and fails to address any significance of 2002 to 2018 projections of increased point source sulfur emission within Arkansas. Although the model is used in a relative sense, no additional discussion or clarification is provided to address how model performance or model response is

² Central Regional Air Planning Association CENRAP is an organization of states, tribes, federal agencies and other interested parties that identifies regional haze and visibility issues and develops strategies to address them. CENRAP is one of the five Regional Planning Organizations RPOs across the U.S. and includes the states and tribal areas of Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, Arkansas, and Louisiana.

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adequately addressing issues that may arise from impacts from sulfates. We are also concerned with the number of new PSDs that do not seem to be represented in the emissions inventory (i.e. John W. Turk and Plum Point II). It is going to be extremely difficult if not impossible to meet the RPG while adding new sources to the mix.

CENRAP (as well as the VISTAS RPO in the southeast United States) produced analyses to assist States in identifying geographic areas which may represent the source area most likely for a State to target additional controls for Reasonable Progress consideration. The State appears to have disregarded these supporting documents, and in spite of increasing sulfur emissions, did not discuss whether additional BART (beyond presumptive levels) for sources subject to BART, or other controls at non-BART pollution sources, may constitute a reasonable control. The SIP does not address the four statutory factors when making decisions to control or not control additional sources. Analysis of all control alternatives of potentially significant sources is necessary in order to fully evaluate reasonableness when looking at the factors. Although it is possible for the State to arrive at the same conclusions as presented in the draft SIP, there is no evidence that the State had sufficient information to conclude as to the reasonableness of its strategy to achieve the 2018 milestones.

18. In Section 10, titled "Reasonable Progress Goals" the State does not specifically declare reasonable progress goals, in-deciview, for the year 2018. Table 10.3, on page 59, speaks to an amount of improvement for the most impaired days from baseline conditions. The reasonable progress goals should be clearly stated as the projected 2018 average of the 20 percent most impaired days and as the 20 percent least impaired days. These numbers are included in Figures 10.5 through 10.8 but are not declared in the text. Please revise the text in Section 10 to clarify ADEQ's choice of the 2018 reasonable progress goal and revise Table 10.3 to include a column indicating the goals for the least impaired days, as required by the regional haze rule.

19. Section 11.3 is very confusing, it switches back and forth between impacts at Arkansas' Class I areas and impacts beyond the State's borders, and declares that otherwise unspecified emission reductions will achieve the RPG goals across seemingly both geographic divisions of Class I areas.

The section opens with a paragraph indicating that the section will cover Arkansas' demonstrating that its SIP includes "all measure as necessary to obtain its fair share of emission reductions needed to meet [reasonable progress goals] in other Class I areas." The next paragraph identifies the categories of technical material that Arkansas relied upon to conduct a gross identification of other states with emissions that influence Arkansas Class I areas, says that those identified States were included in the consultation process, and then asserts that "CENRAP-modeled visibility projections indicate that the emission reductions planned for these states are sufficient to achieve the [reasonable progress goals] for all Class I areas located in Arkansas and Missouri." Nowhere are the emission reductions further described or quantified. The next paragraph indicates that, since CENRAP and ADEQ analysis show that visibility projections for the Class I areas outside Arkansas and Missouri "will all be able to demonstrate a better than uniform rate of progress through the

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implementation of existing and forthcoming State and federal emission reduction programs... The emission reductions described elsewhere herein are sufficient to constitute a fair share of emission reductions needed to meet RPGs in affected Class I areas."

This is the bulk of Arkansas' evaluation of its Long Term Strategy to achieve Reasonable Progress towards visibility improvement both for its Class I areas and for those outside of the State to which Arkansas source emissions contribute. This discussion, both independently and in conjunction with the complete Draft SIP narrative, fails to provide the reader with an understanding of the causes of visibility impairment at either Arkansas' Class I areas or those in nearby States, the control strategies that were considered and levels of control that ADEQ decided to require for this SIP, or the anticipated results of those controls.

20. At the beginning of Section 10 of the Draft SIP, ADEQ outlines the four statutory factors that each State must consider in setting its Reasonable Progress Goals. These factors are intended to be applied holistically, across all contributing sources of visibility impairing pollutants, to inform the decision being made by the State. However, the remainder of the chapter never connects back to the four statutory factors, and in fact points to appendix 10.1, "Analysis of Control Strategies and Determination of Reasonable Progress Goals," which argues that meeting the uniform rate of progress glide slope obviates any need for analyzing the four statutory factors for Reasonable Progress. Thus, the Draft SIP omits the required four-factor analysis for establishing the Reasonable Progress Goals.

21. In Section 11.4.1.6, the Draft SIP identifies "source retirement and replacement," saying that: "retirement and replacement will be managed in conformance with existing SIP requirements pertaining to PSD and New Source Review. Source retirement and replacement will be tracked through on-going point source inventories." Please elaborate on how the PSD and NSR permitting programs will be utilized by ADEQ as part of its Long Term Strategy for meeting Reasonable Progress Goals.

Fire

22. The Arkansas Smoke Management Plan (SMP) and the summary discussion in section 11.4.1.8 of the Draft SIP properly identify Class I areas as being smoke-sensitive, and the SMP instructs prescribed burners to apply the appropriate smoke management techniques to minimize impacts. Overall, this is one of the best presentations of fire-emission-related Regional Haze considerations that we have seen to date.

23. We recommend that ADEQ ensure that its Regional Haze SIP refers to the Arkansas SMP in a way that does not require SIP updates each time the SMP is updated. Also, please indicate whether Arkansas intends to "certify" its SMP as provided for by the 1998 EPA Interim Air Quality Policy on Wildland and Prescribed Fire.

Regional Consistency

24. Arkansas is situated geographically at the boundary between three multi-state Regional Planning Organizations (RPO): CENRAP running along the west of the Mississippi River

ATTACHMENT

**U.S. Forest Service Comments Regarding
Best Available Retrofit Technology (BART) Determinations
Arkansas Draft Regional Haze Rule State Implementation Plan**

April 1, 2008

This document is an attachment to the U.S. Forest Service (FS) comments on the Draft Regional Haze State Implementation Plan prepared by Arkansas and received by the FS on February 25, 2008. It provides source-specific recommendations regarding the Best Available Retrofit Technology (BART) determinations contained within that package.

Entergy Services, Inc. BART Determination for the Lake Catherine Plant

Table 9.2 of the ADEQ RH SIP shows that the Lake Catherine Plant is a subject-to-BART source, but Tables 9.3 a-d do not include emission reductions from the 2002 Baselines for this source. Either the data for the Plant should be included or a reason for their exclusion should be noted.

The low 10% plant utilization rate causes any capital equipment alternative to magnify the cost per ton or incremental cost per ton, thus eliminating standard alternatives available to other BART determinations. For this reason it is important to impose strict emission limitations commensurate with 10% plant utilization in the plant's permit.

Section 3.1 of the BART determination proposes that boiler tuning, BOOS and IFGR is NO_x BART for gas firing. The addition of overfire air to the above three controls results in an annual cost effectiveness of \$1,700 per ton for NO_x control and a \$1.3 million cost per deciview. This is not an unreasonable cost for BART and should be considered. The value of this step would be to decrease the visibility impact from 0.56 deciviews to 0.34 deciviews.

The Arkansas Regional Haze SIP acknowledges that BART requirements are applicable requirements of the Clean Air Act and they will be included as title V permit conditions. It would be desirable that systems be installed to automatically monitor and trim oxygen and fuels for peak performance. Emission limits reflecting the above BART should be met on a continuous basis. For a discussion of this topic please refer to EPA's BART Guidelines.³

³ See 40-CFR Part 51, Appendix Y. The U.S. Environmental Protection Agency finalized its BART Guidelines on June 15, 2005, and published the preamble and final rule text in the Federal Register on July 6, 2005. The rulemaking action added Appendix Y to Part 51, titled "Guidelines for BART Determinations Under the Regional Haze Rule." See Section V.

The costs of alternatives were stated by Entergy, but there was no documentation or a detailed break-out of the costs. The basis for equipment cost estimates also should be documented either with data supplied by an equipment vendor (i.e., budget estimates or bids) or by a referenced source (such as the EPA OAQPS Control Cost Manual), where possible.⁴ A discussion of amortization of costs is presented, but the actual amortization factors are not given.

Entergy Services, Inc. BART Determination for the White Bluff Steam Electric Station

Entergy proposes to install SO₂ and NO_x control equipment that will meet the presumptive requirements of the EPA's BART Guidelines. The Arkansas Regional Haze SIP acknowledges that BART requirements are applicable requirements of the Clean Air Act and they will be included as Title V operating permit conditions. Emission limits such as BART must be met on a continuous basis. Although this provision does not necessarily require the use of continuous emissions monitoring (CEMs), it is important that sources employ techniques that ensure compliance on a continuous basis. The only such reference found in the BART determination was in Section 3.1 relating to boiler tuning, so further discussion of meeting emission limits on a continuous basis should be included. For a discussion of this topic please refer to EPA's BART Guidelines.⁵

Though presumptive BART is met for both NO_x and SO₂ using the proposed emission controls, Table 5-1 shows that the White Bluff Station will still "cause" visibility impairment at the Caney Creek Class I area. In considering its Long Term Strategy in the Regional Haze SIP for Caney Creek, the State should hold discussions at this time with the source to determine the possible need for additional future controls. Entergy might consider an altered mix of capital expenditures for emission control at this time given that information.

Domtar Industries Inc. BART Determination for the Ashdown Mill

The costs of the NO_x control alternatives of Low NO_x (LNB) burners and Overfire Air (OFA) for boilers #1 and #2 are presented in Table 4-3 and the conclusion is that the average cost per ton of NO_x control is cost-prohibitive. Costs in Table 4-3 are derived from total costs shown in Appendix B. The total costs from Appendix B and the Total Annualized Cost for LNB and OFA shown in Table 4-3 seem excessive. For example, the total capital costs are not generally consistent with those presented in Appendix E of the National Council for Air and Stream Improvement (NCA SI) paper entitled, "NO_x Control in Forest Products Industry Boilers: A Review of Technologies, Costs, and Industry Experience."⁶ Also, the amortization factors of 5% interest and 10 year life are not consistent with the 7% and 15 year life required by the OAQPS

⁴ See EPA's BART Guidelines, Section IV.D.Step 4.

⁵ See EPA's BART Guidelines, Section V.

⁶ Report by the National Council for Air and Stream Improvement entitled, "NO_x Control in Forest Products Industry Boilers: A Review of Technologies, Costs, and Industry Experience", Special Report No. 03-04, August 2003, by: Arun V. Sameshwar, Ph.D., and Ashok K. Jain, NCA SI Southern Regional Center, Gainesville, Florida, Appendix E.

Control Cost Manual.⁷ The basis for equipment cost estimates should be documented either with data supplied by an equipment vendor (i.e., budget estimates or bids) or by a referenced source (such as the EPA OAQPS Control Cost Manual, where possible.⁸ More realistic figures may make LNB and OFA cost-effective BART alternatives.

Table 4-7 shows that the Ashdown Mill will still "cause" visibility impairment at the Caney Creek Class I area after implementation of controls. In considering its Long Term Strategy in the Regional Haze SIP for Caney Creek, the State should hold discussions at this time with sources to determine the need for additional future controls. The sources might consider an altered mix of capital expenditures for emission control at this time given that information.

Arkansas Electric Cooperative Corporation BART Determination for Bailey and McClellan Stations

Pages 2 and 5 state that because pollutant-specific modeling for these facilities showed that NO_x did not cause or contribute to visibility impacts at any Class I areas and since the PM impact was less than NO_x, only SO₂ BART controls would be considered. This is not correct. The EPA's BART Guidelines describe a state-wide-cumulative, pollutant-by-pollutant modeling analysis of all BART-eligible sources.⁹ If such an analysis shows that NO_x for example, does not cause or contribute to visibility impairment, you may conclude that none of the BART-eligible sources in the state are subject to BART for NO_x. However, such an exemption is not derived from the modeling of a single, or even two sources. Therefore, NO_x and PM should have been included in the BART determinations for the Bailey and McClellan Stations.

The SO₂ BART determination concluded that "a lower-sulfur fuel oil" should be considered as BART. Only a footnote to a table indicated that 1% low sulfur fuel oil was used for modeling the post-control scenario. First, the BART determination should have considered 1% sulfur fuel oil along with other ultra-low sulfur fuel oils in the analysis and then should have shown the economic viability of one fuel over the others. This is especially true since the table showing post-control modeling results for the Bailey Plant for 2002 showed 8 days above 0.5 dV visibility impact at Mingo using 1% sulfur fuel oil. This indicates that the chosen BART for the Bailey Plant still "contributes" to visibility impairment at Mingo. Serious consideration should be given to a lower-sulfur fuel. Second, a more definitive description of the chosen fuel should be stated and ADEQ should make it an enforceable permit condition.

Other BART determinations reviewed by the RS contain more supporting documentation than the subject determination in terms of exemption modeling data (before and after controls), scrubber cost estimates, fuel alternatives and the Section 4.4 claim that "... high capital cost control of the scrubber alternative (emphasis added) ... may cause the retirement of these units."

⁷ U. S. Environmental Protection Agency, Office of Air Quality Planning and Standards, OAQPS Control Cost Manual, Fifth Edition, February 1996, EPA 453/B-96-001.

⁸ See EPA's BART Guidelines, Section IV.D.Step 4.a.5.

⁹ See EPA's BART Guidelines, Section III.A.3.Option 3.

The EPA's BART Guidelines describe an analysis to be followed when viability of continued plant operations is an issue.¹⁰

Finally, since the Bailey plant is currently operated at only 20% of capacity and since the use of 1% sulfur fuel oil results in a continuing "contribution" to visibility impairment at Mingo; ADEQ should place a permit condition on the facility to operate with emission limitations reflecting 20% of capacity. Of course, if technology with higher emissions control efficiency can be provided, then such a permit condition can be relaxed.

AEP Southwestern Electric Power Company (SWEPCO) BART Discussions for the Flint Creek Power Plant

A two-page letter from SWEPCO to the Arkansas Department of Environmental Quality, dated October 26, 2006, is the only information we have available regarding the subject Plant's effort to meet BART. The RH SIP and/or appendices should contain all of the BART-related data so that they are available to third-party reviewers.

With reference to Item 1, electrostatic precipitators may be BART for particulate matter (PM), but not for the reason cited. For BART purposes it is inappropriate for a source to model for a single pollutant (e.g., PM) and if that single pollutant does not impact a Class I area by more than the threshold, to eliminate emission units which emit that pollutant from BART for that pollutant. As discussed in EPA's BART Guidelines, the total emissions (SO₂, NO_x, and PM) from all emission units from the source should be summed.¹¹ If the potential to emit of any single visibility impairing pollutant exceeds 250 tons per year then that collection of emissions units is a BART-eligible source. Each emission unit is then subject to a BART review for each of the visibility impairing pollutants. Thus, a BART review should have occurred for the emission units that feed the electrostatic precipitators (ESP). It is acknowledged that on a cost basis, it is likely that no other control equipment would be required other than possibly adjustments to the ESPs.

Item 2 of the letter is not clear as to whether control equipment is already functioning at the presumptive limits of 0.15 lbs/mmBTU for SO₂ and 0.23 lbs/mmBTU for NO_x or whether such equipment is proposed to be added to meet BART. The record should contain information that describes the control equipment that is already or will be installed, along with the data that demonstrates how it is deemed to meet BART. If BART is met by the *current* plant configuration then Item 3 referring to "post-control" CALPIBF modeling should not show visibility improvements.

Item 3 of the letter seems to imply (but does not state) that visibility impairment still exists at one or more Class I areas. In considering its Long Term Strategy in the Regional Haze SIP, the State should hold discussions at this time with sources to determine the need for additional future controls. The sources might consider an altered mix of capital expenditures for emission control at this time given that info

¹⁰ See EPA's BART Guidelines, Section IV.D Step 4.k.

¹¹ See EPA's BART Guidelines, Section II.A.3 and 4.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

National Wildlife Refuge System

Branch of Air Quality

7333 W. Jefferson Ave., Suite 375

Lakewood, CO 80235-2017



In Reply Refer To:
FWS/ANRS-NRCP-AQ/

June 27, 2014

Mr. Mike Bates, Chief
Air Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118-5317

Dear Mr. Bates:

On April 21, 2014, the State of Arkansas provided a draft 5-year progress report for the State's Regional Haze State Implementation Plan (SIP). Overall, the draft included several of the necessary elements and information needed to adequately address regional haze progress. However, we do not feel that a comprehensive review can be conducted prior to the State completing the outstanding core elements of the SIP. At this time, we feel that additional information is necessary prior to concurring with the State's "negative declaration". We welcome further consultation regarding the following concerns:

- Critical core elements of the State's Regional Haze Rule SIP are not approved and therefore cannot be evaluated. Elements include the evaluation and determination of Best Available Retrofit Technology (BART) eligible sources, implementation of additional control technologies related to BART, and the establishment of Reasonable Progress Goals for Class I areas within State boundaries.
- Much of the report indicates emission growth through the year 2011, but then predicts significant emission reductions by year 2018. We are unable to see how the State will accomplish these significant emission reductions, and the report provides no explanation.
- Given the general rise in Arkansas' air pollution emissions through 2011 for most categories, the report does not explain why visibility impacts are improving at the State's Class I areas.
- The report declares that emissions generated within the State of Arkansas are not significantly impacting Class I areas located in nearby States, but it does not provide supporting information or explanation to substantiate the claim.

Mr. Bates, page 2

This letter acknowledges that the U.S. Department of Interior, U.S. Fish and Wildlife Service, has conducted a review of the submitted draft 5-year progress report for your Regional Haze SIP. Please note, that only the U.S. Environmental Protection Agency (EPA) can make a final determination regarding the document's completeness and, therefore, ability to receive federal approval from EPA.

We appreciate the opportunity to review your draft Regional Haze SIP 5-year progress report and look forward to continuing consultations as you pursue approval of the original SIP and this subsequent progress report. If you have questions of concerns, please contact Tim Allen at (303) 914-3802. We appreciate your hard work and dedication to the significant improvement in our nation's air quality related values and visibility.

Sincerely,

A handwritten signature in cursive script that reads "Catherine Collins". The signature is written in black ink and is positioned above the printed name and title.

Catherine Collins
Chief, Branch of Air Quality (Acting)

cc (via e-mail):

Mark McCorkle, Environmental Programs Manager, ADEQ
Guy Donaldson, Chief, Air Planning Section, U.S. EPA Region 6
Joe Kordzi, Air Planning Section, US EPA Region 6
Charlie Blair, Regional Refuge Chief, USFWS Midwest Region
Ben Mense, Refuge Manager, Mingo National Wildlife Refuge
Patricia Brewer, Air Resources Division, National Park Service
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Federal Land Manager Consultation

As required by the federal Regional Haze Rule (40 C.F.R. § 51.308), the Arkansas Department of Environmental Quality (ADEQ, Department) prepared and submitted for review by regional Federal Land Managers (FLMs) a draft document titled “State Implementation Plan Review for the Five-Year Regional Haze Progress Report.” Comments submitted by the FLMs are addressed here. Copies of the FLMs comment letters are included in this appendix. FLMs comments were received from:

- United States Department of Agriculture – Forest Service - Ouachita National Forest,
- United States Department of the Interior – Fish and Wildlife Service, and
- United States Department of the Interior – National Park Service.

On September 23, 2008, the ADEQ submitted an initial Regional Haze State Implementation Plan (SIP) to the Environmental Protection Agency (EPA). On March 12, 2012, the Environmental Protection Agency published a Final Rule that partially approved and partially disapproved the 2008 Arkansas Regional Haze SIP (2008 Arkansas RH SIP).

The Regional Haze Rule requires states to “submit a report to the Administrator every five years evaluating progress towards the reasonable progress goal for each mandatory Class I Federal area located within the State and in each mandatory Class I Federal area located outside the State which may be affected by emissions from within the State.” The required elements of this five-year review, which states must submit five years following the initial Regional Haze SIP submission, are described at 40 C.F.R. § 51.308(g).

The five-year Regional Haze Progress Report (five-year RHPR) also provides an opportunity for public input on the state and the EPA’s assessment of whether the approved regional haze SIP is being implemented appropriately and whether reasonable visibility progress is being achieved consistent with the projected visibility improvement in the SIP. As of July 2014, ADEQ has been unable to fully respond to the EPA with information sufficient to address those disapproved elements of the 2008 Arkansas RH SIP. The Department has been working with the EPA and affected sources towards fulfilling EPA’s requirements for an approvable SIP. Therefore, this required five-year RHPR cannot at this time fully address the goals and implementation measures that the State of Arkansas originally identified as appropriate, but which are disapproved by EPA.

All comments submitted by FLMs are addressed herein. However, ADEQ is currently unable to provide the FLMs with some of the requested information because the comments are either not relevant to this progress report or ADEQ has been continuing to work on the disapproved elements of the 2008 Arkansas RH SIP with EPA and affected sources and cannot provide

further information on this report. In this document, the responses to specific comments that are affected by the ultimate resolution of the EPAs' partial disapproval are identified. A response to these comments would serve no useful regulatory purpose at this time. ADEQ has identified one Comment from FLMs that addresses portions of the Arkansas five-year RHPR draft that needs revisions.

**United States Department of Agriculture – Forest Service (FS) - Ouachita National Forest
Comments**

Submitted by Norman Wagoner and Reggie Blackwell, Forest Supervisors

Comment 1: FS had several areas of concern in the Arkansas 2008 Regional Haze SIP (2008 Arkansas RH SIP) that they still would like to bring forward, specifically how the BART decisions are being handled as the treatment of Reasonable Progress and Long Term Strategy. FS requests ADEQ to summarize, on a facility-by-facility basis, levels of controls considered, final control selected, and information on how the "five factors" were considered in making its decisions.

Response: Any concerns that the FS has with regard to the 2008 Arkansas RH SIP, for the purposes of this five-year RHPR, are moot in view of the previous partial approval / partial disapproval action issued by EPA on March 12, 2012. The majority of the BART determinations as well as Reasonable Progress Goals and Long Term Strategy submitted in the 2008 Arkansas RH SIP were disapproved by EPA. Work with EPA and the affected facilities continue in an effort to revise the disapproved portions of the 2008 Arkansas RH SIP. Attempting to address such matters in this five-year RHPR would be premature.

No revisions to the final report are necessary due to this Comment.

Comment 2: FS requests ADEQ to look at their previous comments on the draft SIP dated June 6, 2008, as some of those comments are still pertinent. The Reasonable Progress discussion in the 2008 Arkansas RH draft SIP had several content deficiencies and it does not appear to FS that ADEQ has made the needed corrections. The five-year RHPR draft does not identify any procedure to address single sources, or combinations of sources, that are predicted to continue to significantly impact visibility conditions in the future after implementing BART, CSAPR, and any other on-the-books and on-the-way programs.

Response: Comments previously submitted with regard to the 2008 Arkansas RH SIP have been taken into consideration. ADEQ is working closely with EPA to resolve any issues that remain after the partial approval and partial disapproval of the 2008 Arkansas RH SIP.

No revisions to the final report are necessary due to this Comment.

Comment 3: FS does not agree with Arkansas's conclusion that additional controls are not necessary and points out the following areas that need further consideration:

- a) Clarification on what controls the Central Regional Air Planning Association (CENRAP) Regional Planning Organization (RTO) utilized within Arkansas in their analysis (see comment letter dated June 6, 2008, p.7 #17);
- b) A discussion of why model performance evaluation for the base year indicated significant under predictions of visibility impacts from sulfate at the two Class I areas located within Arkansas (see FS comment letter dated June 6, 2008, p. 3 #7); and
- c) A discussion of significance of 2002 to 2018 projections of increased point source sulfur emission within Arkansas. Although the model is used in a relative sense, no additional discussion or clarification is provided to address how model performance or model response is adequately addressing issues that may arise from impacts from sulfates (see comment letter dated June 6, 2008, p.3 #8).

Response: These comments are based on the content of the 2008 Arkansas RH SIP submittal and are not relevant to the five-year review.

No revisions to the final report are necessary due to this comment.

Comment 4: FS states that new Prevention of Significant Deterioration (PSD) permits that are not represented in the emissions inventory (i.e. John W. Turk and Plum Point II) should be considered as part of the Reasonable Progress Goals (RPG). Table 2.3 appears to have a number of gaps in the data. FS requests clarification if these sources were considered in the inventory presented.

Response: The RPGs were established in 2008. The CENRAP modeling inventory did not include emissions from these facilities as they were not permitted at that time. The five-year review does not require revision to the previously established RPGs. Emissions from the John W. Turk and Plum Point facilities are included in current inventories and subject to consideration when establishing any future additional control strategies that might be required to maintain reasonable progress. To date, the RPGs established and committed to by Arkansas have been met.

No revisions to the final report are necessary due to this comment.

Comment 5: FS states that the draft 2008 Arkansas RH SIP and the draft RHPR omitted the required four-factor analysis for establishing the RPG. Meeting the uniform rate of progress glide slope does not eliminate the need to analyze the four statutory factors or Reasonable Progress. (See comment letter dated June 6, 2008, p.9 #20.)

Response: A four-factor analysis is not required for the five-year RHPR. The inadequacy of the four-factor analysis is an element of the EPA's partial disapproval of the 2008 Arkansas RH SIP and is under consideration by both ADEQ and EPA Region 6.

No revisions to the final report are necessary due to this Comment.

United States Department of the Interior, Fish and Wildlife Service (FWS) Comments

Submitted by Catherine Collins, Branch of Air Quality

Comment 1: FWS expresses that additional information to the Arkansas five-year RHPR draft is necessary for them to concur with the State's "negative declaration."

Response: Ultimate approval of the 2008 Arkansas RH SIP or supplemental SIP revision, or the possibility of new requirements in the form of a Federal Implementation Plan (FIP), will result in more certainty regarding what is considered to be a reasonable rate of progress. The current negative declaration is supported by evidence that visibility in the affected Class I areas is improving.

No revisions to the final report are necessary due to this Comment.

Comment 2: FWS believes that the critical core elements of the 2008 Arkansas RH SIP are not approved and therefore cannot be evaluated. Elements include the evaluation and determination of best available retrofit technology (BART) eligible sources, implementation of additional control technologies related to BART, and the establishment of Reasonable Progress Goals and a Long-Term Strategy for Class I areas within the State boundaries.

Response: FWS correctly states that unapproved elements of the SIP cannot be readily evaluated. Despite the disapproved portions of the 2008 Arkansas RH SIP, visibility is improving in the affected Class I areas. As of September 2014, ADEQ is still working with EPA and affected BART sources for an approvable RH SIP.

No revisions to the final report are necessary due to this Comment.

Comment 3: FWS states that much of the Arkansas five-year RH Progress Report draft indicates emission growth through the year 2011, but then predicts significant emission reductions by the year 2018. FWS is unable to see how the State will accomplish emission reductions as the draft report does not provide an explanation.

Response: The documentation for 2018 emissions is contained in the 2008 Arkansas RH SIP. Expected emission reductions from BART sources have not been achieved to date. Implementation of BART controls at affected facilities has been delayed by the federal review that resulted in a partial disapproval of the 2008 Arkansas RH SIP. BART reductions at least as stringent as those described in the SIP will be recognized at a future date yet to be determined. Other federal measures will also result in future emission reductions.

No revisions to the final report are necessary due to this Comment.

Comment 4: FWS states that, given the general rise of Arkansas's air pollution emissions through 2011, for most categories, the draft report does not explain why visibility impacts are improving at the State's Class I areas.

Response: The many possible causes for improvement at affected Class I areas cannot be readily determined. Emission reductions achieved through other state and federal programs may account for some of the observed improvement.

No revisions to the final report are necessary due to this Comment.

Comment 5: FWS points out that the draft report declares that emissions generated within the State of Arkansas are not significantly impacting Class I areas located nearby states, but it does not provide supporting information or explanation to substantiate the claim.

Response: ADEQ does not find this declaration within the five-year RHPR. At the top of p.5, ADEQ describes the EPA determination that “Arkansas did not show that the strategy will adequately achieve the RPGs set by Arkansas and by other nearby states.”

At this time, all Class I areas identified as affected by Arkansas sources are meeting the RPGs that were established by the States. Regarding SIP elements and strategies, the report does state that “based upon relevant data (i.e. projected emissions and modeling results) they are sufficient to enable Arkansas and other states with Class I areas affected by emissions from Arkansas to meet all established reasonable progress goals. This appears to be the statement that FWS has misinterpreted.

No revisions to the final report are necessary due to this Comment.

United States Department of the Interior, National Park Service (NPS) Comments

Submitted by Susan Johnson, Air Resources Division, Chief Policy, Planning and Permit Review Branch.

Comment 1: In Chapter 2.1, the description of pollutant contributions to haze on the 20% worst days at Caney Creek and Upper Buffalo Wilderness Areas is good. Figures 2.1 and 2.2 demonstrate that sulfate is the largest contributor to haze of the 20% worst days. Figure 2.3 demonstrates that Electric Generating Units (EGU) and non-EGU point sources are the largest contributors to sulfur dioxide (SO₂) emissions in Arkansas. Therefore, NPS would expect Arkansas to concentrate on reducing point source SO₂ emissions in the long-term strategy.

Response: ADEQ will take actions to make necessary reductions to haze precursors based on the ability to make a demonstrable improvement in haze-related air quality values. SO₂ reductions will be achieved when BART sources are required to reduce SO₂. Other SO₂ reductions will be achieved through implementation of the SO₂ NAAQS, federal Tier III gasoline standards, New Source Performance Standards, and Emission Guidelines for existing facilities. Arkansas will continue to evaluate overall SO₂ emissions in an effort to determine which non-BART sources to consider for additional controls that might be needed to continue to meet the RPGs that have been established for Arkansas.

No revisions to the final report are necessary due to this Comment.

Comment 2: In Chapter 3.1, Table 3.1 indicates that annual emissions of SO₂ from EGU in Arkansas actually increased between 2002 and 2011, while nitrogen oxide (NO_x) emissions decreased slightly. No information is presented about expected emissions reductions from existing EGU between 2011 and 2018 to support the 2018 emissions projections in Table 5.1. The information presented does not demonstrate reasonable progress in reducing point source emissions. NPS requests that ADEQ identify any source specific controls planned and CAIR or CSAPR caps that have yet to be met that would require controls on these sources.

Response: The emissions presented in Table 3.1 are historic. No point-source emission reductions associated with the Regional Haze Rule have been realized to date. The 2018 projections contained in Table 5.1 are from the future-year inventory developed by the Central Regional Air Planning Association (CENRAP). Arkansas developed RPGs that included specific emission reduction requirements for BART sources. Because EPA has not yet approved the 2008 Arkansas RH SIP in its entirety, these reductions have not yet been realized. Any source-specific control associated with the implementation of CAIR or CSAPR caps are, or will be, reflected in annual emission inventories.

No revisions to the final report are necessary due to this Comment.

Comment 3: In Chapter 5, there is a typo in the sentence on top of page 50: Tables 5.2, 5.3, and 5.4 compare 2002 and 2011 emissions, not 2018 emissions. NPS recognizes that emissions from area, non-road, and on-road sectors are calculated by EPA. NPS concerns focus on point EGU and non-EGU facilities that are directly permitted by Arkansas and the lack of information supporting 2018 emissions projections.

Response: The sentence at the top of page 50 has been revised to correctly identify the information contained in Table 5.2, Table 5.3 and Table 5.4. The documentation for 2018 emission projections is included in Appendix 7.2-E of the 2008 Arkansas RH SIP submittal.

Comment 4: In Chapter 7, NPS states that in 2012, EPA disapproved Arkansas's BART determinations and reasonable progress goals for 2018. Arkansas has not yet corrected the deficiencies in the 2008 SIP. Arkansas's five-year Progress Report draft addresses goals that have been disapproved.

Response: The progress goals that Arkansas identified in the 2008 Arkansas RH SIP submittal are based on emission reductions that were identified and modeled on a regional scale. Without re-conducting or otherwise updating the regional-scale modeling effort that was conducted by CENRAP, it is not possible to establish new progress goals. Arkansas is satisfied that its previously identified RPGs are currently being met regardless of the fact that BART controls have yet to be implemented. Having a regulatory requirement to submit a progress report, regardless of whether or not the original SIP submittal has been approved in its entirety by the EPA is problematic; however, ADEQ is attempting to meet that requirement notwithstanding partial disapproval. Goals other than those already disapproved have not been established at this time. As of this date, ADEQ is uncertain what EPA might accept as RPGs.

No revisions to the final report are necessary due to this Comment.

Comment 5: In Chapter 7, Arkansas commits on page 50 to work with EPA as it performs the required four-factor analyses. NPS asks that Arkansas also consult with the affected FLMs.

Response: The referenced commitment is expressed in the fifth paragraph on page 55. There is no regulatory requirement or express need to consult FLMs in the development of a four-factor analysis.

No revisions to the final report are necessary due to this Comment.

Comment 6: In Chapter 7, Arkansas has not demonstrated that it is reducing emissions contributing to visibility impairment at Class I areas in neighboring states. Section 7.4 does not explain why Hercules Glade and Mingo in Missouri were the only Class I areas reviewed. Arkansas should cite the CENRAP source apportionment analyses that show the contribution of Arkansas point, area, and mobile sources at neighboring Class I areas, compared to sources in other states.

Response: The Arkansas point source emission reductions envisioned in the 2008 Arkansas RH SIP have not been implemented as of this date. No additional assessment is ongoing at this time. Visibility impairment in affected out-of-state Class I areas has improved. The Class I areas addressed in this five-year review are those identified in the 2008 Arkansas RH SIP and approved by the EPA.

No revisions to the final report are necessary due to this Comment.

Comment 7: NPS disagrees with Arkansas's conclusion that no additional actions are needed as part of this five-year review. NPS encourages Arkansas to complete revisions to the 2008 Arkansas RH SIP before requesting EPA approval of the five-year RHPR.

Response: The Regional Haze Rule requires submission of a progress report within five years of the original submittal of a Regional Haze SIP. Whether or not the submitted SIP has been approved does not alter this requirement. Additional actions to be taken will be established upon approval of the 2008 Arkansas RH SIP or through federal action in the form of a FIP.

No revisions to the final report are necessary due to this Comment.

Comment 8: NPS states that while the Arkansas five-year RHPR draft demonstrates that visibility is improving at Class I areas in Arkansas and Missouri, there is no demonstration that Arkansas is implementing all the reasonable control measures necessary to meet the 2018 reasonable progress goals for Class I areas in Arkansas and neighboring states.

Response: The most recent assessment of visibility conditions in affected Class I areas in Arkansas and Missouri shows that RPGs established by Arkansas in the 2008 RH SIP are being met. ADEQ anticipates that as BART controls are established and implemented in Arkansas, additional progress will be demonstrated.

No revisions to the final report are necessary due to this Comment.

Comment 9: NPS states that Arkansas has not revised the 2008 Arkansas RH SIP to resolve the deficiencies identified by EPA, in the disapproved portions of the SIP, in March 2012.

Therefore, NPS does not agree with Arkansas's conclusion that the requirements of 40 C.F.R. § 51.308(g) have been met nor that they can support Arkansas's determination that no further actions are required.

Response: ADEQ acknowledges that the disapproved portions of the 2008 Arkansas RH SIP have resulted in a situation where less than desired progress can be achieved at this time. Resolution of the deficiencies identified by the EPA is underway. 40 C.F.R. § 51.308(g) requires only a periodic progress report. ADEQ disagrees with the assertion that the required elements described in 40 CFR 51.308(g) have not been addressed in the five-year RHPR draft.

No revisions to the final report are necessary due to this Comment.

Appendix B: State’s Legal Authority to Adopt and Implement the Plan

The State’s legal authority to adopt and implement this State Implementation Plan revision can be found in Ark. Code Ann. §§ 8-4-311(a)(1) and 8-4-317.

Ark. Code Ann. § 8-4-311. Powers generally.

(a) The Arkansas Department of Environmental Quality or its successor shall have the power to:

- (1) Develop and effectuate a comprehensive program for the prevention and control of all sources of pollution of the air of this state;
- (2) Advise, consult, and cooperate with other agencies of the state, political subdivisions, industries, other states, the federal government, and with affected groups in the furtherance of the purposes of this chapter;
- (3) Encourage and conduct studies, investigations, and research relating to air pollution and its causes, prevention, control, and abatement as it may deem advisable and necessary;
- (4) Collect and disseminate information relative to air pollution and its prevention and control;
- (5) Consider complaints and make investigations;
- (6) Encourage voluntary cooperation by the people, municipalities, counties, industries, and others in preserving and restoring the purity of the air within the state;
- (7) Administer and enforce all laws and regulations relating to pollution of the air;
- (8) Represent the state in all matters pertaining to plans, procedures, or negotiations for interstate compacts in relation to air pollution control;
- (9) (A) Cooperate with and receive moneys from the federal government or any other source for the study and control of air pollution.

(B) The Department is designated as the official state air pollution control agency for such purposes;
- (10) Make, issue, modify, revoke, and enforce orders prohibiting, controlling, or abating air pollution and requiring the adoption of remedial measures to prevent, control, or abate air pollution;
- (11) Institute court proceedings to compel compliance with the provisions of this chapter and rules, regulations, and orders issued pursuant to this chapter;
- (12) Exercise all of the powers in the control of air pollution granted to the Department for the

control of water pollution under §§ 8-4-101 -- 8-4-106 and 8-4-201 -- 8-4-229; and

(13) Develop and implement state implementation plans provided that the commission shall retain all powers and duties regarding promulgation of rules and regulations under this chapter.

(b) The Arkansas Pollution Control and Ecology Commission shall have the power to:

(1) (A) Promulgate rules and regulations for implementing the substantive statutes charged to the Department for administration.

(B) In promulgation of such rules and regulations, prior to the submittal to public comment and review of any rule, regulation, or change to any rule or regulation that is more stringent than federal requirements, the commission shall duly consider the economic impact and the environmental benefit of such rule or regulation on the people of the State of Arkansas, including those entities that will be subject to the regulation.

(C) The commission shall promptly initiate rulemaking to further implement the analysis required under subdivision (b)(1)(B) of this section.

(D) The extent of the analysis required under subdivision (b)(1)(B) of this section shall be defined in the commission's rulemaking required under subdivision (b)(1)(C) of this section. It will include a written report that shall be available for public review along with the proposed rule in the public comment period.

(E) Upon completion of the public comment period, the commission shall compile a rulemaking record or response to comments demonstrating a reasoned evaluation of the relative impact and benefits of the more stringent regulation;

(2) Promulgate rules, regulations, and procedures not otherwise governed by applicable law that the commission deems necessary to secure public participation in environmental decision-making processes;

(3) Promulgate rules and regulations governing administrative procedures for challenging or contesting department actions;

(4) In the case of permitting or grants decisions, provide the right to appeal a permitting or grants decision rendered by the Director of the Arkansas Department of Environmental Quality or his or her delegatee;

(5) In the case of an administrative enforcement or emergency action, providing the right to

contest any such action initiated by the director;

(6) Instruct the director to prepare such reports or perform such studies as will advance the cause of environmental protection in the state;

(7) Make recommendations to the director regarding overall policy and administration of the Department, provided, however, that the director shall always remain within the plenary authority of the Governor;

(8) Upon a majority vote, initiate review of any director's decision;

(9) Adopt, after notice and public hearing, reasonable and nondiscriminatory rules and regulations requiring the registration of and the filing of reports by persons engaged in operations that may result in air pollution;

(10) (A) Adopt, after notice and public hearing, reasonable and nondiscriminatory rules and regulations, including requiring a permit or other regulatory authorization from the Department, before any equipment causing the issuance of air contaminants may be built, erected, altered, replaced, used, or operated, except in the case of repairs or maintenance of equipment for which a permit has been previously used, and revoke or modify any permit issued under this chapter or deny any permit when it is necessary, in the opinion of the Department, to prevent, control, or abate air pollution.

(B) A permit shall be issued for the operation or use of any equipment or any facility in existence upon the effective date of any rule or regulation requiring a permit if proper application is made for the permit.

(C) No such permit shall be modified or revoked without prior notice and hearing as provided in this section.

(D) Any person that is denied a permit by the Department or that has such permit revoked or modified shall be afforded an opportunity for a hearing in connection therewith upon written application made within thirty (30) days after service of notice of such denial, revocation, or modification.

(E) The operation of any existing equipment or facility for which a proper permit application has been made shall not be interrupted pending final action thereon.

(F) (i) An applicant or permit holder that has had a complete application for a permit or for a modification of a permit pending longer than the time specified in the state regulations

promulgated pursuant to Title V of the Clean Air Act Amendments of 1990, or any person that participated in the public participation process, and any other person that could obtain judicial review of such actions under state laws, may petition the commission for relief from Department inaction.

(ii) The commission will either deny or grant the petition within forty-five (45) days of its submittal.

(iii) For the purposes of judicial review, either a commission denial or the failure of the Department to render a final decision within thirty (30) days after the commission has granted a petition shall constitute final agency action; and

(11) (A) Establish through its rulemaking authority, either alone or in conjunction with the appropriate state or local agencies, a system for the banking and trading of air emissions designed to maintain both the state's attainment status with the national ambient air quality standards mandated by the Clean Air Act and the overall air quality of the state.

(B) The commission may consider differential valuation of emission credits as necessary to achieve primary and secondary national ambient air quality standards, and may consider establishing credits for air pollutants other than those designated as criteria air pollutants by the United States Environmental Protection Agency.

(C) Any regulation proposed pursuant to this authorization shall be reported to the House Interim Committee on Public Health, Welfare, and Labor and the Senate Interim Committee on Public Health, Welfare, and Labor or appropriate subcommittees thereof prior to its final promulgation; and

(12) In the case of a state implementation plan, provide the right to appeal a final decision rendered by the Director of the Arkansas Department of Environmental Quality or his or her delegate under § 8-4-317.

HISTORY: Acts 1949, No. 472, [Part 2], § 5, as added by Acts 1965, No. 183, § 7; A.S.A. 1947, § 82-1935; Acts 1993, No. 994, § 1; 1995, No. 895, § 4; 1997, No. 179, § 1; 1997, No. 1219, § 6; 1999, No. 1164, § 31; 2013, No. 1302, §§ 2, 3.

Ark. Code Ann. § 8-4-317. **State implementation plans generally.**

(a) In developing and implementing a state implementation plan, the Arkansas Department of Environmental Quality shall consider and take into account the factors specified in § 8-4-312 and the Clean Air Act, 42 U.S.C. §7401 *et seq.*, as applicable.

(b)(1)(A) Whenever the Department proposes to finalize a state implementation plan submittal for review and approval by the United States Environmental Protection Agency, it shall cause notice of its proposed action to be published in a newspaper of general circulation in the state.

(B) The notice required under subdivision (b)(1)(A) of this section shall afford any interested party at least thirty (30) calendar days in which to submit comments on the proposed state implementation plan submittal in its entirety.

(C)(i) In the case of any emission limit, work practice or operational standard, environmental standard, analytical method, air dispersion modeling requirement, or monitoring requirement that is incorporated as an element of the proposed state implementation plan submittal, the record of the proposed action shall include a written explanation of the rationale for the proposal, demonstrating the reasoned consideration of the factors in § 8-4-312 as applicable, the need for each measure in attaining or maintaining the National Ambient Air Quality Standards, and that any requirements or standards are based upon generally accepted scientific knowledge and engineering practices.

(ii) For any standard or requirement that is identical to an applicable federal regulation, the demonstration required under subdivision (b)(1)(C)(i) of this section may be satisfied by reference to the regulation. In all other cases, the Department shall provide its own justification with appropriate reference to the scientific and engineering literature considered or the written studies conducted by the Department.

(2)(A) At the conclusion of the public comment period and before transmittal to the Governor for submittal to the United States Environmental Protection Agency, the Department shall provide written notice of its final decision regarding the state implementation plan submittal to all persons who submitted public comments.

(B)(i) The Department's final decision shall include a response to each issue raised in any public comments received during the public comment period. The response shall manifest reasoned consideration of the issues raised by the public comments and shall be supported by appropriate legal, scientific, or practical reasons for accepting or rejecting the substance of the comment in the Department's final decision

(ii) For the purposes of this section, response to comments by the Department should serve the roles of both developing the record for possible judicial review of a state implementation plan decision and serving as a record for the public's review of the Department's technical and legal interpretations on long-range regulatory issues.

(iii) This section does not limit the Department's authority to raise all relevant issues of regulatory concern upon adjudicatory review by the Arkansas Pollution Control and Ecology Commission of a particular state implementation plan decision.

(c)(1) Only those persons that submit comments on the record during the public comment period have standing to appeal the final decision of the Department to the commission upon written application made within thirty (30) days after service of the notice under subdivision (b)(2)(A).

(2) An appeal under subdivision (c)(1) of this section shall be processed as a permit appeal under § 8-4-205. However, the decision of the Director of the Arkansas Department of Environmental Quality shall remain in effect during the appeal.

HISTORY: Acts 2013, No. 1302, § 4.

Appendix C: Evidence Public Notice Was Given

Arkansas Department of Environmental Quality

Public Notice

The Arkansas Department of Environmental Quality (ADEQ) will hold a public hearing at North Little Rock February 2, 2015, to receive comments on the proposed five-year regional haze progress report on a State Implementation Plan (SIP) revision prior to submission of the revised plan to the U.S. Environmental Protection Agency (EPA). The hearing will begin at 2:00 p.m. (Central Time) in the Commission Room at the ADEQ Headquarters Building, 5301 Northshore Drive, North Little Rock. The deadline for submitting comments on the SIP revisions is 4:30 p.m. (Central Time) February 17, 2015.

The progress report is intended to fulfill one of Arkansas's responsibilities under the Clean Air Act and Regional Haze Rule. Arkansas's original Regional Haze SIP revision was submitted to the U.S. Environmental Protection Agency (EPA) in September 2008 and addressed visibility impairment in the State's Class I Federal areas - Upper Buffalo and Caney Creek Wilderness areas. The proposed SIP is intended to address the requirements of 40 Code of Federal Register (C.F.R.) Section 51.308(g) requiring periodic reports evaluating progress towards the Reasonable Progress Goals established for mandatory Class I areas where visibility may be impacted by Arkansas sources.

This proposed SIP submittal is meant to demonstrate the actions ADEQ has taken to fulfill the requirements under 40 C.F.R. Section 51.308(g) for periodic progress reports. In accordance with 40 C.F.R. Section 51.308(h)(1), the State is submitting a negative declaration that further revision of the existing implementation plan is not needed at this time. However, ADEQ is cognizant of its obligation and the associated timeframe to address the disapproved components of the 2008 Arkansas Regional Haze SIP submittal.

ADEQ is providing the public with the opportunity to comment on this proposed SIP revision in two ways. In addition to commenting at the February 2, 2015, public hearing, interested parties may submit written or electronic mail comments prior to the comment deadline. Oral and written statements will be accepted at the hearing, but written comments are preferred in the interest of accuracy. Written comments should be mailed to Mike Bates, Air Division, Arkansas Department of Environmental Quality, 5301 Northshore Drive, North Little Rock, AR 72118. Electronic mail comments should be sent to: bates@adeq.state.ar.us. Written or E-mail comments must be received by 4:30 p.m. (Central Time) February 17, 2015, in order to be considered.

In the event of inclement weather or other unforeseen circumstances, a decision may be made to postpone the hearing. If the hearing is postponed and rescheduled, a new legal notice will be published to announce the details of the new hearing date and comment period.

Copies of Arkansas's proposed SIP revision are available for public inspection during normal business hours at the Public Outreach and Assistance (POA) Division in the ADEQ headquarters building in North Little Rock and in ADEQ information depositories located in public libraries at Arkadelphia, Batesville, Blytheville, Camden, Clinton, Crossett, El Dorado, Fayetteville, Forrest City, Fort Smith, Harrison, Helena, Hope, Hot Springs, Jonesboro, Little Rock (main branch),

Magnolia, Mena, Monticello, Mountain Home, Pocahontas, Russellville, Searcy, Stuttgart, Texarkana, and West Memphis; in campus libraries at the University of Arkansas at Pine Bluff and the University of Central Arkansas at Conway; and in the Arkansas State Library, 900 W. Capitol, Suite 100, Little Rock, AR. In addition, an electronic copy of the Arkansas's proposed SIP revision is available for viewing or downloading on ADEQ's Internet web site at <http://www.adeg.state.ar.us/air/5year RH Progress Report.pdf>

Published January 2, 2015
Ryan Benefield, P.E., Interim Director
Arkansas Department of Environmental Quality

Arkansas Democrat-Gazette

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Arkansas Department of
Environmental Quality
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Copies of Arkansas's proposed SIP revision are available for public inspection during normal business hours at the Public Outreach and Assistance (POA) Division in the ADEQ headquarters building in North Little Rock and in ADEQ information depositories located in public libraries at Arkadelphia, Batesville, Blytheville, Camden, Clinton, Crossett, El Dorado, Fayetteville, Forrest City, Fort Smith, Harrison, Helena, Hope, Hot Springs, Jonesboro, Little Rock (main branch), Magnolia, Mena, Monticello, Mountain Home, Pochontas, Russellville, Searcy, Stuttgart, Texarkana, and West Memphis; in campus libraries at the University of Arkansas at Pine Bluff and the University of Central Arkansas at Conway; and in the Arkansas State Library, 900 W. Capitol, Suite 100, Little Rock, AR. In addition, an electronic copy of the Arkansas's proposed SIP revision is available for viewing or downloading on ADEQ's internet website at [http://www.adeq.state.ar.us/air/5year R1 Progress Report.pdf](http://www.adeq.state.ar.us/air/5year%20R1%20Progress%20Report.pdf).
Published January 2, 2015
Ryan Benefield, P.E., Interim Director

Arkansas Department of Environmental Quality
729633346

Appendix D: Certification That a Public Hearing Was Held



5-Year Regional Haze Progress Report Public Hearing

“Today is February 2, 2015, and we are here in the Commission Room of the Arkansas Pollution Control and Ecology Commission at the Arkansas Department of Environmental Quality for a public hearing on the SIP.

We are making SIP revisions in order to fulfill one of Arkansas’s responsibilities under the Clean Air Act and Regional Haze Rule. Arkansas’s original Regional Haze SIP revision was submitted to the U.S. Environmental Protection Agency (EPA) in September 2008 and addressed visibility impairment in the State’s Class I Federal areas - Upper Buffalo and Caney Creek Wilderness areas. The proposed SIP is intended to address the requirements of 40 Code of Federal Register (C.F.R.) Section 51.308(g) requiring periodic reports evaluating progress towards the Reasonable Progress Goals established for mandatory Class I areas where visibility may be impacted by Arkansas sources.

This proposed SIP submittal is meant to demonstrate the actions ADEQ has taken to fulfill the requirements under 40 C.F.R. Section 51.308(g) for periodic progress reports. In accordance with 40 C.F.R. Section 51.308(h)(1), the State is submitting a negative declaration that further revision of the existing implementation plan is not needed at this time. However, ADEQ is cognizant of its obligation and the associated timeframe to address the disapproved components of the 2008 Arkansas Regional Haze SIP submittal.

At this time, we will accept comments from the audience. Is there anyone who wishes to comment from the audience? [No response from those present]

Seeing no one wishing to comment, we will close the hearing and we remind everyone that the comment period will remain open until 4:30 p.m., on February 17, 2015. Thank you very much for your attendance.” —

Appendix E: Compilation of Public Comments and Response to Comments

This Appendix contains the Responsiveness Summary for public comments that were received and copies of the comment letters.

February 17, 2015

Ryan Benefield
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118

Via electronic delivery

**Re: Comments Concerning the “State Implementation Plan Review
for the Five-Year Regional Haze Progress Report”**

Dear Director Benefield:

The Energy and Environmental Alliance of Arkansas (“EEAA”) and its individual members¹ are pleased to submit these comments responding to the *State Implementation Plan Review for the Five-Year Regional Haze Progress Report* (“Progress Report”), as publicly noticed by the Arkansas Department of Environmental Quality (“ADEQ” or “Department”) on January 2, 2015.

The EEAA is an ad-hoc collaboration of Arkansas’ investor-owned, co-operative, municipal, and independent electric utilities and other energy companies formed to advocate, communicate and encourage energy and environmental policies that promote sound and predictable regulation of Arkansas’ utility industry and support an economically viable and environmentally secure future for all Arkansans, including access to reliable and affordable energy resources.

Introduction and Background

Regulations implementing the regional haze visibility program of the federal Clean Air Act (“CAA”) require each state to submit reports every five years describing the progress toward the regional progress goals for each mandatory Class I federal area located in the state or outside the state if

¹ The members of EEAA are: AEP/Southwestern Electric Power Company, Arkansas Electric Cooperative Corporation, Arkansas Municipal Power Association, Conway Corporation, Empire District Electric Company, Entergy Arkansas, Inc., Jonesboro City Water & Light, North Little Rock Electric, Oklahoma Gas & Electric Company, Plum Point Services Company, LLC, and West Memphis Utility Commission.

affected by emissions from within the state.² These reports must be in the form of and satisfy the requirements for state implementation plan revisions. In addition, the regulations require that each report contain specific information, including: (i) the status of all measures included in the implementation plan for achieving reasonable progress goals; (ii) a summary of the emissions reductions achieved throughout the state; (iii) current visibility conditions and changes in visibility impairment; (iv) analysis tracking the five-year change in emissions of pollutants contributing to visibility impairment; (v) significant changes in anthropogenic sources; (vi) analysis of whether current implementation plan elements and strategies are sufficient to enable the state to meet reasonable progress goals; and (vii) a review of the state's visibility monitoring strategy.³ Finally, the report must conclude with a determination of adequacy regarding the existing regional haze implementation plan.⁴

On January 2nd, 2015, ADEQ publicly noticed the availability of the proposed Progress Report containing the information responsive to applicable regulatory requirements. The Progress Report concludes with ADEQ's proposed "negative declaration," which specifies "no additional controls are necessary during this first five-year progress report period."⁵

General Comments

I. The Progress Report and Negative Declaration Are Consistent with Federal Regulation and Guidance

Although federal regulations require that each state's five-year progress report contain specific elements, the individual states are left with the primary authority to assess and determine the "adequacy of [the] existing implementation plan."⁶ The EPA intends for the five-year progress report to "involve significantly less effort than a comprehensive SIP revision."⁷

ADEQ's Progress Report contains the elements and considerations required under federal regulation⁸, and more fully described in EPA's *General Principles for the 5-Year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans* (Apr. 2013) ("Guidance"). The Department's

² 40 C.F.R. § 51.308(g).

³ *Id.* § 51.308(g)(1)-(7).

⁴ *Id.* § 51.308(h).

⁵ Progress Report at 64.

⁶ 40 C.F.R. § 51.308(g) and (h).

⁷ 64 *Fed. Reg.* 35714, 35747 (July 1, 1999).

⁸ 40 C.F.R. § 51.308(g)(1)-(7)

draft enumerates each element in sequential chapters, and includes the data and analysis necessary to inform the public and EPA that Arkansas' Class I federal areas remain ahead of Uniform Rate of Progress necessary to attain the national goal of natural visibility conditions by the year 2064.⁹ For these reasons, the Progress Report is consistent with EPA's intent, as spelled out in regulation and guidance.

II. Visibility Improvement at Arkansas' Class I Federal Areas Remains Ahead of the Federally Approved Glide Path

The overarching goal of the visibility program is to restore natural visibility conditions at each Class I federal area, therefore each state's regional haze state implementation plan required an assessment of "the rate of progress needed to attain natural visibility by the year 2064" (the "Uniform Rate of Progress" or "Glide Path").¹⁰ Accordingly, Arkansas' state implementation plan provided a Uniform Rate of Progress equivalent to: (i) a 0.246 deciview (dv) per year (14.78 dv total) improvement for Caney Creek and (ii) 0.245 dv per year (14.70 dv total) improvement for Upper Buffalo.¹¹ The Uniform Rate of Progress for both areas was reviewed and approved by EPA.¹²

In order to track each state's progress toward natural visibility conditions, the regulations require that each state's five-year progress report must include an assessment of visibility conditions for the most and least impaired days, with the same expressed in terms of 5-year averages of the annual values. Specifically, the five-year progress report must provide:

- (i) current visibility conditions for the most and least impaired days;
- (ii) the difference between current visibility conditions for the most and least impaired days and the baseline visibility conditions; and
- (iii) the change in visibility impairment for the most and least impaired days from the past five years.¹³

In order to comply with these requirements, ADEQ's assessment properly utilizes the data and algorithms from the Interagency Monitoring of Protected Visual Improvements ("IMPROVE") program to chart the rate of visibility

⁹ See Progress Report at 56–57.

¹⁰ 40 C.F.R. § 51.308(d)(1)(i)(B)

¹¹ See 76 Fed. Reg. 64186, 64194 (Oct. 17, 2011)

¹² See 77 Fed. Reg. 14604, 14607 (Mar. 12, 2012).

¹³ 40 C.F.R. § 51.308(g)(3).

improvement.¹⁴ The data clearly demonstrates that visibility impairment is decreasing more rapidly than the federally approved Uniform Rate of Progress for each of Arkansas' Class I federal area. The continuing improvement is reflected in both the 20% worst days and 20% best days.¹⁵ The documented rate of progress supports ADEQ's negative declaration.

III. The Progress Report Documents that Arkansas' Existing Emissions Controls and Strategy are Sufficient to Make Continued, Reasonable Progress Toward Natural Visibility Conditions

Though Arkansas' reasonable progress goals, as set forth in the 2008 Arkansas Regional Haze State Implementation Plan, are not approved and final, the Department relied on the goals to conduct the analysis and assessments necessary to complete the five-year progress report. The lack of finality concerning the reasonable progress goals does nothing to impugn the validity and authority of the monitoring data and assessments articulated in the Progress Report, which clearly demonstrate that the state's existing emission controls and strategy are moving the state's Class I federal areas toward the federal goal of natural visibility conditions.

The visibility impairment at Arkansas' Class I federal areas is decreasing *more rapidly* than the federally approved Uniform Rate of Progress.¹⁶ The improvement in visibility is due in significant part to reductions in visibility related pollutants resulting from federal and state programs and increased control efficiencies from EGU sources.¹⁷ Notably, the documented improvement in visibility at Arkansas' Class I federal areas is occurring *without the implementation of best available control technology ("BART") at the state's subject-to-BART sources and without additional controls on additional sources.*¹⁸

Accordingly, the Progress Report validates the state's original determination that existing federal and state programs are adequate to make reasonable progress toward natural visibility. The full implementation of BART controls should only expedite the rapid rate of progress toward 2018 and, ultimately, 2064. In sum, the existing plan and strategy are working and

¹⁴ See Progress Report at 39–41; see also Guidance at 8–9.

¹⁵ See Progress Report at 41–43 and 56–57; Tables 4.1 and 4.2.

¹⁶ See Progress Report at 56–57.

¹⁷ See Progress Report at 35–37.

¹⁸ See Progress Report at 35 and 55.

support ADEQ's proposed negative declaration that "no additional controls are necessary during this first five-year progress period."¹⁹

Specific Comments

- Page(s) 6 and 24: The proposed Progress Report contains statements referencing the D.C. Circuit Court of Appeals grant of EPA's request to lift the stay on CSAPR and indicating that ADEQ is awaiting guidance from the agency for implementation of CSAPR. On December 3, 2014, EPA published a ministerial rule amending the dates to correctly reflect the compliance deadlines for CSAPR.²⁰ Accordingly, ADEQ should revise the applicable sections to note that CSAPR will be implemented in Arkansas beginning with the 2015 ozone season.
- Page 21: The proposed Progress Report should be revised to note that Units 1 and 2 (SN-01) and Unit 3 (SN-02) at Lake Catherine (AFIN 30-00011) were permanently retired and removed from the facility's Title V permit, issued September 26, 2014 (Permit 1717-AOP-R6).
- Page 21: The Progress Report should be updated to note that Unit 4 (SN-03) is no longer permitted to burn fuel oil, with the permitted allowance for fuel oil removed with the issuance of Permit 1717-AOP-R6 on September 26, 2014. The removal of the permitted allowance for fuel oil at Unit 4 (SN-03) eliminates any need to review and consider BART controls for the fuel oil-firing scenario, and ADEQ should highlight the significant decrease in permitted SO₂ emissions from Unit 4.
- Page(s) 30–31: Table 2-6 should be updated to include the retirement of Units 1 and 2 (SN-01) and Unit 3 (SN-02) at the Entergy - Lake Catherine facility.
- Page 37: The Progress Report states that annual SO₂ emissions are projected to increase by an additional 125 tpy in 2018 from 2011 observed emissions. This conclusory statement conflicts with language in the very next paragraph that documents an 87.5% reduction in SO₂ emissions at the SWEPCO Flint Creek Power Plant because of the operation of new control equipment. The statement also contradicts the 2018 emission projections detailed in Chapter 5, which project

¹⁹ See Progress Report at 64.

²⁰ See 79 Fed. Reg. 71663 (Dec. 3, 2014).

significant decreases in SO₂ from EGU sources. The Progress Report should be revised and/or clarified to reconcile the statement on page 37 with the projected data provided in Chapter 5.

Conclusion

ADEQ's proposed Progress Report is consistent with existing regulatory requirements and conforms to agency Guidance. The data, analysis and assessments provide ample support for the Department's "negative declaration." Perhaps most important, the Progress Report validates ADEQ's determination that current and existing emission controls are more than adequate to make reasonable progress toward the federal goal of natural visibility conditions in the year 2064.

EAEA and its members sincerely appreciate the opportunity to provide comments in support of the proposed Progress Report, and the organization remains available to provide any additional information.

DATED: February 17, 2015

Respectfully Submitted,

Energy and Environmental Alliance of Arkansas



Chad L. Wood
GILL RAGON OWEN, P.A.
425 West Capitol Avenue, Suite 3800
Little Rock, Arkansas 72201

*Counsel for Energy and Environmental Alliance of
Arkansas*

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CHARLES W. REYNOLDS
JOHN B. PEACE
WILLIAM DEAN OVERSTREET
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GARY B. ROGERS

JAMES PAUL BEACHBOARD =
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DARRELL D. DOVER (1933-2009)
PHILIP E. DIXON (1932-2005)

OF COUNSEL
GARLAND W. BINNS, JR.

= ALSO LICENSED IN TENNESSEE
+ ALSO LICENSED IN TEXAS

 MERITAS LAW FIRMS WORLDWIDE

February 17, 2015

VIA HAND DELIVERY

Mr. Ryan Benefield
Interim Director
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118

Re: Comments of Nucor Steel Arkansas and of Nucor-Yamato Steel Company on
ADEQ's Five-Year Regional Haze Progress Report

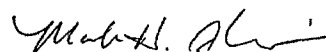
Dear Mr. Benefield:

This firm represents Nucor Steel Arkansas, a division of Nucor Corporation (NSA), and Nucor Yamato Steel Company (NYS). Enclosed are NSA and NYS's comments on ADEQ's proposed Five Year Regional Haze Progress Report. Pursuant to ADEQ's public notice these comments are being submitted prior to the comment deadline at 4:30 p.m., Central Time, February 17, 2015.

Please let me know if you have any questions.

Sincerely,

DOVER DIXON HORNE



Mark H. Allison

Enclosure

cc: Tammera Haralson, Interim Deputy Director
Air Division Chief, ADEQ
Wayne Turney, Nucor Steel Company
Les Jackson, Nucor-Yamato Steel Company

RECEIVED

FEB 17 2015

LF 2:48

Responsiveness Summary for Public Comments on the State Implementation Plan Review for the Five-Year Regional Haze Progress Report

Two sets of comments on the State Implementation Plan Review for the Five-Year Regional Haze Progress Report (the Progress Report) were received. Both of these comments were supportive of ADEQ's determination that the Arkansas Regional Haze State Implementation Plan (SIP) and relevant suggestions were incorporated in this final Report. No adverse comments were received. Copies of the comments received (without attachments) are included herein.

The Progress Report provides an update on the status of visibility conditions in Class I areas and the implementation of the 2008 Arkansas Regional Haze SIP. One commenter "incorporates by reference" their comments submitted to EPA Region VI on December 22, 2011 regarding EPA's notice of its partial approval/disapproval of the Arkansas Regional Haze SIP. It should be noted that the comments submitted to EPA Region VI were with regards to a federal action that was promulgated as a Final Rule in the *Federal Register* on March 12, 2012. These comments would have been addressed by the EPA as part of that action. ADEQ does not consider these comments that were previously addressed by a federal agency to be relevant to the action at hand.

Appendix F: Statutory Five-Factor Analysis Letters to BART Facilities

On May 14, 2012, ADEQ sent letters to BART facilities, via certified mail through the U.S. Postal Service, with the intention to resolve disapproved portions of the 2008 Arkansas Regional Haze SIP. Facilities were asked to prepare the five-factor analysis for specific subject-to-BART units (per C.A.A. § 169(A)(g)(2)) in accordance with 40 C.F.R. Part 51, Appendix Y.

The following facilities were contacted by ADEQ (units listed below facility name):

Arkansas Electric Cooperative Corporation – Carl E. Bailey Generating Station

- Unit 1: SO₂, NO_x, and PM

Arkansas Electric Cooperative Corporation – John L. McClellan Generating Station

- Unit 1: SO₂, NO_x, and PM

American Electric Power – Flint Creek

- Unit 1: SO₂ and NO_x

Entergy – Lake Catherine

- Unit 4: NO_x for natural gas firing
- Unit 4: SO₂, NO_x, and PM for oil firing

Entergy – White Bluff

- Unit 1 and Unit 2: SO₂ and NO_x for both bituminous and sub-bituminous coal firing
- Auxiliary boiler

Domtar – Ashdown

- Power Boiler 1: SO₂ and NO_x
- Power Boiler 2: SO₂, NO_x, and PM

Georgia Pacific Paper – Crossett

- Power Boilers 6A and 9A: SO₂, NO_x, and PM

The letters are included under this Appendix for reference.



ARKANSAS
Department of Environmental Quality

*Copy
mailed 5-15-2012*

Certified Return Receipt Number: 91 7199 9991 7030 4899 3210

91 7199 9991 7030 4899 3210

May 14, 2012

Tracy Johnson
Interim Manager, Arkansas Environmental Support
425 West Capitol Avenue
P.O. Box 551
Little Rock, AR 72203

Re: Arkansas Regional Haze Rule Revision – 5-Factor Analysis

Dear Mr. Johnson:

In accordance with CAA sections 110(a) and 169A, the Air Division of the Arkansas Department of Environmental Quality (ADEQ) is responsible for the development and implementation of a State Implementation Plan (SIP) incorporating the requirements of the federal Regional Haze Rule. ADEQ submitted a Regional Haze SIP on September 23, 2008.

On March 12, 2012, the federal Environmental Protection Agency (EPA) promulgated a Final Rule, Approval and Promulgation of Implementation Plans; Arkansas Regional Haze State Implementation Plan; Interstate Transport State Implementation Plan To Address Pollution Affecting Visibility and Regional Haze – (Federal Register, March 12, 2012), that partially disapproved the Regional Haze SIP. In response to this disapproval, ADEQ has determined that it will take measures to develop appropriate SIP revisions.

As a result, ADEQ will conduct new Best Available Retrofit Technology determinations (BART determinations) for certain facilities identified in the EPA notice. This will require that your company prepare new BART-related analyses. Specifically, ADEQ is requesting that your company submit an analysis of the five factors specified in CAA section 169(A)(g)(2) for the following affected subject to BART unit/units and pollutants:

- White Bluff's Units 1 and 2 SO₂ and NO_x for both bituminous and sub-bituminous coal firing
- White Bluff's auxiliary boiler
- Lake Catherine Unit 4 NO_x for natural gas firing
- Lake Catherine Unit 4 SO₂, NO_x, and PM for oil firing

Each "5 – Factor Analysis" is to be conducted in accordance with 40 CFR 51, App. Y and the guidance provided by ADEQ. This guidance can be obtained by accessing the BART Analysis folder located on the following ftp site:

<ftp://gis.adeg.state.ar.us/pub/AirPermits/>

The format of your submittal should closely follow the procedures described in App. Y. (Please see the attached BART Engineering Analysis Format and the letter from the U.S. EPA recommending the use of CALPUFF version 5.8, the NO OBS = 0 CALMET and CALPOST version 6.221.) This will assist ADEQ staff responsible for completing the BART determinations. I am requesting that you provide this analysis within two months of your receipt of this letter. Questions regarding the development of this analysis should be directed to Thomas Rheaume, Engineer P.E. Branch Manager at Tel. No.: (501) 682- 0762. Questions regarding air quality modeling should be directed to Mary Pettyjohn, Epidemiologist at Tel No.: (501) 682- 0070. Your immediate attention to this request is appreciated.

Sincerely,

A handwritten signature in black ink that reads "Mike Bates". The signature is written in a cursive, slightly slanted style.

Mike Bates, Chief – Air Division

Attachment: 2

ADEQ

ARKANSAS
Department of Environmental Quality

*Copy
mailed 5-15-2012*

Certified Return Receipt Number: 91 7199 9991 7030 4899 3180

91 7199 9991 7030 4899 3180

May 14, 2012

Jim W. Cutbirth
Environmental Affairs Manager
Georgia Pacific
100 Paper Mill Road
Crossett, AR 71635

Re: Arkansas Regional Haze Rule Revision – 5-Factor Analysis

Dear Mr. Cutbirth:

In accordance with CAA sections 110(a) and 169A, the Air Division of the Arkansas Department of Environmental Quality (ADEQ) is responsible for the development and implementation of a State Implementation Plan (SIP) incorporating the requirements of the federal Regional Haze Rule. ADEQ submitted a Regional Haze SIP on September 23, 2008.

On March 12, 2012, the federal Environmental Protection Agency (EPA) promulgated a Final Rule, Approval and Promulgation of Implementation Plans; Arkansas Regional Haze State Implementation Plan; Interstate Transport State Implementation Plan To Address Pollution Affecting Visibility and Regional Haze – (Federal Register, March 12, 2012), that partially disapproved the Regional Haze SIP. In response to this disapproval, ADEQ has determined that it will take measures to develop appropriate SIP revisions.

As a result, ADEQ will conduct new Best Available Retrofit Technology determinations (BART determinations) for certain facilities identified in the EPA notice. This will require that your company prepare new BART-related analyses. Specifically, ADEQ is requesting that your company submit an analysis of the five factors specified in CAA section 169(A)(g)(2) for the following affected subject to BART unit/units and pollutants:

- Crossett Power Boilers 6A and 9A were found to be subject-to-BART for SO₂, NO_x, and PM

Each “5 – Factor Analysis” is to be conducted in accordance with 40 CFR 51, App. Y and the guidance provided by ADEQ. This guidance can be obtained by accessing the BART Analysis folder located on the following ftp site:

<ftp://gis.adeq.state.ar.us/pub/AirPermits/>

The format of your submittal should closely follow the procedures described in App. Y. (Please see the attached BART Engineering Analysis Format and the letter from the U.S. EPA recommending the use of CALPUFF version 5.8, the NO OBS = 0 CALMET and CALPOST version 6.221.) This will assist ADEQ staff

responsible for completing the BART determinations. I am requesting that you provide this analysis within two months of your receipt of this letter. Questions regarding the development of this analysis should be directed to Thomas Rheaume, Engineer P.E. Branch Manager at Tel. No.: (501) 682- 0762. Questions regarding air quality modeling should be directed to Mary Pettyjohn, Epidemiologist at Tel No.: (501) 682- 0070. Your immediate attention to this request is appreciated.

Sincerely,

A handwritten signature in cursive script that reads "Mike Bates".

Mike Bates, Chief – Air Division

Attachment: 2

ADEQ

ARKANSAS
Department of Environmental Quality

*Copy
mailed 5-15-2012*

Certified Return Receipt Number: 91 7199 9991 7030 4899 3197

91 7199 9991 7030 4899 3197

May 14, 2012

Kris Gaus
Principal Environmental Specialist
C/O American Electric Power
Suite 800
1201 Elm Street
Dallas, TX 75270

Re: Arkansas Regional Haze Rule Revision – 5-Factor Analysis

Dear Mr. Gaus:

In accordance with CAA sections 110(a) and 169A, the Air Division of the Arkansas Department of Environmental Quality (ADEQ) is responsible for the development and implementation of a State Implementation Plan (SIP) incorporating the requirements of the federal Regional Haze Rule. ADEQ submitted a Regional Haze SIP on September 23, 2008.

On March 12, 2012, the federal Environmental Protection Agency (EPA) promulgated a Final Rule, Approval and Promulgation of Implementation Plans; Arkansas Regional Haze State Implementation Plan; Interstate Transport State Implementation Plan To Address Pollution Affecting Visibility and Regional Haze – (Federal Register, March 12, 2012), that partially disapproved the Regional Haze SIP. In response to this disapproval, ADEQ has determined that it will take measures to develop appropriate SIP revisions.

As a result, ADEQ will conduct new Best Available Retrofit Technology determinations (BART determinations) for certain facilities identified in the EPA notice. This will require that your company prepare new BART-related analyses. Specifically, ADEQ is requesting that your company submit an analysis of the five factors specified in CAA section 169(A)(g)(2) for the following affected subject to BART unit/units and pollutants:

- Flint Creek Unit 1 SO₂ and NO_x

Each “5 – Factor Analysis” is to be conducted in accordance with 40 CFR 51, App. Y and the guidance provided by ADEQ. This guidance can be obtained by accessing the BART Analysis folder located on the following ftp site:

<ftp://gis.adeq.state.ar.us/pub/AirPermits/>

The format of your submittal should closely follow the procedures described in App. Y. (Please see the attached BART Engineering Analysis Format and the letter from the U.S. EPA recommending the use of

CALPUFF version 5.8, the NO OBS = 0 CALMET and CALPOST version 6.221.) This will assist ADEQ staff responsible for completing the BART determinations. I am requesting that you provide this analysis within two months of your receipt of this letter. Questions regarding the development of this analysis should be directed to Thomas Rheaume, Engineer P.E. Branch Manager at Tel. No.: (501) 682- 0762. Questions regarding air quality modeling should be directed to Mary Pettyjohn, Epidemiologist at Tel No.: (501) 682- 0070. Your immediate attention to this request is appreciated.

Sincerely,

A handwritten signature in black ink that reads "Mike Bates". The signature is written in a cursive style with a large initial "M" and "B".

Mike Bates, Chief – Air Division

Attachment: 2

ADEQ

ARKANSAS
Department of Environmental Quality

*Copy
mailed 5-15-2012*

Certified Return Receipt Number: 91 7199 9991 7030 4899 3203

91 7199 9991 7030 4899 3203

May 14, 2012

Stephen Cain
Senior Environmental Engineer
Arkansas Electric Cooperative Corporation
P.O. Box 194208
Little Rock, AR 72219-4208

Re: Arkansas Regional Haze Rule Revision – 5-Factor Analysis

Dear Mr. Cain:

In accordance with CAA sections 110(a) and 169A, the Air Division of the Arkansas Department of Environmental Quality (ADEQ) is responsible for the development and implementation of a State Implementation Plan (SIP) incorporating the requirements of the federal Regional Haze Rule. ADEQ submitted a Regional Haze SIP on September 23, 2008.

On March 12, 2012, the federal Environmental Protection Agency (EPA) promulgated a Final Rule, Approval and Promulgation of Implementation Plans; Arkansas Regional Haze State Implementation Plan; Interstate Transport State Implementation Plan To Address Pollution Affecting Visibility and Regional Haze – (Federal Register, March 12, 2012), that partially disapproved the Regional Haze SIP. In response to this disapproval, ADEQ has determined that it will take measures to develop appropriate SIP revisions.

As a result, ADEQ will conduct new Best Available Retrofit Technology determinations (BART determinations) for certain facilities identified in the EPA notice. This will require that your company prepare new BART-related analyses. Specifically, ADEQ is requesting that your company submit an analysis of the five factors specified in CAA section 169(A)(g)(2) for the following affected subject to BART unit/units and pollutants:

- Bailey Plant Unit 1 SO₂, NO_x, and PM
- McClellan Plant Unit 1 SO₂, NO_x, and PM

Each "5 – Factor Analysis" is to be conducted in accordance with 40 CFR 51, App. Y and the guidance provided by ADEQ. This guidance can be obtained by accessing the BART Analysis folder located on the following ftp site:

<ftp://gis.adeg.state.ar.us/pub/AirPermits/>

The format of your submittal should closely follow the procedures described in App. Y. (Please see the attached BART Engineering Analysis Format and the letter from the U.S. EPA recommending the use of

CALPUFF version 5.8, the NO OBS = 0 CALMET and CALPOST version 6.221.) This will assist ADEQ staff responsible for completing the BART determinations. I am requesting that you provide this analysis within two months of your receipt of this letter. Questions regarding the development of this analysis should be directed to Thomas Rheaume, Engineer P.E. Branch Manager at Tel. No.: (501) 682- 0762. Questions regarding air quality modeling should be directed to Mary Pettyjohn, Epidemiologist at Tel No.: (501) 682- 0070. Your immediate attention to this request is appreciated.

Sincerely,

A handwritten signature in black ink that reads "Mike Bates". The signature is written in a cursive style with a horizontal line extending from the end of the name.

Mike Bates, Chief – Air Division

Attachment: 2



ARKANSAS
Department of Environmental Quality

*Copy
mailed 5-15-2012*

Certified Return Receipt Number: 91 7199 9991 7030 4899 3227

91 7199 9991 7030 4899 3227

May 14, 2012

Kelley Crouch
Group Leader, Environmental & Energy
Domtar A.W. LLC
285 Highway 71 South
Ashdown, AR 71822

Re: Arkansas Regional Haze Rule Revision – 5-Factor Analysis

Dear Ms. Crouch:

In accordance with CAA sections 110(a) and 169A, the Air Division of the Arkansas Department of Environmental Quality (ADEQ) is responsible for the development and implementation of a State Implementation Plan (SIP) incorporating the requirements of the federal Regional Haze Rule. ADEQ submitted a Regional Haze SIP on September 23, 2008.

On March 12, 2012, the federal Environmental Protection Agency (EPA) promulgated a Final Rule, Approval and Promulgation of Implementation Plans; Arkansas Regional Haze State Implementation Plan; Interstate Transport State Implementation Plan To Address Pollution Affecting Visibility and Regional Haze – (Federal Register, March 12, 2012), that partially disapproved the Regional Haze SIP. In response to this disapproval, ADEQ has determined that it will take measures to develop appropriate SIP revisions.

As a result, ADEQ will conduct new Best Available Retrofit Technology determinations (BART determinations) for certain facilities identified in the EPA notice. This will require that your company prepare new BART-related analyses. Specifically, ADEQ is requesting that your company submit an analysis of the five factors specified in CAA section 169(A)(g)(2) for the following affected subject to BART unit/units and pollutants:

- Domtar Ashdown's Power Boiler # 1 SO₂ and NO_x
- Domtar Ashdown's Power Boiler #2 SO₂, NO_x, and PM

Each "5 – Factor Analysis" is to be conducted in accordance with 40 CFR 51, App. Y and the guidance provided by ADEQ. This guidance can be obtained by accessing the BART Analysis folder located on the following ftp site:

<ftp://gis.adeq.state.ar.us/pub/AirPermits/>

The format of your submittal should closely follow the procedures described in App. Y. (Please see the attached BART Engineering Analysis Format and the letter from the U.S. EPA recommending the use of CALPUFF version 5.8, the NO OBS = 0 CALMET and CALPOST version 6.221.) This will assist ADEQ staff responsible for completing the BART determinations. I am requesting that you provide this analysis within two months of your receipt of this letter. Questions regarding the development of this analysis should be directed to Thomas Rheaume, Engineer P.E. Branch Manager at Tel. No.: (501) 682- 0762. Questions regarding air quality modeling should be directed to Mary Pettyjohn, Epidemiologist at Tel No.: (501) 682- 0070. Your immediate attention to this request is appreciated.

Sincerely,

A handwritten signature in black ink that reads "Mike Bates". The signature is written in a cursive style with a large, stylized "M" and "B".

Mike Bates, Chief – Air Division

Attachment: 2

Arkansas Regional Haze FIP update

Facility Name	Emission Units Subject-to-BART	Unit Description	EPA Final Action on 2008 RH SIP (3/12/12)	Baseline Visibility Impacts from Source	BART Limits Recommended by State and Facilities (We recommend going with these limits in our proposed FIP)
<p style="text-align: center;">Arkansas Electric Cooperative Corporation (AECC) Carl E. Bailey Plant</p>	<p>Boiler SN-01 Installation date- 1966</p>	<p>122 MW-- burns primarily natural gas and also fuel oil</p>	<p>Disapproved SO₂, NO_x, and PM BART</p>	<p>Caney Creek= 0.330 dv Upper Buffalo= 0.348 dv</p>	<p>SO₂ BART= 0.5% Sulfur Fuel Total Annual Cost= \$68,587 SO₂ tons removed= 26.80 tpy Average Cost effectiveness: \$2,559/ton removed Visibility Improvement at Caney Creek: 0.188 dv Visibility Improvement at Upper Buffalo: 0.221 dv Incremental Cost Effectiveness (compared to 1% Sulfur fuel): \$4,693/ ton removed Incremental Visibility improvement over 1% Sulfur fuel at Caney Creek: 0.051 dv Incremental Visibility improvement over 1% Sulfur fuel at Upper Buffalo: 0.067 dv</p> <p><u>Other SO₂ Controls Evaluated (which we are not recommending):</u></p> <p><u>Switch to 1% sulfur fuel oil:</u> Total Annual Cost= \$19,596 SO₂ tons removed= 16.36 tpy Average Cost effectiveness: \$1,198/ ton removed Visibility Improvement at Caney Creek: 0.137 dv Visibility Improvement at Upper Buffalo: 0.154 dv Incremental Cost Effectiveness: NA, least stringent option evaluated Incremental Visibility improvement at Caney Creek: NA, least stringent option evaluated Incremental Visibility improvement at Upper Buffalo: NA, least stringent option evaluated</p> <p><u>Switch to Diesel (0.05% sulfur content):</u> Total Annual Cost= \$194,003 SO₂ tons removed= 36.05 tpy Average Cost effectiveness: \$5,382/ ton removed Visibility Improvement at Caney Creek: 0.246 dv Visibility Improvement at Upper Buffalo: 0.279 dv Incremental Cost Effectiveness (compared to 0.5% Sulfur fuel): \$13,558/ ton removed Incremental Visibility improvement over 0.5% Sulfur fuel at Caney Creek: 0.058 dv Incremental Visibility improvement over 0.5% Sulfur fuel at Upper Buffalo: 0.058 dv</p> <p><u>Switch to Natural Gas:</u> Total Annual Cost= (\$384,550) SO₂ tons removed= 37.02 Average Cost effectiveness: -\$10,387/ ton removed (Note: negative value means there is a cost savings when switching from baseline fuel oil to natural gas) Visibility Improvement at Caney Creek: 0.247 dv Visibility Improvement at Upper Buffalo: 0.276 dv Incremental Cost Effectiveness (compared to diesel): N/A, natural gas is more cost effective Incremental Visibility improvement over diesel at Caney Creek: 0.001 dv Incremental Visibility improvement over diesel at Upper Buffalo: -0.003 dv</p>

- Note: The total annual cost was calculated as the difference between the total annual cost of the baseline fuel oil and the total annual cost of each fuel switching option. Therefore, the total annual cost of switching to natural gas is a negative value due to the current lower cost of natural gas compared to the baseline fuel oil burned at the facility. The baseline fuel oil has a sulfur content of 1.81%.
- Although natural gas is the most cost-effective option based on the current market prices, we recommend that BART is switching to fuels with a sulfur content of no more than 0.5%. This will continue to give the facility the flexibility to burn either fuel oil or natural gas, especially considering that because of cost variability, natural gas curtailments, and other factors, the ability to burn fuel oil is important to the facility.

Arkansas
Electric
Cooperative
Corporation
(AECC)
Carl E. Bailey
Plant

NOx BART= Existing emission limit/No Additional Controls

Other NOx Controls Evaluated (which we are not recommending):

LNB/OFA/FGR (0.15 lb/MMBtu):

Total Annual Cost= \$700,477
NOx tons removed= 18.98 tpy
Average Cost effectiveness: \$36,905/ ton removed
Visibility Improvement at Caney Creek: 0.005 dv
Visibility Improvement at Upper Buffalo: 0.015 dv
Incremental Cost Effectiveness: NA, least stringent option evaluated
Incremental Visibility improvement at Caney Creek: NA, least stringent option evaluated
Incremental Visibility improvement at Upper Buffalo: NA, least stringent option evaluated

LNB/OFA/FGR + SNCR (0.12 lb/MMBtu):

Total Annual Cost= \$1,223,157
NOx tons removed= 25.02 tpy
Average Cost effectiveness: \$48,884/ ton removed
Visibility Improvement at Caney Creek: 0.005 dv
Visibility Improvement at Upper Buffalo: 0.018 dv
Incremental Cost Effectiveness (compared to LNB/OFA/FGR): \$86,536/ ton removed
Incremental Visibility improvement over LNB/OFA/FGR at Caney Creek: 0 dv
Incremental Visibility improvement over LNB/OFA/FGR at Upper Buffalo: 0.003 dv

SCR (0.05 lb/MMBtu):

Total Annual Cost= \$1,555,718
NOx tons removed= 40.16 tpy
Average Cost effectiveness: \$38,738/ ton removed
Visibility Improvement at Caney Creek: 0.007 dv
Visibility Improvement at Upper Buffalo: 0.022 dv
Incremental Cost Effectiveness (compared to LNB/OFA/FGR + SNCR): \$21,966/ ton removed
Incremental Visibility improvement over LNB/OFA/FGR + SNCR at Caney Creek: 0.002 dv
Incremental Visibility improvement over LNB/OFA/FGR + SNCR at Upper Buffalo: 0.004 dv

Rationale for Existing emission limit/No additional controls:

- None of the NOx control options evaluated are cost effective.
- All control options evaluated would result in minimal visibility benefit.

Arkansas
Electric
Cooperative
Corporation
(AECC)
Carl E. Bailey
Plant

PM BART = 0.5% Sulfur Fuel (consistent w/SO₂ BART recommendation for this source)

Total Annual Cost= \$68,587

PM tons removed= 22.88 tpy

Average Cost effectiveness: \$2,997/ ton removed

Visibility Improvement at Caney Creek: 0.188 dv

Visibility Improvement at Upper Buffalo: 0.221 dv

Incremental Cost Effectiveness (compared to 1% Sulfur fuel): \$8,098/ ton removed

Incremental Visibility improvement over 1% Sulfur fuel at Caney Creek: 0.051 dv

Incremental Visibility improvement over 1% Sulfur fuel at Upper Buffalo: 0.067 dv

Other PM Controls Evaluated (which we are not recommending):

Switch to 1% sulfur fuel oil:

Total Annual Cost= \$19,596

PM tons removed= 16.83 tpy

Average Cost effectiveness: \$1,164/ ton removed

Visibility Improvement at Caney Creek: 0.137 dv

Visibility Improvement at Upper Buffalo: 0.154 dv

Incremental Cost Effectiveness: NA, least stringent option evaluated

Incremental Visibility improvement at Caney Creek: NA, least stringent option evaluated

Incremental Visibility improvement at Upper Buffalo: NA, least stringent option evaluated

Switch to Diesel (0.05% sulfur content):

Total Annual Cost= \$194,003

PM tons removed= 25.50 tpy

Average Cost effectiveness: \$7,608/ ton removed

Visibility Improvement at Caney Creek: 0.246 dv

Visibility Improvement at Upper Buffalo: 0.279 dv

Incremental Cost Effectiveness (compared to 0.5% Sulfur fuel): \$47,869/ ton removed

Incremental Visibility improvement over 0.5% Sulfur fuel at Caney Creek: 0.058 dv

Incremental Visibility improvement over 0.5% Sulfur fuel at Upper Buffalo: 0.058 dv

Switch to Natural Gas:

Total Annual Cost= (\$384,550)

PM tons removed= 25.37 tpy

Average Cost effectiveness: -\$15,157/ ton removed (Note: negative value means there is a cost savings when switching from baseline fuel oil to natural gas)

Visibility Improvement at Caney Creek: 0.247 dv

Visibility Improvement at Upper Buffalo: 0.276 dv

Incremental Cost Effectiveness (compared to diesel): N/A, natural gas is more cost effective

Incremental Visibility improvement over diesel at Caney Creek: 0.001 dv

Incremental Visibility improvement over diesel at Upper Buffalo: -0.003 dv

.... continued

**Arkansas
Electric
Cooperative
Corporation
(AECC)
Carl E. Bailey
Plant**

Other PM Controls Evaluated (which we are not recommending), continued:

Wet Scrubber (55% control):

Total Annual Cost= \$50,150,862

PM tons removed= 14.09 tpy

Average Cost effectiveness: \$3,558,286/ ton removed

Visibility Improvement at Caney Creek: 0.002 dv

Visibility Improvement at Upper Buffalo: 0.002 dv

Incremental Cost Effectiveness: NA, least stringent control technology

Incremental Visibility improvement at Caney Creek: NA, least stringent control technology

Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology

Cyclone (85% control):

Total Annual Cost= \$1,188,630

PM tons removed= 21.78 tpy

Average Cost effectiveness: \$54,570/ ton removed

Visibility Improvement at Caney Creek: 0.002 dv

Visibility Improvement at Upper Buffalo: 0.002 dv

Incremental Cost Effectiveness (compared to Wet Scrubber): NA, cyclone is more cost effective

Incremental Visibility improvement over Wet Scrubber at Caney Creek: 0 dv

Incremental Visibility improvement over Wet Scrubber at Upper Buffalo: 0 dv

Wet ESP (90% control):

Total Annual Cost= \$22,638,340

PM tons removed= 23.06 tpy

Average Cost effectiveness: \$981,583/ ton removed

Visibility Improvement at Caney Creek: 0.003 dv

Visibility Improvement at Upper Buffalo: 0.004 dv

Incremental Cost Effectiveness (compared to Cyclone): \$16,757,586/ ton removed

Incremental Visibility improvement over Cyclone at Caney Creek: 0.001 dv

Incremental Visibility improvement over Cyclone at Upper Buffalo: 0.002 dv

- Our recommendation is consistent with that of SO₂ BART for the source.
- Lower sulfur content of the fuel combusted also results in lower PM emissions.
- All other more stringent options are not cost-effective.

**Arkansas
Electric
Cooperative
Corporation
(AECC)
John L.
McClellan
Plant**

Boiler SN-01

Installation date-
1971

134 MW-- burns
primarily natural
gas and also fuel oil

Disapproved SO₂, NO_x,
and PM BART

Caney Creek= 0.622 dv
Upper Buffalo= 0.266 dv

SO₂ BART= 0.5% Sulfur fuel

Total Annual Cost= \$510,532

SO₂ tons removed= 133.55 tpy

Average Cost effectiveness: \$3,823/ton removed

Visibility Improvement at Caney Creek: 0.3 dv

Visibility Improvement at Upper Buffalo: 0.12 dv

Incremental Cost Effectiveness (compared to 1% Sulfur fuel): \$4,691/ ton removed

Incremental Visibility improvement over 1% Sulfur fuel at Caney Creek: 0.215 dv

Incremental Visibility improvement over 1% Sulfur fuel at Upper Buffalo: 0.085 dv

Other SO₂ Controls Evaluated (which we are not recommending):

Switch to 1% sulfur fuel:

Total Annual Cost= \$145,866

SO₂ tons removed= 55.81 tpy

Average Cost effectiveness: \$2,613/ ton removed

Visibility Improvement at Caney Creek: 0.085 dv

Visibility Improvement at Upper Buffalo: 0.035 dv

Incremental Cost Effectiveness: NA, least stringent option evaluated

Incremental Visibility improvement at Caney Creek: NA, least stringent option evaluated

Incremental Visibility improvement at Upper Buffalo: NA, least stringent option evaluated

Switch to Diesel:

Total Annual Cost= \$1,444,077

SO₂ tons removed= 202.11 tpy

Average Cost effectiveness: \$7,145/ ton removed

Visibility Improvement at Caney Creek: 0.448 dv

Visibility Improvement at Upper Buffalo: 0.193 dv

Incremental Cost Effectiveness (compared to 0.5% Sulfur fuel): \$13,616/ ton removed

Incremental Visibility improvement over 0.5% Sulfur fuel at Caney Creek: 0.148 dv

Incremental Visibility improvement over 0.5% Sulfur fuel at Upper Buffalo: 0.073 dv

Switch to Natural Gas:

Total Annual Cost= (\$2,926,874)

SO₂ tons removed= 209.35

Average Cost effectiveness: -\$13,980/ ton removed (Note: negative value means there is a cost savings when switching from baseline fuel oil to natural gas)

Visibility Improvement at Caney Creek: 0.497 dv

Visibility Improvement at Upper Buffalo: 0.214 dv

Incremental Cost Effectiveness (compared to diesel): N/A, natural gas is more cost effective

Incremental Visibility improvement over diesel at Caney Creek: 0.049 dv

Incremental Visibility improvement over diesel at Upper Buffalo: 0.021 dv

- Note: The total annual cost was calculated as the difference between the total annual cost of the baseline fuel oil and the total annual cost of each fuel switching option. Therefore, the total annual cost of switching to natural gas is a negative value due to the current lower cost of natural gas compared to the baseline fuel oil burned at the facility. The baseline fuel oil has a sulfur content of 1.81%.
- Although natural gas is the most cost-effective option based on current market prices, we recommend that BART is switching to fuels with a sulfur content of no more than 0.5%. This will continue to give the facility the flexibility to burn either fuel oil or natural gas, especially considering that because of cost variability, natural gas curtailments, and other factors, the ability to burn fuel oil is important to the facility.

NOx BART= Existing emission limit/No Additional Controls**Other NOx Controls Evaluated (which we are not recommending):****LNB/OFA/FGR (0.15 lb/MMBtu):**

Total Annual Cost= \$746,051
 NOx tons removed= 119.15 tpy
 Average Cost effectiveness: \$6,261 ton removed
 Visibility Improvement at Caney Creek: 0.067 dv
 Visibility Improvement at Upper Buffalo: 0.002 dv
 Incremental Cost Effectiveness: NA, least stringent option evaluated
 Incremental Visibility improvement at Caney Creek: NA, least stringent option evaluated
 Incremental Visibility improvement at Upper Buffalo: NA, least stringent option evaluated

LNB/OFA/FGR + SNCR (0.12 lb/MMBtu):

Total Annual Cost= \$1,990,988
 NOx tons removed= 157.64 tpy
 Average Cost effectiveness: \$12,630/ ton removed
 Visibility Improvement at Caney Creek: 0.079 dv
 Visibility Improvement at Upper Buffalo: 0.002 dv
 Incremental Cost Effectiveness (compared to LNB/OFA/FGR): \$32,344/ ton removed
 Incremental Visibility improvement over LNB/OFA/FGR at Caney Creek: 0.012 dv
 Incremental Visibility improvement over LNB/OFA/FGR at Upper Buffalo: 0 dv

SCR (0.05 lb/MMBtu):

Total Annual Cost= \$1,732,870
 NOx tons removed= 229.06 tpy
 Average Cost effectiveness: \$7,565/ ton removed
 Visibility Improvement at Caney Creek: 0.073 dv
 Visibility Improvement at Upper Buffalo: 0.002 dv
 Incremental Cost Effectiveness (compared to LNB/OFA/FGR + SNCR): -\$3,614/ ton removed
 Incremental Visibility improvement over LNB/OFA/FGR + SNCR at Caney Creek: -0.006 dv
 Incremental Visibility improvement over LNB/OFA/FGR + SNCR at Upper Buffalo: 0 dv

**Arkansas
 Electric
 Cooperative
 Corporation
 (AECC)
 John L.
 McClellan
 Plant**

Rationale for Existing emission limit/No additional controls:

- None of the NOx control options evaluated are cost effective.
- All control options evaluated would result in minimal visibility benefit.

**Arkansas
Electric
Cooperative
Corporation
(AECC)
John L.
McClellan
Plant**

PM BART = 0.5% Sulfur Fuel (consistent w/SO2 BART recommendation for this source)

Total Annual Cost= \$510,532
 PM tons removed= 112.14 tpy
 Average Cost effectiveness: \$4,553/ ton removed
 Visibility Improvement at Caney Creek: 0.3 dv
 Visibility Improvement at Upper Buffalo: 0.12 dv
 Incremental Cost Effectiveness (compared to 1% Sulfur fuel): \$/ ton removed
 Incremental Visibility improvement over 1% Sulfur fuel at Caney Creek:
 Incremental Visibility improvement over 1% Sulfur fuel at Upper Buffalo:

Other PM Controls Evaluated (which we are not recommending):

Switch to 1% sulfur fuel oil:

Total Annual Cost= \$19,596
 PM tons removed= 16.83 tpy
 Average Cost effectiveness: \$1,164/ ton removed
 Visibility Improvement at Caney Creek: 0.137 dv
 Visibility Improvement at Upper Buffalo: 0.154 dv
 Incremental Cost Effectiveness: NA, least stringent option evaluated
 Incremental Visibility improvement at Caney Creek: NA, least stringent option evaluated
 Incremental Visibility improvement at Upper Buffalo: NA, least stringent option evaluated

Switch to Diesel (0.05% sulfur content):

Total Annual Cost= \$1,444,077
 PM tons removed= 134.98 tpy
 Average Cost effectiveness: \$10,698/ ton removed
 Visibility Improvement at Caney Creek: 0.448 dv
 Visibility Improvement at Upper Buffalo: 0.193 dv
 Incremental Cost Effectiveness (compared to 0.5% Sulfur fuel): \$40,873/ ton removed
 Incremental Visibility improvement over 0.5% Sulfur fuel at Caney Creek: 0.148 dv
 Incremental Visibility improvement over 0.5% Sulfur fuel at Upper Buffalo: 0.073 dv

Switch to Natural Gas:

Total Annual Cost= (\$2,926,874)
 PM tons removed= 134.72 tpy
 Average Cost effectiveness: -\$15,157/ ton removed (Note: negative value means there is a cost savings when switching from baseline fuel oil to natural gas)
 Visibility Improvement at Caney Creek: 0.247 dv
 Visibility Improvement at Upper Buffalo: 0.276 dv
 Incremental Cost Effectiveness (compared to diesel): N/A, natural gas is more cost effective
 Incremental Visibility improvement over diesel at Caney Creek: 0.049 dv
 Incremental Visibility improvement over diesel at Upper Buffalo: 0.021 dv

.... continued

**Arkansas
Electric
Cooperative
Corporation
(AECC)
John L.
McClellan
Plant**

Other PM Controls Evaluated (which we are not recommending):

Wet Scrubber (55% Control):

Total Annual Cost= \$52,056,542

PM tons removed= 74.84 tpy

Average Cost effectiveness: \$695,549/ ton removed

Visibility Improvement at Caney Creek: dv

Visibility Improvement at Upper Buffalo: dv

Incremental Cost Effectiveness: NA, least stringent control technology

Incremental Visibility improvement at Caney Creek: NA, least stringent control technology

Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology

Cyclone (85% Control):

Total Annual Cost= \$1,721,384

PM tons removed= 115.67 tpy

Average Cost effectiveness: \$14,882/ ton removed

Visibility Improvement at Caney Creek: 0.002 dv

Visibility Improvement at Upper Buffalo: 0.001 dv

Incremental Cost Effectiveness (compared to Wet Scrubber): NA, cyclone is more cost effective

Incremental Visibility improvement over Wet Scrubber at Caney Creek: 0 dv

Incremental Visibility improvement over Wet Scrubber at Upper Buffalo: -0.001 dv

Wet ESP (90% Control):

Total Annual Cost= \$32,605,907

PM tons removed= 122.47 tpy

Average Cost effectiveness: \$266,237/ ton removed

Visibility Improvement at Caney Creek: 0.004 dv

Visibility Improvement at Upper Buffalo: 0.003 dv

Incremental Cost Effectiveness (compared to Cyclone): \$4,541,842/ ton removed

Incremental Visibility improvement over Cyclone at Caney Creek: 0.002 dv

Incremental Visibility improvement over Cyclone at Upper Buffalo: 0.002 dv

- Our recommendation is consistent with that of SO₂ BART for the source.
- Lower sulfur content of the fuel combusted also results in lower PM emissions.
- All other more stringent options are not cost-effective.

<p>AEP/SWEPCO Flint Creek</p>	<p>Boiler SN-01 Installation date- 1978</p>	<p>558 MW-- burns primarily coal, but can also burn TDF</p>	<p>Approved PM BART Disapproved SO2 and NOx BART</p>	<p>Caney Creek= 0.963 dv Upper Buffalo= 0.965 dv</p>	<p>SO2 BART= 0.06 lb/MMBtu (using NID) Total Annual Cost= \$40,448,089 SO2 tons removed= 10,520.66 tpy Average Cost effectiveness: \$3,845/ton removed Visibility Improvement at Caney Creek: 0.615 dv Visibility Improvement at Upper Buffalo: 0.464 dv Incremental Cost Effectiveness: NA, least stringent control technology Incremental Visibility improvement at Caney Creek: NA, least stringent control technology Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology</p> <p><u>Other SO2 Controls Evaluated (which we are not recommending):</u></p> <p><u>Wet Scrubbers (0.04 lb/MMBtu):</u> Total Annual Cost= \$53,592,663 SO2 tons removed= 10,894.1 tpy Average Cost effectiveness: \$4,919/ ton removed Visibility Improvement at Caney Creek: 0.629 dv Visibility Improvement at Upper Buffalo: 0.477 dv Incremental Cost Effectiveness (compared to NID): \$35,199/ ton removed Incremental Visibility improvement over NID at Caney Creek: 0.014 dv Incremental Visibility improvement over NID at Upper Buffalo: 0.013 dv</p>
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Rationale for not selecting Wet Scrubbers for SO2 BART

- NID (a type of dry scrubbing technology) is much more cost effective than wet scrubbers; while wet scrubbers offer very little incremental visibility improvement.

AEP/SWEPCO
Flint Creek

NO_x BART= 0.23 lb/MMBtu (using LNB/OFA)

Total Annual Cost= \$1,454,621

NO_x tons removed= 826 tpy

Average Cost effectiveness: \$1,762/ton removed

Visibility Improvement at Caney Creek: 0.114 dv

Visibility Improvement at Upper Buffalo: 0.026 dv

Incremental Cost Effectiveness: NA, least stringent control technology

Incremental Visibility improvement at Caney Creek: NA, least stringent control technology

Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology

Other NO_x Controls Evaluated (which we are not recommending):

LNB/OFA + SNCR (0.2 lb/MMBtu):

Total Annual Cost= \$4,177,782

NO_x tons removed= 1,348.45 tpy

Average Cost effectiveness: \$3,099/ton removed

Visibility Improvement at Caney Creek: 0.114 dv

Visibility Improvement at Upper Buffalo: 0.033 dv

Incremental Cost Effectiveness (compared to LNB/OFA): \$5,209/ton removed

Incremental Visibility improvement over LNB/OFA at Caney Creek: 0.000 dv

Incremental Visibility improvement over LNB/OFA at Upper Buffalo: 0.007 dv

SCR (0.07 lb/MMBtu):

Total Annual Cost= \$13,769,599

NO_x tons removed= 3,869.22 tpy

Average Cost effectiveness: \$3,559/ton removed

Visibility Improvement at Caney Creek: 0.245 dv

Visibility Improvement at Upper Buffalo: 0.07 dv

Incremental Cost Effectiveness (compared to LNB/OFA + SNCR): \$3,805/ton removed

Incremental Visibility improvement over LNB/OFA + SNCR at Caney Creek: 0.131 dv

Incremental Visibility improvement over LNB/OFA + SNCR at Upper Buffalo: 0.037 dv

Rationale for not selecting SNCR or SCR for NO_x BART

- Facility offered to install LNB/OFA to meet BART requirement, even though the visibility benefit is on the low end considering the cost in terms of \$/ton. Some could argue against controlling for NO_x at all due to the relatively low visibility benefit.
- LNB/OFA + SNCR has no incremental visibility benefit over LNB/OFA alone at Caney Creek and negligible incremental visibility improvement at Upper Buffalo, so this makes for a strong case against SNCR.
- SCR has a cost (\$/ton) somewhat on the high end, although it is expected to result in around twice as much visibility improvement as LNB/OFA.

<p>Entergy White Bluff Plant</p>	<p>Unit 1 Installation date- 1974</p>	<p>850 MW-- burns sub-bituminous or bituminous coal as primary fuel; No. 2 fuel oil is startup fuel</p>	<p>Approved PM BART Disapproved SO2 and NOx BART</p>	<p>Caney Creek= 1.628 dv Upper Buffalo= 1.140 dv</p>	<p>SO2 BART= 0.06 lb/MMBtu (using dry scrubbing) Total Annual Cost= \$31,981,230 SO2 tons removed= 14,363 tpy Average Cost effectiveness: \$2,227/ton removed Visibility Improvement at Caney Creek: 0.813 dv Visibility Improvement at Upper Buffalo: 0.762 dv Incremental Cost Effectiveness: NA, least stringent control technology Incremental Visibility improvement at Caney Creek: NA, least stringent control technology Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology</p> <p><u>Other SO2 Controls Evaluated (which we are not recommending):</u></p> <p><u>Wet Scrubbers (0.04 lb/MMBtu):</u> Total Annual Cost= \$65,942,351 SO2 tons removed= 18,445 tpy Average Cost effectiveness: \$3,575/ ton removed Visibility Improvement at Caney Creek: 0.834 dv Visibility Improvement at Upper Buffalo: 0.79 dv Incremental Cost Effectiveness (compared to NID): \$8,320/ ton removed Incremental Visibility improvement over NID at Caney Creek: 0.021 dv Incremental Visibility improvement over NID at Upper Buffalo: 0.028 dv</p>
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Rationale for not selecting Wet Scrubbers for SO2 BART

- Dry scrubbers are much more cost effective than wet scrubbers; while wet scrubbers offer very little incremental visibility improvement.

**Entergy
White Bluff
Plant**

Unit 1

NO_x BART= 0.15 lb/MMBtu (using LNB/SOFA)

Total Annual Cost= \$1,085,904

NO_x tons removed= 3,104 tpy

Average Cost effectiveness: \$350/ton removed

Visibility Improvement at Caney Creek: 0.166 dv

Visibility Improvement at Upper Buffalo: 0.101 dv

Incremental Cost Effectiveness: NA, least stringent control technology

Incremental Visibility improvement at Caney Creek: NA, least stringent control technology

Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology

Other NO_x Controls Evaluated (which we are not recommending):

LNB/SOFA + SNCR (0.13 lb/MMBtu):

Total Annual Cost= \$6,430,580

NO_x tons removed= 3,657 tpy

Average Cost effectiveness: \$1,758/ton removed

Visibility Improvement at Caney Creek: 0.2 dv

Visibility Improvement at Upper Buffalo: 0.111 dv

Incremental Cost Effectiveness (compared to LNB/SOFA): \$9,665/ton removed

Incremental Visibility improvement over LNB/SOFA at Caney Creek: 0.034 dv

Incremental Visibility improvement over LNB/SOFA at Upper Buffalo: 0.01 dv

LNB/SOFA + SCR (0.055 lb/MMBtu):

Total Annual Cost= \$20,349,142

NO_x tons removed= 5,729 tpy

Average Cost effectiveness: \$3,552/ton removed

Visibility Improvement at Caney Creek: 0.269 dv

Visibility Improvement at Upper Buffalo: 0.149 dv

Incremental Cost Effectiveness (compared to LNB/SOFA + SNCR): \$6,717/ton removed

Incremental Visibility improvement over LNB/SOFA + SNCR at Caney Creek: 0.069 dv

Incremental Visibility improvement over LNB/SOFA + SNCR at Upper Buffalo: 0.038 dv

Rationale for not selecting SNCR or SCR for NO_x BART

- Although LNB/SOFA + SNCR is cost-effective, the incremental cost effectiveness compared to LNB/SOFA alone is high while the incremental visibility benefit is very small (0.034 dv and 0.01 dv).
- The cost (\$/ton) of LNB/SOFA + SCR is somewhat on the high end, and the incremental visibility benefit compared to LNB/SOFA + SNCR is relatively small (0.069 dv and 0.038 dv).

<p>Entergy White Bluff Plant</p>	<p>Unit 2 Installation date- 1974</p>	<p>850 MW-- burns sub-bituminous or bituminous coal as primary fuel; No. 2 fuel oil is startup fuel</p>	<p>Approved PM BART Disapproved SO2 and NOx BART</p>	<p>Caney Creek= 1.695 dv Upper Buffalo= 1.185 dv</p>	<p>SO2 BART= 0.06 lb/Mmbtu (using dry scrubbers) Total Annual Cost= \$31,981,230 SO2 tons removed= 15,221 tpy Average Cost effectiveness: \$2,101/ton removed Visibility Improvement at Caney Creek: 0.754 dv Visibility Improvement at Upper Buffalo: 0.767 dv Incremental Cost Effectiveness: NA, least stringent control technology Incremental Visibility improvement at Caney Creek: NA, least stringent control technology Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology</p> <p><u>Other SO2 Controls Evaluated (which we are not recommending):</u></p> <p><u>Wet Scrubbers (0.04 lb/MMBtu):</u> Total Annual Cost= \$65,942,351 SO2 tons removed= 16,084 tpy Average Cost effectiveness: \$4,100/ ton removed Visibility Improvement at Caney Creek: 0.775 dv Visibility Improvement at Upper Buffalo: 0.78 dv Incremental Cost Effectiveness (compared to dry scrubbers): \$39,352/ ton removed Incremental Visibility improvement over dry scrubbers at Caney Creek: 0.021 dv Incremental Visibility improvement over dry scrubbers at Upper Buffalo: 0.013 dv</p>
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Rationale for not selecting Wet Scrubbers for SO2 BART

- Dry scrubbers are much more cost effective than wet scrubbers; while wet scrubbers offer very little incremental visibility improvement.

<p style="text-align: center;">Entergy White Bluff Plant</p>	<p style="text-align: center;">Unit 2</p>				<p><u>NOx BART= 0.15 lb/MMBtu (using LNB/SOFA)</u> Total Annual Cost= \$1,403,376 NOx tons removed= 4,125 tpy Average Cost effectiveness: \$340/ton removed Visibility Improvement at Caney Creek: 0.225 dv Visibility Improvement at Upper Buffalo: 0.139 dv Incremental Cost Effectiveness: NA, least stringent control technology Incremental Visibility improvement at Caney Creek: NA, least stringent control technology Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology</p> <p><u>Other NOx Controls Evaluated (which we are not recommending):</u></p> <p><u>LNB/SOFA + SNCR (0.13 lb/MMBtu):</u> Total Annual Cost= \$ 6,759,102 NOx tons removed= 4,666 tpy Average Cost effectiveness: \$1,449 /ton removed Visibility Improvement at Caney Creek: 0.258 dv Visibility Improvement at Upper Buffalo: 0.15 dv Incremental Cost Effectiveness (compared to LNB/SOFA): \$9,900 /ton removed Incremental Visibility improvement over LNB/SOFA at Caney Creek: 0.033 dv Incremental Visibility improvement over LNB/SOFA at Upper Buffalo: 0.011 dv</p> <p><u>LNB/SOFA + SCR (0.055 lb/MMBtu):</u> Total Annual Cost= \$ 18,407,977 NOx tons removed= 6,697 tpy Average Cost effectiveness: \$2,749/ton removed Visibility Improvement at Caney Creek: 0.327 dv Visibility Improvement at Upper Buffalo: 0.188 dv Incremental Cost Effectiveness (compared to LNB/SOFA + SNCR): \$5,736 /ton removed Incremental Visibility improvement over LNB/SOFA + SNCR at Caney Creek: 0.069 dv Incremental Visibility improvement over LNB/SOFA + SNCR at Upper Buffalo: 0.038 dv</p>
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Rationale for not selecting SNCR or SCR for NOx BART.

- Although LNB/SOFA + SNCR is cost-effective, the incremental cost effectiveness compared to LNB/SOFA alone is high while the incremental visibility benefit is very small (0.033 dv and 0.011 dv).
- The cost (\$/ton) of LNB/SOFA + SCR is slightly high, and the incremental visibility benefit compared to LNB/SOFA + SNCR is relatively small (0.069 dv and 0.038 dv).

<p>Entergy Lake Catherine Plant</p>	<p>Unit 4 Installation date-1970</p>	<p>552 MW-- burns primarily natural gas; No. 6 fuel oil is secondary fuel</p>	<p>Natural Gas Firing</p>	<p>Approved SO₂, PM BART Disapproved NO_x BART</p>	<p>Caney Creek= 1.371 dv Upper Buffalo= 0.532 dv</p>	<p>Natural Gas Firing Scenario:</p> <p>NO_x BART= 0.22 lb/MMBtu (using Burners Out of Service) Total Annual Cost= \$92,964 NO_x tons removed= 673 tpy Average Cost effectiveness: \$138/ton removed Visibility Improvement at Caney Creek: 0.596 dv Visibility Improvement at Upper Buffalo: 0.248 dv Incremental Cost Effectiveness: NA, least stringent control technology Incremental Visibility improvement at Caney Creek: NA, least stringent control technology Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology</p> <p><u>Other NO_x Controls Evaluated (which we are not recommending):</u></p> <p><u>LNB/SOFA (0.19 lb/MMBtu):</u> Total Annual Cost= \$1,075,905 NO_x tons removed= 742 tpy Cost effectiveness: \$1,450/ton removed Visibility Improvement at Caney Creek: 0.688 dv Visibility Improvement at Upper Buffalo: 0.282 dv Incremental Cost Effectiveness (compared to BOOS): \$14,246/ton removed Incremental Visibility improvement over BOOS at CC: 0.092 dv Incremental Visibility improvement over BOOS at UB: 0.036 dv</p> <p><u>LNB/SOFA + SNCR (0.14 lb/MMBtu):</u> Total Annual Cost= \$3,047,525 NO_x tons removed= 865 tpy Cost effectiveness: \$3,523/ton removed Visibility Improvement at Caney Creek: 0.842 dv Visibility Improvement at Upper Buffalo: 0.339 dv Incremental Cost Effectiveness (compared to LNB/SOFA): \$16,029/ton removed Incremental Visibility improvement over LNB/SOFA at Caney Creek: 0.154 dv Incremental Visibility improvement over LNB/SOFA at Upper Buffalo: 0.057 dv</p> <p><u>LNB/SOFA + SCR (0.03 lb/MMBtu):</u> Total Annual Cost= \$6,506,935 NO_x tons removed= 1,159 tpy Cost effectiveness: \$5,614/ton removed Visibility Improvement at Caney Creek: 1.208 dv Visibility Improvement at Upper Buffalo: 0.475 dv Incremental Cost Effectiveness (compared to LNB/SOFA + SNCR): \$11,767/ton removed Incremental Visibility improvement over LNB/SOFA + SNCR at Caney Creek: 0.52 dv Incremental Visibility improvement over LNB/SOFA + SNCR at Upper Buffalo: 0.193 dv</p>
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Rationale for not selecting LNB/SOFA or other more stringent controls for NO_x BART.

- The incremental cost effectiveness of LNB/SOFA compared to Burners out of Service is \$14,246/ ton removed. **The incremental cost effectiveness was calculated as follows: (Total Annual Cost of LNB/SOFA - Total Annual Cost of BOOS) / (Annual NO_x emissions reductions due to LNB/SOFA - Annual NO_x emissions reductions due to BOOS) = (\$1,075,905 - \$92,964) / (742 tpy – 673 tpy) = \$14,246/ ton removed.**
- Based on feedback we have received from OGC in the past, where the incremental cost effectiveness is greater than \$10,000/ton removed, we can rule out that technology based on cost.
- The incremental cost effectiveness of SNCR and SCR is also greater than \$10,000/ton removed.
- Although LNB/SOFA is cost-effective, the incremental visibility benefit over Burners out of Service is under 0.1 dv, yet the cost on a \$/ton basis is much higher than Burners out of Service (\$1,450/ton removed vs. \$138/ton removed).
- Lake Catherine Unit 4 is an oil/gas fired peaking unit, with NO_x baseline emissions of 1,236 tpy. By comparison, AEP/SWEPCO Flint Creek Unit 1 is a coal fired base load unit with NO_x baseline emissions of 5,120 tpy.

<p>Entergy Lake Catherine Plant</p>	<p>Unit 4</p>		<p>Fuel Oil Firing</p>	<p>Disapproved SO₂, NO_x, and PM BART</p>	<p>Caney Creek= 1.371 dv Upper Buffalo= 0.532 dv</p>	<p>Fuel Oil Firing Scenario:</p> <p>Facility has not burned fuel oil in over 10 years and does not anticipate burning fuel oil in the near future, and would therefore like to defer getting a BART determination until they start burning fuel oil. Facility will accept a permit condition that would not allow fuel burning until BART limit is in place.</p>
<p>Domtar-Ashdown Mill</p>	<p>Power Boiler #1 (SN-03) Installation date- 1968</p>	<p>580 MMBtu/hr-- combusts primarily bark (75%), also fuel oil and natural gas</p>	<p>Approved PM BART Disapproved SO₂ and NO_x BART</p>	<p>Caney Creek= 0.335 dv Upper Buffalo= 0.038 dv</p>	<p>SO₂ BART= 21.0 lb/hr (Baseline Emission Rate/No Additional Controls)</p> <p>Facility took a streamlined approach to the BART analysis due to the low baseline emissions and that the boiler burns primarily bark, which has low sulfur content.</p>	

<p style="text-align: center;">Domtar- Ashdown Mill</p>	<p style="text-align: center;">Power Boiler #1</p>				<p><u>NOx BART= 207.4 lb/hr</u> (Baseline Emission Rate//No Additional Controls)</p> <p><u>Other NOx Controls Evaluated (which we are not recommending):</u></p> <p><u>SNCR (20% control):</u> Total Annual Cost= \$ 1,118,178 NOx tons removed= 88 tpy Cost effectiveness: \$12,700/ ton removed Visibility Improvement at Caney Creek: 0.061 dv Visibility Improvement at Upper Buffalo: 0.007 dv Incremental Cost Effectiveness: NA, least stringent control technology evaluated Incremental Visibility improvement at Caney Creek: NA, least stringent control technology Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology</p> <p><u>SNCR (32.5% control):</u> Total Annual Cost= \$1,144,103 NOx tons removed= 143 tpy Cost effectiveness: \$7,996/ ton removed Visibility Improvement at Caney Creek: 0.098 dv Visibility Improvement at Upper Buffalo: 0.011 dv Incremental Cost Effectiveness (compared to 20% control): \$471/ ton removed Incremental Visibility improvement over 20% control at Caney Creek: 0.037 dv Incremental Visibility improvement over 20% control at Upper Buffalo: 0.004 dv</p> <p><u>SNCR (45% control):</u> Total Annual Cost= \$1,513,602 NOx tons removed= 379 tpy Cost effectiveness: \$7,640/ ton removed Visibility Improvement at Caney Creek: 0.136 dv Visibility Improvement at Upper Buffalo: 0.015 dv Incremental Cost Effectiveness (compared to 20% control): \$1,566/ ton removed Incremental Visibility improvement over 20% control at Caney Creek: 0.038 dv Incremental Visibility improvement over 20% control at Upper Buffalo: 0.004 dv</p>
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Rationale for not selecting SNCR for NOx BART:

- Facility evaluated SNCR at various levels of control, although they believe 20% removal efficiency is the most reasonable estimate of the level of NO_x control SNCR can achieve at Power Boiler No. 1 on a long-term basis due to the boiler's high load swing.
- When operated at 20% removal efficiency, SNCR is projected to result in visibility improvement of 0.061 and 0.007 dv and is estimated to cost \$12,700 per ton of NO_x removed. We do not believe this high cost justifies the modest visibility improvement projected from the installation and operation of SNCR at 20% removal efficiency.
- In the BART evaluation submitted as part of the 2008 Arkansas RH SIP, LNB, ultra-Low NO_x Burners, OFA, Flue gas recirculation, and SCR were considered and determined to be technically infeasible for this boiler.

<p>Domtar-Ashdown Mill</p>	<p>Power Boiler #2 (SN-05) Installation date- 1975</p>	<p>820 MMBtu/hr-- combusts primarily bituminous coal (80%), also bark/wood chips, natural gas</p>	<p>Disapproved SO₂, NO_x, and PM BART</p>	<p>Caney Creek= 0.844 dv Upper Buffalo= 0.146 dv</p>	<p>SO₂ BART= Facility is recommending an emission limit of 0.31 lb/MMBtu (Based on the use of additional scrubbing reagent in the existing scrubbers)</p> <p>**We are recommending an emission limit in the range of 0.11 lb/MMBtu, which is representative of operating the existing scrubbers at 90% control efficiency, we will invite comment in our proposal on the appropriateness of this emission limit**</p> <p>Total Annual Cost= \$1,960,434 SO₂ tons removed= 1,401 tpy Average Cost effectiveness: \$1,411/ton removed Estimated Visibility Improvement at Caney Creek: 0.139 dv Estimated Visibility Improvement at Upper Buffalo: 0.05 dv Incremental Cost Effectiveness: NA, least stringent control technology evaluated Incremental Visibility improvement at Caney Creek: NA, least stringent control technology Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology</p> <p><u>Other SO₂ Controls Evaluated (which we are not recommending):</u></p> <p><u>Add-on Spray Scrubbers:</u> Total Annual Cost= \$9,833,378 SO₂ tons removed= 1,870 tpy Average Cost effectiveness: \$5,258/ ton removed Visibility Improvement at Caney Creek: 0.146 dv Visibility Improvement at Upper Buffalo: 0.053 dv Incremental Cost Effectiveness (compared to using additional scrubbing reagent): \$16,787/ ton removed Incremental Visibility improvement over additional scrubbing reagent at Caney Creek: 0.007 dv Incremental Visibility improvement over additional scrubbing reagent at Upper Buffalo: 0.003 dv</p>
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Rationale for not selecting Add-On Spray Scrubbers for SO₂ BART:

- The cost of add-on spray scrubbers (which would have been added on top of the existing wet venturi scrubbers) is estimated to be much higher than using the existing scrubbers with additional scrubbing reagent. Add-on spray scrubbers would also have negligible incremental visibility benefit.

**Domtar-
Ashdown
Mill**

Power Boiler #2

NO_x BART= 345 lb/hr (using LNB, 30% control)

Total Annual Cost: \$899,605

NO_x tons removed= 461 tpy

Average Cost effectiveness: \$1,951/ton removed

Visibility Improvement at Caney Creek: 0.181 dv

Visibility Improvement at Upper Buffalo: 0.014 dv

Incremental Cost Effectiveness (compared to SNCR 27.5% control): \$1,437/ ton removed

Incremental Visibility improvement at Caney Creek: 0.015 dv

Incremental Visibility improvement at Upper Buffalo: 0.002 dv

Other NO_x Controls Evaluated (which we are not recommending):

SNCR (27.5% control):

Total Annual Cost= \$843,575

NO_x tons removed= 422 tpy

Cost effectiveness: \$1,998/ ton removed

Visibility Improvement at Caney Creek: 0.166 dv

Visibility Improvement at Upper Buffalo: 0.012 dv

Incremental Cost Effectiveness: NA, least stringent control technology

Incremental Visibility improvement at Caney Creek: NA, least stringent control technology

Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology

SNCR (35% control):

Total Annual Cost= \$1,026,214

NO_x tons removed= 537 tpy

Cost effectiveness: \$1,909/ ton removed

Visibility Improvement at Caney Creek: 0.212 dv

Visibility Improvement at Upper Buffalo: 0.017 dv

Incremental Cost Effectiveness (compared to LNB): \$/ ton removed

Incremental Visibility improvement over LNB at Caney Creek: 0.031 dv

Incremental Visibility improvement over LNB at Upper Buffalo: 0.003 dv

Rationale for not selecting SNCR for NO_x BART:

- SNCR was evaluated at 27.5% and 35% control efficiency, but based on the information provided by the facility we believe that due to the wide variability in steam demand and wide range in furnace temperature observed in Power Boiler No. 2, the NO_x control efficiency of SNCR at the boiler would not reach 35% control on a long-term basis.
- There is uncertainty as to the level of control efficiency that SNCR is able to achieve on a long-term basis for Power Boiler No. 2.
- LNB are cost effective and are expected to result in considerable visibility improvement.

Domtar-Ashdown Mill	Power Boiler #2				<p>PM BART= 0.44 lb/MMBtu (No Additional Controls)</p> <p>0.44 lb/MMBtu is the PM Boiler MACT standard the boiler is subject to. The BART Guidelines allow for a streamlined approach for determining BART for sources subject to the PM Boiler MACT standard. As long as no new cost-effective technologies have been developed subsequent to the MACT standards, the MACT standard may be relied on to satisfy the BART requirement. We recommend taking the streamlined approach for determining BART in this case.</p>
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Reasonable Progress Analysis

Issue: Do we propose SO₂ and NO_x controls on the Entergy Independence Power Plant (a non-BART source) under the Reasonable Progress Requirements?

Option 1: Propose No Additional Controls under Reasonable Progress

- CENRAP modeling shows all Arkansas areas are on or beneath the glide path.
- This approach would not be consistent with our TX/OK Regional Haze FIP proposal.

Option 2: Propose Only SO₂ Controls under Reasonable Progress

- Independence and White Bluff (BART source) are sister facilities, and they have similar baseline visibility impacts at Arkansas Class I areas.
- Independence is currently the second largest point source of SO₂ emissions in Arkansas (2011 NEI), so it is an obvious source to evaluate for controls under RP.
- Based on CALPUFF modeling, the visibility improvement of SO₂ controls at affected Class I areas is projected to be considerable.
- The approach of proposing SO₂ controls and no NO_x controls under RP is consistent with our TX/OK Regional Haze FIP proposal.
- Under Reasonable Progress, the focus is on improving the 20% worst days, and CENRAP modeling shows that SO₂ is the driver while NO_x is not a driver of regional haze on the 20% worst days at Arkansas Class I areas.

Option 3: Propose Both SO₂ and NO_x Controls Under Reasonable Progress

- Both SO₂ and NO_x controls are estimated to be cost-effective and are projected to result in considerable visibility benefit at the affected Class I areas based on CALPUFF modeling that looks at the 8th high day of the modeled period.
- This approach would not be somewhat inconsistent with our TX/OK Regional Haze FIP proposal.

Recommendation: Our recommendation is Option 3 above. Propose an SO₂ emission limit of 0.06 lb/MMBtu and a NO_x emission limit of 0.15 lb/MMBtu under Reasonable Progress for Units 1 and 2 of the Independence Power Plant, based on the installation of semi-dry scrubbers and LNB/SOFA. We will invite public comment on whether NO_x controls are appropriate. Expect significant comment on this issue.

Facility Name	Emission Units Subject-to-BART	Unit Description	Baseline Visibility Impacts from Source	Recommended Emission Limit/ Visibility Improvement
Independence Power Plant	Unit 1 Installation date- 1983	850 MW-- burns sub-bituminous or bituminous coal as primary fuel; No. 2 fuel oil is startup fuel	<p>Unit 1 Impacts Caney Creek= 1.133 dv Upper Buffalo= 0.845 dv Hercules Glades= 0.793 dv Mingo= 0.739 dv</p> <p>Facility-wide Impacts Caney Creek= 2.412 dv Upper Buffalo= 1.764 dv Hercules Glades= 1.704 dv Mingo= 1.547 dv</p>	<p><u>SO2 Under RP= 0.06 lb/MMBtu (Based on semi-dry scrubber installation)</u></p> <p><u>Cost Effectiveness of Semi-Dry Scrubbers (Unit 1)</u> Total Annual Cost = \$31,981,230 SO2 tons removed= 12,912 tpy Average Cost effectiveness: \$2,477/ton removed Visibility Improvement at Caney Creek: 0.476 dv Visibility Improvement at Upper Buffalo: 0.46 dv Visibility Improvement at Hercules Glades: 0.498 dv Visibility Improvement at Mingo: 0.441 dv Incremental Cost Effectiveness: NA, least stringent control technology Incremental Visibility improvement at Caney Creek: NA, least stringent control technology Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology Incremental Visibility improvement at Hercules Glades: NA, least stringent control technology Incremental Visibility improvement at Mingo: NA, least stringent control technology</p> <p><u>Facility-wide (Units 1 and 2) Visibility Improvement from Dry Scrubber controls</u> Caney Creek: 0.938 dv Upper Buffalo: 0.888 dv Hercules Glades: 1.056 dv Mingo: 0.871 dv Total Visibility Improvement: 3.753 dv</p> <p><u>Other SO2 Controls Evaluated for Unit 1 (which we are not recommending):</u></p> <p><u>Wet Scrubbers (0.04 lb/MMBtu):</u> Total Annual Cost= \$65,942,351 SO2 tons removed= 13,463 tpy Average Cost effectiveness: \$4,898/ ton removed Visibility Improvement at Caney Creek: 0.493 dv Visibility Improvement at Upper Buffalo: 0.468 dv Visibility Improvement at Hercules Glades: 0.526 dv Visibility Improvement at Mingo: 0.455 dv Incremental Cost Effectiveness (compared to dry scrubbers): \$61,635/ ton removed Incremental Visibility improvement over dry scrubbers at Caney Creek: 0.017 dv Incremental Visibility improvement over dry scrubbers at Upper Buffalo: 0.008 dv Incremental Visibility improvement over dry scrubbers at Hercules Glades: 0.028 dv Incremental Visibility improvement over dry scrubbers at Mingo: 0.014 dv</p> <p><u>Facility-wide Visibility Improvement from Wet Scrubber controls</u> Caney Creek: 0.97 dv Upper Buffalo: 0.904 dv Hercules Glades: 1.096 dv Mingo: 0.898 dv Total Visibility Improvement: 3.868 dv</p>

<p>Independence Power Plant</p>	<p>Unit 2 Installation date- 1984</p>	<p>850 MW-- burns sub-bituminous or bituminous coal as primary fuel; No. 2 fuel oil is startup fuel</p>	<p><u>Unit 2 Impacts</u> Caney Creek= 1.412 Upper Buffalo= 0.997 dv Hercules Glades= 0.977 dv Mingo= 0.883 dv</p> <p><u>Facility-wide Impacts</u> Caney Creek= 2.412 dv Upper Buffalo= 1.764 dv Hercules Glades= 1.704 dv Mingo= 1.547</p>	<p><u>SO2 Under RP= 0.06 lb/MMBtu (Based on semi-dry scrubber installation)</u></p> <p><u>Cost Effectiveness of Semi-Dry Scrubbers (Unit 2)</u> Total Annual Cost= \$31,981,230 SO2 tons removed= 13,990 tpy Average Cost effectiveness: \$2,286/ton removed Visibility Improvement at Caney Creek: 0.547 dv Visibility Improvement at Upper Buffalo: 0.488 dv Visibility Improvement at Hercules Glades: 0.613 dv Visibility Improvement at Mingo: 0.495 dv Incremental Cost Effectiveness: NA, least stringent control technology Incremental Visibility improvement at Caney Creek: NA, least stringent control technology Incremental Visibility improvement at Upper Buffalo: NA, least stringent control technology Incremental Visibility improvement at Hercules Glades: NA, least stringent control technology Incremental Visibility improvement at Mingo: NA, least stringent control technology</p> <p><u>Facility-wide (Units 1 and 2) Visibility Improvement from Dry Scrubber controls</u> Caney Creek: 0.938 dv Upper Buffalo: 0.888 dv Hercules Glades: 1.056 dv Mingo: 0.871 dv Total Visibility Improvement: 3.753 dv</p> <p><u>Other SO2 Controls Evaluated for Unit 2 (which we are not recommending):</u></p> <p><u>Wet Scrubbers (0.04 lb/MMBtu):</u> Total Annual Cost= \$65,942,351 SO2 tons removed= 14,532 tpy Average Cost effectiveness: \$4,538/ ton removed Visibility Improvement at Caney Creek: 0.569 dv Visibility Improvement at Upper Buffalo: 0.498 dv Visibility Improvement at Hercules Glades: 0.622 dv Visibility Improvement at Mingo: 0.509 dv Incremental Cost Effectiveness (compared to dry scrubbers): \$62,659/ ton removed Incremental Visibility improvement over dry scrubbers at Caney Creek: 0.022 dv Incremental Visibility improvement over dry scrubbers at Upper Buffalo: 0.01 dv Incremental Visibility improvement over dry scrubbers at Hercules Glades: 0.009 dv Incremental Visibility improvement over dry scrubbers at Mingo: 0.014 dv</p> <p><u>Facility-wide (Units 1 and 2) Visibility Improvement from Wet Scrubber controls</u> Caney Creek: 0.97 dv Upper Buffalo: 0.904 dv Hercules Glades: 1.096 dv Mingo: 0.898 dv Total Visibility Improvement: 3.868 dv</p>
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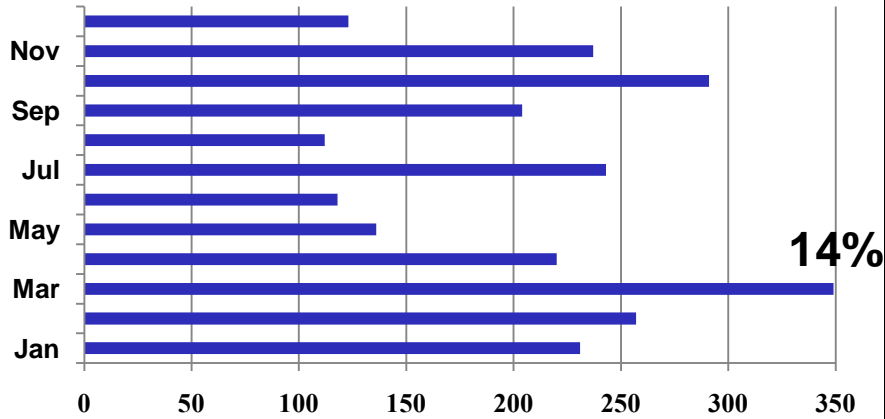
Independence Power Plant	Unit 1		<p><u>Facility-wide Impacts</u> Caney Creek= 2.054 dv Upper Buffalo= 1.724 dv Hercules Glades= 1.482 dv Mingo= 1.492 dv</p>	<p><u>NO_x Under RP= 0.15 lb/MMBtu (LNB/SOFA)</u> We will invite public comment on whether NO_x controls are appropriate.</p> <p><u>Cost Effectiveness for Unit 1</u> Total Annual Cost for Unit 1= \$1,085,904 NO_x tons removed= 2,710 tpy Average Cost effectiveness: \$401/ton removed Incremental Cost Effectiveness: NA, we did not evaluate other NO_x controls</p> <p><u>Facility-wide Visibility Improvement from NO_x controls</u> Caney Creek: 0.461 dv Upper Buffalo: 0.248 dv Hercules Glades: 0.264 dv Mingo: 0.213 dv Total Visibility Improvement: 1.186 dv</p>
Independence Power Plant	Unit 2		<p><u>Facility-wide Impacts</u> Caney Creek= 2.054 dv Upper Buffalo= 1.724 dv Hercules Glades= 1.482 dv Mingo= 1.492 dv</p>	<p><u>NO_x Under RP= 0.15 lb/MMBtu (LNB/SOFA)</u> We will invite public comment on whether NO_x controls are appropriate.</p> <p><u>Cost Effectiveness for Unit 2</u> Total Annual Cost for Unit 2= \$1,403,376 NO_x tons removed= 3,217 tpy Average Cost effectiveness: \$436/ton removed Incremental Cost Effectiveness: NA, we did not evaluate other NO_x controls</p> <p><u>Facility-wide Visibility Improvement from NO_x controls</u> Caney Creek: 0.461 dv Upper Buffalo: 0.248 dv Hercules Glades: 0.264 dv Mingo: 0.213 dv Total Visibility Improvement: 1.186 dv</p>

Slides from Thompson's Prescribed Fire talk showing :

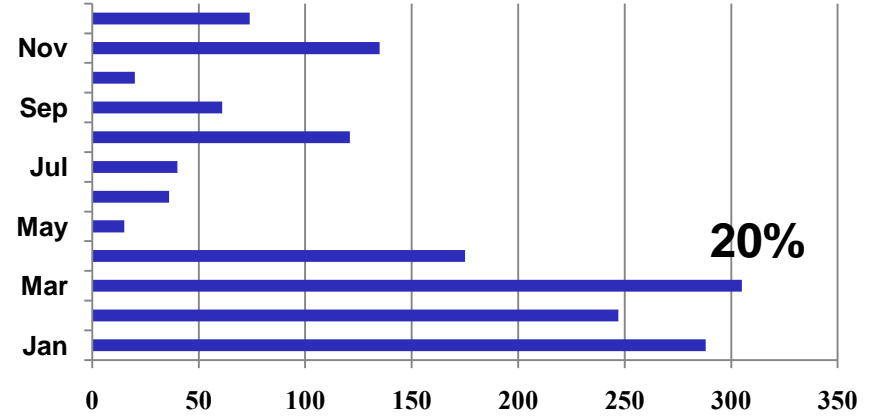
- 1) month when most PFs are done in Arkansas by #, acres, and available tons of fuel;**
- 2) who the primary burners are**
- 3) where in the state most of the smoke exceeds occur, and who are the burners**
- 4) NRCS burns**
- 5) map from ADEQ showing differences in Air Quality for 2005 and 2015**

They give us a basic understanding of the nature of our smoke issues

Burns by Month 2008

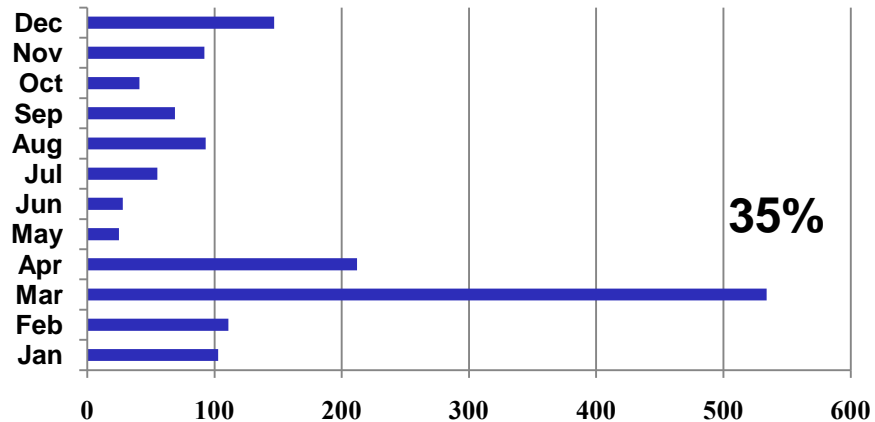


Burns by Month 2009

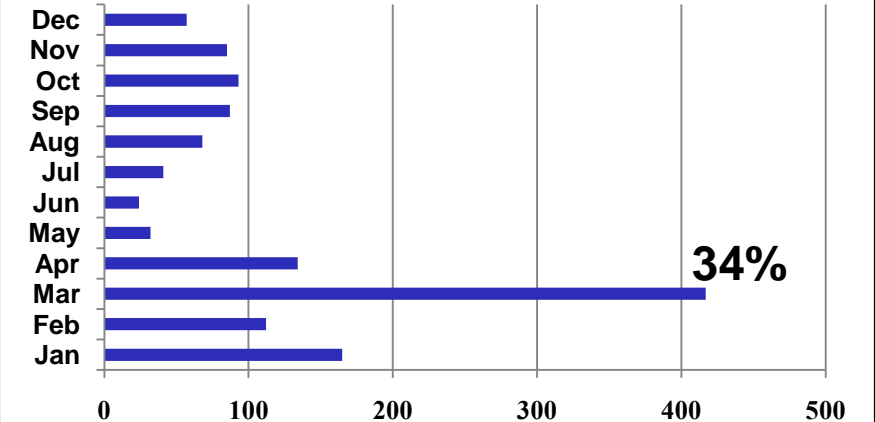


NUMBER of Burns

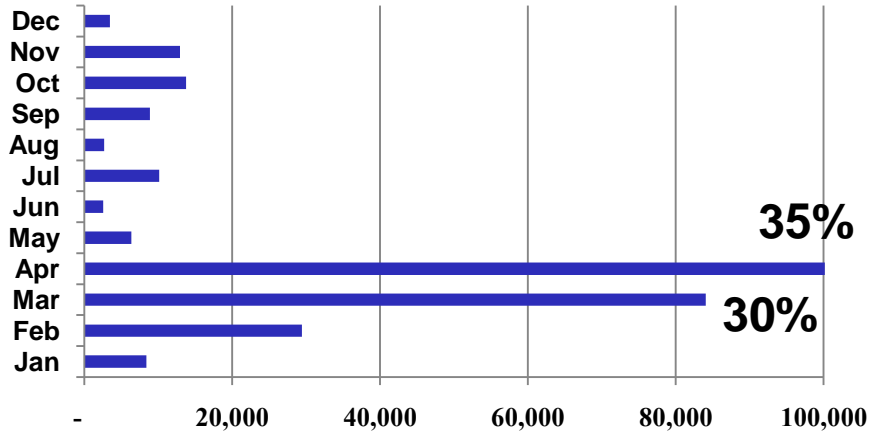
Burns by Month 2010



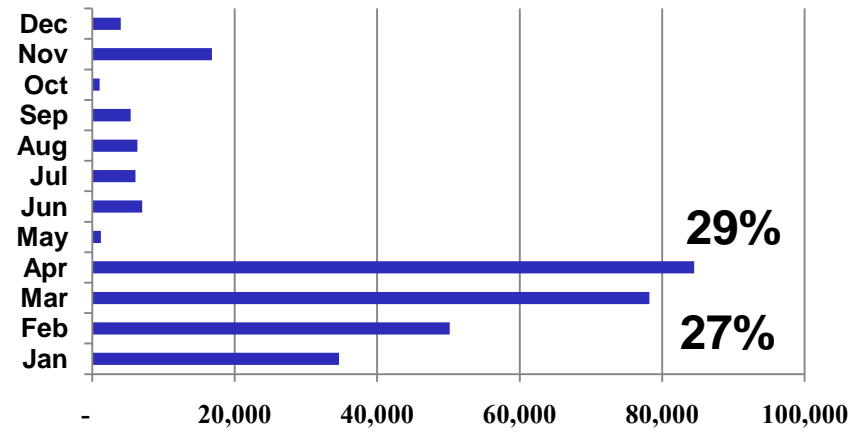
Burns by Month 2011



Burned Acres by Month 2008

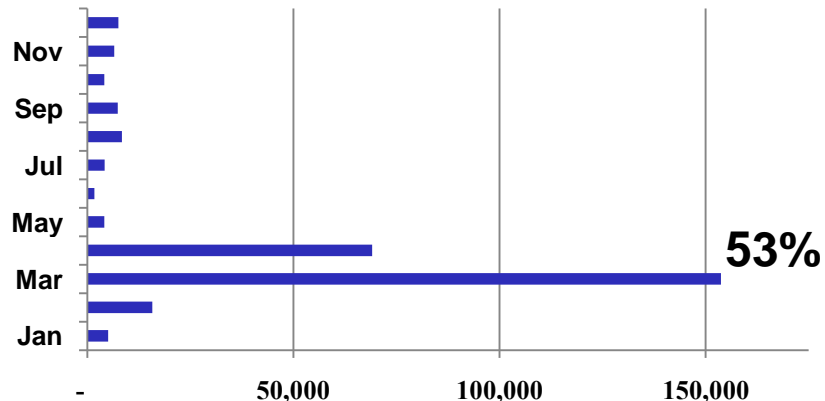


Burned Acres by Month 2009

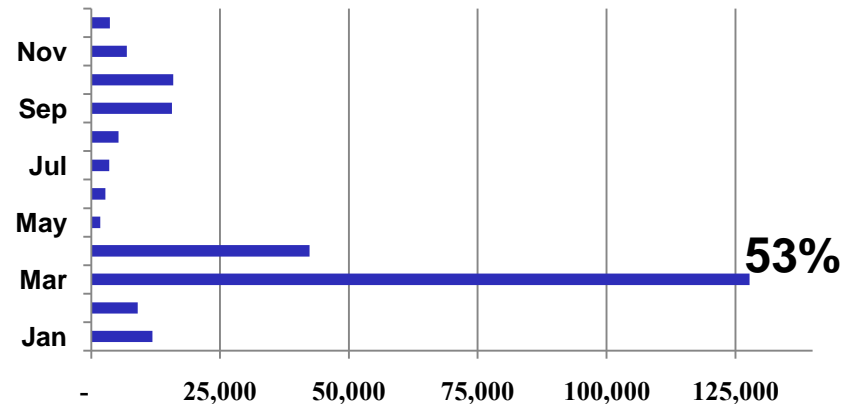


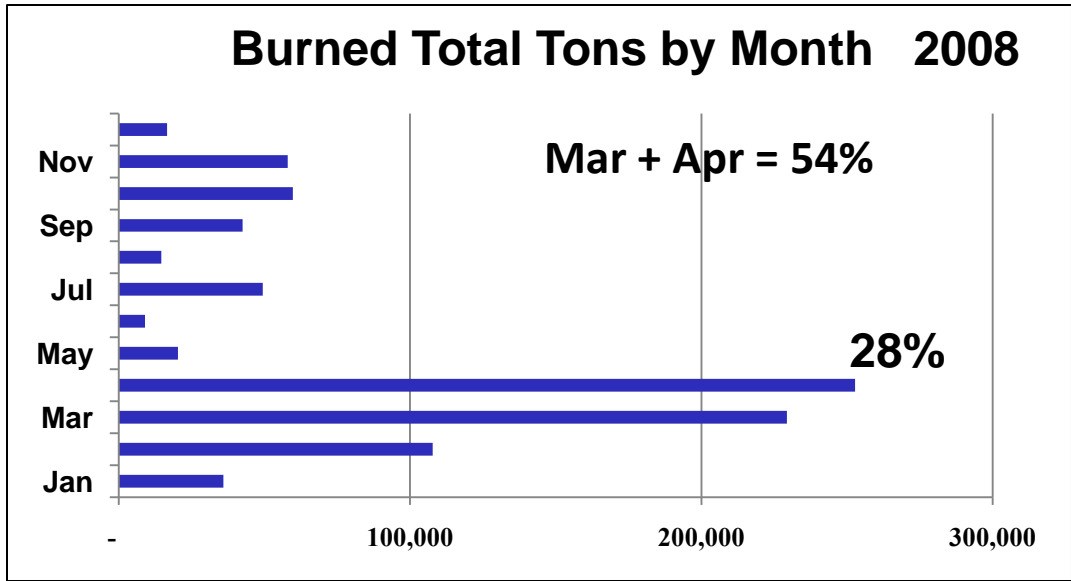
ACRES Burned

Burned Acres by Month 2010

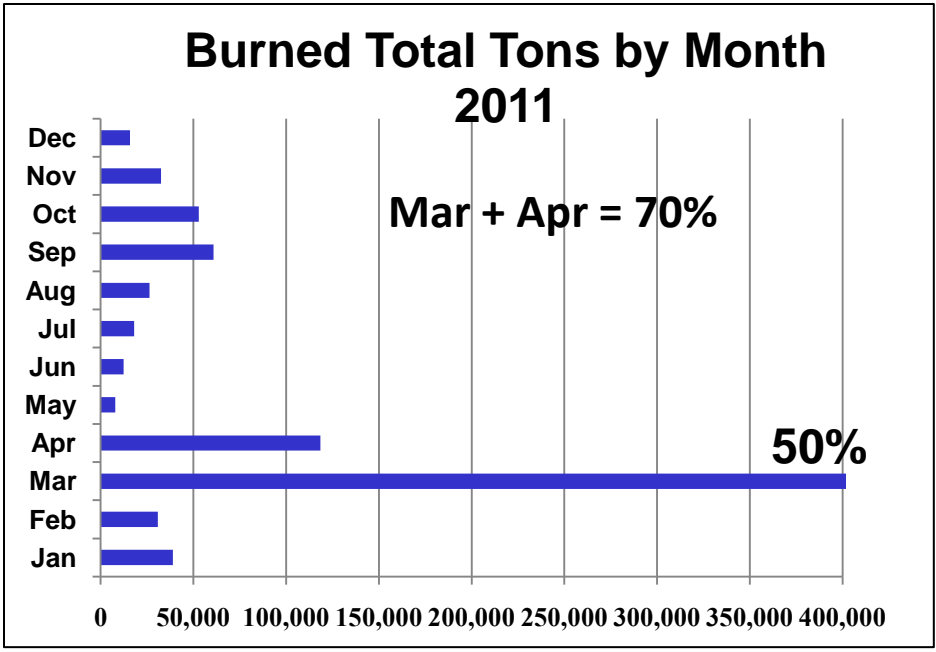
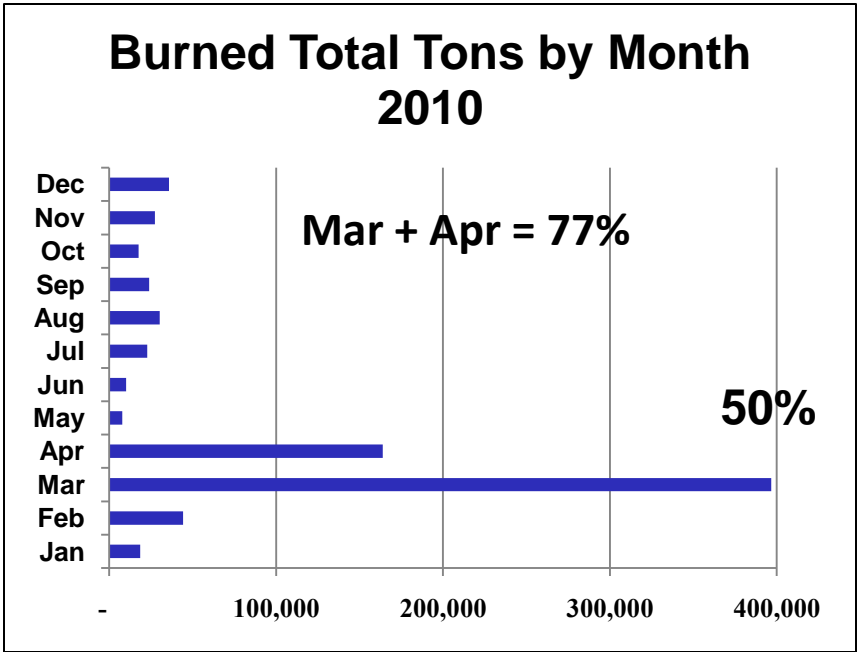


Burned Acres by Month 2011

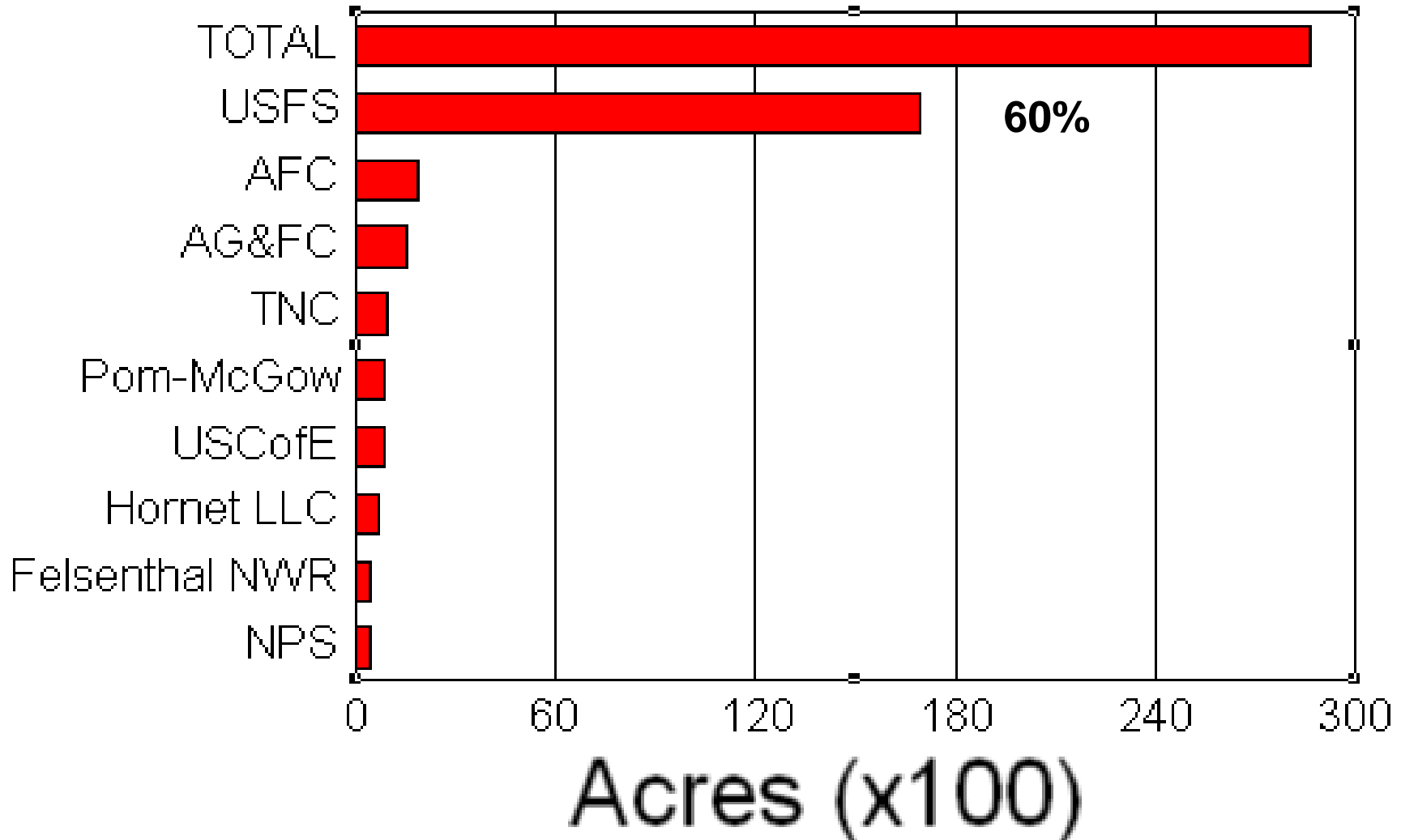




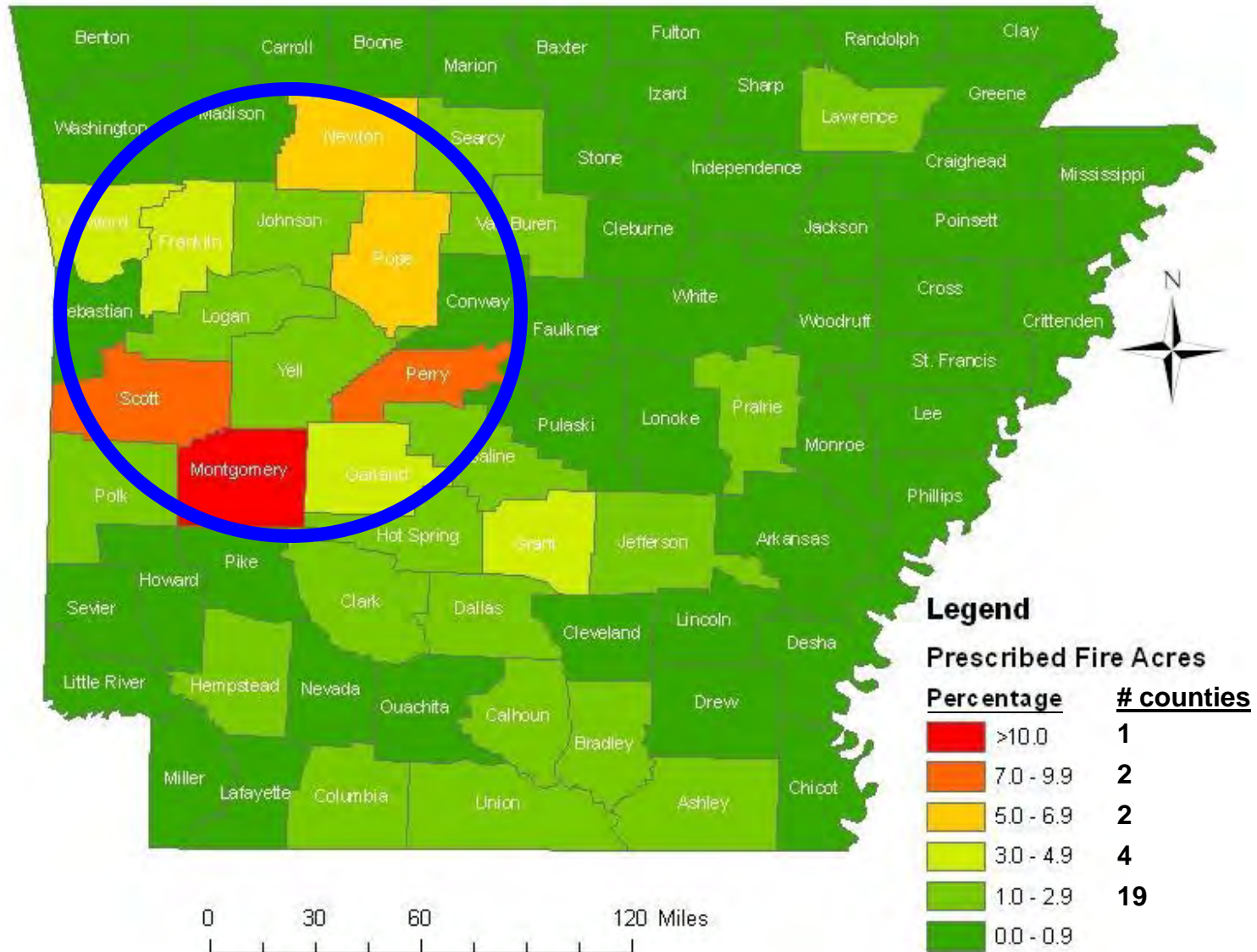
Prescribed Burn Total Available Tons of Fuel by Month



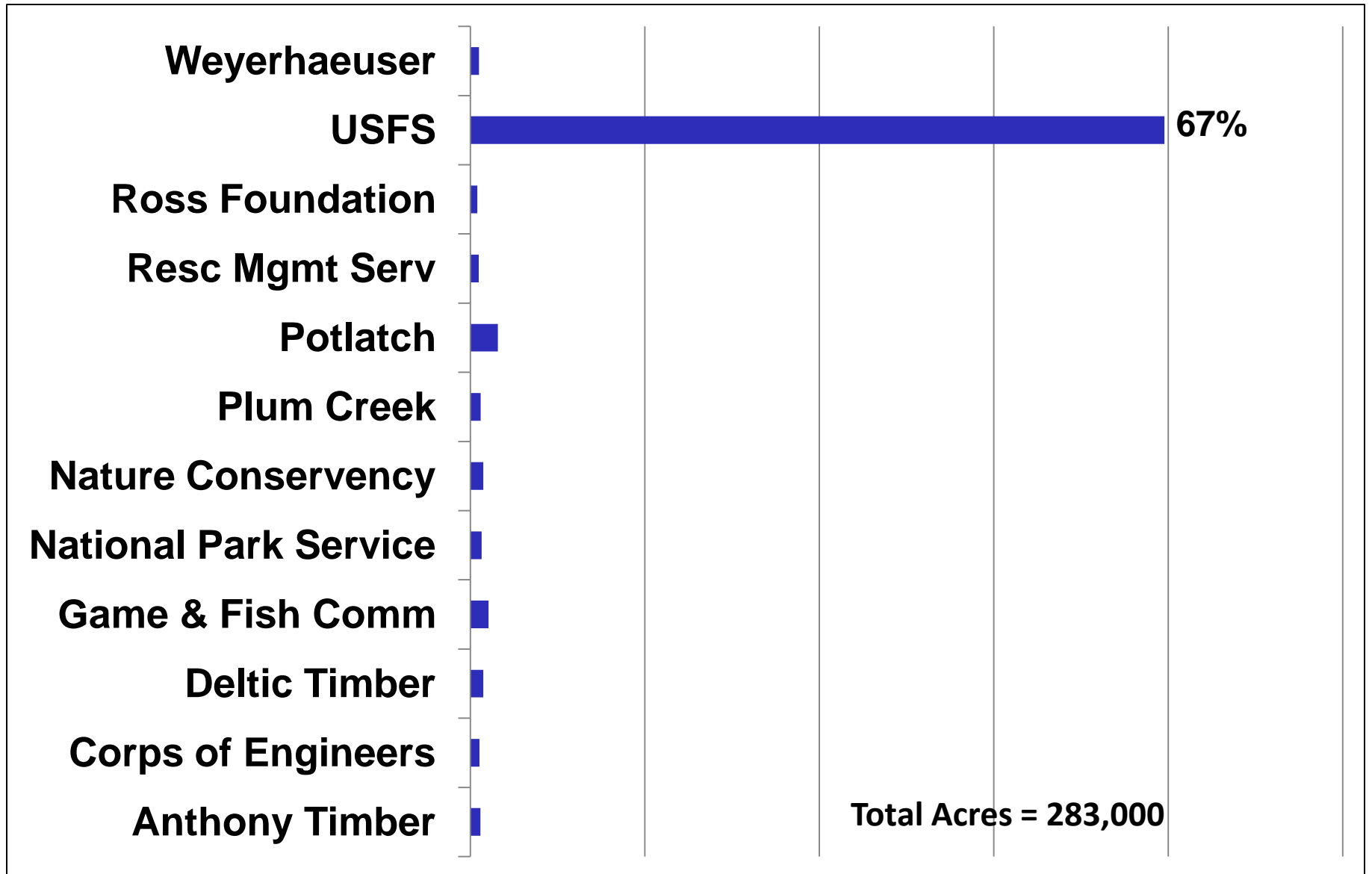
Arkansas Prescribed Fire Burners by Acres, 2006



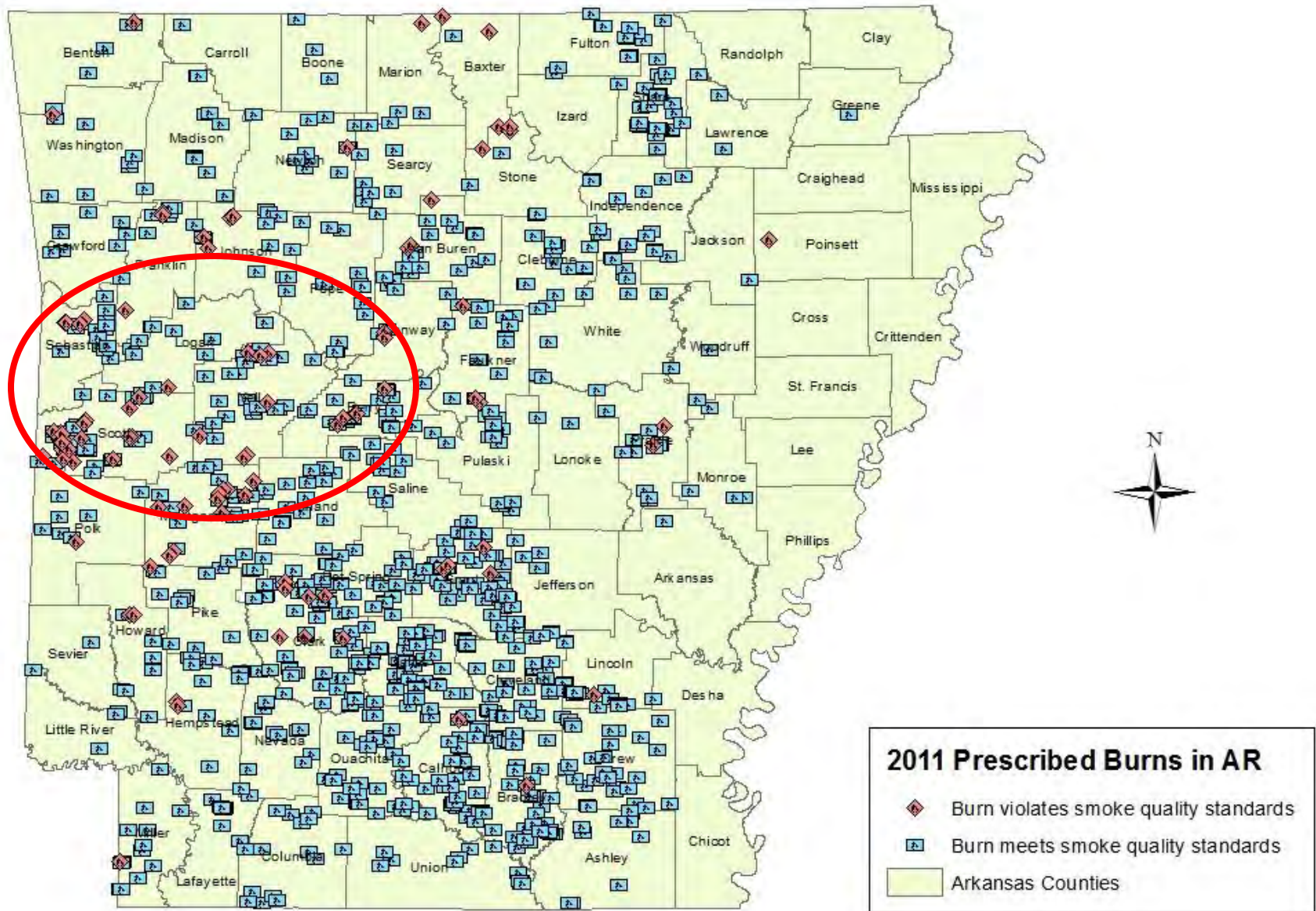
Percentage Prescribed Fire Acres, By County 2006



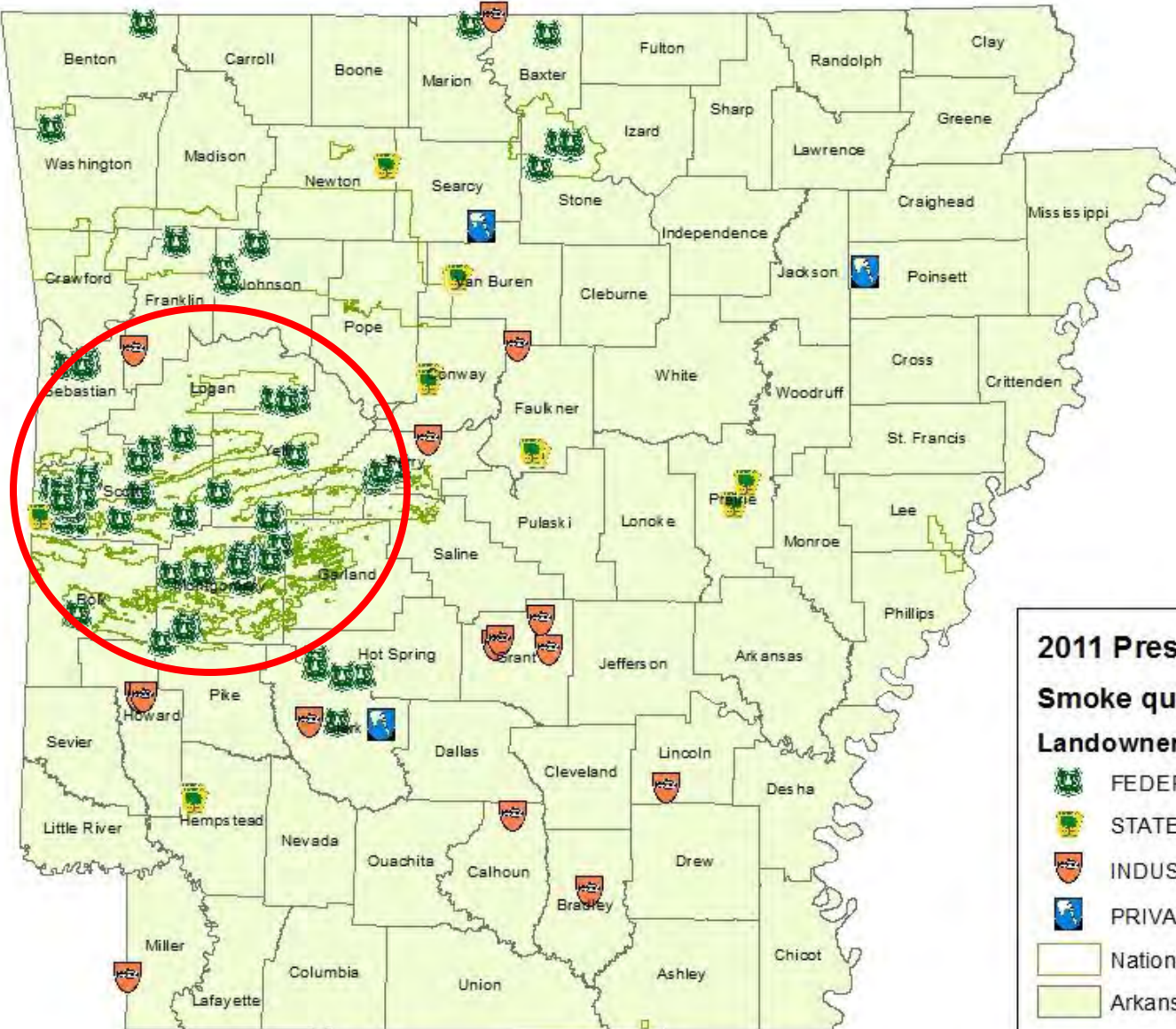
Top Arkansas Burners by Acres 2008



2011 Prescribed burns – Exceeding smoke mgmt standards vs. not



2011 Prescribed burns – Exceeding smoke mgmt standards by landowner class



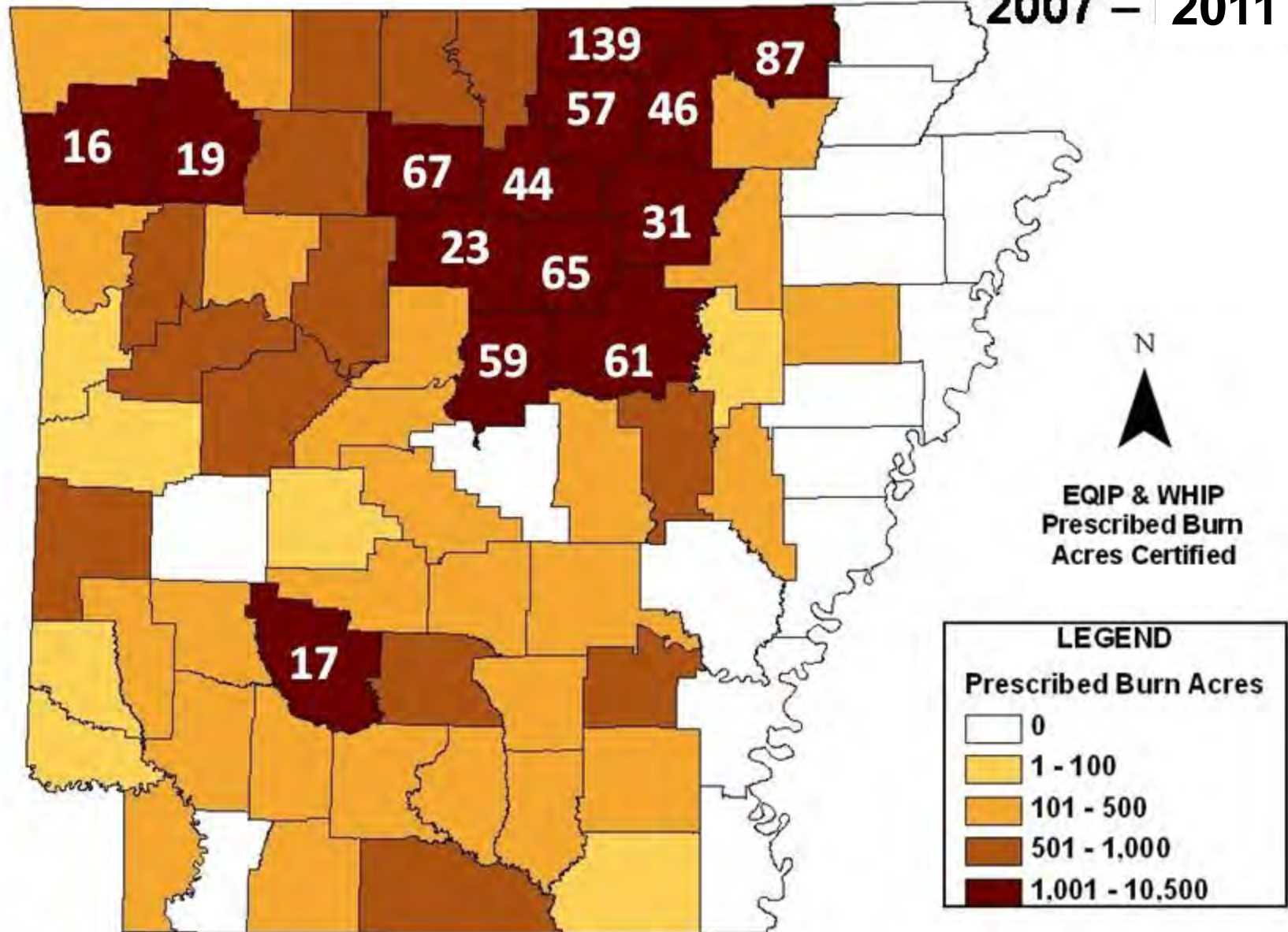
2011 Prescribed Burns in AR
Smoke quality violations

Landowner

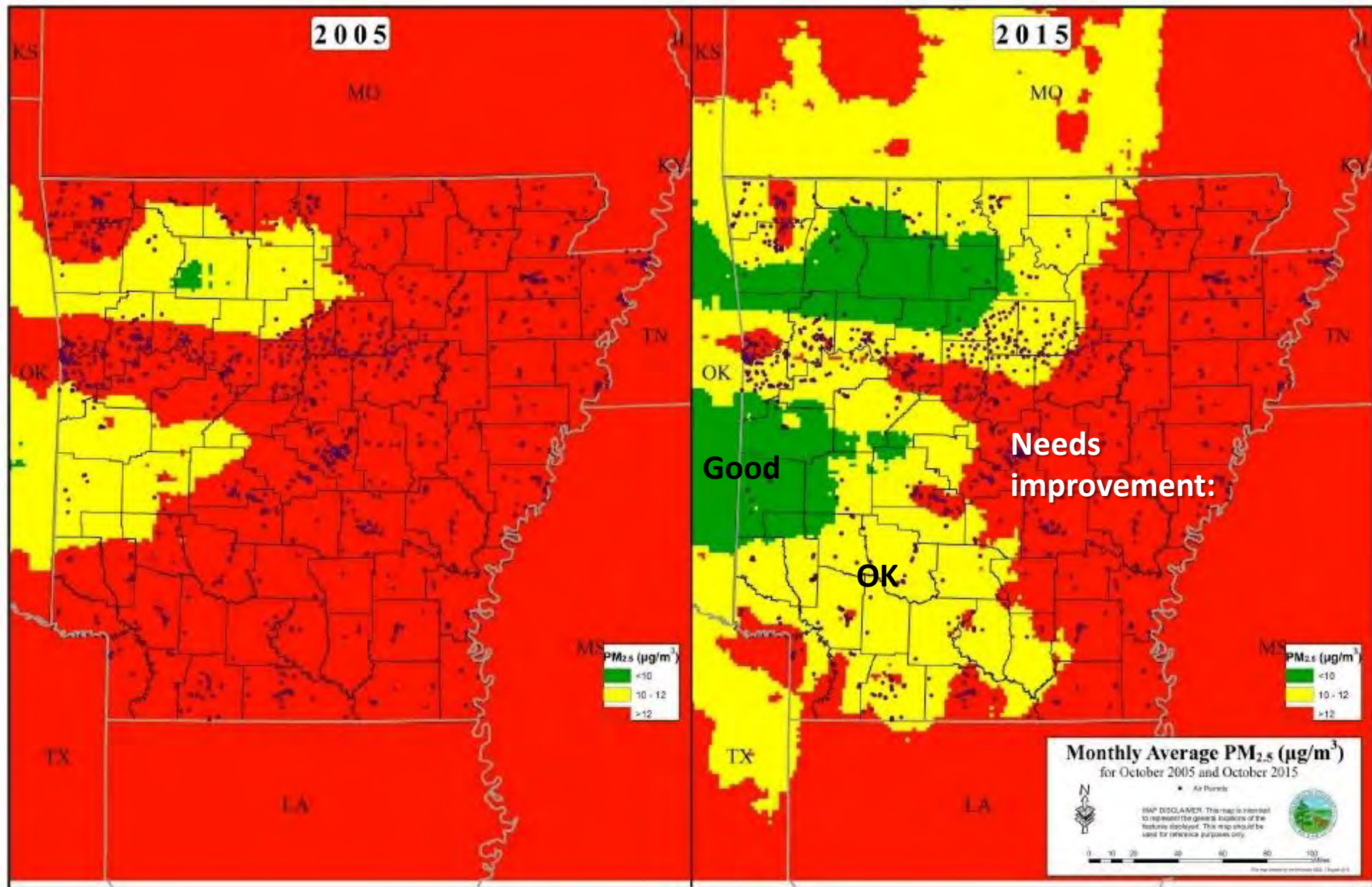
- FEDERAL
- STATE
- INDUSTRIAL
- PRIVATE

National Forest Boundaries
Arkansas Counties

NRCS EQIP & WHIP Prescribed Burn Acres Completed, 2007 – 2011



Improved particulate matter air quality in Arkansas in October, 2005 vs. 2015



Domtar
Nekoosa Mill
301 Point Basse Avenue
Nekoosa, WI 54457-1422
Tel. : (715) 886-7785
annabeth.reitter@domtar.com



July 6, 2015

Mr. Guy Donaldson
Chief, Air Planning Section (6PD-L)
United States Environmental Protection Agency
1445 Ross Avenue #700
Dallas, TX 75202-2733

SUBJECT:
Request for Limited Extension of Public Comment Period
– Docket ID No. EPA-R06-OAR-2015-0189

Dear Mr. Donaldson:

Domtar A.W. LLC's Ashdown Mill is preparing comments on U.S. EPA's proposed Federal Implementation Plan ("FIP") for the mill. The Ashdown Mill requests a limited extension of the comment period for an additional 45 days for the purpose of allowing it to complete modeling work to determine if the imposition of the BART FIP is justified as the assumed visibility improvements appear to be within the CALPUFF margin of error as defined by the United States Court of Appeals for the Ninth Circuit in *Nat'l Parks Conservation Ass'n v. U.S. EPA*, No. 12-73710 (9th Cir. June 9, 2015).

The requested extension is limited in scope to comments addressing the CALPUFF model for the Ashdown Mill. Other comments on the proposed FIP will be submitted by July 15, 2015.

On June 9, 2015, the Ninth Circuit Court of Appeals in *Nat'l Parks Conservation Ass'n* rejected the BART FIP for the Colstrip 1 and 2 facilities in Montana. One of the basis for the decision was the margin of error of the CALPUFF model and the lack of substantial assurance of any improvements in visibility. The Ashdown Mill is currently conducting its own detailed analysis showing that, like the Colstrip 1 and 2 facilities, the model predicted visibility improvement associated with the proposed Ashdown Mill BART FIP is in the margin of error of the CALPUFF model. Since the *Nat'l Parks Conservation Ass'n* decision was issued late in the comment period (June 9, 2015), the Ashdown Mill needs this limited and focused extension in order to complete all of the modeling work and submit it to the Agency.

The requested extension is of limited scope and is for the purpose of submitting to U.S. EPA essential information on a significant aspect of the proposed BART FIP for the Ashdown Mill. Based on the initial modeling work, we anticipate showing that the BART FIP for the Ashdown Mill will not lead to any reasonably anticipated visibility improvements as the purported improvement is beyond CALPUFF's ability to predict with confidence. Not allowing the limited extension will arbitrarily prevent the

Mr. Guy Donaldson
July 6, 2015
Page 2

Ashdown Mill from submitting full and complete comments on the proposed BART FIP and not allow the Agency to fully address all issues associated with the proposed BART FIP for the Ashdown Mill.

If you have any questions, please contact me at Annabeth.Reitter@domtar.com or 715-459-9257.

Sincerely,



Annabeth Reitter
Corporate Manager, Environmental Regulation

cc: Kelley Crouch
Bob Grygotis

United States Court of Appeals
For The Eighth Circuit
Thomas F. Eagleton U.S. Courthouse
111 South 10th Street, Room 24.329
St. Louis, Missouri 63102

Michael E. Gans
Clerk of Court

VOICE (314) 244-2400
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February 07, 2017

Mr. Nicholas Jacob Bronni
Mr. Jamie Leigh Ewing
ATTORNEY GENERAL'S OFFICE
200 Catlett-Prien Building
323 Center Street
Little Rock, AR 72201

RE: 17-1276 State of Arkansas v. EPA, et al

Dear Counsel:

We have received a petition for review of an order of the Environmental Protection Agency in the above case, together with a check in the sum of \$500 for the docket fee. Receipt for docketing fee will be sent through the mail.

This case has been consolidated with the following previously docketed appeals:
16-4270, 4296, 4298, 4300, 4302, 4304, 4309, & 4298.

Counsel in the case must supply the clerk with an Appearance Form. Counsel may download or fill out an [Appearance Form](#) on the "Forms" page on our web site at www.ca8.uscourts.gov.

The petition has been filed and docketed. A copy of the petition is hereby served upon the respondent in accordance with Federal Rule of Appellate Procedure, 15(c).

Your attention is invited to the briefing schedule pertaining to administrative agency cases, a copy of which will be sent under separate Notice of Docket Activity. The clerk's office provides a number of practice aids and materials to assist you in preparing the record and briefs. You can download the materials from our website, the address of which is shown above. Counsel for both sides should familiarize themselves with the material and immediately confer regarding the briefing schedule and contents of the appendix.

On June 1, 2007, the Eighth Circuit implemented the appellate version of CM/ECF. Electronic filing is now mandatory for attorneys and voluntary for pro se litigants proceeding without an attorney. Information about electronic filing can be found at the court's web site

www.ca8.uscourts.gov. In order to become an authorized Eighth Circuit filer, you must register with the PACER Service Center at <https://www.pacer.gov/psco/cgi-bin/cmecf/ea-regform.pl>. Questions about CM/ECF may be addressed to the Clerk's office.

Michael E. Gans
Clerk of Court

JMH

Enclosures

cc: Mr. Avi Samuel Garbow
Loretta E. Lynch
Honorable Regina McCarthy
Mr. Charles Sheehan
Ms. Samara Michelle Spence

Agency Case Number: EPA-R06-OAR-2015-0189

Caption For Case Number: 17-1276

State of Arkansas

Petitioner

v.

U.S. Environmental Protection Agency; Cynthia McCabe, in her Official capacity as Acting Administrator of the United States Environmental Protection Agency

Respondents

Addresses For Case Participants: 17-1276

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Ms. Samara Michelle Spence
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Environment & Natural Resources Division, Environmental Enforcement Section
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IN THE UNITED STATES COURT OF APPEALS
FOR THE EIGHTH CIRCUIT

STATE OF ARKANSAS)

Petitioner)

v.)

Case No. 17-1296

U.S. ENVIRONMENTAL)
PROTECTION AGENCY and)
CYNTHIA MCCABE, in her)
Official capacity as Acting Administrator)
of the United States Environmental)
Protection Agency)

Respondents)

FILED
FEB - 6 2017
MICHAEL GANS
CLERK OF COURT

PETITION FOR REVIEW

Pursuant to Section 307 of the Clean Air Act, 42 U.S.C. 7607, and Rule 15 of the Federal Rules of Appellate Procedure, the State of Arkansas hereby petitions this Court for review of the final action of the United States Environmental Protection Agency and Cynthia McCabe, in her official capacity as Acting Administrator thereof, constructively denying Arkansas's Petition for Reconsideration and Request for Administrative Stay of the rule entitled "*Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate*

RECEIVED

FEB - 6 2017

U.S. COURT OF APPEALS

EIGHTH CIRCUIT

Visibility Transport Federal Implementation Plan; Final Rule.” 81 Fed. Reg. 66332 (Sept. 27, 2016).¹ A copy of Arkansas’s petition is attached as Exhibit A.

Pursuant to 42 U.S.C. 7607(b), jurisdiction and venue for this petition are proper in this Court. Arkansas, on behalf of the Arkansas Department of Environmental Quality, submitted its petition on November 22, 2016 and requested a response within seventy (70) days of receipt of the petition. Arkansas informed EPA that, due to the immediate harm resulting from the Final Rule, failure to respond to the petition would be deemed a constructive denial of the same. Therefore, on January 31, 2017, EPA constructively denied Arkansas’s Petition for Reconsideration and Request for Administrative Stay and this petition for review is timely filed before this Court.

¹ Arkansas previously filed a petition for review of that rule. That petition for review is currently pending as *Arkansas v. EPA*, No. 16-4270 (consolidated).

Respectfully submitted,

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Attorney General

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Deputy Solicitor General

SARAH PAGE TACKER
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Counsel for Petitioner the State of Arkansas

February 3, 2017

IN THE UNITED STATES COURT OF APPEALS
FOR THE EIGHTH CIRCUIT

STATE OF ARKANSAS,)
)
) Petitioners,)
)
) v.) Case No. _____)
)
) U.S. ENVIRONMENTAL)
) PROTECTION AGENCY and)
) CYNTHIA MCCABE, in her)
) Official capacity as Acting Administrator)
) of the United States Environmental)
) Protection Agency,)
)
) Respondents.)

AFFIDAVIT OF SERVICE BY MAIL

STATE OF ARKANSAS)
) ss.
COUNTY OF PULASKI)

Jamie Ewing states under oath as follows:

I swear and affirm upon penalty of perjury that the statements made in this affidavit are true and correct.


I am of legal age and on the 3rd day of February, 2017, I served the following PETITION OF REVIEW upon the following by placing a true and correct copy thereof in an envelope addressed as follows:

Catherine McCabe, Acting Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 3000 South
Washington, DC 20004

Dana J. Boente
Acting U.S. Attorney General
U.S. Department of Justice
950 Pennsylvania Avenue, NW
Washington, DC 20530-0001

Kevin S. Minoli, Acting General Counsel
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Room 4000
Washington, DC 20004

and forwarding the same via Federal Express from Little Rock, Arkansas.

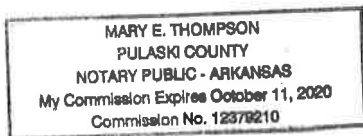


Jamie Ewing, Assistant Attorney General

Subscribed and sworn to before me
this 3rd day of February, 2017



Notary Public



BEFORE THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

In re:

Promulgation of Air Quality)
Implementation Plans; State of)
Arkansas; Regional Haze and) Docket No. EPA-R06-OAR-2015-0189
Interstate Visibility Transport)
Federal Implementation Plan;)
Final Rule)

**PETITION FOR RECONSIDERATION AND REQUEST FOR
ADMINISTRATIVE STAY**

I. Introduction

Pursuant to Section 307 of the Clean Air Act (“CAA”),¹ the Arkansas Department of Environmental Quality (“ADEQ”) submits this Petition for Reconsideration requesting that the Administrator of the U.S. Environmental Protection Agency (“EPA”) convene a proceeding for reconsideration of the final rule, “Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Final Rule” (“Regional Haze FIP”).² The ADEQ also requests that the agency immediately stay the Arkansas Regional Haze FIP pending completion of its reconsideration of the final rule. Absent a stay, implementation of the rule will

¹ 42 U.S.C. § 7607(d)(7)(B).

² 81 Fed. Reg. 66332 (Sept. 27, 2016) (hereinafter “Arkansas Regional Haze FIP” or “FIP”).

require expensive and unnecessary expenditures by utilities within Arkansas which will, ultimately, be borne by electric consumers.

Given the important issues raised by this petition, the EPA should immediately contact the ADEQ to discuss an appropriate schedule and process for reconsideration with an administrative stay in place. In the event the EPA has neither granted the petition nor made alternative arrangements with the consent of the ADEQ to establish a schedule for reconsideration within seventy (70) days of receipt of this request, such inaction will be deemed a denial of the petition.

II. The State raises objections that support reconsideration of the Regional Haze FIP.

The Clean Air Act requires the EPA to convene an administrative proceeding for reconsideration of a rule if a party raising an objection to the rule demonstrates to the EPA that: 1) it was impracticable to raise the objection during the comment period, or that the grounds for such objection arose after the comment period but within the time specified for judicial review; and 2) the objection is of central relevance to the outcome of the rule.³ The objections raised in the sections below are of central relevance to the outcome of the final Regional Haze FIP. Considering the new information presented below, the EPA should reach a different outcome in the rulemaking. This new information provides substantial support for revision of the Regional Haze FIP.

³ 42 U.S.C. § 7607(d)(7)(B).

- a. The EPA should reconsider emission controls on Independence in light of recent IMPROVE monitoring data which shows that Arkansas has already achieved the amount of progress required for this planning period.**

The EPA believes that the reasonable progress four-factor analysis requires additional controls for the Entergy Independence Power Plant (“Independence”).⁴ However, the EPA should reconsider whether controls on Independence are necessary under the Clean Air Act because 2015 monitoring data shows that Arkansas is currently meeting the reasonable progress goals set in the FIP and will continue to meet those goals for remainder of the first planning period.⁵ Therefore, further controls on Independence are not necessary to achieve reasonable progress.

It was impracticable to raise this objection during the public comment period for two reasons. First, the 2015 monitoring data were not available at the time the draft rule was released. Since the close of the comment period for the proposed Regional Haze FIP on April 8, 2015, measured concentration data for January 2015 through September 2015 from the IMPROVE network of Class I Federal area monitors became available.⁶ This monitoring data is the most recent available and shows that visibility values for both Caney Creek and Upper Buffalo are not only well below the Uniform Rate of Progress but also well below the reasonable progress goals set by the EPA in the Regional Haze FIP.

⁴ 81 Fed. Reg. 66332, 66350.

⁵ Interagency Monitoring of Protected Visibility Environment, accessed at <http://vista.cira.colostate.edu/Improve/>.

⁶ The public comment period was reopened twice in 2016 but each instance was limited to specific portions of the proposal not related to this data.

Second, EPA revised the final reasonable progress goals for this planning period downwards so that it would not have been possible to raise an objection during the comment period regarding actual visibility conditions being below the final reasonable progress goals because both visibility conditions and goals are components of that objection.

Wilderness Area	Disapproved 2008 RH SIP RPG	Proposed FIP RPG	Final RH FIP RPG	2015 Actual Conditions
Caney Creek	22.48	22.27	22.47	20.41
Upper Buffalo	22.52	22.33	22.51	19.96

The Clean Air Act requires each implementation plan to “contain such emission limits, schedules of compliance and other measures as may be *necessary to make reasonable progress.*”⁷ Thus, because the 2015 monitoring data indicates that Arkansas has already achieved the FIP’s reasonable progress goals without additional controls, the controls placed on Independence are not necessary. Additional controls simply cannot be necessary to achieve an amount of progress that has already occurred. The EPA exceeds its statutory authority by including controls on Independence despite evidence that such requirements are necessary to make reasonable progress.

Given the current visibility conditions and final reasonable progress goals, the EPA’s methodology may not accurately predict the visibility improvement

⁷ 42 U.S.C. § 7491 (emphasis added).

resulting from the installation of those controls on Independence even though these controls are purportedly required to meet those reasonable progress goals. EPA used the CALPUFF model to predict the visibility improvement. The EPA's CALPUFF results overstate the visibility improvements to be obtained by reductions in SO_x and NO_x emissions. The margins of error show that the calculations by CALPUFF are sufficiently unreliable to decide whether the controls result in visibility improvement. In Appendix A attached to this petition, the ADEQ includes Comments on the Use of the CALPUFF Model.

b. The EPA should reconsider compliance with the Transport Rule as an alternative acceptable method of compliance with BART for NO_x as a result of a recent rulemaking that increased the stringency of the Transport Rule.

The ADEQ requests that the EPA reconsider NO_x limitations placed on BART-eligible facilities and determine that compliance with the Transport Rule⁸ is acceptable for compliance with NO_x BART. The implementing regulations for the regional haze program allow the State to consider compliance with the Transport Rule as an alternative to controls on BART-eligible facilities.⁹ As this option is available to the states, the EPA should also include this BART-alternative in the Regional Haze FIP for NO_x controls.

This request is particularly compelling in light of the recent update to the Transport Rule because the revised NO_x budget for Arkansas is now lower than it was when the "better than BART" regulation was initially promulgated. However,

⁸ Also known as the Cross-State Air Pollution Rule, or "CSAPR."

⁹ 40 C.F.R. 51.308(e).

it was impracticable for the ADEQ to raise this issue before the end of the comment period because the final rule regarding Transport Rule NO_x budgets was not published until October 26, 2016.¹⁰ As discussed below, this issue is of central relevance to the outcome of EPA's decision in Arkansas's Regional Haze FIP and would likely lead to a different outcome in the rule; therefore, the EPA should open a proceeding to reconsider this issue.

In a letter to the ADEQ dated October 13, 2016, the EPA indicates that it will most likely consider compliance with the Transport Rule as a viable alternative for NO_x under the Regional Haze Rule and will issue a national rule to that effect.¹¹ However, the EPA is not required to wait until an updated national rule goes into effect; the current rule allowing compliance with the Transport Rule as a BART-alternative is still in effect and has withstood legal scrutiny. Indeed, the Eighth Circuit Court of Appeals has upheld the EPA's reliance on this alternative.¹² In *National Parks*, the court found that it was not an abuse of discretion for the EPA to rely on its expertise and determine that compliance with the Transport Rule met the requirements of the regional haze program.¹³ The court agreed with the D.C. Circuit that reliance on BART-alternatives is measured on their ability to ensure

¹⁰ 81 Fed. Reg. 74504 (Oct. 26, 2016).

¹¹ The letter from EPA is attached as Appendix B to this petition.

¹² *National Parks Conservation Ass'n. v. McCarthy*, 816 F.3d 989 (8th Cir. 2016) ("*National Parks*").

¹³ *Id.* at 996.

“reasonable progress.”¹⁴ As stated above, recent monitoring data show that Arkansas is meeting the reasonable progress goals set by the EPA and will continue to do so for the rest of the first compliance period.

Allowing facilities subject to the Transport Rule to comply with that rule in satisfaction of NO_x controls for BART in Arkansas will not sacrifice stringency. The EPA has already determined that the Transport Rule—also known as the Cross-State Air Pollution Rule (“CSAPR”)—is “better than BART.”¹⁵ According to the EPA, the Transport Rule achieves “greater reasonable progress towards the national goal of achieving natural visibility conditions in Class I areas than source-specific...BART in those states covered by the Transport Rule.”¹⁶ The EPA recently finalized a rulemaking which updated the Transport Rule, entitled the CSAPR Update Rule.¹⁷ The CSAPR Update Rule provides a small and more stringent NO_x trading budget than the original CSAPR trading program that the EPA considered to be “better than BART.”

If compliance with the earlier CSAPR trading program in Arkansas achieved greater reasonable progress than BART for NO_x, then the CSAPR Update Rule

¹⁴ *Id.* at 995, citing *Utility Air Regulatory Group v. EPA*, 471 F.3d 1333, 1341 (D.C. Cir. 2006), which reviewed the earlier version of the Transport Rule, the Clean Air Interstate Rule (“CAIR”).

¹⁵ Regional Haze: Alternatives to Source-Specific Best Available Retrofit Technology (BART) Determinations, 77 Fed. Reg. 33,642, 33,648 (June 7, 2012) (“Better than BART Rule”).

¹⁶ *Id.* at 33,643.

¹⁷ Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS, 81 Fed Reg. 74504 (Oct. 26, 2016)

must also achieve greater NO_x emissions reductions than necessary for NO_x for BART because the updated NO_x budgets are reduced and more stringent.¹⁸

Thus, based on previous determinations of the EPA, judicial precedent and the increased stringency of the Transport Rule, the agency should open a proceeding to reconsider compliance with the Transport Rule as an acceptable BART-alternative in a program-specific manner for Arkansas. More specifically, the EPA should consider both the original Transport Rule and the CSAPR Update Rule as acceptable methods of compliance with BART for NO_x.

c. The EPA should reconsider the use of low-sulfur coal as BART for SO₂ for White Bluff in light of its recent letter requesting additional information on BART determinations after the close of the comment period.

Since the Regional Haze FIP was published, the EPA authored a letter dated October 13, 2016, which calls into question the agency's decision not to analyze other available control technologies - including existing control technologies - in its BART determinations for the White Bluff and Flint Creek facilities.¹⁹ BART determinations are a central mechanism by which controls are required under the Regional Haze program for this planning period. As a result, the SO₂ BART determination for White Bluff is central to the Regional Haze FIP and, therefore, reconsideration is appropriate.

¹⁸ Compare 81 Fed. Reg. 74504 at 74508 (showing a "12,048" 2017 ozone season NO_x trading budget and "9,210" NO_x trading budget for 2018 and thereafter) with 40 CFR 97.340 (showing a "11,515" 2009-2014 ozone season NO_x trading budget and "9,597" budget for 2015 and thereafter).

¹⁹ See Appendix B.

In its letter of October 13, 2016, the EPA addresses its “preliminary views on supplemental comments regarding a proposed alternative strategy for their White Bluff facility.”²⁰ The letter sets forth the EPA’s official position on additional information necessary to address a five factor analysis for White Bluff based on Entergy’s comments. Among the information requested, the EPA asks for an “Evaluation of DSI as Interim Control.” The EPA appropriately points out that the “BART guidelines require that a subject-to-BART source install and operate the best available emission reduction technology based on the five statutory factors” and states that “it is necessary to consider whether there are additional SO₂ control measures [for White Bluff]. . . that constitute BART.”²¹ Although the EPA’s request is regarding a specific proposal outside of the comment period, the EPA’s position that Arkansas must perform an additional analysis needed for controls that were not considered by the EPA, calls into question whether the EPA, which steps into the shoes of the state, was also legally required to perform a wider range of analysis of possible emissions controls for its own SO₂ BART determination for White Bluff. The EPA’s request for additional information related to SO₂ controls for White Bluff outside of the comment period should necessitate the reconsideration of low-sulfur coal as BART.

In particular, this new information about the EPA’s position on SO₂ for White Bluff should lead the EPA to reconsider other options that include the EPA’s stated criteria for possible controls for SO₂ for White Bluff including having “a relatively

²⁰ See Appendix B at 1.

²¹ *Id.* at 2.

low capital cost” and whether the controls would “be effective if operated for a short period of time,” which is appropriate due to the short remaining time in the first planning period.

The ADEQ requests the EPA reconsider its SO₂ BART determination for White Bluff and include an analysis for controls that would also have a “low capital cost” and would be effective “for a short period of time” – the use of low sulfur content coal tied to an appropriate corresponding emission rate. The ADEQ urges the EPA to undertake a thorough reconsideration of low sulfur content coal using the five factors resulting in a determination of that emission control as BART. In Appendix D attached to this petition, the ADEQ includes considerations for a five-factor analysis that supports a BART determination for low-sulfur coal when taking into consideration the remaining time in this planning period, as well as certain errors in the EPA’s BART determination for White Bluff.

III. Basis for Immediate Administrative Stay

a. The request meets the standard for an administrative stay.

The EPA Administrator is authorized to stay the effective date of its actions “when justice so requires.”²² The Administrator makes this determination by considering the same factors applied to a request for judicial stay. Those factors are: 1) whether the petitioner is likely to prevail on the merits of the appeal; 2) whether the petitioner is likely to suffer irreparable harm in the absence of a stay; 3) whether it is in the public interest to stay the rule; and 4) whether a stay will

²² 5 U.S.C. § 705.

cause harm to other parties. As proven by the analysis below, justice compels the Administrator to stay the Regional Haze FIP.

b. The State is likely to succeed on the merits of a challenge to the Regional Haze FIP.

Much of the Regional Haze FIP is arbitrary, capricious and without a basis in the law and the State has a strong likelihood of success on the merits of a challenge. The ADEQ does not waive any arguments not raised in this section. The following is not an exhaustive list of the legal flaws in the Regional Haze FIP but, rather, an example of some of the most glaring errors in the rule.

1. The EPA is arbitrary, capricious and without a basis in the law in applying emissions controls to BART-eligible facilities. Some of the emissions controls will not be implemented until after the end of the first planning period²³, a requirement that was questioned by the Fifth Circuit in reviewing a stay request for the Texas Regional Haze FIP.²⁴ In addition, the EPA reduces the time for compliance for other controls without any basis in the record.²⁵
2. The EPA ignored the fact that Arkansas is below the Uniform Rate of Progress (“URP”) in meeting background visibility by 2064. EPA does not explain why it chose to ignore the facts and insisted additional controls were necessary to achieve “reasonable progress.” In combination with the IMPROVE monitoring data discussed above, the ADEQ is very likely to succeed in arguing that additional controls are not necessary to achieve reasonable progress toward background visibility.
3. The EPA has not justified the alleged benefits of the Regional Haze FIP in relation to the costs of compliance. The data in the record demonstrate that the required controls offer no appreciable visibility improvement. Without perceptible visibility improvement,

²³ For example, compliance with SO₂ controls for White Bluff Units 1 and 2 must be met three (3) years after the effective date of the rule, which will be after the end of the first planning period in 2018. See 81 Fed. Reg. 66332, 66335 (Sept. 27, 2016).

²⁴ *Texas v. EPA*, 829 F.3d 405, 429-30 (5th Cir. 2016)

²⁵ See 81 Fed. Reg. 66332, 66342 (Sept. 27, 2016).

the EPA cannot justify the significant costs of compliance – costs that will be passed on to electric ratepayers in Arkansas. The EPA clearly ignores the Supreme Court’s ruling in *Michigan v. EPA*²⁶.

c. An administrative stay will prevent irreparable harm to ratepayers of Arkansas and is in the public interest.

Without an administrative stay of the Regional Haze FIP, the rule will mandate controls that are both unnecessary and costly, imposing billions of dollars in total economic costs without the requisite evaluation of the impact of the controls on visibility improvement in Class I federal areas.

Implementation of the rule as written will inflict irreparable harm upon the Arkansas ratepayers who will ultimately pay for the controls required by the facilities regulated by the rule under the FIP. Entergy Arkansas filed comments estimating that the installation of scrubbers on Independence and White Bluff will cost roughly \$1 billion each.²⁷ Under Arkansas law, the capital costs such as those for installation of emissions controls required by federal law may be passed on to ratepayers.²⁸

The public interest favors the granting of stay because Arkansas has already achieved the reasonable progress goal for this period and excess controls would not further the purpose of the regional haze program. The Regional Haze program grants the EPA the authority to promulgate regulations, including FIPs, that

²⁶ 576 U.S. ___, 135 S.Ct. 2699 (2015).

²⁷ See Entergy comments of August 7, 2015 at p.4; Exhibit B (For White Bluff, the “total capital investment to install dry [scrubbers] was estimated to be “\$1,072,370,000.”), found at <https://www.regulations.gov/document?D=EPA-R06-OAR-2015-0189-0166>.

²⁸ See Ark. Code Ann. § 23-4-501 *et seq.*

“contain such emission limits, schedules of compliance and other measures as may be *necessary to make reasonable progress*.”²⁹ As has been demonstrated by the recent IMPROVE monitoring data, the EPA has no legal basis for mandating additional controls because reasonable progress, as measured by the reasonable progress goals for this planning period, has already been achieved. Therefore, the imposition of emissions controls in excess of this statutory authority are unnecessary and will burden the state’s ratepayers with costs passed on from impacted utilities for the installation of controls that are wholly without a basis in law or fact. It is in the public interest to stay the rulemaking because the high costs of the FIP would unduly burden Arkansas ratepayers without providing an appreciable benefit and in a manner that exceeds the EPA’s authority under the Clean Air Act.

d. An administrative stay will not cause harm to other parties.

A stay of the Regional Haze FIP will not cause harm to the EPA or other parties. As stated above, Arkansas is currently making reasonable progress toward background visibility conditions in its two Class I Federal areas—without any additional controls. Additionally, this progress is projected to continue through 2018 and likely beyond. An administrative stay of the Regional Haze FIP will not slow this progress and will not negatively impact visibility within Class I Federal areas affected by Arkansas sources.

²⁹ 42 U.S.C. § 7491.

IV. Conclusion

For the foregoing reasons, the EPA should open a proceeding to reconsider its decision regarding the Arkansas Regional Haze FIP and should immediately stay the rule.

Date: November 22, 2016

Respectfully submitted by:

/s/ Jamie L. Ewing

On behalf of

Arkansas Dept. of Environmental Quality
Becky Keogh, Director
5301 Northshore Drive
North Little Rock, AR 72118

Jamie L. Ewing
Assistant Attorney General
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323 Center Street, Suite 200
Little Rock, AR 72201
(501) 682-5310
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Appendix A

Comments on the Use of the CALPUFF Model in the US Environmental Protection Agency's Federal Implementation Plan for the Regional Haze Rule in Arkansas

Prepared by:

Gale F Hoffnagle, CCM, QEP

TRC Environmental Consultants

November 18, 2016

INTRODUCTION

The focus of these comments is on the scientific support for US Environmental Protection Agency's (EPA) reliance on small changes in CALPUFF visibility model calculations and results to make policy decisions related to sulfur oxides (SOx) and nitrogen oxides (NOx) emissions controls necessary to reduce visibility impacts on Class I areas in Arkansas. EPA contends in its proposed Federal Implementation Plan (FIP) that modeled visibility improvement numbers on the order of or less than 1 deciview down to 0.002 deciviews in the modeling analysis are sufficient to impose additional controls on power plant units. However, EPA (at Page 2009 of the proposed Utah FIP), admits that "*most people can detect a change in visibility at one dv (deciview)*".

These comments are meant to challenge the scientific integrity of EPA assertions and calculations in the final FIP regarding the CALPUFF-modeled visibility improvement analyses.

MARGIN OF ERROR

Inert Transport

Knowing the range of error for a CALPUFF modeled dv result is important in understanding the relevance of the results. For instance, if CALPUFF says that the visibility will improve by 0.085 dv, what is the range (margin) of error in that model result? Could the range be 0.2 dv to -0.1 dv (no improvement)? To understand how faithfully CALPUFF reproduces actual

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results we must look to the field experiments comparing CALPUFF³ (version 5.8 as used by EPA) to measured results. The most comprehensive comparisons of CALPUFF with long range transports experiments was prepared for EPA¹ in 2012.

The margin of error is technically determined by multiplying the central value by the standard deviation of multiple values at some confidence level. It is expected that the central value of the measured data and the central value of the modeled results are the same and that the range of modeled error can reasonably be determined by a simple formula. What is immediately apparent by looking through the experiments is that CALPUFF is always biased high using the CALPUFF version (2005, Version 5.8.4) which is cited in the BART Guidelines and used rigorously by EPA in all the BART SIP/FIP work. The studies are presented in Attachment A. There are two issues to contend with, the bias and the margin of error.

A summary table of the EPA¹ results has been prepared:

Table 1: CALPUFF Mean Normalized Bias and Normalized Mean Square Error

Comparisons to Field Studies				
		Maximum Observed Percent MNB/NMSE		Centerline Percent MNB
		MNB	NMSE	
Great Plains				
	100 km,	84%		65%
	600 km.	-75%		-76%
Savannah River				
	100 km.	71%		221%
CAPTEX				
	all receptors 100-1000 km.		41%	
ETEX				
	all receptors 50-1400 km.		320%	

Details of the studies and the results presented in Table 1 are contained in Attachment A.

In summary, all of these comparisons to field experiments show is that CALPUFF has a bias for over predicting maximum concentrations which is at least 71% and a margin of error of

at least 41% around that bias central value. So, as an example, if CALPUFF estimated a visibility reduction of 0.085 Dv, then it is likely that the actual the margin of error is between 0.085 to -0.085 Dv. There is thus the opportunity in the margin of error that the change in Deciviews is imperceptible. The better expression is in Inverse Megameters (Mm^{-1}), because the total extinction goes from 23.05 Mm^{-1} to a range from 19.01 to 9.56 Mm^{-1} .

Table 2: Example Calculation of the Margin of Error

	98% Modeled		Correct for Bias (71%)		Margin of Error (Mm^{-1})		Margin of Error (Dv)	
	Mm-1	Dv	Mm-1	Dv	+41%	-41%	+41%	-41%
Without Control	23.250	8.437	13.596	3.072	19.171	9.643	6.508	-0.364
With Control	23.053	8.352	13.481	2.987	19.009	9.561	6.423	-0.449
Difference	0.197	0.085	0.115	0.085	0.162	0.082	0.085	-0.085

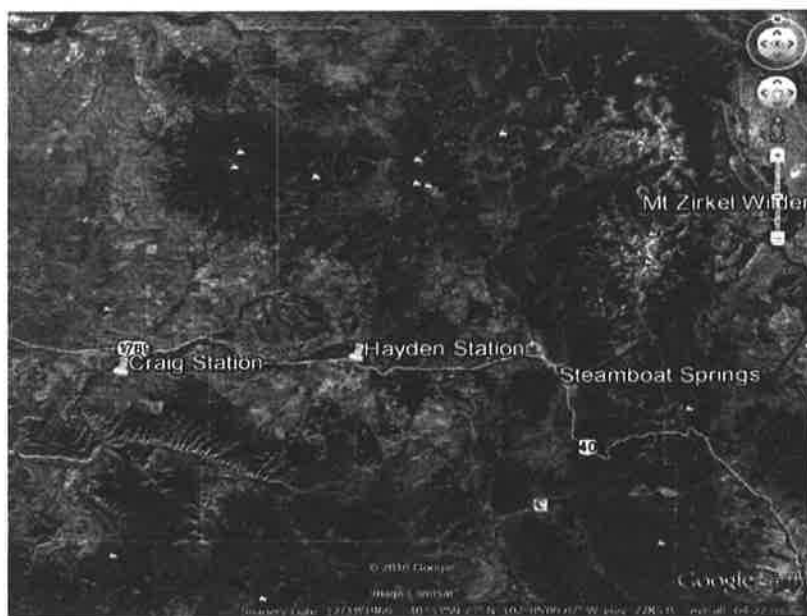
But, all of these evaluations of CALPUFF against field data are from experiments with chemically inert tracers. There was little to no atmospheric chemistry occurring in any of these experiments. So it only reveals the margin of error associated with getting the molecule of SOx or NOx to the Class I area, not whether it is now a sulfate or nitrate.

Atmospheric Chemistry

To address the margin of error associated with the modeling of the atmospheric chemistry involved in the visibility calculation, comparisons of the modeled visibility versus the measured visibility must be used. This relatively straightforward comparison has not been used by EPA in any of the BART actions which they have undertaken. EPA simply states that the Guidance requires the use of the 2005 version of CALPUFF and that its answers can be relied upon to make decisions regarding BART controls and the visibility improvements are *reasonably anticipated*.

In visibility modeling measured versus modeled comparisons should use the IMPROVE ² measured data. On every third day IMPROVE measures the particulate matter which causes visibility impairment and calculates the total extinction and the portions of that extinction due to many types of particles, most especially including nitrates. Nitrate chemistry is the most important to the BART process because in almost every case EPA insists on requiring NO_x reduction through control technology. Because the modeling requires making a daily 24-hour average estimation there is a one-to-one correlation of measured and modeled on every third day. There is, arguably, some offset for travel time from source to park and this occurs around midnight each day. An example which has been studied extensively ³ is two coal fired power plants which are less than 100 kilometers west of the Mt. Zirkel Wilderness Area in Colorado. Figure 1 shows the geographic situation.

FIGURE 1: Geographic Layout between Power Plants and Mt. Zirkel

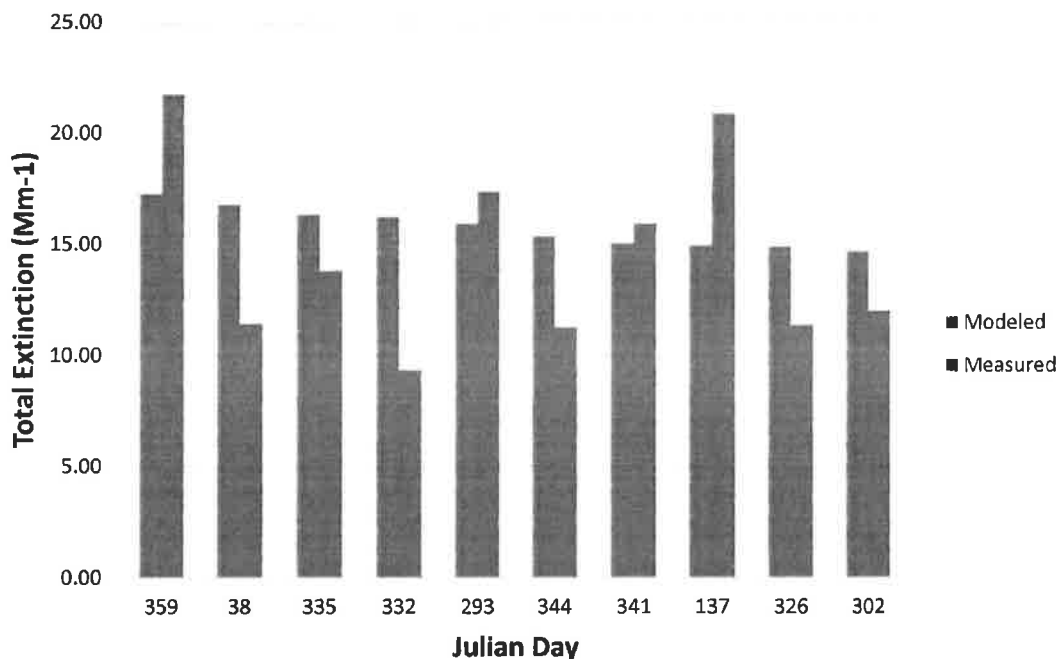


Craig Station is approximately 83 kilometers from the Mt. Zirkel IMPROVE site and Hayden Station is approximately 50 kilometers away in nearly the same direction where it is

anticipated that both facilities would impact on some of the same days. EPA, by the way, almost never models the impacts of multiple facilities when determining BART.

Because the wind doesn't always blow from the WSW direction, the comparison should be made on the worst case days of modeled impact at Mt. Zirkel. Using modeling produced by Colorado ⁴ the 25 worst case modeled days were matched with days of measured data at Mt. Zirkel resulting in 10 days in 2002. Figure 2 shows a comparison of total extinction for those 10 days when the only modeled contributor to visibility extinction is Craig Station.

FIGURE 2: Predicted vs Observed Total Extinction: Craig Station to Mt. Zirkel Wilderness 2002



Note: This has been revised based on the analysis of previous results in Docket EPA-R06-OAR-2015-0189-0222

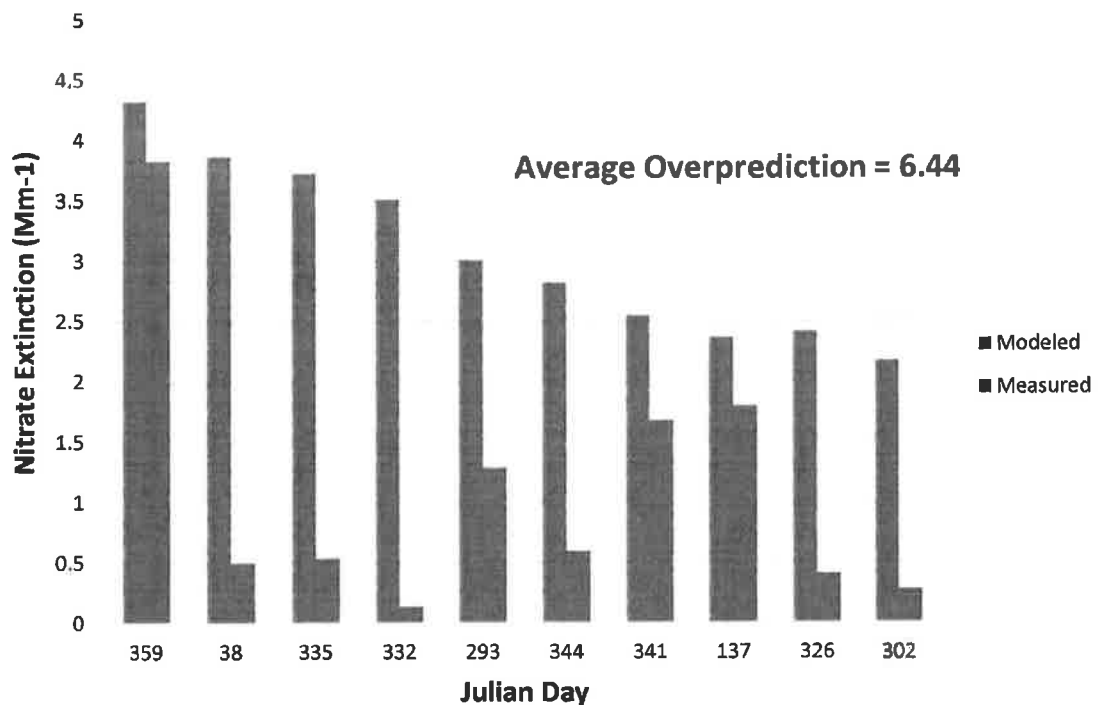
The modeled results exceed the observed in Figure 2 by 17% (the bias) and the margin of error is 38%. That result assumes that Craig Station is the only contributor to extinction at Mt. Zirkel, which clearly is not true. When Hayden Station is added to the evaluation, the modeled exceeds the observed by 61% (the bias) and the margin of error is 132%. There are, of course, G. Hoffnagle Comments, November 2016

other power plants and oil and gas sources in the area that contribute to the measured data which are not accounted for in the model and thus the over prediction and margin of error are actually greater.

The results for total extinction are somewhat in line with the margin of error for non-reactive comparisons made above. That is, over predictions on the order of 71%.

The issues in the BART SIP/FIP debates are, however, the prediction of nitrate extinction due to NOx emissions which EPA seeks to control. Because the model calculates and the IMPROVE data measures nitrates at the parks, a comparison can be made of the nitrate calculation margin of error. Starting again with Craig Station only, the comparison is shown in Figure 3:

FIGURE 3: Predicted vs Observed Nitrate Extinction : Craig Station to Mt. Zirkel Wilderness 2002



Note: This has been revised based on the analysis of previous results in Docket EPA-R06-OAR-2015-0189-0222

Again, this is the subset of the top 10 modeled days for which there is a measurement at Mt. Zirkel versus the modeled nitrate extinction from Craig Station only. The average over prediction (the bias) is 6.44 times the measured extinction, not just 71%. The margin of error grows to 45.5 times the value. This implies that the model is consistently making far more nitrates than are actually measured and has no reasonable ability to predict nitrate concentrations. If Hayden Station is added, the over prediction (the bias) goes to 14.3 times the actual measured.

The reason for the models over prediction is obvious to many atmospheric chemists. EPA insists that the ammonia be set to 1 ppb, no matter the time of year. Almost all of the occurrences of high extinction due to the power plants occur in the winter when ammonia concentrations in the atmosphere are low. There is one exception (May 16, Julian day 137). When the atmosphere is cold enough to make nitrates from NO_x, there is little ammonia available to do so in the winter months. Also, SO_x in the plumes preferentially uses the ammonia. EPA has insisted that background ammonia concentrations be kept at 1 ppb throughout the year and be available to every NO_x or SO_x molecule that is modeled. The use of an annual concentration for ammonia is curious since many measurements of ambient air ammonia show concentrations in the range of 0.1 ppb in the winter months and EPA uses monthly average concentrations of water vapor and hourly measures of ozone in its modeling.

Summary

The bias for the use of the 2005 version of CALPUFF in evaluating concentrations and thus extinction in National Parks and Wilderness Areas is on the order of 71% over prediction (the bias) for atmospheric dispersion process and at least a factor of 6.44 times actual extinction (the bias) for winter time nitrate formation from emission sources. The margin of error is 41%

for the inert transport and 37% for total extinction. For nitrates specifically the margin of error is 45 times the value.

Comparing Model Results and Applying the Margin of Error

In rejecting Arkansas's BART SIP, EPA chose to add the Independence Power Plant to the facilities needing controls. EPA primarily relies on just one model result to test the results of its controls, the 98% of potential visibility impacts in the Parks. That means the impacts on just 7.3 days (8th highest impact day). This, of course is the most stringent test and is not derived from the focus of the BART rule on the best 20% of days and the worst 20% of days.

The Independence Plant is 180 kilometers from the Upper Buffalo Wilderness Area and 277 kilometers from Caney Creek Wilderness Area. Referring again to the tracer studies on the transport and dispersion of CALPUFF 5.8 shown in Table 1, the bias and margin of error for the model at these distances is substantially worse than it is at 100 kilometers. Technically the bias and margin of error are larger at these distances and the EPA deciview results are even less reliable.

For the Arkansas FIP EPA CALPUFF model results⁵ for the Independence Plant, Table 3 shows the effect of considering the transport/diffusion margin of error assuming the calculation is at 100 kilometers. The reductions in predicted deciviews account only for the bias and margin of error in the transport and diffusion of gases to the Wilderness Areas and do not account for the errors in atmospheric chemistry.

**Table 3: Apply Transport and Diffusion Margin of Error to EPA Independence Results
(EPA final Rule Table 14)**

Final Rule	Model Predicted Baseline		With FGDD		FGDD Improvement	
	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv
Caney Creek Upper Buffalo	12.86	2.51	11.52	1.42	1.33	1.10
	12.54	2.26	11.15	1.09	1.39	1.18

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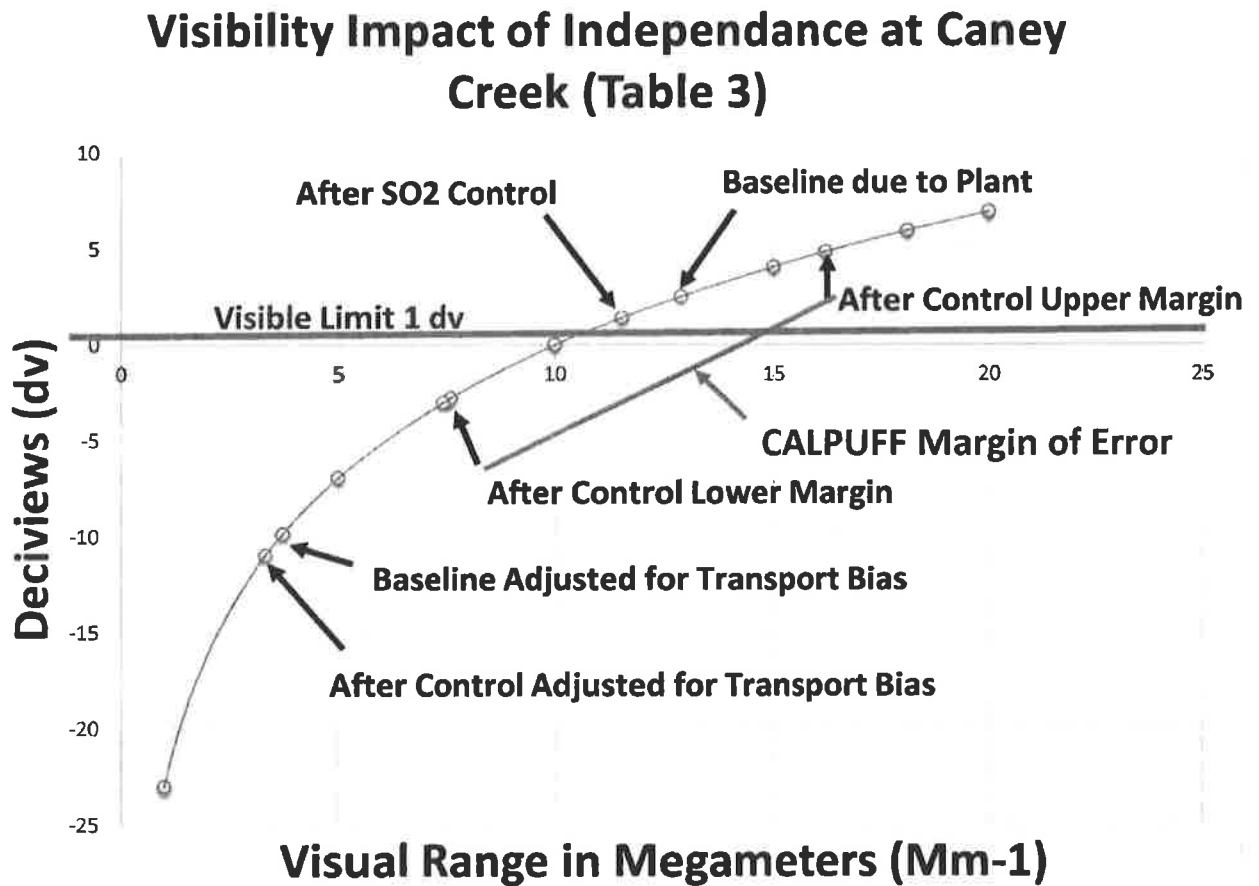
Subtract Bias of 71%						
Bias	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv
Caney Creek Upper Buffalo	3.73	-9.87	3.34	-10.96	0.39	not visible
	3.64	10.11	3.23	-11.29	0.40	not visible
Margin of Error of +41%						
Plus Margin	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv
Caney Creek Upper Buffalo	18.13	5.95	16.24	4.85	1.88	1.10
	17.68	5.70	15.72	4.52	1.96	1.18
Margin of Error of -41%						
Minus Margin	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv
Caney Creek Upper Buffalo	7.58	-2.76	6.80	-3.86	0.79	not visible
	7.40	-3.01	6.58	-4.19	0.82	not visible

Table 3 shows the EPA Table 14 results in the first set labeled **Final Rule**. It shows EPA's calculation of visibility improvement of 1.1 and 1.18 deciviews when using a dry FGD. I have used two significant figures to the right of the decimal point, but even that is more places than valid by the calculation error. The second set of calculations is an evaluation using the bias of CALPUFF and is labeled **Bias**. This shows that bias brings the calculation of an impact of both the base case impact on the Wilderness Areas to well below zero deciviews and no visually perceptible impact. In order to show the margin of error issue, I will ignore for the moment that the bias takes the calculation of any visible impact. The third set is applying the margin of error on the plus side and is labeled **Plus Margin**. The plus margin results in impacts of 4.85 and 4.52 Mm-1 of extinction. The last set is the negative margin and is labeled **Minus Margin**. It shows

that the margin of error includes no visible impact at all. When the change in visibility is too small (below zero dv) it is labeled “not visible”.

To aid in visualizing the results in Table 3 they are reproduced in Figure 4.

FIGURE 4: Presentation of the Results in Table 3



The Table 3 results show that correcting for dispersion and transport bias would result in no visibility impact from the Independence Plant. The Table 3 results show that utilizing the transport and diffusion margin of error (without accounting for the bias), the EPA CALPUFF model results show too large a margin of error to conclude that that requiring dry FGD on the

Independence Plant would assure an improvement in visibility. The margin of error is from 4.85 Mm-1 to not visible at all.

The bias and margin of error for the EPA CALPUFF modeling for Independence Plant for the effectiveness of NOx controls is related to the formation of nitrates from the emissions of NOx. The results can be evaluated in the same way. EPA has chosen, in order to maximize the effect of reductions in NOx emissions to use a different baseline for calculation of the controls benefit. This is highly unusual since it then changes the dates, times and locations of the 98% frequency of impact on the Class I areas. Because of this change I have had to re-evaluate the transport and diffusion errors before adding the atmospheric chemistry errors. These results are presented in Table 4.

Table 4 demonstrates that when you consider the transport and diffusion bias to the EPA calculated NOx control analysis all results fail to have a visible impact. The atmospheric chemistry bias for total emissions and for nitrate emissions discussed above are applied separately at that line in the Table.

Table 4: Apply Transport, Diffusion and Atmospheric Chemistry Margin of Error to EPA Results (EPA Final Rule Table 15)

Final Rule	Model Predicted Baseline		With NOx Controls		NOx Improvement	
	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv
Caney Creek Upper Buffalo	12.25	2.03	11.70	1.57	0.55	0.46
	12.22	2.00	11.98	1.81	0.24	0.20
Transport Bias and Margin Plus Margin						
	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv
Caney Creek Upper Buffalo	5.01	-6.91	4.78	-7.37	0.22	not visible
	5.00	-6.94	4.90	-7.14	0.10	not visible

Minus Margin	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv
Caney Creek	3.55	-10.35	3.39	-10.81	0.16	not visible
Upper Buffalo	3.54	-10.38	3.47	-10.57	0.07	not visible
	Bias of 17%			Bias of 6.44		
Chem Bias	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv
Caney Creek	10.17	0.16	9.71	-0.29	0.09	not visible
Upper Buffalo	10.14	0.14	9.94	-0.06	0.04	not visible
	Chem + Trans					
Chem + Trans	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv	$\Delta Mm-1$	Δdv
Caney Creek	3.55	-10.35	3.39	-10.81	0.02	not visible
Upper Buffalo	3.54	-10.38	3.47	-10.57	0.01	not visible

Other Evidence

The most compelling evidence of the bias and margin of error would come from a direct comparison of the modeled results to actual measurements at the Class I areas. It is a sign of the unscientific approach to visibility which EPA has undertaken that they never compare their model predictions to measured data. The IMPROVE network has been taking measurements of the nitrates and sulfates at many Class I areas including the Caney Creek Wilderness Area and Upper Buffalo Wilderness Area for decades, including the years 2001, 2002 and 2003 which are the subject of the modeling. The measurements are 24 hour averages, just like the model results and so one-to-one comparisons can be made. It should be noted that the IMPROVE margin of error is on the order of 3% for the equation they developed to calculate deciviews from measured particulate concentrations. It is beyond scientific understanding why EPA does not do or require this analysis model comparison analysis in the BART process.

Fortunately for this Arkansas case, this kind of measured to model comparison has been done. Trinity Consultants⁶ prepared for EAI the model results at the Lake Catherine Plant. Caney Creek is approximately about 100 kilometers west of Lake Catherine (the ideal distance for the margin of error derived above) and approximately 160 kilometers southeast of Upper Buffalo. The comparisons are shown on Trinity Figures 4-1 through 4-6 of the report and show that the Lake Catherine Plant makes infinitesimal contributions to the 20% worst case days at the two Wilderness areas. This is compared to the EPA methodology CALPUFF model results which estimate that Lake Catherine makes average contributions on the 20% worst case days of 28.60 Mm⁻¹ (dv=1.39). The bias is evident and the margin of error is 1.16 dv at Caney Creek and 0.93 at Upper Buffalo.

CONCLUSION

The bias and margins of error for CALPUFF, both the transport and diffusion error and the chemistry error, have been applied to various results of EPA CALPUFF BART modeling for the Arkansas Regional Haze SIP and EPA FIP. The CALPUFF results considering the bias overstates the visibility improvements to be obtained by reductions in SO_x and NO_x emissions. The margins of error show that the calculations by CALPUFF are sufficiently unreliable to decide whether the controls result in visibility improvement. Improvements in visibility for the Independence Plant are not visible once the bias and margin of error of the CALPUFF modeling are taken into account. In addition, predicted improvements are below 1 Dv, the limit of human perceptibility. Adding controls to the Independence Plant will not lead to significant or measureable improvements in visibility in the Wilderness Areas.

REFERENCES

1. US Environmental Protection Agency: “Documentation of the Evaluation of CALPUFF and other Long Range Transport Models using Tracer Experiment Data”, prepared by ENVIRON International Corporation, EPA-454/R-12-003, May 2012. Docket EPA-R06-OAR-0189-0215
2. IMPROVE data base: <http://vista.cira.colostate.edu/improve/>
3. Colorado BART Modeling Data Figure 25, page 51 BART CALPUFF Class I Federal Area Individual Source Attribution Visibility Impairment Modeling Analysis for Tri-State Generation & Transmission Association Craig Station Units 1 and 2. Docket EPS-R06-OAR-2015-0189-0244
4. Colorado Air Pollution Control, “BART CALPUFF Class I Federal Area individual Source Attribution Craig Station Units 1 and 2”, June 2012.
5. “Summary of Additional Modeling for Entergy Independence”, Michael Feldman, Region 6, April 20, 2015. Docket EPA-R06-OAR-2015-0189-0147
6. Trinity Consultants, “Evaluation of the CALPUFF Modeling system Margin of Error for BART Analysis” August 4, 2015. Exhibit H of Entergy Comments of August 7, 2015. Docket EPA-R06-OAR-2015-0189-0153

Attachment A

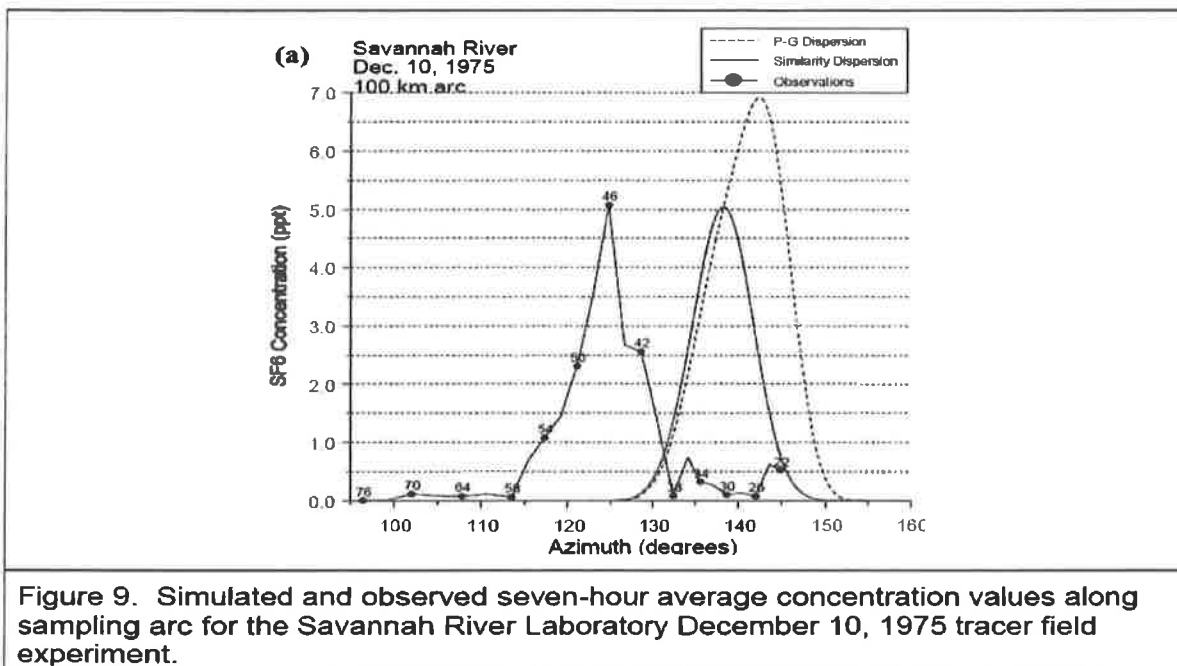
Basis for Adopting CALPUFF in the BART Rules:

The US EPA adopted, in November 9, 2005, changes to the Guideline on Air Quality Models (40 CFR part 51, Appendix W) which identified the modeling system called CALPUFF version 5.8 (originally developed for the California Air Resources Board) as the “preferred” model for Long Range Transport (LRT), i. e. any distance beyond 50 kilometers from the source. Nearly simultaneously, July 9, 2005, EPA finalized the BART Guidance (40 CFR part 51, Appendix Y) which allowed the use of the CALPUFF version 5.8 modeling system in assessing visibility improvements at Class I areas for BART eligible sources. These actions were based on nearly 10 years of work, mostly by the Federal Land Managers, to determine if CALPUFF was appropriate for the analysis.

The basis of these adoptions was comparisons of CALPUFF results to measured data from 4 long range transport (LRT) experiments. Each of these experiments used inert tracers and thus evaluated the transport and diffusion aspects of CALPUFF. The tests were summarized in the report “Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts”, EPA-454/R-98-019, December 1998. EPA also produced a document “A Comparison of CALPUFF Modeling Results to Two Tracer Field Experiments”, EPA-454/R-98-009, June 1998. This document dealt with the Savannah River and Great Plains studies. The outcomes of these model comparisons are as follows:

1. Savannah River Laboratory Tracer Study: A single 6 hour tracer release was measured along an arc of measurement points 100 kilometers from the release. The terrain was flat and heavily wooded so the release was from an elevated tower. The CALPUFF 5.8 result was 35% higher than the measured concentration of the released gas and 20° off in the wind direction and much too narrow a plume.

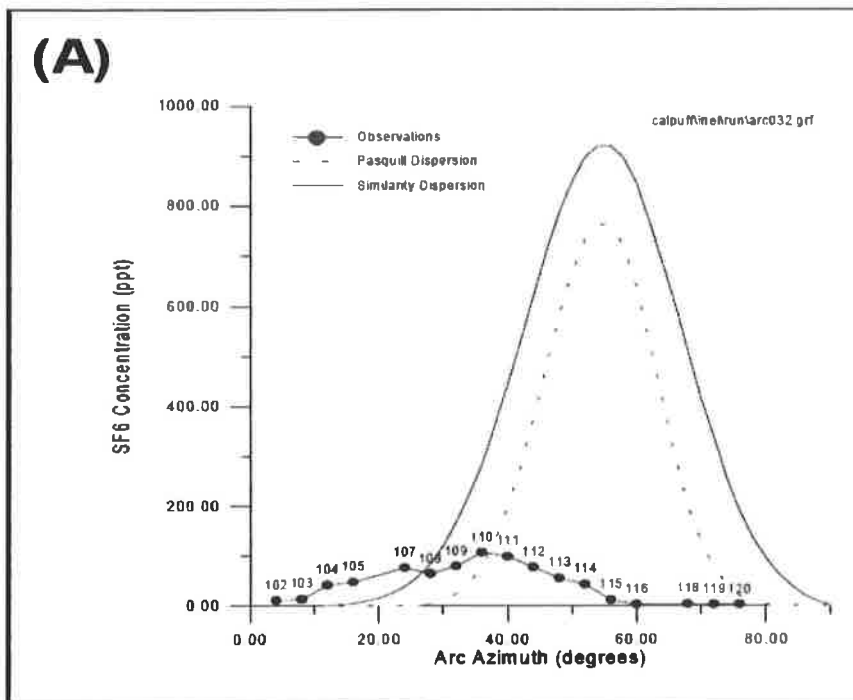
Figure 1: Savannah River Results at 100 Kilometers



Dashed line represents CALPUFF version 5.8 results which require use of P-G dispersion

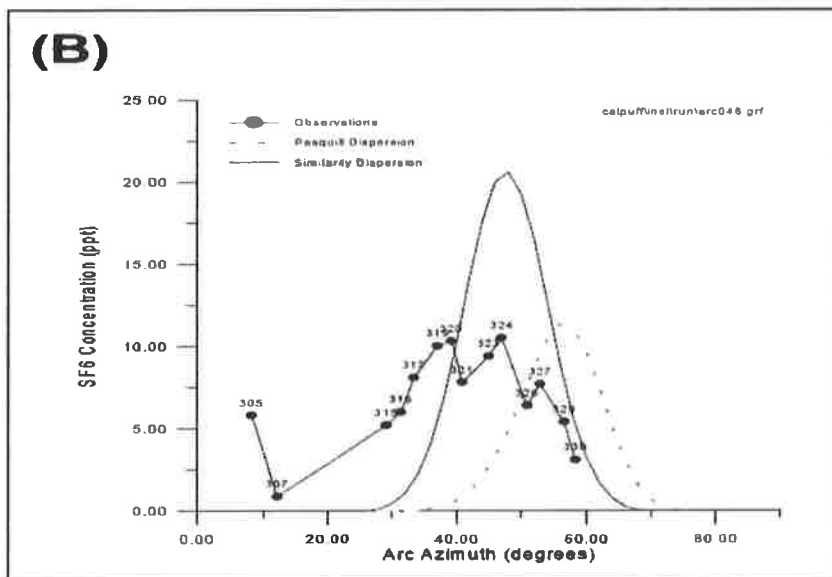
2. Idaho Falls Tracer Study: A single 3 hour release was measured along three sampling arcs at 3, 48 and 90 kilometers. The terrain was flat rangeland.
 - a. At 3 kilometers the CALPUFF 5.8 result was 9 times too high and 10°
 - b. At 48 kilometers the CALPUFF 5.8 result was 10% too high, 20° off in wind direction and much too narrow.
 - c. At 90 kilometers the CALPUFF version 5.8 result was 5% too high and 10° off in wind direction and the width was similar.

Figure 2: Idaho Falls Results at 3 Kilometers



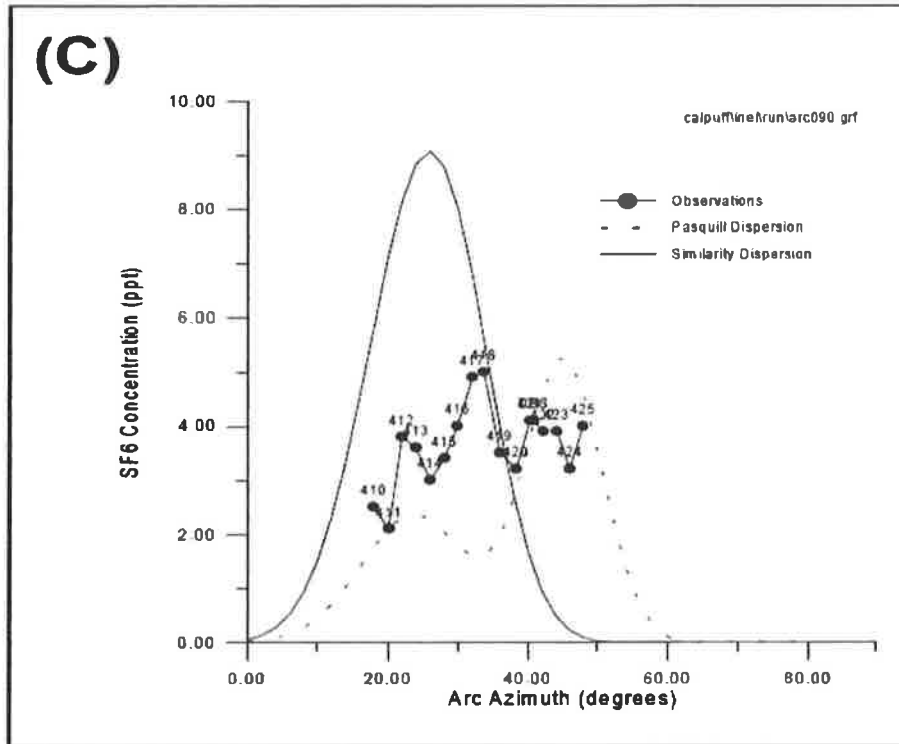
Dashed line represents CALPUFF version 5.8 results which require use of P-G dispersion

Figure 3: Idaho Falls Results at 48 Kilometers



Dashed line represents CALPUFF version 5.8 results which require use of P-G dispersion

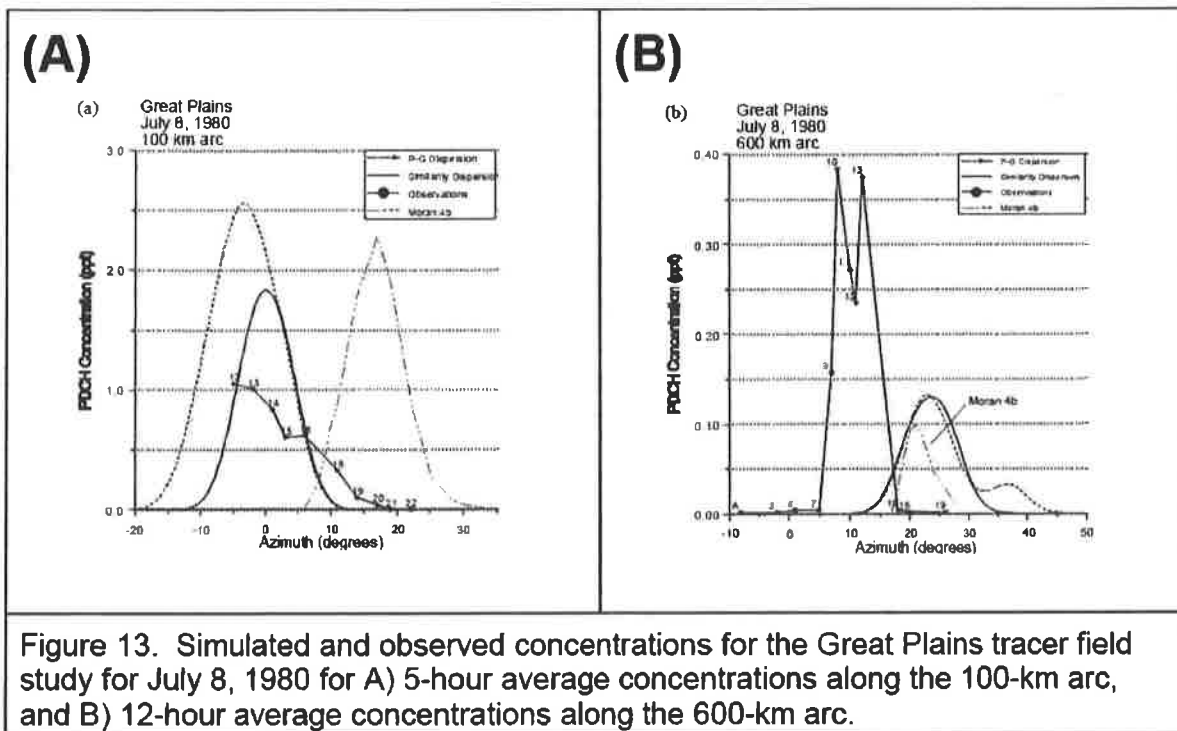
Figure 4: Idaho Falls Results at 90 Kilometers



Dashed line represents CALPUFF version 5.8 results which require use of P-G dispersion

3. Great Plains Tracer Study: A 3-4 hour tracer release from near Oklahoma City was measured at distances of 100 and 600 kilometers. The terrain was flat except for the Ozark Mountains.
 - a. At 100 kilometers the CALPUFF version 5.8 result was 2.5 times the measured data, about right in wind direction but narrower than the plume. There was a second test at 100 kilometers where the CALPUFF version 4.8 results were 2.27 times the measured.
 - b. At 600 kilometers the CALPUFF version 5.8 result was 1/3rd of the measured concentrations, 15° off in wind direction and wider than the plume.

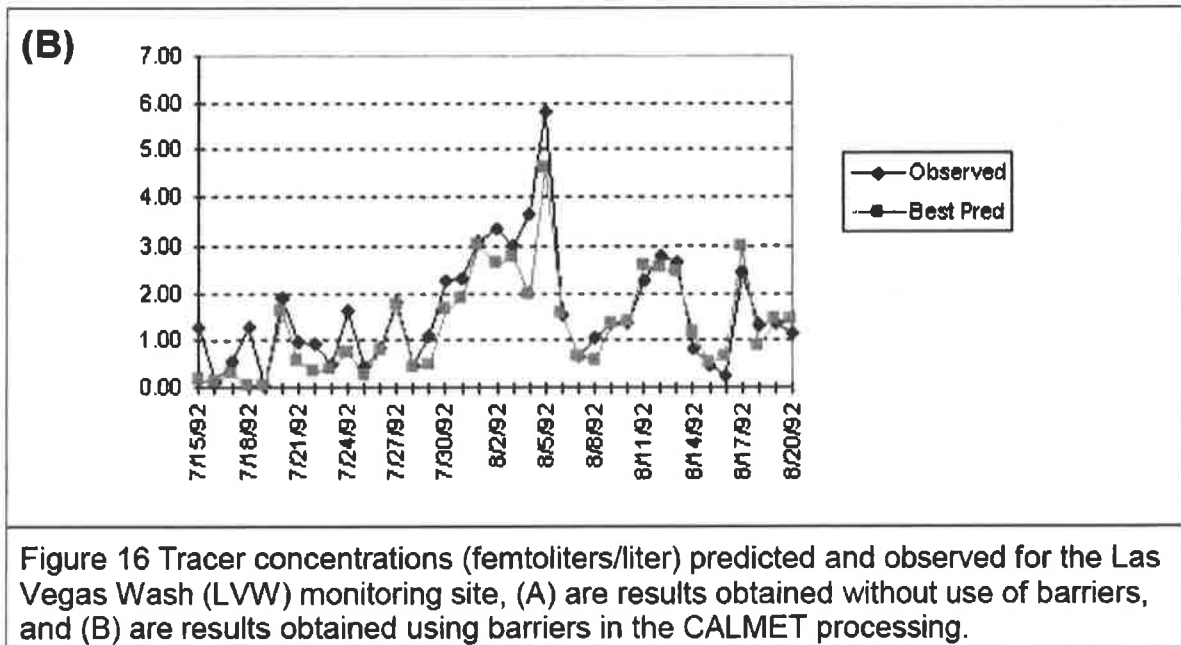
Figure 5: Great Plains Results at 100 kilometer (A) and 600 Kilometers (B)



Dashed line represents CALPUFF version 5.8 results which require use of P-G dispersion

4. Project Mohave Tracer Study: This is the only long term release study used, it had 31 days of emissions in mid-summer. There were several monitors but not an arc like the other studies. After various artificial changes to the model method, CALPUFF version 5.8 results at a single monitor about 100 kilometers away showed various results but tended to follow the measured data fairly closely.

Figure 6: Project Mohave Results at ~100 Kilometers



These were the four long range transport experiments available for comparison to the CALPUFF version 5.8 at the time of adoption. All these experiments lacked the rigor of a truly useful database for making a model comparison. They also suffer from using inert tracers that do not have any atmospheric chemistry and thus only test the ability of the model to get gases from point A to point B. All but one of these comparisons is on flat terrain and thus unlike Utah. Most importantly, these comparisons are not comparisons for calculating deciviews. Despite all of the issues raised by these studies, the IWAQM conclusion was that

“Comparisons were made of CALPUFF simulated dispersion with near surface concentrations collected during several tracer field studies, where the transport distances were of the order 50 to 300 km. ...The CALPUFF modeling system is recommended in place of the MESOPUFF II modeling system for a number of reasons..... The IWAQM recommends the CALPUFF modeling system for use as a refined long-range transport and dispersion modeling technique for characterizing reasonably attributable pollutant impacts from one or a few sources.”

From the accumulated tracer-study results, I could only conclude that at 100 kilometers CALPUFF version 5.8 was 35%, 5% or 250% too high, an average of 96% too high. The mean error rate for all four tests was 96%. At 600 kilometers it vastly underestimated concentrations. The source of the regulatory use of CALPUFF out to 300 kilometers is the offhand statement G. Hoffnagle Comments, November 2016 20

cited above and not supported by any of the data in the report. There are comparisons to data at less than 50 kilometers and to other models but none of them tell us anything about the long range transport capabilities of CALPUFF version 5.8.

In addition, as best that could be determined from the Savannah River and Great Plains experiments (Table 2 of EPA-454/R-98-009) at the time there is an error rate of 79% and always greater than the measured concentration. The error rate can be expected to become worse at distances beyond 100 kilometers, but we only know what happens at 600 kilometers where the model is clearly not consistent with the experimental results. The “margin of error” identified in the aforementioned studies is hereafter referred to as the “transport/diffusion margin of error” because these studies measured CALPUFF v. 5.8’s accuracy relative to long-range transport and diffusion.

Activities since Adoption of the BART Guidance:

There have only been two changes to the BART Guideline’s version of the CALPUFF modeling system since its adoption in 2005. Version 5.8 was actually adopted on July 29, 2007 after some initial bug fixes. But even that version had bugs that were pointed out soon afterward to the EPA Air Quality Modeling Group (AQMG) of the EPA Office of Air Quality Planning and Standards (OAQPS) which is responsible for the Guidelines and thus the preferred versions of the models. Finally, on December 4, 2013 (6 and ½ years later) EPA approved bug fixes to create version 5.8.4 used in the Utah modeling. No other enhancements to CALPUFF were allowed. Separately, on August 27, 2012 AQMG made a change to the preferred version of CALPOST to version 6.221 which allowed the use of the revised IMPROVE equation for visibility and has been used in the Utah modeling. No changes to CALPUFF itself occurred at that time.

The owners of CALPUFF (first TRC and then EXPONENT) have prepared more advanced versions of CALPUFF that have not been adopted by EPA. The focus of these advancements have been in providing better atmospheric chemistry based on twenty years of advancement in atmospheric chemistry science. AQMG has steadfastly refused to give anything more than lip service to these advancements and yet continuously criticizes CALPUFF for not having advanced chemistry.

In May 2012, EPA released a report entitled “Documentation of the Evaluation of CALPUFF and Other Long Range Transport Models Using Tracer Field Experiment Data”, EPA-454/R-12-003 (Environ Report). It used CALPUFF Version 5.8 (without bug fixes) to

evaluate the data bases cited above and two new ones; 1) the Cross Appalachian Tracer Experiment (CAPTEX) and the European Tracer Experiment (ETEX). CAPTEX covered distances of 100 to 1000 kilometers northeast from the release point in Dayton, Ohio. All of the receptors were in complex terrain crossing the Appalachian Mountains. This is actually more of a test of the meteorological model performance (CALMET) than the concentration model performance (CALPUFF). ETEX covered distances from 50 kilometers to 1,400 kilometers across Europe from a release point in France. Again, the emphasis of the analysis was getting the meteorology model (CALMET) to perform well.

The Environ Report also re-evaluated 2 other LRT models and a plethora of modifications to CALPUFF. The purpose of the report, to analyze CALPUFF performance, was a thinly veiled attempt by AQMG at EPA to replace CALPUFF. That is apparent because in each comparison CALPUFF performed the worst and the bias of the study has been pointed out by many since.

The Environ Report does provide statistical evaluations of the CALPUFF Mean Normalized Bias (MNB), essentially the margin of error, which is the objective of this report. The results can be summarized as follows:

Table 1: Margin of Error for CALPUFF

Comparisons to Field Studies				
		Maximum Observed Percent MNB*		Centerline Percent MNB
Great Plains				
	100 km,	65%		84%
	600 km.	-75%		-76%
Savannah River				
	100 km.	71%		221%
CAPTEX				
	all receptors 100-1000 km.		41%**	
ETEX				
	all receptors 50-1400 km.		320%**	
* Mean Normalized Bias				
**Normalized Mean Square Error				

Appendix B



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OCT 13 2016

Mr. Stuart Spencer
Associate Director, Office of Air Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Dear Mr. Spencer:

I am writing today to provide our preliminary views on supplemental comments received from Entergy regarding a proposed alternative strategy for their White Bluff facility. These comments were received on August 8, 2016, well outside the comment period, and therefore could not be considered in our final Federal Implementation Plan (FIP) action, for which we were under a court-ordered deadline of August 31, 2016 (Sierra Club v. Gina McCarthy, No. 4:14CV00643JLH (ED Ark. Western Div. Nov. 3, 2015)). We believe, however, that the alternative plan proposed by Entergy in their comments has potential merit with respect to addressing the best available retrofit technology (BART) requirements for White Bluff, and if the issues identified in the enclosure were to be addressed, could provide the basis for an approvable State Implementation Plan (SIP) revision. If Arkansas believes that Entergy's alternative plan is a more appropriate course, we would be happy to continue to work with you on such a SIP revision that could replace the FIP requirements for the White Bluff units.

Please contact me at 214-665-7548, or Guy Donaldson, of my staff, at 214-665-7242, if you would like to discuss further.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Hansen".

Mark Hansen
Associate Director for
Air, Multimedia Division

Enclosure

cc: Kelly McQueen
Assistant General Counsel, Entergy

Enclosure:

Entergy's August 8, 2016 letter requests that the sulfur dioxide (SO₂) BART determination for the White Bluff units be either an emission limit of 0.06 lb/MMBtu on a 30 boiler-operating-day rolling average consistent with the installation of dry flue gas desulfurization (dry FGD), or as an alternative to the installation of these controls, a binding requirement to (1) cease coal fired operation at one unit by the end of 2025 and the other unit by the end of 2026 and (2) limit the operation of one unit to a capacity factor of no greater than 50 percent in 2025. In addition, Entergy requests a revised nitrogen oxide (NO_x) BART emission limit of 1,305 lb/hr for periods when the White Bluff units are operating at a low capacity factor. Based on the information provided in the August 8, 2016 comment letter, an approvable SIP revision that includes Entergy's requested BART determinations for White Bluff must also include certain additional information and documentation to fully support those BART determinations. The additional information and documentation that are needed are discussed in the paragraphs that follow.

Enforceable Mechanism

If Arkansas agrees that it would be appropriate to take the alternative approach for White Bluff, the SIP revision must include an enforceable mechanism which requires that Entergy (1) cease coal combustion at White Bluff by the end of 2025 at one unit and by the end of 2026 at the other unit, and (2) limit operation of one unit to a capacity factor of no greater than 50 percent in 2025.

Revised dry FGD Cost Analysis

As part of the BART analysis, a demonstration that dry FGD is no longer cost-effective in light of a shorter remaining useful life for the White Bluff units must be included in the SIP revision. Entergy's August 8, 2016 letter includes an updated BART analysis of the five statutory BART factors. In this analysis, Entergy relies on the cost analysis prepared in 2015 by Sargent & Lundy (2015 Sargent & Lundy cost analysis), and indicates that the cost effectiveness of dry FGD would range from \$10,400 to \$11,800/ton removed at each unit if coal combustion were to cease in 2025 and 2026. As discussed in our Arkansas FIP signed on August 31, 2016, the 2015 Sargent & Lundy cost analysis presents problems that prevented us from using it in our FIP, primarily because it is undocumented. For example, the 2015 Sargent & Lundy cost analysis uses a 2013 Alstom quote as its basis, but the 2013 Alstom quote is not provided in the 2015 Sargent & Lundy cost analysis. This omission prevents us from verifying the scope of work covered in that cost analysis. In addition, certain costs included in the 2015 Sargent & Lundy cost analysis were not documented. An approvable SIP revision that relies on the 2015 Sargent & Lundy cost analysis must include corrections of the issues we identified with that cost analysis, as discussed in our Arkansas FIP. Alternatively, the SIP revision could rely on our revised cost analysis for dry FGD, as presented in our Arkansas FIP, to calculate the cost effectiveness of dry FGD in light of the shorter remaining useful life.

Additionally, in the updated BART five factor analysis provided in Entergy's letter, the cost effectiveness of dry FGD controls was calculated based on an assumption that the annual emissions reductions achieved with dry FGD would be lower if the unit were restricted to operate at a capacity factor of no greater than 50 percent in 2025. Additional explanation of how the annual emissions reductions were calculated and the calculations themselves must be provided to properly support the assumed annual emissions reductions. The updated BART five factor analysis also includes a revision of

the direct variable and fixed operation and maintenance (O&M) costs to reflect operating at a capacity factor of no greater than 50 percent in 2025. The calculations of the revised direct variable and fixed O&M costs must be provided.

Evaluation of DSI as an Interim Control

As discussed in our Arkansas FIP, because section 51.308(e)(1) and the BART guidelines require that a subject-to-BART source install and operate the best available emission reduction technology based on the five statutory factors, it is necessary to consider whether there are any additional SO₂ control measures (beyond the interim SO₂ emission limit of 0.6 lb/MMBtu proposed by Entergy) that constitute BART during the interim period before coal combustion ceases at the White Bluff units. In particular, dry sorbent injection (DSI) has a relatively low capital cost and may be cost effective even if operated for a short period of time. An approvable SIP revision must include a full BART analysis that considers and evaluates DSI to determine if it constitutes BART during the interim period. This evaluation must include the following:

- Evaluation of the feasibility and capability of DSI at the White Bluff units, including the anticipated range of emissions reductions. This may include evaluation of the existing particulate matter (PM) control equipment and any need for potential additional PM control equipment to handle the additional PM load. The BART analysis must include documentation of the need for any additional PM control equipment needed to handle the additional PM load.
- Cost evaluation of DSI and any necessary additional PM control equipment (including supporting documentation) that takes into consideration the remaining useful life of the units.
- Evaluation of the potential visibility benefits of DSI controls.
- Evaluation of any energy and non-air quality environmental impacts of DSI controls.

Entergy's Refined NO_x BART Emission Limit

With regard to appropriate NO_x BART limits, Entergy's letter states that it "has refined its analysis of the proposed NO_x limitation," and determined that a NO_x emission limit of 1,305 lb/hr is achievable and appropriate as NO_x BART for the White Bluff units when they are operated at less than 50 percent of capacity. While we understand Entergy's concerns about not being able to meet an emission limit of 0.15 lb/MMBtu on a 30 boiler-operating-day rolling average when the units are operated at less than 50 percent of capacity, there is no information presented in Entergy's letter to demonstrate that an emission limit of 1,305 lb/hr is sufficiently protective or appropriate when the units are operated at low capacity. In particular, we discussed in our Arkansas FIP that the 1,342.5 lb/hr emission limit Entergy initially requested in the comments submitted during the comment period appeared to be based on the maximum heat input rating for each unit and therefore was not an appropriate emission limit for operation at low capacity. The revised emission limit Entergy requests in the August 8, 2016 letter is only slightly lower. Entergy provided no information demonstrating that this limit would be sufficiently protective or appropriate when the units are operated at low capacities considering that NO_x emissions on a mass basis are expected to be lower when the units are operated at low capacity compared to operation at high capacity. As the Regional Haze Rule requires the identification and evaluation of the highest level of control a particular control technology is capable of achieving (see 64 FR at 35740), additional information must be provided to document and demonstrate that 1,305 lb/hr is appropriate and sufficiently controls NO_x emissions using LNB/SOFA when the units are operated at less than

50 percent of capacity. This additional information could consist of the refined analysis Entergy mentions in page 5 of the supplemental comments attached to the August 8, 2016 letter and/or a vendor guarantee.

Entergy's Updated NO_x Control Costs

Entergy's August 8, 2016 letter provides an updated calculation of the cost effectiveness of NO_x controls that takes into consideration a shortened remaining useful life for the White Bluff units. The updated calculation of the cost effectiveness of NO_x control costs appears to be based on the cost analysis included in Entergy's "Revised BART Five Factor Analysis for White Bluff Steam Electric Station Redfield, Arkansas (AFIN 35-00110)," dated October 2013. As discussed in our FIP proposal (see 80 FR at 18973), that cost analysis of NO_x controls included certain line items that were not documented by Entergy and do not appear to be valid costs under the Control Cost Manual methodology. The updated calculation of the cost effectiveness of NO_x controls must be based on a cost analysis that either properly documents these line items or eliminates them from the total annual cost estimate.

Additionally, Entergy's updated calculation of the cost effectiveness of NO_x controls assumes that the annual emissions reductions achieved would be lower if the unit is restricted to operate at a capacity factor of no greater than 50 percent in 2025. Additional explanation of how the annual emissions reductions were calculated and the calculations themselves must be provided to properly support the assumed annual emissions reductions. In the updated cost analysis, Entergy also revised the direct variable and fixed O&M costs of NO_x controls to reflect operating at a capacity factor of no greater than 50 percent in 2025. The calculation of the revised direct variable and fixed O&M costs must be provided.

CSAPR Better than BART

As discussed in our Arkansas FIP, we proposed and ultimately finalized source specific NO_x BART determinations for Arkansas' electric generating units (EGUs) instead of relying on the Cross State Air Pollution Rule (CSAPR) because at the time of our proposed action, this approach properly accounted for uncertainty in the CSAPR better-than-BART regulation created by ongoing litigation regarding the CSAPR program. This approach was also consistent with Arkansas' earlier decision to conduct source-specific NO_x BART determinations in lieu of relying on CSAPR's predecessor, the Clean Air Interstate Rule, to meet the BART requirements. In addition, after we proposed the Arkansas FIP, the D.C. Circuit issued a July 2015 decision in *EME Homer City Generation v. EPA* upholding CSAPR but remanding without vacatur a number of the Rule's state NO_x and SO₂ emissions budgets (795 F.3d 118 (D.C. Cir 2015)). Arkansas' ozone season NO_x budget is not itself affected by the remand. However, the Court's remand of the affected states' emissions budgets has implications for CSAPR better-than BART, since the demonstration underlying that rulemaking relied on the emission budgets of all states subject to CSAPR, including those that the D.C. Circuit remanded, to establish that CSAPR provides for greater reasonable progress than BART. We are in the process of acting on the Court's July 2015 remand. On September 7, 2016, we finalized an update to the CSAPR ozone season program by issuing the CSAPR Update. This rule addresses the summertime (May – September) transport of ozone pollution in the eastern United States that crosses state lines to help downwind states and communities meet and maintain the 2008 ozone national ambient air quality standard (NAAQS), and also responds to the Court's remand of the Phase 2 ozone season NO_x budgets for 11 states. The CSAPR Update also

promulgates a FIP for Arkansas that establishes an EGU NO_x ozone season emission budget to reduce interstate transport for the 2008 ozone NAAQS. We are in the process of responding to the Court's remand of the Phase 2 SO₂ emission budgets for four states, consistent with the planned response we outlined in a June 2016 memorandum.¹ We expect that the uncertainty created by the D.C. Circuit's remand of the affected states' emission budgets will shortly be resolved. The CSAPR Update does not include determinations or establish any presumptions that compliance with that rule satisfies NO_x BART for EGUs. However, the Environmental Protection Agency's preliminary analysis indicates that CSAPR participation will remain an appropriate BART alternative for all states participating in CSAPR (either by FIP or SIP adoption). We intend to determine whether compliance with CSAPR will continue to be an appropriate BART alternative in another rulemaking soon that takes into account the changes to CSAPR following the July 2015 remand. If EPA finds that CSAPR continues to provide for greater reasonable progress than BART,² the State may submit a SIP revision that includes reliance on CSAPR to satisfy the NO_x BART requirements for Arkansas' EGUs instead of doing source-specific NO_x BART determinations.

Additional Information on Operation After Coal Combustion Ceases

Entergy's August 8, 2016 letter indicates that it anticipates ceasing coal combustion at White Bluff by the end of 2025 at one unit and 2026 at the other unit. A SIP revision that assumes a shorter remaining useful life for the units should include a discussion of the fuel types Entergy anticipates using after coal combustion ceases, including whether there will be a limit on the sulfur content of any fuel oil burned at the units.

¹ https://www3.epa.gov/airtransport/CSAPR/pdfs/CSAPR_SO2_Remand_Memo.pdf

² Alternatively, Arkansas could conduct an analysis that demonstrates compliance with the CSAPR Update for certain EGUs in Arkansas fulfills NO_x BART for those EGUs.

Appendix C

CONSIDERATIONS FOR A REVISED FIVE-FACTOR ANALYSIS FOR LOW-SULFUR COAL AS BART

a. Cost of Compliance

In contrast to Flue Gas Desulfurization, low-sulfur coal would be cost effective over the remainder of the first planning period, which ends in 2018. EPA underestimates certain costs and overestimates emission reductions with respect to installation of scrubbers according to a report prepared for Entergy by engineering firm Sargent and Lundy, LLC (“S & L”).¹ Taken in combination, EPA’s assumptions artificially lower the annual cost and cost-effectiveness (\$/ton reduced annually) estimates. The S & L report estimates that the actual cost-effectiveness for scrubbers would be between \$5,462 – \$6,445 more expensive per ton of SO₂ reduced than EPA’s estimate in the FIP. Due to market conditions for coal and natural gas, Entergy White Bluff has seen a decrease in dispatch that is expected to continue during this planning period resulting in a reduction in annual SO₂ emissions. Units 1 and 2 are currently permitted to emit 45,727.2 tons per year (tpy) SO₂ (10,440.0 lb SO₂/hr) each or 91,454.4 tpy SO₂ (20,880 lb SO₂/hr) combined.² Annual emissions for Entergy White Bluff units 1 and 2 combined from 2008 – 2014 ranged from 31,684 – 37,939 tpy SO₂—less than half of total allowable emissions in their permit.³ Annual emissions from Entergy White Bluff dropped to 20,480 tpy SO₂ in 2015.⁴ Based on a comparison of 2015 and 2016 Quarters 1 – 3 data submitted to the Air Markets Program Division

¹ *Review of EPA-s Cost Analysis for Arkansas Regional Haze Proposed Federal Implementation Plan (2015)*. Prepared by Sargent & Lundy for Entergy Arkansas, Inc., Docket No. EPA-R06-OAR-2015-0189.

² Entergy Arkansas, Inc. – White Bluff, Permit No. 0263-AOP-R10, AFIN: 35-00110

³ 2009 Arkansas Department of Environmental Quality Emissions Inventory, 2010 Arkansas Department of Environmental Quality Emissions Inventory, 2011 National Emissions Inventory Version 2, 2012 Arkansas Department of Environmental Quality Emissions Inventory, 2013 Arkansas Department of Environmental Quality Emissions Inventory, 2014 National Emissions Inventory Version 1

<<https://eis.epa.gov/eis-system-web>>

⁴ Air Markets Program Data: Air Markets Program Data: Annual SO₂ Data for Entergy White Bluff for 2015
<<https://ampd.epa.gov/ampd/>>

of EPA, 2016 SO₂ emissions from Entergy White Bluff are on track to be even lower than 2015 SO₂ emissions. Because Entergy White Bluff's actual emissions are much lower than permitted and emissions from Entergy White Bluff are expected to continue to remain low due to economic dispatch throughout the remainder of the current Regional Haze planning period, it does not make sense to require installation of costly controls during the 2008 – 2018 planning period based on the assumption that Entergy will run at a greater capacity than is economically realistic.

EPA's BART determination overstates the cost-effectiveness of installing scrubbers at Entergy White Bluff. EPA underestimates certain costs, makes unreasonable assumptions with respect to the amortization period for the scrubbers, and makes errors in calculating baseline emissions and achievable emission reductions.⁵ EPA estimates the cost-effectiveness of scrubbers at Entergy White Bluff units 1 and 2 to be \$2,227/ ton and \$2,101, respectively. By contrast, total cost-effectiveness estimated by S & L ranges from \$6,097 – \$8,599, depending on the unit and remaining useful life assumptions.⁶

b. Existing Controls in Use at the Source

Second, the existing emissions in controls in use at the facility include low-sulfur coal and an enforceable emission rate appropriate for such a BART determination would solidify the improvements that these controls have already made during this planning period and ensure their continued operation until the next planning period. The current permitted emission rate for units 1 and 2 at Entergy White Bluff is 1.2 lb SO₂/million British Thermal Units (MMBtu) based on

⁵ *Review of EPA's Cost Analysis for Arkansas Regional Haze Proposed Federal Implementation Plan (2015)*. Prepared by Sargent & Lundy for Entergy Arkansas, Inc. Docket No. EPA-R06-OAR-2015-0189.

⁶ *Id.*

the new source performance standard for fossil-fuel fired steam generators.⁷ Entergy White Bluff is currently using lower sulfur content coal to minimize costs of compliance with the Acid Rain Program. Using low sulfur coal, Entergy White Bluff has been able to achieve monthly average emission rates in the range of 0.46 – 0.69 lb SO₂/MMBtu.⁸ The average monthly emission rate between 2009 and 2015 was 0.56 lb SO₂/MMBTU for unit 1 and 0.58lb SO₂/MMbtu for unit 2.⁹ Consequently, Entergy White Bluff has already lowered its visibility impact on potentially impacted federal Class I areas during this planning period beyond what would be expected due to emissions at its permitted emission rate. Setting a BART limit based on 0.6 lb SO₂/MMbtu on a 30-day rolling average would render the use of lower sulfur coal permanent and enforceable ensuring the continuation of reduced sulfur dioxide emissions from Entergy White Bluff and the associated visibility improvements at federal Class I areas.

c. Remaining Useful Life

S & L asserts that EPA arbitrarily assumed a longer remaining useful life and lower costs associated with balance of plant costs, owner's cost, escalation, and operating costs. EPA used the estimated life of the scrubber (30 years) for amortization rather than the remaining useful life of the Entergy White Bluff units. This method of amortization is particularly misleading given EPA's typical modeling assumptions use a 40-year book life for coal-fired power plants and a 15 year schedule for financing environmental retrofits. Entergy White Bluff unit 1 began operation in 1980 and unit 2 began operation in 1981. Units 1 and 2 will reach their 40th year in 2020 and 2021, respectively; therefore, an assumption of a 30-year amortization period starting in 2021

⁷ 40 CFR 60.42b(b)

⁸ Air Markets Program Data: Monthly Heat Input and SO₂ Data for Entergy White Bluff for 2009 - 2015
<<https://ampd.epa.gov/ampd/>>

⁹ Id.

does not reasonably take into account remaining useful life of the units. Coal-fired power plants may continue to operate beyond the 40-year book life assumption; but, it is unlikely that these units would operate 30 additional years beyond their book life.

d. Visibility Improvement

Most importantly, the visibility benefits from a low-sulfur coal BART determination would actually occur during this planning period. Requiring compliance with an emission limit appropriate to White Bluff's use of low-sulfur coal would have benefit of being feasible to implement in matter weeks as opposed to years. In addition, this consolidates the visibility improvement that has allowed Arkansas to exceed the FIP's reasonable progress goals for this planning period. In contrast, EPA the installation of dry scrubbers at White Bluff is not feasibility before the end of this planning period in 2018.



ATTORNEY GENERAL
LESLIE RUTLEDGE

ARKANSASAG.GOV

February 3, 2017

Michael E. Gans
U.S. Court of Appeals Eighth Circuit
Thomas F. Eagleton Courthouse
111 South 10th Street, Room 24.329
St. Louis, MO 63102

17-1296

RE: Petition for Review – State of Arkansas v. United States Protection Agency, et al.

Dear Mr. Gans:

Enclosed please find the State of Arkansas’s Petition for Review of the United States Environmental Protection Agency’s denial of Arkansas’s Petition for Reconsideration and Request for Administrative Stay of the rule entitled “*Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Final Rule.*” 81 Fed. Reg. 66332 (Sept. 27, 2016). Included with the Arkansas’s Petition for Review is the \$500.00 filing fee.

Should you have questions, please contact me at the address listed below or e-mail at Nicholas.Bronni@arkansasag.gov.

Sincerely,

Nicholas Bronni
Deputy Solicitor General

Enclosures: Petition for Review
Check for \$500.00 filing fee
Copy of Arkansas’s Petition for Reconsideration and Request for
Administrative Stay

323 Center Street, Suite 200, Little Rock, Arkansas 72201
Office: (501) 682-2007 | Fax: (501) 682-8084



AGLeslieRutledge



AGRutledge



AGLeslieRutledge



Attorney General Leslie Rutledge



ArkansasAG



AGRutledge

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EIGHTH CIRCUIT

From
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 Company **Arkansas Attorney General's Office**
 Address **323 Center Street, Suite 200**
 City **Little Rock** State **AR** ZIP **72201**

2 Your Internal Billing Reference **17-1296**

3 To
 Recipient's Name **Michael E. Ganz** Phone **314 244 2400**
 Company **U.S. Court of Appeals Eighth Circuit**
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Case #17-1296

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**Guidance for Setting Reasonable Progress
Goals Under the Regional Haze Program**

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Air Quality Policy Division
Geographic Strategies Group
Research Triangle Park, NC

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Abbreviations and Acronyms

BACT - Best Available Control Technology

BART - Best Available Retrofit Technology

CAA - Clean Air Act

CAIR - Clean Air Interstate Rule

CFR - Code of Federal Regulations

dv - Deciviews

EPA - Environmental Protection Agency

FLM - Federal Land Manager

FR - Federal Register

NO_x - A mixture of nitrogen dioxide (NO₂), nitric oxide (NO), and other nitrogen oxide gases

NAAQS - National Ambient Air Quality Standard

OAQPS - Office of Air Quality Planning and Standards

PM_{2.5} - Particulate Matter of 2.5 microns or less in size

RHR - Regional Haze Rule

RPG - Reasonable Progress Goal

RPO - Regional Planning Organization

SIP - State Implementation Plan

yr - Year

1.0 INTRODUCTION

The purpose of this document is to provide guidance to States in setting reasonable progress goals (RPGs) as part of their regional haze state implementation plans (SIPs) and in deciding those measures necessary to meet these goals. We emphasize that this document is merely guidance and that States or the Environmental Protection Agency (EPA) may elect to follow or deviate from this guidance, as appropriate. The ultimate determination of whether a given SIP submission by a State meets the statutory requirements of sections 169A and 169B of the Clean Air Act (CAA) and the regional haze regulations at 40 CFR 51.300 - 309 will be accomplished through notice and comment rulemaking in which the facts and circumstances of each State submission will be evaluated by EPA.

Under the Tribal Authority Rule, 40 CFR part 49, Tribes have the authority to seek “treatment as a State” for purposes of administering certain CAA programs, including the regional haze program. Whether Tribes seek this authority or not, EPA encourages Tribes to participate in the regional planning efforts to address visibility and to consult with neighboring States as they develop their regional haze SIPs. We hope that this guidance will provide Tribes with an understanding of the process for establishing RPGs that will assist them in the consultation process.

1.1 Legislative and Regulatory History

The CAA was amended in August 1977, and a new section 169A was added for the protection of visibility in mandatory class I Federal areas (Class I areas) of great scenic importance. In section 169A(a)(1), Congress established the national goal for visibility protection:

Congress hereby declares 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.

Section 169A(a)(4), in part, requires EPA to “promulgate regulations to assure reasonable progress toward meeting the national goal.” The CAA also requires States to submit SIPs containing such emission limits, schedules of compliance, and other measures as may be necessary to make reasonable progress toward meeting the goal.¹

¹ CAA §169A(b)(2).

Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program

In the CAA Amendments of 1990, Congress added section 169B to strengthen and reaffirm the national goal. Section 169B(e) calls for EPA to “carry out the Administrator’s regulatory responsibilities under [section 169A], including criteria for measuring ‘reasonable progress’ toward the national goal.”

In response to these mandates, EPA promulgated the regional haze rule (RHR) on July 1, 1999.² Under section 51.308(d)(1) of this rule, States must “establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions” for each Class I area within a State. These RPGs must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.³

The RHR also requires States to submit a long-term strategy that includes such measures as are necessary to achieve the RPG for each Class I area.⁴ The regulations require States to consider major and minor stationary sources, mobile sources, and area sources in developing their long-term strategies. In addition, States must submit a SIP that contains either emission limitations representing best available retrofit technology (BART) for certain sources put into operation between 1962 and 1977 *or* alternative measures that provide for greater reasonable progress than BART.⁵ The BART requirements were addressed in a rule revising certain provisions of the regulations in section 51.308(e) and promulgating the BART Guidelines.⁶

1.2 Meaning of the Term “Reasonable Progress Goal”

States must establish RPGs, measured in deciviews (dv), for each Class I area for the purpose of improving visibility on the haziest days and ensuring no degradation in visibility on the clearest days over the period of each implementation plan.⁷ RPGs are interim goals that represent incremental visibility improvement over time toward the goal of natural background conditions and are developed in consultation with other affected States and Federal Land

² 64 FR 35714 (codified at 40 CFR 51.300-309).

³ 40 CFR 51.308(d)(1).

⁴ 40 CFR 51.308(d)(3).

⁵ 40 CFR 51.308(e).

⁶ 70 FR 39104 (July 6, 2005).

⁷ 40 CFR 51.308(d)(1).

Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program

Managers (FLM).⁸

In determining what would constitute reasonable progress, section 169A(g) of the CAA requires States to consider the following four factors:

- The costs of compliance;
- The time necessary for compliance;
- The energy and non-air quality environmental impacts of compliance; and
- The remaining useful life of existing sources that contribute to visibility impairment.⁹

States must demonstrate in their SIPs how these factors are taken into consideration in selecting the RPG for each Class I area in the State.

The discussion of the statutory factors in this guidance is largely aimed at helping States apply these factors in considering measures for point sources. States may find that the factors can be applied to sources other than point sources; the meaning of the factors, however, should not be unduly strained in order to fit non-point sources. In other words, if common sense dictates that a particular statutory factor cannot be applied to a particular source category, then the State's analysis may reflect that fact, and emissions reductions from such sources may still be included in the SIP.

As noted above, the RHR establishes an additional analytical requirement for States in the process of establishing the RPG. This analytical requirement requires States to determine the rate of improvement in visibility needed to reach natural conditions by 2064, and to set each RPG taking this "glidepath" into account.¹⁰ (The process for determining the glidepath is discussed later in this document.) EPA adopted this approach, in part, to ensure that States use a common analytical framework that accounts for the regional differences affecting visibility and, in part, to ensure an informed and equitable decision making process. The glidepath is not a presumptive target, and States may establish a RPG that provides for greater, lesser, or equivalent visibility improvement as that described by the glidepath.

⁸ 40 CFR 51.308(d)(1)(iv) and 51.308(i).

⁹ CAA §169A(g)(1); 40 CFR 51.308(d)(1)(i)(A).

¹⁰ 40 CFR 51.308(d)(1)(i)(B).

In deciding what amount of emissions reduction is appropriate in setting the RPG, you should take into account the fact that the long-term goal of no manmade impairment encompasses several planning periods. It is reasonable for you to defer reductions to later planning periods in order to maintain a consistent glidepath toward the long-term goal.

1.3 Relationship of Reasonable Progress to BART and the Long-Term Strategy

The RPGs, the long-term strategy, and BART (or alternative measures in lieu of BART) are the three main elements of the regional haze SIPs that States are required to submit by December 17, 2007. The long-term strategy and BART emissions limitations or other alternative measures, including cap-and-trade programs or other economic incentive approaches, are inherently related to the RPG. The long-term strategy is the compilation of “enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the [RPGs],”¹¹ and is the means through which the State ensures that its RPG will be met. BART emissions limits (or alternative measures in lieu of BART, such as the Clean Air Interstate Rule (CAIR)) are one set of measures that must be included in the SIP to ensure that an area makes reasonable progress toward the national goal, and the visibility improvement resulting from BART (or a BART alternative) is included in the development of the RPG.

¹¹ 40 CFR 51.308(d)(3),

2.0 OVERVIEW OF THE PROCESS FOR DEVELOPING THE RPG

Development of the RPG for each Class I area should be a collaborative process among State, local, and Tribal authorities, Regional Planning Organizations (RPOs), and FLMs. Steps for developing RPGs will be briefly outlined in this section of the guidance, along with references to other guidance and rules where additional detail can be found. The remaining sections of this guidance expand on particular aspects of these steps. In addition, as this is guidance for States in developing RPGs, the use of “you” through the rest of the document refers to States.

2.1 Establish Baseline and Natural Visibility Conditions

To track progress toward the national goal, the RHR, among other things, requires you to establish the “baseline conditions” representing visibility for the best and worst days at the time the regional haze program is established for each Class I area. Once established, the baseline represents the starting point from which reasonable progress will be measured. The RHR also requires you to estimate “natural conditions” for each Class I area that represents the visibility conditions that would exist in the absence of man-made impairment.

As explained in the RHR, the baseline for each Class I area is the average visibility (in dv) for the 20 percent most impaired days, or “worst days”, and for the 20 percent least impaired days, or “best days,” for the years 2000 through 2004.¹² Using available monitoring data for the 2000 to 2004 time period, you are required to calculate the baseline by averaging the annual values (in dv) for the 20 percent worst days in each year (yr) to produce a single value (in dv) that represents the baseline conditions for the worst days. You should follow the same approach for determining the value that represents the baseline conditions for the best days. Natural conditions at each Class I area are also expressed by reference to the level of visibility (in dv) for the 20 percent most impaired and least impaired days.¹³

¹² 64 FR at 35730.

¹³ For more detail on determining baseline and natural conditions, you can review the preamble and regulations in the RHR, 64 FR at 35728 – 35730, 40 CFR 51.308(d)(2), EPA’s *Guidance for Tracking Progress Under the Regional Haze Rule*, EPA-454/B-03-004 (September 2003) available at www.epa.gov/ttn/oarpg/t1/memoranda/rh_tpurhr_gd.pdf, and EPA’s *Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Rule*, EPA-454/B-03-005 (September 2003) available at www.epa.gov/ttn/oarpg/t1/memoranda/rh_envcurhr_gd.pdf.

2.2 Determine the Glidepath, or Uniform Rate of Progress

By comparing baseline conditions with natural conditions, you can determine the uniform rate of visibility improvement, or progress, needed to reach natural conditions by 2064 for each Class I area. Figure 1, below, illustrates the basic steps in the process for calculating the uniform rate of progress toward natural conditions for the first planning period at a hypothetical Class I area.

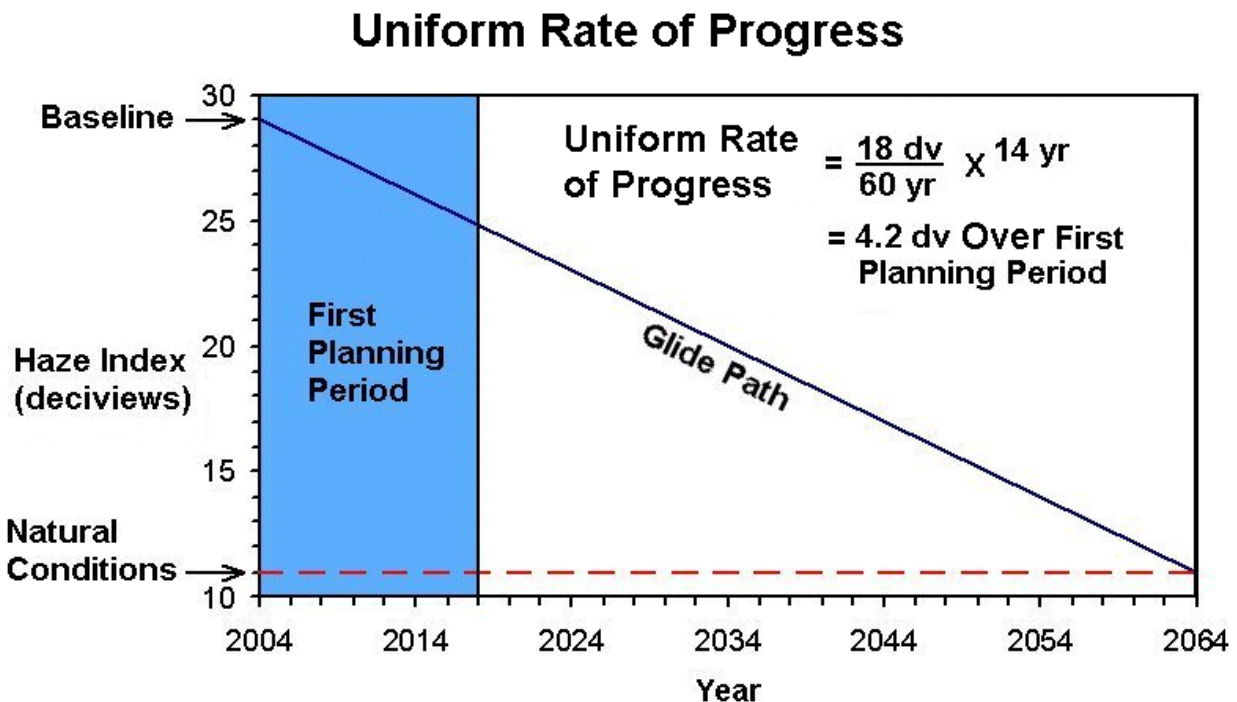


Figure 1

Figure 1 Example of a Uniform Rate of Progress

- Compare baseline conditions to natural conditions. The difference between these two represents the amount of progress needed to reach natural visibility conditions. In this example, the State has determined that the baseline for the 20 percent worst days for the Class I area is 29 dv and estimated that natural background is 11 dv, a difference of 18 dv.
- Calculate the annual average visibility improvement needed to reach natural conditions by 2064 by dividing the total amount of improvement needed by 60 years (the period between 2004 and 2064). In this example, this value is 0.3 dv/yr.

- Multiply the annual average visibility improvement needed by the number of years in the first planning period (the period from 2004 until 2018). In this example, this value is 4.2 dv. This is the uniform rate of progress that would be needed during the first planning period to attain natural visibility conditions by 2064.

If you were to achieve this steady improvement in visibility over the next 60 years, you would reach the national goal by 2064.

2.3 Identify and Analyze the Measures Aimed at Achieving the Uniform Rate of Progress.

The next step in setting an RPG is to identify and analyze the measures aimed at achieving the uniform rate of progress and to determine whether these measures are reasonable based on the statutory factors identified in Section 1.2 above. To meet this requirement, we suggest the following approach which ensures that States consider all reasonable measures in developing their regional haze SIPs:

- Identify the key pollutants and sources and/or source categories that are contributing to visibility impairment at each Class I area. The sources of impairment for the most impaired and least impaired days may differ. Section 3 discusses this process.
- Identify the control measures and associated emission reductions that are expected to result from compliance with existing rules *and* other available measures for the sources and source categories that contribute significantly to visibility impairment. This is covered in more detail in Section 4.
- Determine what additional control measures would be reasonable based on the statutory factors and other relevant factors for the sources and/or source categories you have identified.
- Estimate through the use of air quality models the improvement in visibility that would result from implementation of the control measures you have found to be reasonable and compare this to the uniform rate of progress.

Another possible approach that some States and RPOs are using is to “back out” the measures necessary to achieve the uniform rate of progress. In this process, States are using dispersion modeling to estimate the visibility impacts of a specific percentage reduction in visibility impairing pollutants. The resulting visibility conditions are then compared to the uniform rate of progress. Using this process, States will be able to identify a percentage

reduction in visibility impairing pollutants that would provide progress at or beyond the uniform rate of progress. In a separate step, States would consider the statutory factors along with other relevant factors to select appropriate measures to achieve the identified reduction in emissions. States can thus identify the measures that would be needed to achieve the uniform rate of progress at a Class I area and determine whether such measures are reasonable.

2.4 Establish a RPG

In developing a RPG, you must consult with other States with emissions sources that may reasonably be anticipated to cause or contribute to visibility impairment at Class I areas in your State.¹⁴ The regulations anticipate that States may not always agree on what measures would be reasonable or on the appropriateness of a RPG. We encourage States to work together early and often to resolve such issues. In addition, the FLMs may provide insight and assistance to States in identifying regional approaches to address the RPG.

The improvement in visibility resulting from implementation of the measures you have found to be reasonable, considering the uniform rate of progress, is the amount of progress that represents your RPG. The regional haze rule requires you to clearly support your RPG determination in your SIP submission based on the statutory factors.¹⁵

¹⁴ 40 CFR 51.308(d)(1)(iv).

¹⁵ 40 CFR 51.308(d)(1)(i)(A).

3.0 IDENTIFYING KEY POLLUTANTS AND SOURCE CATEGORIES FOR THE FIRST PLANNING PERIOD

This process begins with the identification of key pollutants and source categories that contribute to visibility impairment at the Class I area. Such analysis has been the subject of considerable study over the past decade, including studies by the Grand Canyon Visibility Transport Commission and ongoing work by RPOs. For the purpose of this document, it is assumed that analyses identifying the key pollutants contributing to visibility impairment have been conducted for each Class I area.

3.1 Identification of Source Categories From Which These Pollutants and Their Precursors Are Emitted

Once the key pollutants contributing to visibility impairment at each Class I area have been identified, the sources or source categories responsible for emitting these pollutants or pollutant precursors can also be determined. There are several tools and techniques being employed by the RPOs to do so, including analysis of emission inventories, source apportionment, trajectory analysis, and atmospheric modeling. Technical guidance on these tools and techniques is beyond the scope of this document. Instead, this document focuses on policy considerations relevant to the identification of which source categories should be considered as part of the regional haze SIP development process.

When identifying the sources or source categories responsible for regional haze, you should consider the relationship between the RPG and the requirements for long-term strategies. The regulations require States to consider major and minor stationary sources, as well as mobile and area sources, in developing long-term strategies.¹⁶ At a minimum, the regulations require you to consider several factors when developing a long-term strategy, including the following:

- Emissions reductions due to ongoing air pollution control programs, including measures to address reasonably attributable visibility impairment and those taken to attain the fine particulate matter (PM_{2.5}) national ambient air quality standards (NAAQS).
- Measures to mitigate the impact of construction activities.
- Smoke management techniques for agricultural and forestry management purposes.

¹⁶ 40 CFR 51.308(d)(3)(iv).

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- Anticipated visibility effects from changes in point, area, and mobile source emissions.¹⁷

As illustrated by these factors, States should consider a broad array of sources and activities when deciding which sources or source categories contribute significantly to visibility impairment.

¹⁷ 40 CFR 51.308(d)(3)(v).

4.0 IDENTIFY CONTROL MEASURES FOR CONTRIBUTING SOURCE CATEGORIES FOR THE FIRST PLANNING PERIOD

There are numerous possible conceptual approaches that you can use to identify control measures for the long-term strategy and the related RPG. We suggest beginning by concentrating on possible emissions reductions of several pollutant species from a few selected source sectors, focusing on those source categories that may have the greatest impact on visibility at Class I areas, considering cost and the other factors discussed further in Section 5.0.

4.1 Consideration of Emissions Reductions from State, Federal, and Local Control Measures

One important factor to keep in mind when establishing a RPG is that you cannot adopt a RPG that represents less visibility improvement than is expected to result from the implementation of other CAA requirements.¹⁸ You must therefore determine the amount of emission reductions that can be expected from identified sources or source categories as a result of requirements at the local, State, and federal levels during the planning period of the SIP and the resulting improvements in visibility at Class I areas. Given the significant emissions reductions that we anticipate to result from BART, the CAIR, and the implementation of other CAA programs, including the ozone and PM_{2.5} NAAQS, for many States this will be an important step in determining your RPG, and it may be all that is necessary to achieve reasonable progress in the first planning period for some States.

The first step in this process is to identify the baseline emissions inventory year on which your strategies are based. For the first RHR SIP, we anticipate that States will use 2002 as the baseline year for emission inventories.¹⁹ If you do use 2002, you may take credit in your long-term strategy for emission reductions achieved after 2002. This includes emission reductions from measures implemented to attain the ozone and PM_{2.5} NAAQS,²⁰ and Federal programs, such as the national mobile source program and federal standards for hazardous air pollutants (air toxics).

¹⁸ 40 CFR 51.308(d)(1)(vi).

¹⁹ 40 CFR 51.308(d)(3)(iii) provides that the baseline emission inventory year is presumed to be the most recent year of the consolidated emissions inventory for the SIP. A memorandum from OAQPS, entitled *2002 Base Year Emission Inventory SIP Planning: 8-hr Ozone, PM 2.5, and Regional Haze Programs* (November 18, 2002) (“2002 EI Memo”), identifies 2002 as the anticipated baseline emission inventory year for regional haze. See www.epa.gov/ttn/oarpg/t1/memoranda/2002bye_gm.pdf

²⁰ 2002 EI Memo at 3-4.

4.2 Identification of Additional Emissions Control Strategies for the Source Categories Identified

After determining the amount of emissions reductions of visibility impairing pollutants that may be expected from implementation of other CAA programs, you will be ready to identify any additional measures that are reasonable. The RHR gives States wide latitude to determine additional control requirements, and there are many ways to approach identifying additional reasonable measures; however, you must at a minimum, consider the four statutory factors. Based on the contribution from certain source categories and the magnitude of their emissions you may determine that little additional analysis is required to determine further controls are not warranted for that category. As discussed further in section 5, you have considerable flexibility in how you take these factors into consideration. In addition to source-specific controls, emissions cap-and-trade programs may be considered. Sources of information on control techniques for specific source categories include the RACT/BACT/LAER Clearinghouse and EPA's AIRControlNet database.²¹

One approach that you could take to streamline what could be an extremely complex task would be to first identify alternative control scenarios with different levels of stringency. Each control scenario would assume application of specific control levels or measures to the sources or source categories you have identified as the significant sources of visibility impairment. As indicated previously in section 4.1, the starting point for this assessment is the visibility improvement achieved as a result of BART, the CAIR, and the implementation of other CAA programs, including other measures for attainment of the ozone and PM_{2.5} NAAQS. You would then consider whether any additional control scenarios are reasonable based on your consideration of the statutory factors and any other factors you have determined are relevant.

Another approach you could take, consistent with the "back out" approach discussed in section 2.3, would involve identifying the set of emissions control measures that achieves the target percentage reductions in visibility-impairing pollutants associated with progress at or beyond the uniform rate of progress. The selection of control measures to include in this set would be guided by your consideration of the statutory factors and any other factors you have determined are relevant.

Note that for some sources determined to be subject to BART, the State will already have completed a BART analysis. Since the BART analysis is based, in part, on an assessment of many of the same factors that must be addressed in establishing the RPG, it is reasonable to

²¹ Information on AirControlNet can be found at www.epa.gov/ttn/ecas/econtool.html. The RACT/BACT/LAER Clearinghouse is located at <http://cfpub.epa.gov/rblc/htm/bl02.cfm>.

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conclude that any control requirements imposed in the BART determination also satisfy the RPG-related requirements for source review in the first RPG planning period. Hence, you may conclude that no additional emissions controls are necessary for these sources in the first planning period.

5.0 APPLYING STATUTORY FACTORS TO POTENTIALLY AFFECTED STATIONARY SOURCES

In determining reasonable progress, CAA §169A(g)(1) requires States to take into consideration a number of factors. However, you have flexibility in how to take into consideration these statutory factors and any other factors that you have determined to be relevant. For example, the factors could be used to select which sources or activities should or should not be regulated, or they could be used to determine the level or stringency of control, if any, for selected sources or activities, or some combination of both. The factors may be considered both individually and/or in combination. As noted in section 4.1, given the significant emissions reductions that we anticipate to result from BART, the CAIR, and the implementation of other CAA programs, these reductions may be all that is necessary to achieve reasonable progress in the first planning period for some States. Also, as noted in section 4.2, it is not necessary for you to reassess the reasonable progress factors for sources subject to BART for which you have already completed a BART analysis.

5.1 Reasonable Progress Statutory Factor (a): Costs of Compliance

The first factor to take into consideration is the “costs of compliance.” In this context we believe that the cost of compliance factor can be interpreted to encompass the cost of compliance for individual sources or source categories, and more broadly the implication of compliance costs to the health and vitality of industries within a state. For additional guidance on applying the cost of compliance factor to stationary sources, you may wish to consult the BART guidelines, referenced above.

To assess compliance costs for individual sources or source categories potentially subject to emission limitations, we suggest that you use established control cost analysis techniques. For stationary sources, generally this involves the following:²²

- a) Identify the emissions units to be controlled;
- b) Identify the design parameters for emissions controls; and
- c) Develop cost estimates based upon those design parameters.

²² As noted above, application of the cost factor to non-point sources is beyond the scope of this guidance. This is also true for mobile sources.

You should evaluate both average and incremental costs. To maintain and improve consistency wherever possible, cost estimates should be based on EPA's *Air Pollution Control Cost Manual*.²³

In considering the cost of compliance factor, you should keep in mind that different pollutants differently impact visibility impairment. For example, on a ton basis, sulfur dioxide-related particles have a greater impact on visibility impairment than crustal material. Therefore, in assessing additional emissions reduction strategies for source categories or individual, large scale sources, simple cost effectiveness estimates based on a dollar-per-ton calculation may not be as meaningful as a dollar-per-deciview calculation, especially if the strategies reduce different groups of pollutants.

5.2 Reasonable Progress Statutory Factor (b): Time Necessary for Compliance

The second factor is the “time necessary for compliance.” It may be appropriate for you to use this factor to adjust the RPG to reflect the degree of improvement in visibility achievable within the period of the first SIP if the time needed for full implementation of a control measure (or measures) will extend beyond 2018. For example, if you anticipate that constraints on the availability of construction labor will preclude the installation of controls at all sources of a particular category by 2018, the visibility improvement anticipated from installation of controls at the percentage of sources that *could* be controlled within the strategy period should be considered in setting the RPG and in establishing the SIP requirements to meet the RPG.

5.3 Reasonable Progress Statutory Factor (c): Energy and Non-Air Impacts

The third factor is “energy and non-air environmental impacts.” In assessing energy impacts, you may want to consider whether the energy requirements associated with a control technology result in energy penalties. For example, controls on diesel engines may decrease the engine's fuel efficiency, leading to an increase in diesel fuel consumption. Or, a particular control may require a fuel unavailable in the area. To the extent that these considerations are quantifiable they should be included in the engineering analyses supporting compliance cost estimates.

Some examples of non-air environmental impacts that you may wish to consider, are the effects of the waste stream that may be generated by a particular control technology, and/or other

²³ Any additional information used for the cost calculations, including any information supplied by vendors that affects your assumptions regarding purchased equipment costs, equipment life, replacement of major components, and any other element of the calculation that differs from the *Control Cost Manual*, should be documented. EPA's *Control Cost Manual* is located at: www.epa.gov/ttn/catc1/products.html#cccinfo.

resource consumption rates such as water, water supply, and waste water disposal. To the extent that these considerations are quantifiable, they should also be included in the analyses supporting compliance cost estimates.

For additional guidance on applying this factor to stationary sources, you may wish to consult the BART Guidelines, referenced above.

5.4 Reasonable Progress Statutory Factor (d): The Remaining Useful Life of the Source

The fourth statutory factor is “the remaining useful life of any existing source subject to [reasonable progress] requirements.” This factor is generally best treated as one element of the overall cost analysis. The “remaining useful life” of a source, if it represents a relatively short time period, may affect the annualized costs of retrofit controls. For example, the methods for calculating annualized costs in EPA’s *Air Pollution Control Cost Manual* require the use of a specified time period for amortization that varies based upon the type of control. If the remaining useful life of the source will clearly exceed this time period, the remaining useful life factor has essentially no effect on control costs and on the reasonable progress determination process. Where the remaining useful life of the source is less than the time period for amortizing the costs of the retrofit control, you may wish to use this shorter time period in your cost calculations.

For additional guidance on applying this factor to stationary sources, you may wish to consult the BART Guidelines, referenced above.

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Arkansas Department of Environmental Quality's October 2017 Proposed Revisions to the Arkansas
State Implementation Plan Regional Haze SIP for 2008-2018 Planning Period
Prepared by Victoria R. Stamper, February 1, 2018

Introduction

The Arkansas Department of Environmental Quality (ADEQ) is in the process of revising portions of the Arkansas Regional Haze State Implementation Plan (SIP) to replace the Federal Implementation Plan (FIP) published by the U.S. Environmental Protection Agency (EPA) on September 27, 2016.¹ On October 31, 2017, ADEQ proposed a SIP revision addressing, among other elements of the SIP, sulfur dioxide (SO₂) control requirements for Entergy's White Bluff Generating Station Units 1 and 2.

To support the SIP development process, and at ADEQ's request, Entergy submitted an updated Best Available Retrofit Technology (BART) analysis for the control of SO₂ emissions from White Bluff Units 1 & 2. *White Bluff Steam Electric Station, Updated BART Five-Factor Analysis for SO₂ for Units 1 and 2* (Aug. 18, 2017) ("Revised BART Analysis"). The Revised BART Analysis included updated SO₂ control technology cost estimates for three control scenarios, and a revised cost-effectiveness analysis to reflect the shortened useful remaining life proposed by Entergy for the White Bluff units (firing coal). Available SO₂ retrofit control technology options evaluated by ADEQ for White Bluff Units 1 and 2 included: lower sulfur coal; dry sorbent injection (DSI) at two control levels; and dry flue gas desulfurization (DFGD). Control system costs for the BART determination were prepared for Entergy by Sargent & Lundy LLC (S&L). Detailed cost estimating basis reports were prepared for each technology and included as attachments to Entergy's Revised BART Analysis.²

Based on the Revised BART Analysis, ADEQ proposed low sulfur coal and an SO₂ emission limit of 0.60 lb/MMBtu (30-day rolling average) as BART for White Bluff Units 1 & 2. ADEQ concluded that add-on SO₂ control technologies were not cost-effective given the shortened remaining useful coal-fired life of

¹ On September 27, 2016, at 81 Fed. Reg. 66332, the U.S. Environmental Protection Agency (EPA) published a final Federal Implementation Plan (FIP) addressing the requirements of the Regional Haze Rule and interstate visibility transport for the portions of Arkansas' Regional Haze State Implementation Plan (SIP) that EPA disapproved in a final rule published in the Federal Register on March 12, 2012. In the March 2012 action, EPA partially approved and partially disapproved the State's plan to implement the regional haze program for the first planning period. 77 Fed. Reg. 14604 (Mar. 12, 2012).

² See Sargent & Lundy reports SL-012831: White Bluff Dry FGD Cost Estimate and Technical Basis, dated August 3, 2017; SL-014000: White Bluff DSI Cost Estimate Basis Document, dated August 3, 2017; and SL-014001: White Bluff Enhanced DSI Cost Estimate Basis Document, dated August 3, 2017.

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the White Bluff units. ADEQ relied on Entergy's Revised BART Analysis and updated cost-effectiveness analysis which showed that DFGD had an average cost effectiveness of more than \$5,400/ton and that the DSI control options had an average cost effectiveness exceeding \$6,000/ton. (ADEQ NODA, Table 4-4, pg. 4-5).

On February 2, 2018 the Conservation Organizations submitted comments on the proposed SIP revisions. *Comments of Sierra Club, National Parks Conservation Association and Earthjustice on Revisions to the Arkansas State Implementation Plan: Regional Haze SIP Revision for the 2008-2018 Planning Period* (Feb. 2, 2018) ("Conservation Organizations comments"). Conservation Organizations comments included a Technical Support Document dated February 1, 2018 prepared by Ms. Victoria Stamper, addressing Entergy's revised BART analysis and ADEQ's proposed SO₂ BART determination for White Bluff Units 1 & 2 (the "Stamper Report"). In general, the Stamper Report asserts that: (1) Entergy's revised cost-effectiveness analyses for White Bluff are flawed and do not demonstrate that the costs of add-on SO₂ controls at White Bluff Units 1 & 2 are not reasonable; (2) Entergy's cost-effectiveness analyses of DSI at 50% control and Enhanced DSI are based on unrealistic design parameters that tend to overestimate control system costs; (3) control system design parameters, annual emission reductions, and annual O&M costs were calculated using an incorrect baseline period; and (4) control system costs estimates provided by Entergy were not developed in accordance with EPA's *Control Cost Manual*.³

This report provides a response to comments submitted by the Conservation Organizations through the Stamper Report. Information provided herein supports the conclusion that ADEQ reasonably relied on costs provided by Entergy in its August 18, 2017 Revised BART Analysis to establish SO₂ BART controls for White Bluff Units 1 & 2.

³ Stamper Report, pgs. 6-18.

A. Conservation Organization Comment: Entergy's cost-effectiveness analysis of DSI at 50% control is based on unrealistic design parameters that tend to overestimate control system costs⁴

Ms. Stamper provides three general arguments to support her assertion that Entergy's cost-effectiveness analysis of DSI at 50% control is based on unrealistic design parameters that would tend to overestimate control costs. First, she argues that S&L used an incorrect baseline period to establish the control system design parameters, estimate annual O&M costs, and estimate annual emission reductions. Second, she argues that S&L used an incorrect inlet SO₂ loading rate to size and cost the DSI control equipment, and to calculate annual O&M costs and annual emission reductions. Third, she contends that these "unrealistic" design considerations resulted in S&L including costs for an unnecessary ESP upgrade. A response to each of the assertions is provided below.

1.0 Emissions from White Bluff Units 1 and 2 during the 2009-2013 timeframe provide a realistic depiction of anticipated annual emissions for the units; thus, the 2009-2013 timeframe is an appropriate baseline period for the units' BART cost-effectiveness evaluation

S&L established control system design parameters, calculated annual O&M costs, and calculated annual SO₂ emission reductions based on actual emissions from White Bluff Units 1 & 2 during the 2009-2013 baseline period. Annual emissions from White Bluff Units 1 & 2 during the 2009-2013 timeframe averaged 15,939 tons per year (tpy) and 16,034 tpy, respectively. Ms. Stamper asserts that 2001-2003 was a more appropriate baseline period.⁵ During the 2001-2003 baseline period annual emissions from White Bluff Units 1 & 2 were higher, averaging 19,716 and 17,007 tpy, respectively

Ms. Stamper contends that the more recent 2009-2013 baseline reflects a lower sulfur content coal than the coal used at White Bluff during the 2001-2003 timeframe, and that using the 2001-2003 baseline period "is most consistent with the baseline period that EPA has stated is to be used for

⁴ Stamper Report, pg. 9.

⁵ *Id.*

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baseline visibility conditions in EPA's regional haze rules. (emphasis added)"⁶ She further asserts that "EPA's 'consistency' rationale requires that the baseline for the BART cost analysis cover a similar period."⁷

The consistency rationale referenced by Ms. Stamper refers to establishing baseline visibility conditions that states can use to determine their reasonable progress glide path and demonstrate reduced visibility impacts.⁸ However, the consistency rationale does not extend to using the same period to evaluate BART controls. In fact, using 2001-2003 emissions data to establish baseline emissions from White Bluff Units 1 & 2 is inconsistent with the BART Guidelines at 40 CFR Part 51 Appendix Y.

EPA's BART Guidelines define annual emissions reductions as "the difference between baseline annual emissions and the estimate of emissions after controls."⁹ The BART Guidelines state that baseline emissions from existing sources "should represent a realistic depiction of anticipated annual emissions for the source."¹⁰ In the absence of future operating parameters that differ significantly from the baseline period, facilities should "calculate baseline emissions based upon continuation of past practice."¹¹

Entergy has no plans to utilize coals with significantly different characteristics (e.g., heating value and sulfur content) than the coals used at White Bluff for the past several years, including the 2009-2013 timeframe. Thus, emissions from 2009-2013 provide a realistic depiction of anticipated annual emissions from White Bluff Units 1 & 2, and 2009-2013 represents an appropriate baseline period for

⁶ Stamper Report, pg. 20.

⁷ *Id.*, pg. 21.

⁸ 64 Fed. Reg. 35728, July 1, 1999

⁹ 40 CFR Part 51 Appendix Y, Section IV.D.4.c.

¹⁰ 40 CFR Part 51 Appendix Y, Section IV.D.4.d.

¹¹ *Id.*

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the White Bluff BART evaluation. Further, this is the time period that was used by EPA in its development of baseline emissions for the FIP.¹²

¹² See 81 Fed. Reg. at 66331

2.0 S&L's August 2017 Cost Estimate for DSI at 50% Control was based on Realistic Control System Design Parameters and Sound Engineering Judgment and Assumptions

Ms. Stamper asserts that S&L's cost estimate for DSI at the 50% control option was based on unrealistic control system design parameters, including: (1) an inlet SO₂ rate of 0.76 lb/MMBtu; (2) a design target emission rate of 0.35 lb/MMBtu; and (3) the need to rebuild the existing ESP control systems.¹³ Control system design parameters and assumptions used by S&L to develop the cost estimates are addressed below.

2.1 Design parameters used by S&L to develop DSI control system costs were based on facility-specific operating information and sound engineering judgment to properly size and cost control system components

S&L used an SO₂ design inlet rate of 0.76 lb/MMBtu to size and cost major components of the DSI control system.¹⁴ The 0.76 lb/MMBtu emission rate represents the highest 5% of SO₂ emissions during the 2009-2013 baseline period.¹⁵ Because the cost-effectiveness of an air pollution control system is calculated as an annualized cost effectiveness (i.e., the annual cost of controls divided by the annual tons of pollutant removed), Ms. Stamper contends that “the design and cost of controls should be based on the average annual reductions in SO₂ emission rate, not the highest 5% of SO₂ emissions over the baseline period.”¹⁶ She concludes that “the capital and operating costs for the DSI system evaluated by Entergy are inflated based on the cost to reduce SO₂ by 50% from [an] uncommonly high SO₂ rate for the White Bluff Units.”¹⁷

Ms. Stamper is confusing the cost-effectiveness calculation with the approach engineers use to design, size, and cost air pollution control systems. Air pollution control systems are not

¹³ Stamper Report, pg. 9

¹⁴ See S&L's Report SL-014000, pg. 2

¹⁵ *Id.*

¹⁶ Stamper Report, pg. 9

¹⁷ *Id.*

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designed or sized based on average design conditions, in this case the annual average SO₂ loading to the control system. To do so would result in control system components that are undersized, and a system that would not be able to meet target emission rates when inlet loading exceeds the average.

DSI control system components, including reagent storage, milling, conveyance, and reagent injection systems, as well as upgrades to the ESP ash handling systems, must be sized based on a reasonable estimate of the maximum SO₂ inlet rate to the control system. Sizing the major system components based on an average SO₂ inlet rate would result in inadequately sized reagent handling and ash handling systems. Sizing the system based on a design inlet SO₂ rate of 0.76 lb/MMBtu, the highest 5% of SO₂ emissions during the 2009-2013 baseline period, is an appropriate methodology to establish the design inlet SO₂ rate and size the DSI control system components.

2.2 S&L calculated annual emission reductions and annual O&M control technology costs based on facility-specific operating parameters

Ms. Stamper contends that Entergy understated the annual tons per year reduced with the DSI control system by basing the achievable emission limit (i.e., the design target emission rate of 0.35 lb/MMBtu) on less than a 50% reduction in annual average SO₂ emissions.¹⁸ However, in order to achieve compliance under all normal operating conditions, the design target emission rate must be based on a reasonable estimate of the highest SO₂ loading rate to the control system, not the average inlet rate. The design target emission rate of 0.35 lb/MMBtu (30-day average) was based on the highest 30-day average emission rate achieved during the baseline period, and represents an appropriate design target for the control technology evaluation.

¹⁸ *Id.*

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Ms. Stamper also contends that “operating costs for the DSI system evaluated by Entergy are inflated based on the cost to reduce SO₂ by 50% from uncommonly high SO₂ rate for the White Bluff units”¹⁹ However, as described in S&L's Report SL-014000, annual O&M costs were calculated based on 50% SO₂ removal from an uncontrolled SO₂ rate of 0.57 lb/MMBtu, the annual average SO₂ emission rate during the 2009-2013 baseline period.

In summary, S&L sized the DSI control system components based on an inlet SO₂ loading rate of 0.76 lb/MMBtu, the highest 5% of SO₂ emission rates during the 2009-2013 baseline period. Capital costs were generated based on control system components sized to treat all reasonably anticipated SO₂ inlet loading rates. Annual O&M costs were calculated assuming 50% SO₂ removal from an uncontrolled SO₂ rate of 0.57 lb/MMBtu, the annual average SO₂ emission rate during the baseline period. The approach used by S&L to calculate capital costs and O&M costs was appropriate based on sound engineering principles, and did not inflate the capital costs or operating costs of the control system.

2.3 *Based on the design and operating parameters established for the DSI control system, it is very likely that the White Bluff Unit 1 & 2 ESPs would have to be rebuilt as part of the DSI project; thus, costs for the ESP rebuild should be included in the BART cost evaluation*

Ms. Stamper asserts that “these and other unrealistic design considerations were carried over into an ESP upgrade that Sargent & Lundy stated may not even be needed at the White Bluff units with DSI at 50% controls but yet included the costs in its DSI cost effectiveness analysis.”²⁰ Design parameters identified as being unrealistic included: (1) the design ash loading rate to the ESP of 55,000 lb/hr; (2) the design Trona injection rate of 22,000 lb/hr; and (3) an outlet PM emission rate of 0.015 lb/MMBtu.²¹

¹⁹ *Id.*

²⁰ *Id.*

²¹ *Id.*, pg. 10.

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Operating parameters used by S&L to evaluate potential impacts to the ESP and controlled PM emissions were established using the original ESP design information and operating parameters established for the DSI control system. Fly ash loading to the ESP was based on a coal heating value of 8,450 Btu/lb, 6.5% ash, and assuming 80% of the ash being emitted as fly ash²² as shown below:

$$\text{Fly Ash Loading} = \frac{\text{Heat Input (Btu/hr)}}{\text{Heating Value (Btu/lb)}} \times \frac{\text{Coal Ash Content (\%)}}{100\%} \times \frac{\text{Fly Ash Split (\%)}}{100\%}$$

Based on our experience designing particulate matter control systems, the uncontrolled PM emission factor from AP-42 Table 1.4-1, on which Ms. Stamper relied to calculate ash loading to the ESP (i.e., 10A lb. PM/ton of coal fired, where A = ash content), does not accurately reflect particulate loading at the boiler outlet. Accordingly, establishing control system design parameters using the AP-42 emissions factor would result in an undersized control system.

The Trona injection rate was calculated based on the design SO₂ inlet rate of 0.76 lb/MMBtu (discussed in Section 2.1) and a normalized stoichiometric ratio (NSR) of 1.3 to achieve 50% removal, as shown below:

$$\begin{aligned} \text{Trona Injection Rate} = & \frac{\text{Inlet SO}_2 \text{ (lb/hr)}}{\text{SO}_2 \text{ MW (lb/lb-mole)}} \times \frac{2 \text{ Moles Na}}{1 \text{ Mole SO}_2} \times \text{NSR} \times \frac{1 \text{ Mole Trona}}{3 \text{ Moles Na}} \\ & \times \text{Trona MW (lb/lb-mole)} \times \frac{100\%}{\text{Purity (\%)}} \end{aligned}$$

With respect to the outlet PM emission rate of 0.015 lb/MMBtu, Ms. Stamper argues that the White Bluff units are subject to a PM permit limit that is more than 6 times higher than the target PM emission limit, while conceding that “Energy would want to ensure that actual PM emissions

²² The Babcock & Wilcox Company, *Steam: Its Generation and Use; Edition 41*, Chapter 21. “In a dry-bottom unit most of the ash, typically 70 to 80%, is entrained in the flue gas and carried out of the furnace. This portion of the ash is commonly known as *flyash*.”

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do not increase above PSD significance levels and trigger PSD permitting.”²³ (Stack test data provided by Ms. Stamper showed controlled PM emission rates of 0.019 and 0.016 lb/MMBtu for White Bluff Units 1 & 2, respectively. Modeling conducted by S&L estimated controlled PM emissions of approximately 0.0155 lb/MMBtu, consistent with the stack test results. A design target of 0.015 lb/MMBtu, an emission rate slightly below existing actual emissions from the units, is a reasonable design parameter for evaluating control system operations and provides a compliance margin.

Regardless of the target PM emission rate, the New Source Review applicability determination is based on a past-actual to projected-future-actual test. The PSD significance level for filterable PM is 25 tpy.²⁴ ESPs operate at a constant efficiency assuming the operating conditions (such as temperature, ash resistivity, or flue gas velocity) stay the same; therefore, increased particulate loading to the ESP will likely result in an incremental increase in controlled emissions.

Assuming an annual heat input of 55,830,000 MMBtu/yr (the actual average annual heat input to White Bluff Unit 1 during the 2009-2013 baseline period), an increase in the controlled PM emission rate of only 0.0009 lb/MMBtu would result in an emissions increase greater than the PSD significant level (55,830,000 MMBtu/hr x 0.0009 lb/MMBtu ÷ 2000 lb/ton = 25.1 tpy increase for a single unit). Because, as Ms. Stamper concedes, Entergy would want to ensure that actual PM emissions do not increase above PSD significance levels, a design target emission rate of 0.015 lb/MMBtu following installation of the DSI control system is a reasonable design parameter.

As described in detail in S&L's Report SL-014000, S&L used EPA's ESPVI 4.0W Performance Prediction Model to simulate ESP operating scenarios with and without DSI.²⁵ That evaluation

²³ *Id.*

²⁴ 40 CFR 52.21(b)(23)(i).

²⁵ S&L Report SL-014000, pg. 6.

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concluded that, given the high Trona injection rates needed to achieve 50% SO₂ removal, an ESP rebuild will likely be required to ensure PM emission increases stay below the applicable PSD threshold. In addition to modeling the White Bluff ESPs, S&L engaged an equipment vendor experienced with ESP retrofits to evaluate ESP performance and upgrade requirements. The equipment vendor, FuelTech, concluded, based on the design parameters discussed above, that it would be "extremely difficult to achieve the requested 0.015 lb/MMBtu outlet PM emissions, without retrofitting the entire ESPs to BART technology." [FuelTech Report, October 17, 2016, pg. 4].

Based on the significant increase in particulate loading to the ESP with DSI, ESP performance modeling with and without DSI, and input from an ESP equipment vendor, it is very likely that the ESPs would have to be rebuilt as part of a DSI project to ensure that the air pollution control project would not trigger PSD permitting, and costs for the ESP rebuild should be included in the BART cost evaluation. By removing ESP upgrade costs, Ms. Stamper significantly underestimated the capital costs Entergy would incur to implement DSI at 50% control.

B. Conservation Organization Comment: Entergy's cost analysis of "Enhanced DSI" is also based on design parameters that would overestimate costs of controls

Ms. Stamper repeats her DSI at 50% control comments to support her conclusion that Entergy's cost-effectiveness analysis of Enhanced DSI (i.e., DSI designed for 80% SO₂ removal) was based on unrealistic design parameters that would tend to overestimate control costs.²⁶ In general, Ms. Stamper asserts that: (1) S&L used an incorrect baseline period to establish control system design parameters; (2) a design inlet rate of 0.76 lb/MMBtu is unrealistically high; (3) a design target emission rate of 0.15 lb/MMBtu does not reflect 80% control; and (4) the design and cost of controls should be based on the average annual reduction in the SO₂ emission rate, not the highest 5% of SO₂ emissions over the baseline period.²⁷

As discussed in Section 1.0, emissions from 2009-2013 provide a realistic depiction of anticipated annual emissions from White Bluff Units 1 & 2 and this timeframe was used by EPA to develop baselines for the FIP. Therefore, using the 2009-2013 timeframe to establish baseline emissions for the White Bluff BART determination meets the requirements of Section IV.D.4.d of the BART Guidelines. Using emissions from 2001-2003, as suggested by Ms. Stamper, would not provide a realistic depiction of anticipated emissions from the White Bluff units, and would not be consistent with the BART Guidelines.

As discussed in Section 2.1, air pollution control system components, including reagent storage, milling, conveyance, and reagent injection systems, as well as upgrades to the ash handling systems, must be sized based on a reasonable estimate of the maximum SO₂ inlet rate to the control system. Sizing the major system components based on an average SO₂ inlet rate would result in inadequately sized systems. Sizing the system components based on a design inlet SO₂ rate of 0.76 lb/MMBtu, the highest 5% of SO₂ emissions during the baseline period, is an appropriate methodology to size the DSI control system components. Similarly, the design target emission rate (0.15 lb/MMBtu) was established based on 80%

²⁶ Stamper Report, pg. 11.

²⁷ *Id.*

SO₂ control from the highest 30-day emission rate during the baseline period, not 80% removal from the annual average baseline SO₂ emission rate of 0.57 lb/MMBtu.²⁸ As with the 50% DSI control option, annual O&M costs for the Enhanced DSI option were calculated based on 80% SO₂ removal from an uncontrolled SO₂ rate of 0.57 lb/MMBtu, the annual average SO₂ emission rate during the 2009-2013 baseline period.²⁹

In summary, S&L sized the Enhanced DSI control system components based on an inlet SO₂ loading rate of 0.76 lb/MMBtu, the highest 5% of SO₂ emission rate during the 2009-2013 baseline period control system. Capital costs were generated based on control system components sized to treat all reasonably anticipated SO₂ inlet loading rates. Annual O&M costs were calculated assuming 80% SO₂ removal from an uncontrolled SO₂ rate of 0.57 lb/MMBtu, the annual average SO₂ emission rate during the baseline period. The approach used by S&L to calculate capital costs and O&M costs was appropriate based on sound engineering principals, and did not inflate the capital costs or operating costs of the control system.

C. Conservation Organization Comment: ADEQ Must Ensure that the Cost Effectiveness Analyses Relied on for its Revised BART Determinations Are Not Based on Costs that EPA Does Not Allow in BART Cost Effectiveness Analyses

Ms. Stamper asserts that ADEQ must ensure that the cost effectiveness analyses relied on for its revised BART determinations are not based on costs that EPA does not allow in BART cost effectiveness analyses, and suggests that “it is not clear whether the cost effectiveness numbers being relied on by ADEQ comport with the methodology of EPA’s *Control Cost Manual*.”³⁰ She also states that “[i]t appears that Entergy’s cost effectiveness analysis that [ADEQ] is relying on is based on an entirely different ‘all in’ costing methodology, which seek to determine the actual cost to the owner.”³¹ To remedy these

²⁸ *Id.*, pg. 12.

²⁹ S&L Report SL-014000, pg. 2.

³⁰ Stamper Report, pg. 12.

³¹ *Id.*, pg. 13.

alleged deficiencies, Ms. Stamper prepared alternate control technology cost estimates using EPA’s IPM cost modules.³²

As described in more detail below, Ms. Stamper’s assertion that control technology costs prepared by S&L were developed using an “all in” methodology rather than the methodology described in the *Control Cost Manual* is not accurate. Furthermore, the IPM cost modules on which Ms. Stamper relied to generate alternate control technology costs do not provide unit-specific costs, were not prepared in accordance with the BART Guidelines nor the methodology described in the *Control Cost Manual*, and should not be used as the basis for a unit-specific BART determination.

1.0 BART Guidelines – Cost Estimating Requirements

The BART Guidelines describe, among other things, how agencies should estimate costs and evaluate the cost-effectiveness of available retrofit technologies.³³ Section IV.D.4.a of the BART Guidelines describes the following steps when developing a BART control technology cost estimate:

1. Identify the emissions units being controlled;
2. Identify design parameters for the emissions controls; and
3. Develop cost estimates based on those design parameters.

To maintain and improve consistency in the development of case-by-case BART cost estimates, the BART Guidelines suggest that “cost estimates should be based on [EPA’s] *Control Cost Manual*, where possible,” and that facilities should include documentation for any additional information used in the cost calculations.³⁴

2.0 EPA’s Control Cost Manual – Cost Estimating Methodology

³² *Id.*, pg. 21.

³³ *See*, BART Guidelines, 40 CFR Part 51 Appendix Y, Section IV.D.4.a “Impact analysis part 1: how do I estimate the costs of control?”

³⁴ *Id.*, at Section IV.D.4.b.5. References to the *Control Cost Manual* refer to EPA’s Office of Air Quality Planning and Standards (OAQPS), *Air Pollution Control Cost Manual*, Sixth Edition, January 2002, EPA/452/B-02-001.

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The *Control Cost Manual* describes a cost-estimating methodology that can be used by persons having knowledge of the source being controlled to produce study-level cost estimates.³⁵ Although the manual does not include specific chapters for any of the SO₂ technologies included in ADEQ's BART evaluation, it does describe a methodology that can be used to develop study-level costs.³⁶

The cost estimating procedures described in the *Control Cost Manual* consist of the following five steps:

- 1) obtaining the control system design parameters and regulatory options for a given facility;
- 2) roughing out the control system design;
- 3) sizing the control system components;
- 4) estimating the cost of these individual components; and
- 5) estimating the costs (capital and annual) of the entire system.³⁷

The *Control Cost Manual* describes the equipment and other direct costs that are included in an estimate of the Total Capital Investment (TCI) required to install a given control technology; including all costs required to purchase equipment needed for the control system (purchased equipment costs); the costs of labor and materials for installing that equipment (direct installation costs); costs for site preparation and buildings, and certain indirect installation costs (e.g., engineering costs, construction and field expenses, contractor fees, contingencies, etc.).³⁸

³⁵ *Control Cost Manual*, Section 1, Chapter 2, pg. 2-3.

³⁶ The *Control Cost Manual* does not include chapters specifically for DSI or Dry FGD controls. In fact, the manual specifically states that for certain control systems, including FGD units, it deviates from its standard approach of providing study level costs and, instead, provides a description of the factors that influence total capital cost for the analyst to consider. The *Control Cost Manual* takes this approach because "the control in question is either so large or so site-specific in design that suppliers design, fabricate, and construct each control according to the specific needs of the facility." See, *Control Cost Manual*, Section 1, Chapter 2, pg. 2-27.

³⁷ *Control Cost Manual*, Section 1, Chapter 2, pg. 2-23.

³⁸ See, *Control Cost Manual*, Section 1, Chapter 2, pg. 2-5 for a more detailed description of the costs to be included in a cost estimate developed following the *Control Cost Manual* methodology.

3.0 S&L's August 2017 Control System Cost Estimating Approach

As described in the August 2017 control technology cost basis reports, S&L prepared cost estimates for the White Bluff SO₂ control systems using an approach consistent with the BART Guidelines and *Control Cost Manual*. To develop the cost estimates, S&L:

- Established control system design parameters based on White Bluff specific data;
- Developed a conceptual design and general arrangement drawing of the major components;
- Sized the major components;
- Identified the balance-of-plant (BOP) work that would be needed to integrate the system into the existing units (e.g., civil engineering, mechanical components, demolition and relocation of existing systems, electrical system upgrades, and instrumentation and controls);
- Determined labor costs to install the equipment;
- Calculated indirect construction costs based on industry recognized factors; and
- Calculated annual operating and maintenance costs based on unit-specific design parameters.

Major equipment costs for the SO₂ control systems were based on available costs from similar previous projects, scaled for the White Bluff units, or budgetary proposals from equipment manufacturers.³⁹ Major components of the control systems (e.g., absorber vessels, particulate matter control, reactant storage and distribution, byproduct handling, etc.) were sized based on White Bluff-specific design parameters, including heat input to the boilers, fuel characteristics, flue gas flow rates and temperatures, and baseline SO₂ emission rates. Material quantities for related construction activities needed for control system installation (e.g., steel, concrete, ductwork, piping, cable, etc.) were developed by the various engineering disciplines based on the conceptual design and general arrangement drawings.

BOP costs for equipment tie-ins, ductwork, foundations, structural steel, piping, pumps, conduit, and other similar materials were estimated based on the general arrangement drawings and preliminary

³⁹ See, e.g., S&L's Report SL-012831 pg. 11, FuelTech Report dated October 17, 2016, and S&L's Report SL-014001, pg. 3.

engineering calculations. For example, S&L's structural engineers reviewed the conceptual design of the control system to calculate the quantity of structural steel and ductwork required, and provide an estimate of the number and types of foundations required to support the structure. Material quantity estimates were developed by each engineering discipline based on the conceptual design, actual quantities from similar projects, and engineering judgment. Major equipment costs and material quantities were provided to S&L's cost estimating group to develop the overall cost estimate.

A detailed description of the approach and assumptions used to develop the August 2017 cost estimates is included in each cost basis document. Design parameters, assumptions regarding the conceptual design, and cost factors used to calculate project indirect costs are all clearly described in the reports. The approach used by S&L to develop the August 2017 cost estimates is the industry standard and is used regularly by S&L and other engineering firms to prepare study level cost estimates, and is entirely consistent with the 5-step approach described in the *Control Cost Manual*.

4.0 Conservation Organization's Cost Estimating Approach

Ms. Stamper used EPA's IPM cost algorithms, with adjustments, to calculate alternative capital costs and annual control system costs for each SO₂ control technology.⁴⁰ Ms. Stamper used the revised total annual cost estimates (annualized capital recovery costs plus annual fixed and variable O&M costs) to prepare a revised cost-effectiveness analysis and demonstrate that add-on SO₂ pollution controls are cost effective even with a shortened remaining useful life of White Bluff Units 1 & 2.⁴¹ In her evaluation, Ms. Stamper asserts that the IPM cost modules "are sufficiently grounded in real costs for SO₂ pollution control retrofits for EGUs, while still being tailored to the specifics of each EGU that would effect SO₂ removal."⁴² However, as described in more detail below, costs generated using the IPM modules do not meet the requirements of the BART Guidelines or the *Control Cost Manual*, do

⁴⁰ Stamper Report, pg. 19.

⁴¹ *Id.*

⁴² *Id.*, pg. 22.

not provide unit-specific costs, and should not be used to evaluate the cost-effectiveness of BART control technologies when more appropriate site-specific information is available.

4.1 Purpose and Limitations of the IPM Model Cost Estimating Algorithms

The IPM model is described by EPA as a multi-regional, dynamic, deterministic linear programming model used by EPA's Clean Air Markets Division (CAMD) to analyze system-wide impacts of air emissions policies on the U.S. electric power sector in the 48 contiguous states and the District of Columbia. The purpose of the model is to provide forecasts of least-cost capacity expansion, electricity dispatch, and emission control strategies for meeting energy demand within specified environmental, transmission, dispatch, and reliability constraints.⁴³

The IPM cost modules were developed to support CAMD's work on the development of regulatory programs. The intended purpose of the IPM cost algorithms is to provide generic costs for various air pollution control technologies that EPA can apply to a system-wide analysis of the electric power generating industry. Cost algorithms in the IPM model were developed by S&L based on a statistical evaluation of cost data available from various industry publications, and provide order-of-magnitude retrofit costs that can be used to compare compliance alternatives.⁴⁴ By necessity, the IPM cost algorithms are designed to require minimal information that is available from publicly available sources. Inputs to the IPM DSI and dry FGD cost algorithms are limited to gross unit size (MW), fuel type, unit heat input or heat rate, and an SO₂ removal efficiency. Given the limited number of unit-specific inputs needed to generate IPM costs, the algorithms do not take into consideration site-specific costs or constructability issues and limitations, and are not intended to estimate costs for a specific unit.

⁴³ See <https://www.epa.gov/airmarkets/clean-air-markets-power-sector-modeling>, "General Purpose of EPA Power Sector Modeling".

⁴⁴ See, e.g., IPM Model—Updates to Cost and Performance for APC Technologies, Wet FGD Cost Development Methodology, Final March 2013. Prepared by Sargent & Lundy, Project 12847-002, pg. 1.

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Relying on the IPM cost algorithms to determine project-specific costs is inconsistent with the methodology described in the *Control Cost Manual* for at least four reasons.

- First, the IPM cost algorithms do not account for unit-specific design/operating parameters that can affect control system design and costs.
- Second, the IPM cost algorithms do not take into consideration site-specific constraints and constructability issues that can significantly affect control system design and costs.
- Third, the IPM cost algorithms do not account for site-specific limits and conditions that could affect BOP costs that a facility would incur to install the control system.
- Fourth, the IPM cost algorithms do not account for support facilities and equipment upgrades that a facility would need to install to successfully operate the control system.

4.2 *Site-Specific Constraints and Constructability Issues Affecting FGD Retrofit Costs*

The BART Guidelines state that the cost analysis should “take into account any site-specific design or other conditions...that affect the cost of a particular BART technology option.”⁴⁵ The IPM cost algorithms are not set up to identify and account for site-specific conditions that may affect control system design and costs. Examples of site-specific issues that would affect the cost of a retrofit SO₂ control system include, but are not necessarily limited to:

- Demolition and relocation of existing buildings, foundations, equipment, cables, pumps, piping, and underground utilities needed to install the SO₂ control system;
- Modifications/upgrades that may be required to the facility's material receiving, preparation, and transport systems;
- Modifications/upgrades that may be required to the unit's existing particulate removal systems;
- Modifications that may be required to the unit's existing ash handling systems;
- Impact to the existing draft system and potential need for reinforcement of existing equipment and ductwork;
- Impacts to and potential expansion of existing solid waste management and disposal facilities;
- Modifications/upgrades to the unit's existing auxiliary power system; and
- Modifications to other systems at the facility needed to successfully operate the control system.

The impact of these site constraints on the cost of a retrofit SO₂ control system must be determined during preliminary engineering and development of a conceptual level control system design, as described in the *Control Cost Manual*. By relying on the IPM cost algorithms, Ms. Stamper's cost estimates represent generic order-of-magnitude costs that do not take into consideration any site-specific constraints or limitations that could significantly affect control system costs.

⁴⁵ BART Guidelines, Section IV.D.4.a.

4.3 Cost Estimates Adjustments and Excluded Costs

Ms. Stamper used the IPM cost modules, with adjustments, to generate both capital and annual O&M costs for each SO₂ control option. Adjustments to the IPM-generated costs included removing Owner’s Costs and AFUDC, based on her assertion that these costs were not consistent with the overnight costing methodology of EPA’s *Control Cost Manual*).⁴⁶ Ms. Stamper also escalated (or de-escalated) the IPM-generated costs from 2012 (the year the cost algorithms were published) to 2016. Each adjustment is discussed below.

4.3.1 Allowance for Funds Used During Construction

Ms. Stamper excluded AFUDC from the IPM-generated capital costs, asserting that AFUDC (Allowance for Funds During Construction, or the interest paid on funds used during the construction project) are not allowed under the *Control Cost Manual*’s overnight costing methodology.⁴⁷ However, we see nothing in the *Control Cost Manual* that suggests capital costs calculated using the methodology described in the manual represent overnight costs. In fact, the definition of total capital investment (TCI) in the manual appears to include all costs required to purchase and install the equipment.⁴⁸

⁴⁶ Stamper Report, pg. 22.

⁴⁷ *Id.*, pg. 40.

⁴⁸ Section 2.3 of the *Control Cost Manual* (Section 1, Chapter 2) describes the cost categories used in the manual. Cost categories defined in Section 2.3 include total capital investment (TCI). TCI is defined in the manual to “include all costs required to purchase equipment needed for the control systems (purchased equipment costs), the costs of labor and materials for installing that equipment (direct installation costs), costs for site preparation and buildings, and certain other costs (indirect installation costs). TCI also includes costs for land, working capital, and off-site facilities.” Direct installation costs include costs for foundations and supports, erecting and handling the equipment, electrical work, piping, insulation, and painting. Indirect installation costs include costs such as engineering costs; construction and field expenses (i.e., costs for construction supervisory personnel, office personnel, rental of temporary offices, etc.); contractor fees (for construction and engineering firms involved in the project); start-up and performance test costs (to get the control system running and to verify that it meets performance guarantees); and contingencies.

The cost estimating methodology in the *Control Cost Manual* is more accurately described as a constant dollar approach. Control system costs, including capital costs, annual maintenance costs, and annual operating costs, are annualized (in constant dollars) over the life of the system. The manual recommends translating the costs in each future year to year zero using an equivalent uniform annual cash flow method and real interest rate (excluding inflation).⁴⁹

AFUDC accounts for the time value of money associated with the distribution of construction cash flows over the construction period, which for a DFGD project could be spread over a construction period of approximately 36 months. AFUDC can be calculated as a capital cost and annualized over the life of the project using the equivalent uniform annual cash flow method. AFUDC can represent a significant cost on large construction projects with long project durations, and excluding AFUDC will skew the results of a cost-effectiveness evaluation towards high capital, long-duration projects. Nevertheless, Entergy provided cost estimates that did not include AFUDC in its August 2017 Revised BART Analysis, and ADEQ relied on these costs estimates to determine BART for White Bluff Units 1 & 2.⁵⁰

4.3.2 Owners Costs

Ms. Stamper also excluded "Owner's Costs" from the IPM cost estimates, arguing that the costs were not allowed under the *Control Cost Manual* methodology.⁵¹ Indirect installation costs are defined in the *Control Cost Manual* to include "costs such as engineering costs; construction and field expenses (i.e., costs for construction supervisory personnel, office personnel, rental of temporary offices, etc.); contractor fees (for construction and engineering firms involved in the project); start-up and performance test costs (to get the control system

⁴⁹ *Control Cost Manual*, pg. 2-18.

⁵⁰ Entergy's August 18, 2017 Revised BART Analysis.

⁵¹ Stamper Report, pg. 14.

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running and to verify that it meets performance guarantees); and contingencies.”⁵² The definition of indirect costs in the manual is expansive and does not preclude owner’s costs, as that term was used in S&L’s 2017 cost estimates.

As described in S&L’s 2017 Cost Reports, owner’s costs include the project-related costs that would be incurred to purchase, engineer, manage, administer, and implement the construction project.⁵³ These necessary costs include expenses such as internal labor and management costs, travel expenses, legal services, and builders risk insurance. Owner’s costs clearly fall within the *Control Cost Manual*’s definition of indirect costs. Owner’s costs are also included in specific air pollution control examples in the *Control Cost Manual*, generally under the line item “Engineering & Home Office” and are calculated as a percentage of the total direct capital costs.⁵⁴ Nevertheless, Entergy provided cost estimates that did not include owner’s costs in its August 2017 BART analysis, and ADEQ relied on these costs estimates to determine BART for White Bluff Units 1 & 2.⁵⁵

4.3.3 Using the Chemical Engineering Plant Cost Index (CEPCI) to Escalation Total Annual Costs from 2012 to 2016

Ms. Stamper adjusted the IPM-generated costs for each control technology by escalating the total annual cost (i.e., annualized capital plus annual O&M costs) from 2012 to 2016 using the Chemical Engineering Plant Cost Index (“CEPCI Index”).⁵⁶ This approach is incorrect because the CEPCI index should not be used to escalate (or de-escalate) annual O&M costs.

⁵² *Id.*

⁵³ See, e.g., S&L’s Report SL-012831, pg. 19.

⁵⁴ See, e.g., *Control Cost Manual*, Section 4.2, Chapter 2 (Selective Catalytic Reduction), pg. 2-44.

⁵⁵ Entergy’s August 18, 2017 Revised BART Analysis.

⁵⁶ Stamper Report, pg. 5.

Sargent & Lundy L.L.C.
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The CEPCI Index consists of a composite index and several sub-indexes. Plant cost indexes that make up the composite index include Equipment, Construction Labor, Buildings, and Engineering and Supervision. Indexes are compiled and, with weighting and normalizing factors, are summed to make the composite CEPCI Index.

The CEPCI Index was developed to provide a simplified method of escalating construction costs associated with chemical process equipment and chemical process plants. While some of these types of process equipment are used in air pollution control systems, most are not. Thus, weighting factors based on the chemical processing industry to develop the composite CEPCI Index would not be representative of air pollution control systems.⁵⁷ Furthermore, the CEPCI Index does not take into consideration other market forces and site-constructability issues that will affect the cost of retrofit air pollution control systems.

More importantly, Ms. Stamper used the CEPCI index to adjust both capital costs (annualized) and annual O&M costs. The CEPCI index should not be used to adjust annual O&M costs, especially commodity costs. Commodity costs should be based on recent pricing from vendors or publically available commodity price indexes. Applying the CEPCI index to escalate costs is especially inaccurate for the DSI control options. For example, O&M costs account for approximately 40% of the total annual costs for the 50% DSI option (i.e., \$23.76MM/yr. capital recovery and \$14.91MM annual O&M), and reagent costs (Trona) account for approximately 70% of the total annual O&M costs (i.e., \$10.55MM of the \$14.91MM annual cost).

By applying the CEPCI construction cost index to both annualized capital costs and annual O&M costs (including reagent costs) Ms. Stamper incorrectly adjusted total annual costs of

⁵⁷ See, Vatavuk, *Air Pollution Control Escalate Equipment Costs*, Chemical Engineering, December 1995, pg. 89, available at <http://infohouse.p2ric.org/ref/27/26839.pdf>.

Sargent & Lundy L.L.C.
Comments on the Conservation Organization's Technical Support Document
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the SO₂ control systems downward by more than 7% (based on a 2012 index of 584.6 and 2016 index of 541.7). This approach is especially inaccurate for the DSI options given the fact that Trona costs during that time period remained constant or slightly increased.⁵⁸

⁵⁸ See, e.g., Solvay press release indicating a \$20/ton price increase for Trona in 2015.
https://www.solvay.us/en/media/press_releases/2015-09-24-Bicar-Trona-Price-Increase.html

D. Correction to S&L's DSI Cost Estimate Basis Report

On Page 9 of her report, Ms. Stamper discusses the basis of the proposed DSI emission rate, "Entergy has also proposed an SO₂ emission limit achievable with this control of only 0.35 lb/MMBtu based on a maximum 30-day average from 2014-2016 of 0.66 lb/MMBtu. It is not clear why Entergy used 2014-2016 data when its cost analysis is based on a 2009-2013 baseline."⁵⁹

S&L notes that the reference to the 2014-2016 data was an error. The 0.66 lb/MMBtu maximum 30-day average that appears in S&L's Report does reflect the maximum 30-day average from 2009-2013 and not 2014-2016 as the text states.

⁵⁹ Stamper Report, pg. 9.

E. Summary and Conclusions

Based on information provided herein, and detailed cost estimating information provided in the 2017 Cost Basis Reports, ADEQ reasonably relied on Entergy's August 18, 2017 Revised BART Analysis for White Bluff Units 1 & 2 for the following reasons:

- Control system cost estimates prepared by S&L (August 2017) and relied on by ADEQ for its revised BART determination, were:
 - Established using an appropriate baseline period;
 - Established using appropriate design and operating parameters;
 - Developed using an approach meeting the BART Guidelines and in accordance with the approach and methodology described in EPA's *Control Cost Manual*.
- S&L sized the SO₂ control system components based on a reasonable estimate of the maximum SO₂ inlet rate to the control system. Sizing the major system components based on an average SO₂ inlet rate would result in inadequately sized systems that would not ensure compliance with emissions limits.
- Annual O&M costs for the DSI options were calculated assuming either 50% or 80% SO₂ removal from an uncontrolled SO₂ rate of 0.57 lb/MMBtu, the annual average SO₂ emission rate during the baseline period.
- The approach used by S&L to calculate capital costs and O&M costs was appropriate based on sound engineering principals, and did not inflate the capital costs or operating costs of the control system.
- Based on the significant increase in particulate loading to the ESP with DSI, ESP performance modeling with and without DSI, and input from an ESP equipment vendor, it is very likely that the ESPs would have to be rebuilt as part of the DSI project to ensure that the air pollution control project would not trigger PSD permitting, and costs for the ESP rebuild should be included in the BART cost evaluation.
- By removing ESP upgrade costs, Ms. Stamper significantly underestimated the capital costs Entergy would incur to implement DSI at 50% control.

Sargent & Lundy L.L.C.
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- Ms. Stamper used EPA's IPM cost algorithms, with adjustments, to calculate alternative capital costs and annual control system costs for each SO₂ control technology.⁶⁰ However, costs generated using the IPM modules do not meet the requirements of the BART Guidelines or the *Control Cost Manual* for the following reasons:
 - The IPM cost algorithms do not account for unit-specific design/operating parameters that can affect control system design and costs;
 - the IPM cost algorithms do not take into consideration site-specific constraints and constructability issues that can significantly affect control system design and costs;
 - the IPM cost algorithms do not account for site-specific limits and conditions that could affect BOP costs that a facility would incur to install the control system; and
 - the IPM cost algorithms do not account for support facilities and equipment upgrades that a facility would need to install to successfully operate the control system.
- Ms. Stamper incorrectly removed AFUDC and Owner's Costs from her capital cost estimates.
- Ms. Stamper incorrectly escalated (de-escalated) total annual costs generated using the IPM cost modules (i.e., annual capital plus annual O&M) using the CEPCI Index. The CEPCI index should not be used to escalate O&M costs or commodity costs.
- Costs generated by the IPM cost modules represent order-of-magnitude costs that do not take into consideration site-specific operating parameters, site constraints, and balance-of-plant costs that could have a significant impact on control system costs, and, as a result, should not be used as the basis for a site-specific BART determination.

⁶⁰ *Id.*, pg. 19.



Entergy Services, Inc.
425 West Capitol Avenue
P. O. Box 551
Little Rock, AR 72203-0551
Tel. 501-377-5760
Fax 501-377-5814
kmcque1@entergy.com

Kelly McQueen
Assistant General Counsel

April 3, 2018

Ms. Tricia Treece
Office of Air Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

Re: Supplement to Comments Submitted by Entergy Arkansas, Inc. on ADEQ's Draft Phase II Regional Haze SIP: SO₂ Compliance Deadline for White Bluff Electric Generating Station

Dear Ms. Treece:

On February 2, 2018, Entergy Arkansas, Inc. ("EAI") submitted comments on the draft Phase II state implementation plan ("SIP") to address certain regional haze requirements, which ADEQ released for comment on October 31, 2017 ("Draft SIP"). The Draft SIP proposed rolling 30-boiler operating day sulfur dioxide ("SO₂") limits of 0.6 lb/mmBTU for each of the two coal-fired electric generating units at White Bluff. The SO₂ limits are based on ADEQ's determination that a switch to low sulfur coal constitutes best available retrofit technology ("BART") for the White Bluff units. ADEQ proposed a compliance deadline of three years from the date of the U.S. EPA's final approval of the SIP to allow EAI sufficient time to make the switch to low sulfur coal at White Bluff.

As a follow up to public comments on the Draft SIP, ADEQ has requested additional support for EAI's need for three years to meet the SO₂ BART limits. As EAI explained in its comments on the Draft SIP, the company's practice is to contract for a portion of its coal supply for up to three years in advance and the company also is required to keep a reserve supply of coal on site to ensure that the White Bluff units can continue to operate in the event of a fuel supply disruption. EAI Comments on the Draft SIP at 7-8 (Feb. 2, 2018).

The current coal contracts limit the sulfur content of delivered coal to 1.2 lb/mmBTU or less. Although the coal delivered to White Bluff has lately been of lower sulfur content, our experience is that the sulfur content can vary widely, which means that White Bluff cannot ensure that it will receive coal with a low enough sulfur content to ensure compliance with the BART SO₂ limits until the company has had sufficient time to negotiate new contracts and the existing coal pile has been depleted and replaced with lower sulfur content coal. This is because, even if EAI were to purchase lower sulfur coal for the uncontracted portion of its projected coal supply needs over the next few years, White Bluff does not have fuel blending capability on site sufficient to ensure compliance with the SO₂ BART limits. Although the plant can achieve crude fuel “blending” by simultaneously feeding coal from the stockpile and directly from a train, the plant does not track the sulfur content of coal fed onto the stockpile and thus cannot accurately calculate the expected SO₂ emissions where a portion of the total coal feed is from the stockpile and a portion is fed directly from a train. In addition, due to minimum belt speeds, this crude blending ability is limited at low-load and/or single-unit operating scenarios.

For the next three years, EAI forecasts its coal consumption to be between 11.5 and 12.4 million tons per year, approximately half of which can be attributed to White Bluff. EAI currently has contracted for 9.9 million tons of coal for 2018 under the sulfur specification of <.9 lbs/mmBtu. For 2019, the forecast is for 11.5 million tons of coal, approximately 6 million tons of which already has been contracted with a sulfur specification of <.7 lbs/mmBtu. For 2020, EAI forecasts needing 12.4 million tons, and has contacted for 3 million tons to date, also with a sulfur specification of <.7 lbs/mmBtu. If EAI were to cancel its current contracts, the company would face significant financial penalties. The contractual provisions relating to penalties for cancellation are confidential and could be subject to litigation, so EAI is unable to divulge this information to ADEQ. Before making any purchasing decisions on lower sulfur coal that has not previously been used at White Bluff, EAI will need to allow time to conduct test burns.

Given the current coal contracts and the fuel blending limitations, it would be difficult for the White Bluff units to assure compliance in less than three years with the rolling 30-boiler operating day SO₂ emission limits of 0.6 lb/mmBTU and the plant would risk exceeding the limits. Accordingly, EAI requests that ADEQ finalize a three-year compliance deadline for the White Bluff units to meet the SO₂ BART limits.

Letter to Tricia Treece
April 3, 2018
Page 3

If you have any questions about this information, please contact David Triplett at (501) 377-4030.

Sincerely,

A handwritten signature in black ink, appearing to read "K McQueen", with a long, sweeping horizontal flourish extending to the right.

Kelly M. McQueen
Assistant General Counsel – Environmental (Lead)
Entergy Services, Inc.

Treece, Tricia

From: Keaton Smith (kwsmith1200@gmail.com) Sent You a Personal Message <automail@knowwho.com>
Sent: Monday, December 18, 2017 10:30 AM
To: Treece, Tricia
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Keaton Smith
88 E 4th St
Fayetteville, AR 72701
kwsmith1200@gmail.com
(479) 879-7922

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Janine Perlman \(jpandjf@swbell.net\) Sent You a Personal Message](mailto:jpandjf@swbell.net)
To: [Treece, Tricia](#)
Subject: Please stop Entergy plants from polluting Arkansas and Missouri!
Date: Wednesday, January 17, 2018 6:09:28 PM

Dear Arkansas Department of Environmental Quality,

New data show that the Clean Air Act has saved 80,000 more lives than initially estimated. As a biomedical scientist, and someone whose never-smoking family has severe asthma due to air pollution, I implore you MAKE OUR AIR CLEANER!!!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Janine Perlman
14817 Willy Ln
Alexander, AR 72002
jpandjf@swbell.net
(501) 555-1010

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lori Homstad \(lhomstad@yahoo.com\) Sent You a Personal Message](mailto:lhomstad@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop polluting Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:34:59 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Lori Homstad
2220 Waverly Avenue
Springdale, AR 72762
lhomstad@yahoo.com
(479) 263-0945

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Trudi Rust \(trudirust@yahoo.com\) Sent You a Personal Message](mailto:trudirust@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 6:06:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Trudi Rust
3650 S Wilson Hollow Rd
Fayetteville, AR 72701
trudirust@yahoo.com
(479) 442-3067

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Veronica Clarke \(queeniev@gmail.com\) Sent You a Personal Message](mailto:queeniev@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:45:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Veronica Clarke
3770 Glenbrook Loop
Springdale, AR 72764
queeniev@gmail.com
(479) 225-7443

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Victoria Rich \(vicki.rich@sbcglobal.net\)](mailto:vicki.rich@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:40:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Victoria Rich
455 Ridgcorde Pl
Saint Louis, MO 63141
vicki.rich@sbcglobal.net
(314) 997-3933

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Virginia Diliberti \(desertginny@yahoo.com\)](mailto:desertginny@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 8:17:38 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Virginia Diliberti
705 Weston Cir
Cave Springs, AR 72718
desertginny@yahoo.com
(479) 248-2929

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Walter Boyd \(waltboyd@usa.net\)](mailto:waltboyd@usa.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:02:54 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Walter Boyd
18 Royale Dr
Van Buren, AR 72956
waltboyd@usa.net
(479) 474-5329

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [William and Elizabeth Etges \(williametges@cox.net\) Sent You a Personal Message](mailto:williametges@cox.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:08:45 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

William and Elizabeth Etges
1132 N Eastwood Dr
Fayetteville, AR 72701
williametges@cox.net
(479) 444-0849

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [William Hiers \(wshnlr@gmail.com\) Sent You a Personal Message](mailto:wshnlr@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:55:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

William Hiers
21 Prospect Trl
North Little Rock, AR 72118
wshnlr@gmail.com
(501) 812-0452

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [William Ragar \(wragar@pmidpi.com\) Sent You a Personal Message](mailto:wragar@pmidpi.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:12:28 PM

Dear Arkansas Department of Environmental Quality,

Even Exxon, China, India and are divesting from coal to safe renewables. We all know coal is dead. We need to retrain the coal workers to make solar panels and wind turbines. Do the right thing.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

William Ragar
640 Whittington Ave
Hot Springs, AR 71901
wragar@pmidpi.com
(501) 256-3461

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [William Selbert \(wselbert@slpl.org\) Sent You a Personal Message](mailto:wselbert@slpl.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:43:39 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

William Selbert
3248 Patterson Place Dr
Saint Louis, MO 63129
wselbert@slpl.org
(314) 520-8737

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [William Sherman \(cen22939@centurytel.net\)](mailto:cen22939@centurytel.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:05:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

William Sherman
106 Flintridge Dr
Mountain Home, AR 72653
cen22939@centurytel.net
(870) 405-4220

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Xochi Kaplan \(ryxochi@yahoo.com\) Sent You a Personal Message](mailto:ryxochi@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:19:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Xochi Kaplan
1779 N Hartford Dr
Fayetteville, AR 72701
ryxochi@yahoo.com
(479) 283-2135

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Yvonne Segal \(feelingheart@hotmail.com\)](mailto:feelingheart@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 8:00:42 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Yvonne Segal
3656 S Dead Horse Mountain Rd
Fayetteville, AR 72701
feelingheart@hotmail.com
(479) 263-3511

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Yvonne Segal \(yvonne@promolife.com\) Sent You a Personal Message](mailto:yvonne@promolife.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:18:03 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Yvonne Segal
PO Box 385
Fayetteville, AR 72702
yvonne@promolife.com
(479) 263-3511

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Aaron Baldwin \(aaronbaldwin10@gmail.com\) Sent You a Personal Message](mailto:aaronbaldwin10@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:40:36 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Aaron Baldwin
316 Fern Ave
Little Rock, AR 72205
aaronbaldwin10@gmail.com
(501) 310-8259

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Adam Schaffer \(adamschaffer2@yahoo.com\) Sent You a Personal Message](mailto:adamschaffer2@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, December 28, 2017 3:09:58 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Adam Schaffer
1807 NW Buckskin Ave
Bentonville, AR 72712
adamschaffer2@yahoo.com
(479) 283-0318

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Adolfo Garnica \(checkadg@gmail.com\)](mailto:checkadg@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:04:58 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Adolfo Garnica
22 Ouachita Dr
Maumelle, AR 72113
checkadg@gmail.com
(501) 851-1266

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Adrienne Taylor \(adrienne32055@aol.com\) Sent You a Personal Message](mailto:adrienne32055@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:39:34 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Adrienne Taylor
45 LedgeLawn Dr
Little Rock, AR 72212
adrienne32055@aol.com
(501) 351-6550

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Agnes Hollifield \(aggistl@yahoo.com\) Sent You a Personal Message](mailto:aggistl@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:56:55 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Agnes Hollifield
11 Lenox Pl
Saint Louis, MO 63108
aggistl@yahoo.com
(314) 367-0002

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Al Brooks \(aljaneb@gmail.com\) Sent You a Personal Message](mailto:AlBrooks@aljaneb@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:31:03 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Al Brooks
9734 Penny Ln
Waldron, AR 72958
aljaneb@gmail.com
(479) 637-4471

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Alice Ault \(aaault1090@att.net\)](mailto:aaault1090@att.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:49:20 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Alice Ault
450 Fairview Ave
Saint Louis, MO 63119
aaault1090@att.net
(314) 961-1090

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Alice Bloch \(abloch45@gmail.com\)](mailto:abloch45@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 7:10:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Alice Bloch
7228 Shaftesbury Ave
Saint Louis, MO 63130
abloch45@gmail.com
(314) 725-0629

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Alice Harrison \(partsman@conwaycorp.net\)](mailto:partsman@conwaycorp.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:34:03 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Alice Harrison
1917 Duncan St
Conway, AR 72034
partsman@conwaycorp.net
(501) 327-5806

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Amanda Roberts \(miacmom2006@gmail.com\)](mailto:miacmom2006@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:12:12 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Amanda Roberts
808 E Main St
Batesville, AR 72501
miacmom2006@gmail.com
(870) 834-8198

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Amy Hereford \(a.hereford@yahoo.com\) Sent You a Personal Message](mailto:a.hereford@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:07:19 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Amy Hereford
6400 Minnesota Ave
Saint Louis, MO 63111
a.hereford@yahoo.com
(314) 972-4763

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Amy Patton \(amy.patton@sbcglobal.net\)](mailto:amy.patton@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:35:56 AM

Dear Arkansas Department of Environmental Quality,

So the "Natural State" is working towards a new motto - the "Toxic State". That should really encourage businesses to invest in doing business in Arkansas. I'm sure it'll be quite the enticement for corporations and employees alike.

And I'm sure our healthcare system in America will take care of these issues without any problems.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Amy Patton
4607 Walkers Corner Rd
Scott, AR 72142
amy.patton@sbcglobal.net
(479) 466-5097

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Andrew Heaslet \(andy.heaslet@sierraclub.org\) Sent You a Personal Message](mailto:andy.heaslet@sierraclub.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:59:42 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Andrew Heaslet
3510 S Compton
St Louis, MO 63118
andy.heaslet@sierraclub.org
(636) 352-9488

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Andy Winger \(andy_winger@yahoo.com\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 6:52:13 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Andy Winger
1110 Sunflower St
Centerton, AR 72719
andy_winger@yahoo.com
(469) 877-0979

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Angela Miller \(almiller@wustl.edu\) Sent You a Personal Message](mailto:almiller@wustl.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:25:43 PM

Dear Arkansas Department of Environmental Quality,

Stop ruining our air, causing asthma in our children, and lung problems in adults!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Angela Miller
6214 Pershing Ave
Saint Louis, MO 63130
almiller@wustl.edu
(314) 488-8810

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Angelika Mueller-Rowry \(amuellerrowry@gmail.com\) Sent You a Personal Message](mailto:amuellerrowry@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:07:47 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Angelika Mueller-Rowry
6626 Crest Ave
Saint Louis, MO 63130
amuellerrowry@gmail.com
(314) 727-2282

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Anita Lasakaris \(ael500@att.net\)](mailto:ael500@att.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:43:54 PM

Dear Arkansas Department of Environmental Quality,

Missouri does not need pollution from other states. Hard enough to have Missouri's government put restraints on its polluters.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Anita Lasakaris
2331 Kratky Rd Apt E
Saint Louis, MO 63114
ael500@att.net
(314) 890-0746

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ann Jacobs \(ann@annjacobs.com\)](mailto:ann@annjacobs.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:06:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ann Jacobs
4541 Tholozan Ave
Saint Louis, MO 63116
ann@annjacobs.com
(314) 323-8959

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ann Owen \(ann.owen@sbcglobal.net\)](mailto:ann.owen@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:41:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Ann Owen
2501 N. Pierce
Little Rock, AR 72207
ann.owen@sbcglobal.net
(501) 960-0063

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Annie Eveker \(eveker@slu.edu\) Sent You a Personal Message](mailto:eveker@slu.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 9:15:14 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Annie Eveker
4725 Don Ron Dr
Saint Louis, MO 63123
eveker@slu.edu
(314) 638-9024

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Anne Philipps \(annie.philipps@gmail.com\)](mailto:annie.philipps@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:34:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Anne Philipps
6613 Devonshire Ave # A
Saint Louis, MO 63109
annie.philipps@gmail.com
(314) 458-8886

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Annette Hopkins \(annehopkins87@charter.net\)](mailto:annehopkins87@charter.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:19:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Annette Hopkins
9109 Grant Park Dr
Saint Louis, MO 63123
annehopkins87@charter.net
(314) 849-1068

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Annie Philipps \(anniephilipps@gmail.com\)](mailto:anniephilipps@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, January 22, 2018 12:22:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Annie Philipps
6613 Devonshire Ave # A
Saint Louis, MO 63109
anniephilipps@gmail.com
(314) 458-8886

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Arleen Wiley \(arleenwiley@gmail.com\)](mailto:arleenwiley@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:52:55 PM

Dear Arkansas Department of Environmental Quality,

Arkansas...the Natural State...will no longer BE the clean, pristine State the attracts tourists from all over the world as it does now. I am appalled that this would be done in such an allegedly Christian state,..to do something so harmful to all life.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Arleen Wiley
130 Polk Road 238
Mena, AR 71953
arleenwiley@gmail.com
(479) 243-0228

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Arthur Hoyt \(drhoyt@centurytel.net\)](mailto:drhoyt@centurytel.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:22:38 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Arthur Hoyt
PO Box 1139
Mountain Home, AR 72654
drhoyt@centurytel.net
(870) 492-2350

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ashley Lawrence \(fembomb@fembomb.com\) Sent You a Personal Message](mailto:fembomb@fembomb.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:41:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Ashley Lawrence
PO Box 26447
Little Rock, AR 72221
fembomb@fembomb.com
(501) 217-0057

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Austin Bailey \(gelderbailey@gmail.com\)](mailto:gelderbailey@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:38:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Austin Bailey
62 lefever lane
Little rock, AR 72227
gelderbailey@gmail.com
(501) 944-4939

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Barbara Bagby \(b.bagby@sbcglobal.net\)](mailto:b.bagby@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:21:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Barbara Bagby
1037 Louisville Ave
Saint Louis, MO 63139
b.bagby@sbcglobal.net
(314) 644-4284

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Barbara Salmo \(barbsalmo@hotmail.com\) Sent You a Personal Message](mailto:barbsalmo@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:59:47 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Barbara Salmo
5116 Wilshusen Ave
Saint Louis, MO 63119
barbsalmo@hotmail.com
(314) 647-5118

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Barbara Waymire \(barbara.waymire@gmail.com\)](mailto:barbara.waymire@gmail.com) [Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:43:35 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Barbara Waymire
12201 Loganberry Dr
Alexander, AR 72002
barbara.waymire@gmail.com
(501) 455-3458

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Barry Arnold \(paramoto@att.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 11:30:17 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Barry Arnold
1315 E Nettleton Ave
Jonesboro, AR 72401
paramoto@att.net
(870) 932-2655

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Barry Haas \(bhaas@sbcglobal.net\)](mailto:bhaas@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:11:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Barry Haas
804 Konrad Ct
Little Rock, AR 72223
bhaas@sbcglobal.net
(501) 821-4097

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Becky Williams \(rcwilliams715@yahoo.com\)](mailto:rcwilliams715@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:38:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Becky Williams
PO Box 250804
Little Rock, AR 72225
rcwilliams715@yahoo.com
(501) 607-1035

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ben Kloepper \(meowlin@socket.net\) Sent You a Personal Message](mailto:meowlin@socket.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:08:49 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ben Kloepper
729 Ruprecht Ave
Saint Louis, MO 63125
meowlin@socket.net
(555) 666-6245

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ben Sandmon,usn Ret. \(docbenusn@gmail.com\) Sent You a Personal Message](mailto:docbenusn@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 9:27:53 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ben Sandmon,usn Ret.
118 Treasure Cutoff
Hot Springs, AR 71913
docbenusn@gmail.com
(501) 282-5109

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Berette Salazar \(beretsal@hotmail.com\) Sent You a Personal Message](mailto:beretsal@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:29:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Berette Salazar
461 Florence Ave
Saint Louis, MO 63119
beretsal@hotmail.com
(314) 420-5929

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Beth Carty \(bmjc@aristotle.net\) Sent You a Personal Message](mailto:bmjc@aristotle.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:02:07 PM

Dear Arkansas Department of Environmental Quality,

Please stand strong for clean air for your customers. As a major corporation, please respect the planet and its resources. In addition, please move forward with renewable energy in your strategic planning for your corporation. We, as a progressive nation along with all major world leaders, are concerned about climate change and the need to become diverse in our energy resources.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Beth Carty
2111 Settlement Rd
Little Rock, AR 72210
bmjc@aristotle.net
(501) 351-4240

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Betsy Domoto \(betsy@aldinetravel.com\) Sent You a Personal Message](mailto:betsy@aldinetravel.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:45:17 AM

Dear Arkansas Department of Environmental Quality,

Please think of the environment(s) and how this is putting you - your families and many of the rest of us in health dangers. Demand to work with your State and local areas to get the most up to date equipment and work with only the plant facilities that do so. Kindest regards,
Betsy

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Betsy Domoto
15 Mayfair Rd
Saint Louis, MO 63124
betsy@aldinetravel.com
(314) 853-3739

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Beverly Edwards, Jr. \(bcdedwards73@gmail.com\) Sent You a Personal Message](mailto:bcdedwards73@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:47:16 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Beverly Edwards, Jr.
2905 W Highway 88
Oden, AR 71961
bcdedwards73@gmail.com
(281) 703-5849

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Beverly Edwards \(bcdedwards73@gmail.com\)](mailto:bcdedwards73@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:31:56 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Beverly Edwards
2905 W Highway 88
Oden, AR 71961
bcdedwards73@gmail.com
(281) 703-5849

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Bill Page \(billpage2012@hotmail.com\) Sent You a Personal Message](mailto:billpage2012@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 1:04:51 PM

Dear Arkansas Department of Environmental Quality,

As an Arkansan with family in St. Louis, I am disgusted by Entergy's management of these coal plants and their effect on the air. There is no good reason for Arkansan energy sources to be considered the dirtiest.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Bill Page
1704 Dogwood Trl
Paragould, AR 72450
billpage2012@hotmail.com
(870) 476-9456

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Billie Farmer \(bjfarmer1301@comcast.net\) Sent You a Personal Message](mailto:bjfarmer1301@comcast.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:39:48 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Billie Farmer
1001 Courtyard Cottage Cir
Bryant, AR 72022
bjfarmer1301@comcast.net
(501) 481-8900

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Billy Marshall \(billyd.marshall@yahoo.com\) Sent You a Personal Message](mailto:billyd.marshall@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 11:22:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Billy Marshall
1511 Glover St
Malvern, AR 72104
billyd.marshall@yahoo.com
(501) 229-2294

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Bob Stuckmeyer \(bstuckmeyer@yahoo.com\) Sent You a Personal Message](mailto:bstuckmeyer@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:19:42 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Bob Stuckmeyer
2347 Cavendish Ln
Saint Louis, MO 63129
bstuckmeyer@yahoo.com
(314) 555-1212

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Bobbie Peel \(bobbiepeel@sbcglobal.net\)](mailto:bobbiepeel@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:54:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Bobbie Peel
4610 Arlington Ave
Fort Smith, AR 72904
bobbiepeel@sbcglobal.net
(479) 285-9801

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Bonnie Davis \(davisbg@cox.net\)](mailto:davisbg@cox.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:55:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Bonnie Davis
128 E Davidson St
Fayetteville, AR 72701
davisbg@cox.net
(479) 582-1503

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Boyce Pearson \(boycepearson@sbcglobal.net\) Sent You a Personal Message](mailto:boycepearson@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:54:13 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Boyce Pearson
14405 Pride Valley Dr
Little Rock, AR 72211
boycepearson@sbcglobal.net
(501) 312-1507

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Brad Catoe \(bradcatoe@gmail.com\) Sent You a Personal Message](mailto:bradcatoe@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:04:58 PM

Dear Arkansas Department of Environmental Quality,

I spend most of my time in arkansas. Stop using dirty energy when there are better options. Science!
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Brad Catoe
34616 Heinze Cv
Paron, AR 72122
bradcatoe@gmail.com
(202) 757-1437

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Brett Robbins \(brettdyann@yahoo.com\) Sent You a Personal Message](mailto:brettdyann@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:59:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Brett Robbins
5 Halstead Ln
Bella Vista, AR 72715
brettdyann@yahoo.com
(417) 818-4077

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Brooks Caruthers \(brookscar@yahoo.com\) Sent You a Personal Message](mailto:brookscar@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:33:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Brooks Caruthers
1000 N Cleveland St
Little Rock, AR 72207
brookscar@yahoo.com
(501) 353-2436

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cara DeFlorian \(deflorian.cara@yahoo.com\) Sent You a Personal Message](mailto:deflorian.cara@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:35:37 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Cara DeFlorian
15 Aleatha Cv
Cabot, AR 72023
deflorian.cara@yahoo.com
(501) 743-6120

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cara Wilsey \(carawilsey@gmail.com\) Sent You a Personal Message](mailto:carawilsey@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 1:07:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Cara Wilsey
1101 Clay St
Arkadelphia, AR 71923
carawilsey@gmail.com
(501) 282-8613

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carmen Caldwell \(robocarm@sbcglobal.net\) Sent You a Personal Message](mailto:robocarm@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:20:46 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Carmen Caldwell
3 Pivot Rock Rd
Eureka Springs, AR 72632
robocarm@sbcglobal.net
(999) 999-9999

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carmen Schultz \(bumblybee@cox.net\) Sent You a Personal Message](mailto:Carmen_Schultz_(bumblybee@cox.net)_Sent_You_a_Personal_Message)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:08:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carmen Schultz
214 W Thurman St
Prairie Grove, AR 72753
bumblybee@cox.net
(479) 846-1802

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carmine Coscia \(carmine.coscia@slu.edu\)](mailto:Carmine.Coscia@slu.edu) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:54:10 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carmine Coscia
6320 Alamo Ave
Saint Louis, MO 63105
carmine.coscia@slu.edu
(314) 977-9254

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carol Gardner \(mindfulnow.cg@gmail.com\)](mailto:Carol.Gardner@mindfulnow.cg@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:18:13 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carol Gardner
PO Box 205
Rudy, AR 72952
mindfulnow.cg@gmail.com
(336) 432-4231

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carol Robinson \(caroldierkes@charter.net\) Sent You a Personal Message](mailto:caroldierkes@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:26:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carol Robinson
1050 Etherton Dr
Saint Louis, MO 63126
caroldierkes@charter.net
(314) 968-4820

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carole Schuster \(schustercarole@yahoo.com\)](mailto:schustercarole@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:43:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carole Schuster
1723 N Oakland Ave
Fayetteville, AR 72703
schustercarole@yahoo.com
(479) 595-2638

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [carol small \(carol.small@gmail.com\) Sent You a Personal Message](mailto:carol.small@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 4:39:59 PM

Dear Arkansas Department of Environmental Quality,

We should be at 100% renewables!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

carol small
915 Prospect Avenue
Hot Springs, AR 91901
carol.small@gmail.com
(501) 282-7299

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carole Scott \(ssnhrty@aol.com\) Sent You a Personal Message](mailto:ssnhrty@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:36:23 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carole Scott
521 Westgate Ave
Saint Louis, MO 63130
ssnhrty@aol.com
(314) 725-6217

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carole Von Eschen \(cvstcave@gmail.com\)](mailto:cvstcave@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 6:40:21 AM

Dear Arkansas Department of Environmental Quality,

You are hurting our people!!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carole Von Eschen
4402 Arco Ave
Saint Louis, MO 63110
cvstcave@gmail.com
(314) 571-9172

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Caroline Pufalt \(carolinepufalt@gmail.com\)](mailto:carolinepufalt@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:55:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Caroline Pufalt
7530 Delmar Blvd
Saint Louis, MO 63130
carolinepufalt@gmail.com
(314) 721-7207

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carolyn Geffken \(c.geffken@sbcglobal.net\)](mailto:c.geffken@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:29:23 PM

Dear Arkansas Department of Environmental Quality,

We need to make coal clean, or, it will need to go! Consumers would pay a few more cents to breath fresh air. But the technology needs to be used.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carolyn Geffken
6301 Evergreen Dr
Little Rock, AR 72207
c.geffken@sbcglobal.net
(501) 664-4310

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carrie Losten \(carrielosten@gmail.com\) Sent You a Personal Message](mailto:carrielosten@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:08:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carrie Losten
4840 Trinity Crossing Dr.
Conway, AR 72034
carrielosten@gmail.com
(501) 269-1425

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Catherine Beaver \(ninetails426@gmail.com\) Sent You a Personal Message](mailto:ninetails426@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:31:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Catherine Beaver
2687 Highway 71 N
Mena, AR 71953
ninetails426@gmail.com
(479) 394-3171

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Catherine Betz \(rosabetz@gmail.com\)](mailto:rosabetz@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:41:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Catherine Betz
3952 Cleveland Ave
Saint Louis, MO 63110
rosabetz@gmail.com
(618) 580-3825

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Catherine Pellerito \(ma05@centurytel.net\) Sent You a Personal Message](mailto:ma05@centurytel.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:52:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Catherine Pellerito
610 Thicket Ln
Lake Saint Louis, MO 63367
ma05@centurytel.net
(636) 625-4550

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cathy Sullins \(cactuscats@aol.com\) Sent You a Personal Message](mailto:cactuscats@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:15:42 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Cathy Sullins
4518 Oakland Ave Fl 2
Saint Louis, MO 63110
cactuscats@aol.com
(314) 737-3052

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cecelia Thompson \(cthomps@uark.edu\) Sent You a Personal Message](mailto:Cecelia.Thompson@uark.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:32:12 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Cecelia Thompson
PO Box 101
Lead Hill, AR 72644
cthomps@uark.edu
(479) 595-1932

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Char Leverette \(phatkhat@centurylink.net\) Sent You a Personal Message](mailto:phatkhat@centurylink.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:50:19 PM

Dear Arkansas Department of Environmental Quality,

Entergy is also much more expensive than our rural coops. They are pocketing a huge amount of profit. This profiteering on the backs of their customers and their neighbors is unacceptable. Clean it up NOW. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Char Leverette
1011 Simstown Rd
Evening Shade, AR 72532
phatkhat@centurylink.net
(501) 757-0116

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Charles Hughes \(dochughesbooks@gmail.com\)](mailto:dochughesbooks@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:10:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Charles Hughes
2709 Mockingbird Ln
Arkadelphia, AR 71923
dochughesbooks@gmail.com
(870) 246-8557

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Charles Rush \(jadespring1@hotmail.com\)](mailto:jadespring1@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:31:59 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Charles Rush
20 Brixton Ln
Bella Vista, AR 72714
jadespring1@hotmail.com
(479) 713-9885

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Charles Sisco \(cpsisco@cox.net\)](mailto:cpsisco@cox.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:52:40 AM

Dear Arkansas Department of Environmental Quality,

Keep Arkansas "The Natural State".

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Charles Sisco
PO Box 65
Springdale, AR 72765
cpsisco@cox.net
(479) 445-6550

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Charles Stephen Lee \(tbjexploration@gmail.com\)](mailto:tbjexploration@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:05:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Charles Stephen Lee
5517 Cross Ln
Fort Smith, AR 72904
tbjexploration@gmail.com
(479) 221-7057

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Chicana Cook \(thickestmami@yahoo.com\)](mailto:thickestmami@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 03, 2018 7:57:19 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Chicana Cook
1167 Watts Ave
Saint Louis, MO 63130
thickestmami@yahoo.com
(314) 265-2854

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Chris Mihill \(cmihill@sbcglobal.net\)](mailto:cmihill@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:08:38 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Chris Mihill
7730 Devonshire Ave
Saint Louis, MO 63119
cmihill@sbcglobal.net
(314) 647-8004

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Chris Sanders \(chris.e.sanders@gmail.com\)](mailto:chris.e.sanders@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:52:07 PM

Dear Arkansas Department of Environmental Quality,

As someone with family members in both AR and MO, this is extremely upsetting. If you're going to continue to burn dirty coal rather than converting to cleaner technologies, at least add catalytic reduction to your power plants!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Chris Sanders
11915 Mattox Ct
Saint Louis, MO 63131
chris.e.sanders@gmail.com
(314) 997-5904

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christina Garrett \(ninag1089@aol.com\) Sent You a Personal Message](mailto:ninag1089@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:38:36 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Christina Garrett
3400 S Bowman Rd
Little Rock, AR 72211
ninag1089@aol.com
(501) 838-8110

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christina Latzer \(cel3m8@mail.umsl.edu\) Sent You a Personal Message](mailto:cel3m8@mail.umsl.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 8:34:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Christina Latzer
1325 Andrew Dr
Saint Louis, MO 63122
cel3m8@mail.umsl.edu
(314) 835-9137

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christina Mullinax \(christinamullinax@gmail.com\)](mailto:christinamullinax@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:36:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Christina Mullinax
3219 W Markham St
Little Rock, AR 72205
christinamullinax@gmail.com
(501) 352-5328

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christine Carlson \(ccarlson_89@yahoo.com\) Sent You a Personal Message](mailto:ccarlson_89@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:27:13 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Christine Carlson
1561 N Lexington Dr
Centerton, AR 72719
ccarlson_89@yahoo.com
(513) 560-4093

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christopher Pinne, SJ \(cpinne@gmail.com\) Sent You a Personal Message](mailto:cpinne@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:42:46 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Christopher Pinne, SJ
3601 Lindell Blvd.
Saint Louis, MO 63108
cpinne@gmail.com
(314) 633-4554

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christopher Warren \(c2warren@yahoo.com\) Sent You a Personal Message](mailto:c2warren@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 7:08:44 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Christopher Warren
5805 Stonewall Rd
Little Rock, AR 72207
c2warren@yahoo.com
(310) 745-7669

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cindy Bushue \(bushue@charter.net\) Sent You a Personal Message](mailto:bushue@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:57:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Cindy Bushue
860 Dielman Rd
Saint Louis, MO 63132
bushue@charter.net
(555) 555-5555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cindy English \(cid1555@yahoo.com\)](mailto:Cindy.English@yahoocom) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:19:03 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Cindy English
2426 Grist Mill Rd
Little Rock, AR 72227
cid1555@yahoo.com
(501) 224-3402

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cindy Gross \(cjgross10@gmail.com\) Sent You a Personal Message](mailto:cjgross10@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:17:06 AM

Dear Arkansas Department of Environmental Quality,

We all deserve clean air!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Cindy Gross
3137 Allen Ave
Saint Louis, MO 63104
cjgross10@gmail.com
(314) 772-0803

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Colleen Fitzpatrick \(collfitz@yahoo.com\) Sent You a Personal Message](mailto:collfitz@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Saturday, January 20, 2018 7:51:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Colleen Fitzpatrick
7322 Drexel Dr
Saint Louis, MO 63130
collfitz@yahoo.com
(210) 413-8044

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Corlita Bonnarens \(cbonnarens@mercysc.org\)](mailto:cbonnarens@mercysc.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:26:55 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Corlita Bonnarens
2039 N Geyer Rd
Saint Louis, MO 63131
cbonnarens@mercysc.org
(314) 909-4610

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Curtis Stuck \(cstuck1091@gmail.com\) Sent You a Personal Message](mailto:cstuck1091@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:23:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Curtis Stuck
909 Holmes Road, K-173
Searcy, AR 72143
cstuck1091@gmail.com
(918) 297-6950

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cynthia Stillwell \(macmspike@hotmail.com\) Sent You a Personal Message](mailto:macmspike@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 5:02:13 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Cynthia Stillwell
892 Emiline Rd
Salem, AR 72576
macmspike@hotmail.com
(870) 895-2360

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cynthia Yandell \(yandell_cynthia@yahoo.com\) Sent You a Personal Message](mailto:yandell_cynthia@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:50:38 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Cynthia Yandell
706 north 18th Street #7, 4
Fort Smith, AR 72901
yandell_cynthia@yahoo.com
(615) 601-8394

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dan and Mary Cornell \(mt.cornell@gmail.com\) Sent You a Personal Message](mailto:mt.cornell@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 9:04:37 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dan and Mary Cornell
5635 Waterman Blvd Apt 12
Saint Louis, MO 63112
mt.cornell@gmail.com
(314) 203-9605

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Daniel Berg \(danielralphberg@hotmail.com\) Sent You a Personal Message](mailto:danielralphberg@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 8:58:34 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Daniel Berg
1455 Gregg Ave
Saint Louis, MO 63139
danielralphberg@hotmail.com
(314) 602-4599

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Daniel Bertram \(raven1003@gmail.com\) Sent You a Personal Message](mailto:raven1003@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:12:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Daniel Bertram
323 Walnut St
Little Rock, AR 72205
raven1003@gmail.com
(501) 399-7333

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Daniel Conford \(daniel8email@yahoo.com\) Sent You a Personal Message](mailto:daniel8email@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:32:42 PM

Dear Arkansas Department of Environmental Quality,

Your children breathe air too.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Daniel Conford
4046 Magnolia Pl
Saint Louis, MO 63110
daniel8email@yahoo.com
(201) 696-7101

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Danny Jenkins \(saneh8t@hotmail.com\) Sent You a Personal Message](mailto:saneh8t@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:19:57 AM

Dear Arkansas Department of Environmental Quality,

Write laws for health not wealth.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Danny Jenkins
404 N Assembly Dr
Fayetteville, AR 72701
saneh8t@hotmail.com
(479) 236-6021

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Darena Yielding \(julieyielding55@gmail.com\) Sent You a Personal Message](mailto:julieyielding55@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:07:28 PM

Dear Arkansas Department of Environmental Quality,

Arkansas protect our state and Missouri from pollution, Stop the pollution
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Darena Yielding
620 Cypress Lake Rd
Beebe, AR 72012
julieyielding55@gmail.com
(501) 388-3598

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dave MacDonald \(xdavemx@gmail.com\)](mailto:xdavemx@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:27:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Dave MacDonald
14201 Kanis Rd
Little Rock, AR 72223
xdavemx@gmail.com
(321) 480-6426

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [David Cox \(satchmo11@att.net\) Sent You a Personal Message](mailto:satchmo11@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 5:47:27 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

David Cox
3403 Falcon Rd
Springdale, AR 72762
satchmo11@att.net
(479) 422-0131

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [David Freeburg \(dfreeburg@charter.net\) Sent You a Personal Message](mailto:dfreeburg@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 7:59:06 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

David Freeburg
12 Alden Ln
Saint Louis, MO 63141
dfreeburg@charter.net
(314) 395-0074

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [David Mccullough \(davidmccullough@gmail.com\) Sent You a Personal Message](mailto:davidmccullough@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:55:38 PM

Dear Arkansas Department of Environmental Quality,

It is long past time to reign in the emissions from coal plants. Coal does NOT have a place in our time if we will not strengthen the pollution regulations.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

David Mccullough
5336 N Grandview St
Little Rock, AR 72207
davidmccullough@gmail.com
(501) 666-0009

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [David Neil \(davidneil@charter.net\) Sent You a Personal Message](mailto:davidneil@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:42:00 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

David Neil
7346 Tulane Ave
Saint Louis, MO 63130
davidneil@charter.net
(314) 863-0417

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [David Nilles \(davenil@att.net\) Sent You a Personal Message](mailto:davenil@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:49:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

David Nilles
6712 Evergreen Dr
Little Rock, AR 72207
davenil@att.net
(501) 590-3555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dawn Nahlen \(newnahlen@yahoo.com\) Sent You a Personal Message](mailto:newnahlen@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:31:57 PM

Dear Arkansas Department of Environmental Quality,

Please consider the people impacted by your actions -- or inactions -- and make the responsible, morally correct decision to enforce regulations that reduce or mitigate emissions. Thank you.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dawn Nahlen
6420 Hopi Dr
North Little Rock, AR 72116
newnahlen@yahoo.com
(501) 223-0183

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Deanna White \(deannalwhite32@gmail.com\)](mailto:deannalwhite32@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:59:25 PM

Dear Arkansas Department of Environmental Quality,

We must back clean energy everywhere.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Deanna White
63 Brannon Landing Rd
Conway, AR 72032
deannalwhite32@gmail.com
(501) 339-5498

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Deanna White \(deannalwhite32@gmail.com\) Sent You a Personal Message](mailto:deannalwhite32@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:38:37 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Deanna White
63 Brannon Landing Rd
Conway, AR 72032
deannalwhite32@gmail.com
(501) 339-5498

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Deborah Dorsch \(ddorsch@aol.com\) Sent You a Personal Message](mailto:ddorsch@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:39:54 PM

Dear Arkansas Department of Environmental Quality,

We in Arkansas can do better!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Deborah Dorsch
10635 Prairie Creek North Rd
Rogers, AR 72756
ddorsch@aol.com
(609) 290-3334

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Denise Baker \(3loons@charter.net\) Sent You a Personal Message](mailto:3loons@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, December 21, 2017 7:34:42 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Denise Baker
PO Box 432031
Saint Louis, MO 63143
3loons@charter.net
(314) 803-4696

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dennis Wolff \(d_wolff59@yahoo.com\)](mailto:d_wolff59@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:38:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Dennis Wolff
590 S. Main St.
Cave Springs, AR 72718
d_wolff59@yahoo.com
(479) 203-7443

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dian Copeland \(dianwc@cablelynx.com\)](mailto:dianwc@cablelynx.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 1:26:42 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Dian Copeland
124 Charles Thomas Blvd
Searcy, AR 72143
dianwc@cablelynx.com
(501) 279-0529

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Diana Eckholdt \(dje1935@yahoo.com\) Sent You a Personal Message](mailto:dje1935@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 25, 2017 2:29:17 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Diana Eckholdt
3221 N Florissant Ave
Saint Louis, MO 63107
dje1935@yahoo.com
(314) 240-5530

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Diana Glixman \(glixmandiana@yahoo.com\)](mailto:glixmandiana@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:47:43 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Diana Glixman
7150 Amherst Ave
Saint Louis, MO 63130
glixmandiana@yahoo.com
(314) 961-9258

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Don Hamilton \(dirk1745@gmail.com\) Sent You a Personal Message](mailto:dirk1745@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:33:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Don Hamilton
1 Glenleigh Dr
Little Rock, AR 72227
dirk1745@gmail.com
(501) 225-1959

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Donna Griffin \(donnaofgriffin@gmail.com\) Sent You a Personal Message](mailto:donnaofgriffin@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:18:01 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Donna Griffin
1420 Justin Ct
Siloam Springs, AR 72761
donnaofgriffin@gmail.com
(870) 512-8980

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Donna Springer \(dsprin5574@aol.com\)](mailto:dsprin5574@aol.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 26, 2017 7:58:22 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Donna Springer
5931 Suson Pl Apt 4
Saint Louis, MO 63139
dsprin5574@aol.com
(314) 752-4064

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Donovan Netherland \(dnetherland@live.com\)](mailto:Donovan.Netherland@live.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:41:38 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Donovan Netherland
PO Box 1081
Fayetteville, AR 72702
dnetherland@live.com
(479) 435-1109

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dorothy Funk \(dfunklr@comcast.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:04:50 PM

Dear Arkansas Department of Environmental Quality,

Please require cleaner air standards so I, and many other asthma sufferers, will be able to breathe!!!
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dorothy Funk
5 Longlea Dr
Little Rock, AR 72212
dfunklr@comcast.net
(501) 227-4862

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dteven Jarvis \(sjarvis@sjarvis.com\) Sent You a Personal Message](mailto:sjarvis@sjarvis.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:14:33 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dteven Jarvis
2409 E. Tall Oaks Dr.
Fayetteville, AR 72703
sjarvis@sjarvis.com
(479) 582-4228

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dustin Sotnyk \(dsotnyk@gmail.com\)](mailto:dsotnyk@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:58:04 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dustin Sotnyk
5609 Oleatha Ave
Saint Louis, MO 63139
dsotnyk@gmail.com
(618) 210-5566

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dwight Rezny \(dwightauto@hotmail.com\) Sent You a Personal Message](mailto:dwightauto@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:59:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dwight Rezny
104 Graeser Acres
Saint Louis, MO 63146
dwightauto@hotmail.com
(314) 522-9449

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ed and Carol Schlachtenhaufen \(ecschla2@gmail.com\) Sent You a Personal Message](mailto:ecschla2@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 3:33:53 PM

Dear Arkansas Department of Environmental Quality,

I love living in Arkansas...please stop spoiling our beautiful country.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ed and Carol Schlachtenhaufen
19 Durango Way
Hot Springs Village, AR 71909
ecschla2@gmail.com
(352) 728-4214

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ed Daigle \(misteredaigle@gmail.com\) Sent You a Personal Message](mailto:misteredaigle@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:59:20 PM

Dear Arkansas Department of Environmental Quality,

P.S. We can live without coal but not without the planet!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ed Daigle
199 Quest Ln
Marshall, AR 72650
misteredaigle@gmail.com
(501) 548-2492

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Edward Hejtmanek \(ehejtmanek1949@msn.com\) Sent You a Personal Message](mailto:ehejtmanek1949@msn.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:36:44 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Edward Hejtmanek
1622 W Markham Rd
Fayetteville, AR 72701
ehejtmanek1949@msn.com
(479) 442-5675

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Eileen Joyce \(efjoyce@att.net\)](mailto:efjoyce@att.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:39:29 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Eileen Joyce
1308 Cove View Ln
Little Rock, AR 72211
efjoyce@att.net
(501) 221-1616

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elaine Burns \(elena.centli@gmail.com\) Sent You a Personal Message](mailto:elena.centli@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:47:38 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Elaine Burns
3824 Culberhouse
Jonesboro, AR 72401
elena.centli@gmail.com
(870) 972-5009

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elaine Potter \(epotter43@live.com\) Sent You a Personal Message](mailto:epotter43@live.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, December 21, 2017 12:59:14 PM

Dear Arkansas Department of Environmental Quality,

Why? Why do we need to pollute? Why? How can you sleep at night? Don't answer to me, tell your grandchildren how we are so lazy that we don't mind ruining everything we touch. Good luck to the next generation because we don't care what we leave you!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Elaine Potter
419 E 10th St
Little Rock, AR 72202
epotter43@live.com
(501) 372-7232

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elaine Scott \(elainescott8@me.com\)](mailto:elainescott8@me.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:50:56 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Elaine Scott
621 North Pine St.
Little Rock, AR 72205
elainescott8@me.com
(501) 664-3210

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elissa Ellis \(april-elissa@sbcglobal.net\)](mailto:april-elissa@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:26:23 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Elissa Ellis
9 Crockett Rd
Plumerville, AR 72127
april-elissa@sbcglobal.net
(501) 626-9539

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elizabeth Wedel \(wedgio@sbcglobal.net\) Sent You a Personal Message](mailto:wedgio@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 4:16:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Elizabeth Wedel
16 Calanas Ln
Hot Springs, AR 71909
wedgio@sbcglobal.net
(501) 922-6464

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elyse Partee \(monah202@gmail.com\) Sent You a Personal Message](mailto:monah202@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 9:46:20 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Elyse Partee
202 SW "O" Street
Bentonville, AR 72712
monah202@gmail.com
(479) 273-2456

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Emily Adams \(emilyeadams@gmail.com\) Sent You a Personal Message](mailto:emilyeadams@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:33:58 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Emily Adams
4101 Shaw Blvd
Saint Louis, MO 63110
emilyeadams@gmail.com
(314) 435-5771

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Erica Williams \(ericaw0@yahoo.com\) Sent You a Personal Message](mailto:ericaw0@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:51:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Erica Williams
9204 Cloverhill Rd
Little Rock, AR 72205
ericaw0@yahoo.com
(501) 626-3555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Erma Noiel \(ermanoiel@windstream.net\) Sent You a Personal Message](mailto:ermanoiel@windstream.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 2:08:35 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Erma Noiel
6109 Timbercreek Dr
Texarkana, AR 71854
ermanoiel@windstream.net
(870) 772-0030

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Eva Coffee \(koko72927@hotmail.com\) Sent You a Personal Message](mailto:koko72927@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:45:40 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Eva Coffee
536 W Main St
Booneville, AR 72927
koko72927@hotmail.com
(479) 763-6345

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Faebyan Whittle \(faebyanwhittle3@gmail.com\)](mailto:faebyanwhittle3@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:46:13 PM

Dear Arkansas Department of Environmental Quality,

We get it. You want to make money but we want an environment our grandchildren can not only survive, but flourish. There is a way to do the right thing and be wealthy. You just have to decide. So what do you choose? Health or wealth?

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Faebyan Whittle
3373 W Cornell Dr
Fayetteville, AR 72704
faebyanwhittle3@gmail.com
(501) 831-5640

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Felisa Womble \(felidarocs@yahoo.com\) Sent You a Personal Message](mailto:felidarocs@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:21:29 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Felisa Womble
722 willow st
North Little rock, AR 72114
felidarocs@yahoo.com
(501) 462-2109

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Fran Alexander \(fran@deane-alexander.com\)](mailto:fran@deane-alexander.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:11:46 PM

Dear Arkansas Department of Environmental Quality,

Why should my grandchild's very breath subsidize a coal plant's bottom line? Her asthma is not her fault---it's yours, Entergy. Shame on your criminality! Try finding some morals and ethics in your company.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Fran Alexander
1946 N Fox Hunter Rd
Fayetteville, AR 72701
fran@deane-alexander.com
(479) 442-5307

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Frances Lipschitz \(otomom77@gmail.com\) Sent You a Personal Message](mailto:otomom77@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:26:24 PM

Dear Arkansas Department of Environmental Quality,

Not only are these plants environmentally unsound, they are an embarrassment to our state!!
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Frances Lipschitz
3420 Hill Rd
Little Rock, AR 72205
otomom77@gmail.com
(501) 960-6794

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Francine Cantor \(frcantor@mac.com\) Sent You a Personal Message](mailto:frcantor@mac.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:41:00 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Francine Cantor
11700 Tarrytown Dr
Saint Louis, MO 63141
frcantor@mac.com
(314) 974-5387

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Francine Glass \(fran813@gmail.com\) Sent You a Personal Message](mailto:fran813@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:12:23 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Francine Glass
8737 Villa Crest Dr
Saint Louis, MO 63126
fran813@gmail.com
(314) 843-0791

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Fred Bach \(fbach@centurytel.net\) Sent You a Personal Message](mailto:fbach@centurytel.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:22:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Fred Bach
821 Christensen Road
Mountain Home, AR 72653
fbach@centurytel.net
(870) 492-4715

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Fred Longino \(flongino@gmail.com\) Sent You a Personal Message](mailto:flongino@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:58:22 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Fred Longino
7 Nisa Ln
Hot Springs Village, AR 71909
flongino@gmail.com
(501) 922-1054

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Frederick Goldthorpe \(fred.goldthorpe@gmail.com\)](mailto:fred.goldthorpe@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:50:27 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Frederick Goldthorpe
91 High Point Dr
Mayflower, AR 72106
fred.goldthorpe@gmail.com
(501) 516-2956

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gamin Davis \(arkietrekker@sbcglobal.net\)](mailto:arkietrekker@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:29:39 PM

Dear Arkansas Department of Environmental Quality,

Let's preserve Arkansas' beauty and natural resources by NOT allowing companies to muddy up our skies and water!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Gamin Davis
3103A Adrian Ave
Springdale, AR 72764
arkietrekker@sbcglobal.net
(479) 305-3235

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gary Davis \(davisgl@mac.com\) Sent You a Personal Message](mailto:davisgl@mac.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:38:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gary Davis
3634 Juniata St
Saint Louis, MO 63116
davisgl@mac.com
(314) 335-7468

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gay Signoff \(gsignoff@sbcglobal.net\) Sent You a Personal Message](mailto:gsignoff@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:48:47 PM

Dear Arkansas Department of Environmental Quality,

I have lived in Arkansas for the past 30 years. I am appalled to know that you have used the money I pay Entergy for services every month has not been used to better the life and welfare of Arkansas. I beg you to end coal pollution and smog that harms the Natural State and its inhabitants. Clean up the emissions from the Entergy plants!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gay Signoff
5814 McMurtrey Dr
North Little Rock, AR 72118
gsignoff@sbcglobal.net
(501) 753-0000

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Geoffrey Pruitt \(geoffrey.pruitt@gmail.com\) Sent You a Personal Message](mailto:geoffrey.pruitt@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:36:01 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Geoffrey Pruitt
6818 Virginia Ave
Saint Louis, MO 63111
geoffrey.pruitt@gmail.com
(314) 650-2689

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gerry Archibald \(garchibald@live.com\) Sent You a Personal Message](mailto:garchibald@live.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:42:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gerry Archibald
7 Newcastle Ln
Bella Vista, AR 72714
garchibald@live.com
(720) 883-3626

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gerry Segal \(gerryasegal@gmail.com\) Sent You a Personal Message](mailto:gerryasegal@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:36:05 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gerry Segal
PO Box 385
Fayetteville, AR 72702
gerryasegal@gmail.com
(479) 263-0604

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ginny Masullo \(masullo.ginny1@gmail.com\)](mailto:masullo.ginny1@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 1:35:48 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ginny Masullo
1837 N Ruppel Rd
Fayetteville, AR 72704
masullo.ginny1@gmail.com
(479) 530-0280

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ginny Masullo \(masullo.ginny1@gmail.com\)](mailto:masullo.ginny1@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:20:42 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ginny Masullo
1837 N Ruppel Rd
Fayetteville, AR 72704
masullo.ginny1@gmail.com
(479) 530-0280

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gladys Tiffany \(gladystiffany@yahoo.com\) Sent You a Personal Message](mailto:Gladys.Tiffany@gladystiffany@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:40:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gladys Tiffany
105 N Willow Ave
Fayetteville, AR 72701
gladystiffany@yahoo.com
(479) 935-4422

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Glenda Hollis \(gkhollis@hotmail.com\) Sent You a Personal Message](mailto:gkhollis@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 3:01:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Glenda Hollis
PO Box 1963
Fayetteville, AR 72702
gkhollis@hotmail.com
(479) 249-9906

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gloria Bond \(gbond20586@prodigy.net\)](mailto:gbond20586@prodigy.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:57:05 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gloria Bond
4418 Crestland Dr
Saint Louis, MO 63121
gbond20586@prodigy.net
(314) 381-7754

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gloria Mcgee \(gloria.mcgee@sbcglobal.net\)](mailto:gloria.mcgee@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:57:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gloria Mcgee
1900 Jean St
Springdale, AR 72762
gloria.mcgee@sbcglobal.net
(479) 751-8102

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Glorian Mcguire \(glorianmcguire@gmail.com\)](mailto:Glorian.Mcguire@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:10:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Glorian Mcguire
836 Mary Meadows Ln
Saint Louis, MO 63141
glorianmcguire@gmail.com
(314) 432-4036

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gloria Miller \(drmom36@gmail.com\)](mailto:drmom36@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:40:36 AM

Dear Arkansas Department of Environmental Quality,

Stop destroying our planet

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Gloria Miller
16 Cumbrian Dr
Bella Vista, AR 72714
drmom36@gmail.com
(254) 709-5948

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gordon Messling \(touchingback@gmail.com\)](mailto:touchingback@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:19:12 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gordon Messling
28 S College Ave Ste 2
Fayetteville, AR 72701
touchingback@gmail.com
(479) 571-3020

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gregory Mennemeier \(greg.mennemeier@gmail.com\) Sent You a Personal Message](mailto:greg.mennemeier@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:12:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gregory Mennemeier
5235 Windsor Pkwy
Saint Louis, MO 63116
greg.mennemeier@gmail.com
(314) 301-9625

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gregory Thomas \(tingdr@aol.com\)](mailto:tingdr@aol.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:14:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gregory Thomas
14578 Goshen Tuttle Rd
Elkins, AR 72727
tingdr@aol.com
(479) 422-8528

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gretchen Hines \(gretchenhines1992@gmail.com\) Sent You a Personal Message](mailto:gretchenhines1992@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:29:24 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gretchen Hines
203 Morgan street
Newark, AR 72562
gretchenhines1992@gmail.com
(870) 321-2886

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gretchen Waddell Barwick \(gretchen.waddellbarwick@sierraclub.org\) Sent You a Personal Message](mailto:gretchen.waddellbarwick@sierraclub.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:00:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gretchen Waddell Barwick
1400 McCausland Ave
Saint Louis, MO 63117
gretchen.waddellbarwick@sierraclub.org
(314) 954-7108

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Guy Amsler \(guyamsler@yahoo.com\) Sent You a Personal Message](mailto:guyamsler@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:32:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Guy Amsler
2100 Rebsamen Park Rd Apt 422A
Little Rock, AR 72202
guyamsler@yahoo.com
(501) 580-8302

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Harvey Cantor \(hecantor@me.com\) Sent You a Personal Message](mailto:hecantor@me.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:40:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Harvey Cantor
11700 Tarrytown Dr
Saint Louis, MO 63141
hecantor@me.com
(314) 570-1387

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Heather Beck \(mom2beckboys@yahoo.com\) Sent You a Personal Message](mailto:mom2beckboys@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:33:08 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Heather Beck
37 Green Meadows Dr.
Vilonia, AR 72173
mom2beckboys@yahoo.com
(940) 257-4639

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Heather Drain \(heathermariedrain@gmail.com\) Sent You a Personal Message](mailto:heathermariedrain@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 9:27:53 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Heather Drain
PO Box 9238
Fayetteville, AR 72703
heathermariedrain@gmail.com
(479) 957-1234

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Heather Hammig \(souphammig@gmail.com\) Sent You a Personal Message](mailto:souphammig@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:26:35 PM

Dear Arkansas Department of Environmental Quality,

We must all work for the collective good. Breathing clean air has to be among the most basic issues for a good quality of life.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Heather Hammig
1800 N Barrington Dr
Fayetteville, AR 72701
souphammig@gmail.com
(479) 251-1510

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Helen Ludbrook \(helenludbrook@att.net\) Sent You a Personal Message](mailto:helenludbrook@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:02:58 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Helen Ludbrook
1422 Lawnwood Dr
Saint Louis, MO 63131
helenludbrook@att.net
(314) 965-3438

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Henry Carraro \(hcarraro@hughes.net\)](mailto:hcarraro@hughes.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:13:36 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Henry Carraro
12401 Arch Street
Little Rock, AR 72206
hcarraro@hughes.net
(501) 261-1854

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Herb Huebner \(huebnerhr@live.com\) Sent You a Personal Message](mailto:huebnerhr@live.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:34:00 PM

Dear Arkansas Department of Environmental Quality,

People here are getting ill from the smog, and its important for all polluters, in STL and in surrounding states, to eliminate unhealthful emissions from their power plants as soon as possible.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Herb Huebner
2066 Rurline Dr
Saint Louis, MO 63146
huebnerhr@live.com
(314) 873-6633

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Holly Goodrich \(avIntes@hotmail.com\) Sent You a Personal Message](mailto:avIntes@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:08:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Holly Goodrich
5536 Poinciana Blvd
Saint Louis, MO 63123
avIntes@hotmail.com
(360) 213-4344

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Holly Hope \(holly_hope@sbcglobal.net\) Sent You a Personal Message](mailto:holly_hope@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:50:27 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Holly Hope
210 Dennison St
Little Rock, AR 72205
holly_hope@sbcglobal.net
(501) 681-2120

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Hosea Mcadoo \(hwmcadoo@sbcglobal.net\)](mailto:hwmcadoo@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:47:43 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Hosea Mcadoo
3829 Stone Mountain Dr
Sherwood, AR 72120
hwmcadoo@sbcglobal.net
(501) 835-6765

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Houston Taylor \(hdtaylor6@gmail.com\) Sent You a Personal Message](mailto:hdtaylor6@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 1:55:37 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Houston Taylor
PO Box 2001
Magnolia, AR 71754
hdtaylor6@gmail.com
(870) 234-6948

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Iliia Mcneal \(itsilia@gmail.com\)](mailto:itsilia@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:29:46 PM

Dear Arkansas Department of Environmental Quality,

As a citizen of the Natural state, I demand that you come into 2018 with the rest of the world and STOP ALL COAL PLANT OPERATIONS/PRODUCTION- it is disgusting and filthy and RUINING OUR 1 EARTH!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! get your life together.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Iliia Mcneal
53 Pin Oak Loop
Maumelle, AR 72113
itsilia@gmail.com
(501) 332-8825

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Irma Kennebeck \(iris63126@gmail.com\) Sent You a Personal Message](mailto:Irma.Kennebeck@iris63126@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:38:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Irma Kennebeck
8840 Glenwood Dr
Saint Louis, MO 63126
iris63126@gmail.com
(314) 849-2404

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ittikorn Meeboonlue \(ittikorn_1994@hotmail.com\) Sent You a Personal Message](mailto:ittikorn_1994@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:57:35 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ittikorn Meeboonlue
212 Edgar Rd APT213
Saint Louis, MO 63119
ittikorn_1994@hotmail.com
(314) 755-7280

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [J Morgan Chism-Diebold \(gabbylld@sbcglobal.net\) Sent You a Personal Message](mailto:J.Morgan.Chism-Diebold@gabbylld@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, January 22, 2018 12:22:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

J Morgan Chism-Diebold
1207 E Walnut St
Rogers, AR 72756
gabbylld@sbcglobal.net
(479) 372-6115

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [J.Olgaard \(jolgaard@gmail.com\) Sent You a Personal Message](mailto:jolgaard@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:51:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

J Olgaard
4909 Laclede Ave
Saint Louis, MO 63108
jolgaard@gmail.com
(314) 799-8155

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jack Mccurdy \(crabbyoldman35@gmail.com\) Sent You a Personal Message](mailto:Jack_Mccurdy_(crabbyoldman35@gmail.com)_Sent_You_a_Personal_Message)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:05:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jack Mccurdy
2509 Captiva Dr Apt 7
Saint Louis, MO 63125
crabbyoldman35@gmail.com
(314) 845-0187

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jacob Buchowski \(jbuchow@hotmail.com\) Sent You a Personal Message](mailto:jbuchow@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:19:03 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jacob Buchowski
27 Rio Vista Dr
Saint Louis, MO 63124
jbuchow@hotmail.com
(314) 395-9266

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Brewer \(james067@centurytel.net\) Sent You a Personal Message](mailto:james067@centurytel.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:39:58 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

James Brewer
6710 Dawson Rd
Greenwood, AR 72936
james067@centurytel.net
(479) 996-4811

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Burke \(jmburke320@gmail.com\) Sent You a Personal Message](mailto:jmburke320@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:28:46 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

James Burke
295 McDonald St
West Fork, AR 72774
jmburke320@gmail.com
(479) 387-1987

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Hammons \(jham640422@aol.com\)](mailto:jham640422@aol.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:32:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

James Hammons
3004 N 16th St
Rogers, AR 72756
jham640422@aol.com
(479) 621-7922

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Phelps \(chezphelps@juno.com\) Sent You a Personal Message](mailto:chezphelps@juno.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:23:13 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

James Phelps
7511 Teasdale Ave
Saint Louis, MO 63130
chezphelps@juno.com
(314) 556-8698

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Pona \(tandemjim@charter.net\)](mailto:tandemjim@charter.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:54:24 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

James Pona
11915 Crystal Dr
Saint Louis, MO 63131
tandemjim@charter.net
(314) 432-4873

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Wilson \(socket312@gmail.com\)](mailto:James.Wilson(socket312@gmail.com)) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:38:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

James Wilson
8331 Highway 115
Pocahontas, AR 72455
socket312@gmail.com
(870) 647-2547

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jan Baker \(jan.baker@att.net\) Sent You a Personal Message](mailto:jan.baker@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:47:07 AM

Dear Arkansas Department of Environmental Quality,

Stop the pollution going on in our beautiful natural state.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jan Baker
11933 Rivercrest Dr
Little Rock, AR 72212
jan.baker@att.net
(501) 352-6823

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jan Nolte \(jano.four@yahoo.com\) Sent You a Personal Message](mailto:jano.four@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:01:31 PM

Dear Arkansas Department of Environmental Quality,

I really don't think Arkansas can truthfully call itself The Natural State while outgassing coal burning pollution. I grew up in Arkansas and I don't want pollution to harm me and my family, the wilderness areas nor citizens of our neighboring state Missouri. Let's focus on clean alternative energy!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jan Nolte
112 Mitchell St
Conway, AR 72034
jano.four@yahoo.com
(555) 555-5555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jan Schmidt \(jls215@aol.com\)](mailto:jls215@aol.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:58:08 AM

Dear Arkansas Department of Environmental Quality,

Stop polluting St. Louis air. Clean and healthy air is a responsibility every state owes to the other. Arkansas would expect the same from us.

Thank you.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jan Schmidt
35 Provincial Ct
Saint Louis, MO 63122
jls215@aol.com
(314) 210-5918

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jade Elledge \(jbelledge@gmail.com\) Sent You a Personal Message](mailto:jbelledge@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:45:29 PM

Dear Arkansas Department of Environmental Quality,

unacceptable. do the right thing entergy

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jade Elledge
10 Shadywood Ct
Little Rock, AR 72223
jbelledge@gmail.com
(501) 295-6234

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jane House \(jane_house@sbcglobal.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 3:47:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jane House
948 Chelsea Ave
Saint Louis, MO 63122
jane_house@sbcglobal.net
(314) 965-3486

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Janet Browne \(jebrowne@att.net\) Sent You a Personal Message](mailto:jebrowne@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 12:47:44 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Janet Browne
2712 North Taylor Street
Little Rock, AR 72207
jebrowne@att.net
(501) 664-0253

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jaquelyn Enzweiler \(fayzar@yahoo.com\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:13:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jaquelyn Enzweiler
1390 County Road 3867
Lamar, AR 72846
fayzar@yahoo.com
(479) 885-3361

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jeanne Derer \(clearwater1039@gmail.com\)](mailto:clearwater1039@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:45:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jeanne Derer
8840 Glenwood Dr
Saint Louis, MO 63126
clearwater1039@gmail.com
(314) 849-2404

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jeanne Van Fleet \(jeannevanfleet@yahoo.com\) Sent You a Personal Message](mailto:jeannevanfleet@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:59:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jeanne Van Fleet
838 Bourbon Red Dr
Saint Louis, MO 63131
jeannevanfleet@yahoo.com
(314) 592-7171

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jeannie True-Jenkins \(jeannie.amman@gmail.com\) Sent You a Personal Message](mailto:jeannie.amman@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:06:58 PM

Dear Arkansas Department of Environmental Quality,

Clean and Reduce the emissions now from Entergy coal plants NOW!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jeannie True-Jenkins
2840 N Susan Carol Ln
Fayetteville, AR 72703
jeannie.amman@gmail.com
(479) 856-9059

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jeff Albers \(jedal5@live.com\) Sent You a Personal Message](mailto:jedal5@live.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 8:02:04 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jeff Albers
1127 Hollin Ct
Saint Louis, MO 63131
jedal5@live.com
(314) 620-7319

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jenna Greer \(selsowner@gmail.com\) Sent You a Personal Message](mailto:selsowner@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:35:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jenna Greer
37 Greenway Dr.
Little Rock, AR 72209
selsowner@gmail.com
(501) 326-1779

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jennifer Leftwich \(jleftwi@att.net\) Sent You a Personal Message](mailto:jleftwi@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:04:58 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jennifer Leftwich
2480 Riverfront Ln
Fayetteville, AR 72703
jleftwi@att.net
(479) 935-3374

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jennifer Skates \(skatesj@yahoo.com\) Sent You a Personal Message](mailto:skatesj@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:52:22 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jennifer Skates
301 Bethel St
Hot Springs, AR 71901
skatesj@yahoo.com
(501) 276-3405

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jerriann Nielsen \(jerriann.nielsen@sbcglobal.net\)](mailto:jerriann.nielsen@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:30:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jerriann Nielsen
35 Panorama Dr
Hot Springs Village, AR 71909
jerriann.nielsen@sbcglobal.net
(501) 915-8750

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jim and Carol Woolly \(jim.carol@sbcglobal.net\)](mailto:jim.carol@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, January 22, 2018 2:00:09 PM

Dear Arkansas Department of Environmental Quality,

Coal kills!! On both a short term and long term basis.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jim and Carol Woolly
30 Pamela Dr
Little Rock, AR 72227
jim.carol@sbcglobal.net
(501) 224-5341

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jo Ann Jennier \(jjennier@msn.com\) Sent You a Personal Message](mailto:jjennier@msn.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:08:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jo Ann Jennier
100 Whitaker HI
Norman, AR 71960
jjennier@msn.com
(870) 782-4472

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jo Coscia \(jmc820@gmail.com\) Sent You a Personal Message](mailto:jmc820@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:49:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jo Coscia
6320 Alamo Ave
Saint Louis, MO 63105
jmc820@gmail.com
(314) 977-9254

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jo Johnson \(garglingdogs@outlook.com\) Sent You a Personal Message](mailto:garglingdogs@outlook.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Sunday, January 07, 2018 8:50:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jo Johnson
111 River Valley Loop
Maumelle, AR 72113
garglingdogs@outlook.com
(501) 734-8430

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joan Z Cohen \(joanzcohen@gmail.com\)](mailto:joanzcohen@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:45:45 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joan Z Cohen
7732 Davis Dr
Saint Louis, MO 63105
joanzcohen@gmail.com
(314) 303-6621

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [JoAnn Kulaski \(kulaski517@gmail.com\) Sent You a Personal Message](mailto:kulaski517@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 2:10:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

JoAnn Kulaski
517 East Whitefish Bay Place, #4
Fayetteville, AR 72701
kulaski517@gmail.com
(479) 595-9846

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joanna Person-Michener \(jbperson@uark.edu\) Sent You a Personal Message](mailto:jbperson@uark.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 6:27:26 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Joanna Person-Michener
1823 South Hoot Owl Lane
Fayetteville, AR 72701
jbperson@uark.edu
(479) 225-6804

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jodi Barnes \(jodib9@gmail.com\)](mailto:jodib9@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 8:02:42 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jodi Barnes
112 Colonial Cir
Monticello, AR 71655
jodib9@gmail.com
(803) 318-1453

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joe Atkinson \(jfatkinsonjr@sbcglobal.net\)](mailto:jfatkinsonjr@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:42:10 AM

Dear Arkansas Department of Environmental Quality,

I have chronic bronchitis and clean air is essential to my survival. Please stop polluting my air.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joe Atkinson
2726 Reeder St
Fort Smith, AR 72901
jfatkinsonjr@sbcglobal.net
(479) 782-9620

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joe Boersma \(j.boersma@cox.net\)](mailto:j.boersma@cox.net) [Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:19:32 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joe Boersma
824 Brush Creek Rd
Springdale, AR 72762
j.boersma@cox.net
(479) 586-8521

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joe Murphy \(j.b.murphy.3.17@gmail.com\)](mailto:j.b.murphy.3.17@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:45:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joe Murphy
34 Church Cir
Greenbrier, AR 72058
j.b.murphy.3.17@gmail.com
(314) 640-9664

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jo-Ed Woodward \(jodi1944@gmail.com\) Sent You a Personal Message](mailto:jodi1944@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:40:48 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jo-Ed Woodward
PO Box 607
Mayflower, AR 72106
jodi1944@gmail.com
(501) 505-6129

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [John Glebs \(johneg@ymail.com\) Sent You a Personal Message](mailto:John.Glebs@ymail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:43:39 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

John Glebs
3868 Blow St
Saint Louis, MO 63116
johneg@ymail.com
(314) 352-1103

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [John Hickey \(johnhickey77@gmail.com\) Sent You a Personal Message](mailto:John.Hickey77@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:54:01 AM

Dear Arkansas Department of Environmental Quality,

I am the father of two teen-age boys who breathe St. Louis air every day. Please do your part to support clean air by reducing pollution from these two Arkansas coal plants.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

John Hickey
532 Mason Ave
Saint Louis, MO 63119
johnhickey77@gmail.com
(314) 961-0038

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [John Hickey \(john.hickey@sierraclub.org\)](mailto:john.hickey@sierraclub.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:59:59 AM

Dear Arkansas Department of Environmental Quality,

As the parent of two teenagers who breathe St. Louis air every day, I would like to see Arkansas act as quickly as possible.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

John Hickey
532 Mason Ave.
Saint Louis, MO 63119
john.hickey@sierraclub.org
(314) 961-0038

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [John McClellan \(iguanagate@gmail.com\) Sent You a Personal Message](mailto:John.McClellan@iguanagate@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:36:32 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

John McClellan
4007 Miami St
Saint Louis, MO 63116
iguanagate@gmail.com
(314) 664-5141

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [John Moszyk \(johnmoszyk48@hotmail.com\) Sent You a Personal Message](mailto:johnmoszyk48@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:09:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

John Moszyk
4278 Bordeaux Dr
Saint Louis, MO 63129
johnmoszyk48@hotmail.com
(314) 894-0044

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jon Cunningham \(jinsell@charter.net\)](mailto:jinsell@charter.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:07:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jon Cunningham
950 Dielman Rd
Saint Louis, MO 63132
jinsell@charter.net
(314) 993-5643

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jonathan Kiesling \(kieslingje@gmail.com\) Sent You a Personal Message](mailto:kieslingje@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:07:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jonathan Kiesling
819 Greeley Ave
Saint Louis, MO 63119
kieslingje@gmail.com
(314) 724-2931

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joseph Poniewaz \(jponiewaz@srgglobal.com\) Sent You a Personal Message](mailto:jponiewaz@srgglobal.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:47:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joseph Poniewaz
5101 Milburn Rd
Saint Louis, MO 63129
jponiewaz@srgglobal.com
(314) 487-6726

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joseph Sims \(joesims1234@yahoo.com\) Sent You a Personal Message](mailto:joesims1234@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:33:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joseph Sims
4563 Loughborough Ave
Saint Louis, MO 63116
joesims1234@yahoo.com
(314) 600-4653

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joseph Wankum \(jbwankum@aol.com\) Sent You a Personal Message](mailto:jbwankum@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, January 22, 2018 11:01:02 PM

Dear Arkansas Department of Environmental Quality,

The two power plants have delayed taking action for altogether too many years. The time for clean air is now.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joseph Wankum
PO Box 11590
Conway, AR 72034
jbwankum@aol.com
(501) 327-2548

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Josh Cryar \(jscryar@gmail.com\)](mailto:jscryar@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:40:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Josh Cryar
261 Bayshore Dr
Hot Springs, AR 71901
jscryar@gmail.com
(318) 794-5181

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Josh Kuykendall \(josh2719@yahoo.com\) Sent You a Personal Message](mailto:josh2719@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:43:38 PM

Dear Arkansas Department of Environmental Quality,

Solar and Wind power are better options, and less harmful on the environment.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Josh Kuykendall
310 Porchester Dr
Saint Louis, MO 63125
josh2719@yahoo.com
(314) 803-4164

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Josiah Pleasant \(jpleasant@harding.edu\) Sent You a Personal Message](mailto:jpleasant@harding.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:18:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Josiah Pleasant
1101 E River Ave
Searcy, AR 72143
jpleasant@harding.edu
(760) 936-2848

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joy Foy \(carebear_1@sbcglobal.net\) Sent You a Personal Message](mailto:Joy.Foy@carebear_1@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:48:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joy Foy
403 E School St
Lincoln, AR 72744
carebear_1@sbcglobal.net
(972) 505-1627

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joy Martin \(joyjoytotheworld@cs.com\) Sent You a Personal Message](mailto:joyjoytotheworld@cs.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 5:56:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joy Martin
4143 Federer St
Saint Louis, MO 63116
joyjoytotheworld@cs.com
(314) 832-7545

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joyce Browning \(joycebrowning@windstream.net\) Sent You a Personal Message](mailto:joycebrowning@windstream.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:56:50 PM

Dear Arkansas Department of Environmental Quality,

We need clean energy in Arkansas and everywhere else.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joyce Browning
2024 Ash St
Texarkana, AR 71854
joycebrowning@windstream.net
(870) 772-2227

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Judy Mckinney \(judyorvmck@cox.net\) Sent You a Personal Message](mailto:judyorvmck@cox.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 3:32:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Judy Mckinney
78 Pleasant Ridge Dr
Holiday Island, AR 72631
judyorvmck@cox.net
(479) 244-6905

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Julia Correia \(juliaalinecorreia@gmail.com\) Sent You a Personal Message](mailto:juliaalinecorreia@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:07:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Julia Correia
105 Ridge Three Ct
Hot Springs, AR 71901
juliaalinecorreia@gmail.com
(501) 282-2316

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Julia Ranft \(juliaranft@mac.com\) Sent You a Personal Message](mailto:juliaranft@mac.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:29:16 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Julia Ranft
239 Hobson Ave
Hot Springs, AR 71913
juliaranft@mac.com
(501) 623-5433

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Julie Birkenmaier \(birkenjm@slu.edu\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:11:48 PM

Dear Arkansas Department of Environmental Quality,

In short, we all need clean air, and we need corporate America to do their part.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Julie Birkenmaier
1053 S Taylor Ave
Saint Louis, MO 63110
birkenjm@slu.edu
(314) 534-3951

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Julie Holley \(holleyjaw@gmail.com\)](mailto:holleyjaw@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:20:00 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Julie Holley
226 E Bodley Ave
Saint Louis, MO 63122
holleyjaw@gmail.com
(314) 800-5405

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [June Clabon \(juneclabon@sbcglobal.net\) Sent You a Personal Message](mailto:juneclabon@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:59:57 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

June Clabon
4004 S Highway 161 Lot 32
Jacksonville, AR 72076
juneclabon@sbcglobal.net
(501) 258-1365

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Carson \(karencrsn@yahoo.com\) Sent You a Personal Message](mailto:karencrsn@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:55:49 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Karen Carson
1110 W Callahan Dr
Rogers, AR 72758
karencrsn@yahoo.com
(479) 381-5368

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Edwards \(kj44r22e@charter.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 4:14:58 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Karen Edwards
42 Sunset Ct
Saint Louis, MO 63121
kj44r22e@charter.net
(314) 229-5796

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Gerot \(karengerot@gmail.com\) Sent You a Personal Message](mailto:karengerot@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Sunday, January 28, 2018 12:54:33 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Karen Gerot
PO Box 101
Dover, AR 72837
karengerot@gmail.com
(479) 229-1561

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Levine \(karenlevine365@yahoo.com\)](mailto:karenlevine365@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:54:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Karen Levine
1791 Boulder Springs Dr Apt A
Saint Louis, MO 63146
karenlevine365@yahoo.com
(314) 395-9927

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Sage \(karensage@sbcglobal.net\) Sent You a Personal Message](mailto:karensage@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 3:32:05 PM

Dear Arkansas Department of Environmental Quality,

Here in the Ozarks we are known for our natural beauty. We need to protect our environment now and for future generations.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Karen Sage
1311 W Birch Dr
Rogers, AR 72758
karensage@sbcglobal.net
(479) 636-9009

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Shaw \(karen@karenschawrealtor.com\)](mailto:karen@karenschawrealtor.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:48:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Karen Shaw
772 Whitfield Rd
Percy, AR 71964
karen@karenschawrealtor.com
(501) 538-3774

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Bartle \(karenbartle@ymail.com\) Sent You a Personal Message](mailto:karenbartle@ymail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:49:12 AM

Dear Arkansas Department of Environmental Quality,

We can no longer ignore the impact of fossil fuels on our environment. We either go on as a species developing a sustainable live syle, or we cause planet-wide extinctions.. our choice.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Karen Bartle
HC 72 Box 38
Mount Judea, AR 72655
karenbartle@ymail.com
(870) 434-5624

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Corley \(kmcstlouis50@gmail.com\) Sent You a Personal Message](mailto:kmcstlouis50@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:26:46 PM

Dear Arkansas Department of Environmental Quality,

I have asthma and need higher air quality, or I will have to move out of St. Louis!
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Karen Corley
342 Larkhill Ct
Saint Louis, MO 63119
kmcstlouis50@gmail.com
(314) 640-7701

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karl Studenroth \(krskyfl@yahoo.com\)](mailto:krskyfl@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:33:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Karl Studenroth
7 Santa Maria Ln
Hot Springs Village, AR 71909
krskyfl@yahoo.com
(501) 204-4205

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kate Williams \(kltwilliams@hotmail.com\)](mailto:kltwilliams@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:38:08 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kate Williams
8314 Fairway Ln
Rogers, AR 72756
kltwilliams@hotmail.com
(785) 577-3474

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katherine Alexander \(katherin.alexander@sbcglobal.net\) Sent You a Personal Message](mailto:katherin.alexander@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:24:00 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Katherine Alexander
21 Atrayente Way
Hot Springs, AR 71909
katherin.alexander@sbcglobal.net
(501) 922-3644

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kathryn Morse \(stcatherine57@msn.com\)](mailto:stcatherine57@msn.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:09:08 PM

Dear Arkansas Department of Environmental Quality,

I live in the other direction from St. Louis. I live in South Arkansas. I moved here 4 years ago from Central Mississippi. I use a CPAP machine nightly. One filter in my CPAP machine would begin to look dirty in Mississippi after 6 months use. Another after a year. Here in South Arkansas, they look dirtier after one weeks use than what I just wrote about my Mississippi experience. Also, I am a gardener. The soil here is different and for awhile I couldn't remember what it reminded me of. It finally dawned on that the soil in South Arkansas reminds me of the ash heaps in Saltville, Virginia, that are now an EPA Superfund Site.

And, I am 60 years old and used to teach. When I visit my granddaughter's schools, I am always astounded at what to me seems like a very high number of special needs children. I am worked in schools in towns and counties with a similar number of people, but which did not have this many special needs students. Also, I see larger numbers of special needs adults that I am used to from living in cities outside of Arkansas. There seems to be something very very wrong here and I suspect it is in the environment. This is a terrible strain on individuals, their families and government programs like Social Security Disability. Taking care of our environment is the most important issue to me. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kathryn Morse
510 West 8th Street
El Dorado, AR 71730
stcatherine57@msn.com
(870) 444-4702

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kathryn Norris \(kgnor@yahoo.com\) Sent You a Personal Message](mailto:kgnor@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:42:00 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kathryn Norris
PO Box 385
Summit, AR 72677
kgnor@yahoo.com
(479) 381-6701

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kathy Lane \(mike.kathy@sbcglobal.net\) Sent You a Personal Message](mailto:mike.kathy@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:05:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kathy Lane
8164 Pollock Rd
Rogers, AR 72756
mike.kathy@sbcglobal.net
(479) 372-6029

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kathy Martone \(kmartone@dreamagik.com\) Sent You a Personal Message](mailto:kmartone@dreamagik.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:33:08 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kathy Martone
23 Elk St
Eureka Springs, AR 72632
kmartone@dreamagik.com
(303) 394-3928

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kathy Smith \(ks6958739@gmail.com\)](mailto:ks6958739@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:57:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kathy Smith
278 Eastside Gdns
Trumann, AR 72472
ks6958739@gmail.com
(870) 227-1275

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katie Collins \(kcollinsnwa@yahoo.com\) Sent You a Personal Message](mailto:Katie.Collins@knowwho.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 3:48:42 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Katie Collins
400 Coachlight Dr
Bentonville, AR 72712
kcollinsnwa@yahoo.com
(479) 790-0270

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katie Lappe \(flopalop@gmail.com\)](mailto:flopalop@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 27, 2017 12:58:02 PM

Dear Arkansas Department of Environmental Quality,

Please prioritize health of people over wealth of energy companies

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Katie Lappe
3327 Pestalozzi St
Saint Louis, MO 63118
flopalop@gmail.com
(314) 497-3485

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katie Mcclelland \(krmccle@gmail.com\) Sent You a Personal Message](mailto:krmccle@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 1:48:02 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Katie Mcclelland
76 S Cedar Ave
West Fork, AR 72774
krmccle@gmail.com
(479) 236-0000

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katie O'Byrne \(katieobyrne@sbcglobal.net\)](mailto:katieobyrne@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 9:20:13 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Katie O'Byrne
117 Sour rock springs rd
Hot Springs, AR 71913
katieobyrne@sbcglobal.net
(501) 545-1024

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katie Parker \(kbparker@fortierinc.com\)](mailto:kbparker@fortierinc.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:36:45 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Katie Parker
420 Ellis RD
Pottsville, AR 72858
kbparker@fortierinc.com
(501) 548-4134

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kelly Warner \(kwarner@robbidavisagency.com\) Sent You a Personal Message](mailto:kwarner@robbidavisagency.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:48:24 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kelly Warner
281 Ross Hollow Rd
Bigelow, AR 72016
kwarner@robbidavisagency.com
(501) 330-2028

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kenneth Boyle \(kenboyle49@yahoo.com\)](mailto:kenboyle49@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:21:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kenneth Boyle
501 SW Diamond Dr Apt 13
Bentonville, AR 72712
kenboyle49@yahoo.com
(479) 306-0001

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kenneth Koniczny \(kennethkoniczny@sbcglobal.net\) Sent You a Personal Message](mailto:kennethkoniczny@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:57:27 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kenneth Koniczny
124 Lemay Gardens Dr
Saint Louis, MO 63125
kennethkoniczny@sbcglobal.net
(314) 638-5260

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kent Johnson \(kentj1948@gmail.com\) Sent You a Personal Message](mailto:kentj1948@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:58:16 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kent Johnson
12928 Midfield Ter
Saint Louis, MO 63146
kentj1948@gmail.com
(636) 399-8053

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kerry Hall \(friendsofnie@nwaonline.com\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:32:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kerry Hall
212 N East Ave
Fayetteville, AR 72701
friendsofnie@nwaonline.com
(479) 684-5526

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [KeViN MeInHaRdT \(nivekpaul4@yahoo.com\) Sent You a Personal Message](mailto:nivekpaul4@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:58:24 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

KeViN MeInHaRdT
3912 Crosby Drive
Saint Louis, MO 63123
nivekpaul4@yahoo.com
(314) 638-7553

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kevin Tennal \(ktennal@aristotle.net\) Sent You a Personal Message](mailto:ktennal@aristotle.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:34:54 PM

Dear Arkansas Department of Environmental Quality,

"We all live downstream." By caring about how our waste affects others, we will improve our own condition as well as theirs.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kevin Tennal
120 Berry St
Little Rock, AR 72205
ktennal@aristotle.net
(501) 603-0102

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kevin Thompson \(kevinkt91@gmail.com\)](mailto:kevinkt91@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 1:35:56 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kevin Thompson
5318A Lansdowne Ave
Saint Louis, MO 63109
kevinkt91@gmail.com
(314) 737-0247

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kim Lovely \(kimbc@yahoo.com\) Sent You a Personal Message](mailto:kimbc@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:40:56 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kim Lovely
200 Fletcher Pl
Russellville, AR 72802
kimbc@yahoo.com
(479) 890-4575

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kimberly Campbell \(kimberlycampbell1130@gmail.com\)](mailto:kimberlycampbell1130@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:30:56 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kimberly Campbell
613 N 7th St
Paragould, AR 72450
kimberlycampbell1130@gmail.com
(870) 627-8338

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kimberly Stroncsek \(hsfaery@gmail.com\) Sent You a Personal Message](mailto:hsfaery@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:17:33 PM

Dear Arkansas Department of Environmental Quality,

Stop the pollution. Be responsible. Do no harm!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kimberly Stroncsek
138 Amber St
Hot Springs, AR 71901
hsfaery@gmail.com
(501) 802-4397

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kirk Rhoads \(kirkrhoads@hotmail.com\) Sent You a Personal Message](mailto:kirkrhoads@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:05:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kirk Rhoads
101 Elk Way
Mountain Home, AR 72653
kirkrhoads@hotmail.com
(870) 656-7887

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kris Monahan \(krismonahan@att.net\) Sent You a Personal Message](mailto:krismonahan@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 24, 2018 7:15:20 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kris Monahan
5728 Tholozan Ave
Saint Louis, MO 63109
krismonahan@att.net
(314) 481-6745

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kristen Riedinger \(chatterboxpwns@gmail.com\) Sent You a Personal Message](mailto:chatterboxpwns@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:22:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kristen Riedinger
6515 Wydown Blvd
Saint Louis, MO 63105
chatterboxpwns@gmail.com
(630) 488-2427

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kristin Wages \(kmwages@gmail.com\)](mailto:kmwages@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:01:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kristin Wages
900 Westminster
Cave Springs, AR 72718
kmwages@gmail.com
(479) 200-8841

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Larry Trochtenberg \(laro12@att.net\) Sent You a Personal Message](mailto:laro12@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:07:02 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Larry Trochtenberg
156 Forest Brook Ln
Saint Louis, MO 63146
laro12@att.net
(314) 432-5247

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Allers-Lowry \(laura@stlouisearthday.org\) Sent You a Personal Message](mailto:laura@stlouisearthday.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:47:12 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Laura Allers-Lowry
5659 Tholozan Ave
Saint Louis, MO 63109
laura@stlouisearthday.org
(314) 800-7328

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Neuman-Howe \(a728laura@hotmail.com\)](mailto:a728laura@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:04:55 PM

Dear Arkansas Department of Environmental Quality,

We want healthier air for everybody!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Laura Neuman-Howe
834 Louwen Dr
Saint Louis, MO 63124
a728laura@hotmail.com
(314) 283-5236

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Stanley \(lvls@comcast.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:23:21 PM

Dear Arkansas Department of Environmental Quality,

As good neighbors we should stop this.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Laura Stanley
1109 N Polk St
Little Rock, AR 72205
lvls@comcast.net
(501) 951-0578

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Stefacek \(lstefacek@yahoo.com\) Sent You a Personal Message](mailto:lstefacek@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:59:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Laura Stefacek
5626 Oleatha Ave
Saint Louis, MO 63139
lstefacek@yahoo.com
(314) 353-1904

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Timby \(laurab2053@gmail.com\)](mailto:laurab2053@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:29:38 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Laura Timby
PO Box 25
Gilbert, AR 72636
laurab2053@gmail.com
(870) 439-2968

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Wright \(lwright21@slu.edu\) Sent You a Personal Message](mailto:lwright21@slu.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:54:01 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Laura Wright
5714 Walsh St
Saint Louis, MO 63109
lwright21@slu.edu
(573) 864-6593

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lauren Daniel \(laurendaniel98@gmail.com\)](mailto:laurendaniel98@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:39:19 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Lauren Daniel
2730 Dave Ward Dr
Conway, AR 72035
laurendaniel98@gmail.com
(501) 606-2534

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lauren Rapp \(laurenrapp@gmail.com\) Sent You a Personal Message](mailto:laurenrapp@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:47:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Lauren Rapp
2201 Stephen Ct
Saint Louis, MO 63110
laurenrapp@gmail.com
(314) 306-2187

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Leo Bierling \(lbier1@hotmail.com\) Sent You a Personal Message](mailto:lbier1@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:01:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Leo Bierling
10025 Zenith Ct
Saint Louis, MO 63123
lbier1@hotmail.com
(314) 544-4694

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Leslie Lewis \(leslew365@yahoo.com\) Sent You a Personal Message](mailto:leslew365@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 1:19:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Leslie Lewis
615 Jamison St
Blytheville, AR 72315
leslew365@yahoo.com
(870) 762-5499

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Linda Caldwell \(sedonan@msn.com\) Sent You a Personal Message](mailto:sedonan@msn.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:07:30 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Linda Caldwell
26 Mission Hills Ln
Eureka Springs, AR 72631
sedonan@msn.com
(479) 200-1752

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Linda Padgett \(hogrockinglinda@cox.net\)](mailto:hogrockinglinda@cox.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:34:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Linda Padgett
5719 S Berry Farm Dr
Rogers, AR 72758
hogrockinglinda@cox.net
(479) 569-0807

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Linda Swaty \(lswati2002@yahoo.com\) Sent You a Personal Message](mailto:Linda Swaty (lswati2002@yahoo.com) Sent You a Personal Message)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 6:23:04 AM

Dear Arkansas Department of Environmental Quality,

The health of Arkansans and Missourians is at stake.

It is the duty of the coal plants to have rigorous cleanup plans that actually protect the residents of Arkansas and Missouri. Take the responsible course of action!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Linda Swaty
751 N Woodlawn Ave
Saint Louis, MO 63122
lswati2002@yahoo.com
(314) 822-2934

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Linda Wigger Kraft \(createcenter@gmail.com\) Sent You a Personal Message](mailto:createcenter@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:28:56 PM

Dear Arkansas Department of Environmental Quality,

My dear friend suffers from asthma. Her health is threatened by polluted air your company is responsible for.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Linda Wigger Kraft
7275 Creveling Dr # 63130
Saint Louis, MO 63130
createcenter@gmail.com
(314) 866-1136

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lisa Hayes \(lisa.lynn.hayes@gmail.com\)](mailto:lisa.lynn.hayes@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 11:03:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Lisa Hayes
6105 Delmar Blvd
Saint Louis, MO 63112
lisa.lynn.hayes@gmail.com
(574) 261-8154

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lisa Tuxker \(lt269910@gmail.com\) Sent You a Personal Message](mailto:lt269910@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:08:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Lisa Tuxker
35 Brown St
Farmington, AR 72730
lt269910@gmail.com
(501) 352-0241

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lori Williamson \(sgwillia@charter.net\)](mailto:sgwillia@charter.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:39:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Lori Williamson
1024 Schulte Rd
Saint Louis, MO 63146
sgwillia@charter.net
(314) 872-3175

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lu Harding \(lu.harding@arumc.org\)](mailto:lu.harding@arumc.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:25:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Lu Harding
PO Box 96
Chidester, AR 71726
lu.harding@arumc.org
(501) 253-0851

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Luke Barnes \(lukebarnes02@gmail.com\)](mailto:lukebarnes02@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 4:27:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Luke Barnes
22 Wynona St
Fort Smith, AR 72901
lukebarnes02@gmail.com
(479) 353-8597

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lynae Wachter \(lynaelacostelo@hotmail.com\) Sent You a Personal Message](mailto:lynaelacostelo@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:00:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Lynae Wachter
3316 Calvert Ave
Saint Louis, MO 63114
lynaelacostelo@hotmail.com
(314) 429-5572

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lynne Clifton \(lynneclifton@att.net\) Sent You a Personal Message](mailto:LynneClifton@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:47:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Lynne Clifton
424 Keightly Dr
Little Rock, AR 72207
lynneclifton@att.net
(501) 940-4308

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Madelin Pajas \(mpajas@cox.net\) Sent You a Personal Message](mailto:mpajas@cox.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 7:25:48 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Madelin Pajas
31 Oniell Ln
Bella Vista, AR 72715
mpajas@cox.net
(479) 321-8887

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Madeline Marquette \(madgs@sbcglobal.net\) Sent You a Personal Message](mailto:madgs@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:57:26 PM

Dear Arkansas Department of Environmental Quality,

Thank you for taking these actions to keep the world healthy for our children.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Madeline Marquette
7818 Valley Forge Rd
Fort Smith, AR 72903
madgs@sbcglobal.net
(479) 478-7021

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mara Stoll \(ribomara@gmail.com\) Sent You a Personal Message](mailto:ribomara@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:40:52 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mara Stoll
418 Heathstone Ln
Saint Louis, MO 63122
ribomara@gmail.com
(314) 629-1022

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [MarÃa Dabrowski \(maria.i.dabrowski@wustl.edu\) Sent You a Personal Message](mailto:MarÃa_Dabrowski_(maria.i.dabrowski@wustl.edu)_Sent_You_a_Personal_Message)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:32:33 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Maria Dabrowski
6600 Washington Ave Apt 114
Saint Louis, MO 63130
maria.i.dabrowski@wustl.edu
(847) 507-2404

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [MarÅa Dabrowski \(maria.i.dabrowski@wustl.edu\) Sent You a Personal Message](mailto:maria.i.dabrowski@wustl.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:39:49 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Maria Dabrowski
6600 Washington Ave Apt 114
Saint Louis, MO 63130
maria.i.dabrowski@wustl.edu
(847) 507-2404

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Marcia Mcmichael \(ark3m@sbcglobal.net\) Sent You a Personal Message](mailto:ark3m@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:46:54 PM

Dear Arkansas Department of Environmental Quality,

Incredible that Arkansas, The Natural State, is still a pollutant!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Marcia Mcmichael
5 Lucir Ln
Hot Springs Village, AR 71909
ark3m@sbcglobal.net
(501) 915-0190

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Margaret Lincourt \(margaret@usscanman.com\) Sent You a Personal Message](mailto:margaret@usscanman.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:01:49 PM

Dear Arkansas Department of Environmental Quality,

We need to protect the health and lives of Americans. We cannot do that and simultaneously support coal fired plants in Arkansas. Please, please end coal pollution being generated by Arkansas plants. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Margaret Lincourt
2605 Charter Oak Dr
Little Rock, AR 72227
margaret@usscanman.com
(501) 224-2443

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Margean Kastner \(margeankastner@gmail.com\) Sent You a Personal Message](mailto:margeankastner@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 12:26:37 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Margean Kastner
1767 Robin Knoll Ct
Saint Louis, MO 63146
margeankastner@gmail.com
(314) 721-4848

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Margot Cameron \(margotcameron@gmail.com\)](mailto:margotcameron@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:19:20 PM

Dear Arkansas Department of Environmental Quality,

This is quite a nasty reality....the "Natural State". We should be ashamed.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Margot Cameron
114 N Summit St
Little Rock, AR 72205
margotcameron@gmail.com
(501) 612-5118

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Marian Beightol \(bxrldy2@aol.com\) Sent You a Personal Message](mailto:bxrldy2@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:27:45 PM

Dear Arkansas Department of Environmental Quality,

you must do a better job of reducing the pollution that is emitted from your coal plants. It affects both humans and the environment.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Marian Beightol
2579 E Meandering Way
Fayetteville, AR 72701
bxrldy2@aol.com
(479) 973-0017

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Marjorie Ivey \(m_ivey@sbcglobal.net\)](mailto:m_ivey@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:45:43 PM

Dear Arkansas Department of Environmental Quality,

Anyone with respiratory issues knows that clean air is a vital part of living and all agencies need to recognize their responsibility to achieve clean air.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Marjorie Ivey
28 Godwin Ln
Saint Louis, MO 63124
m_ivey@sbcglobal.net
(314) 993-2334

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mark Anthony \(ants126@hotmail.com\) Sent You a Personal Message](mailto:ants126@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:27:45 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

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Sincerely,

Mark Anthony
126 Lakeside Ln
Hot Springs, AR 71901
ants126@hotmail.com
(501) 622-8900

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mark Mcandrew \(mpmcandrew@me.com\)](mailto:mpmcandrew@me.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:47:46 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mark Mcandrew
6221 Northwood Ave Apt 1E
Saint Louis, MO 63105
mpmcandrew@me.com
(615) 661-4529

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mark Meinhardt \(mark7649@gmail.com\)](mailto:mark7649@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:58:13 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mark Meinhardt
3912 Crosby Dr
Saint Louis, MO 63123
mark7649@gmail.com
(314) 638-7553

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Marlene Sheetz \(sheetzm2@gmail.com\) Sent You a Personal Message](mailto:sheetzm2@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:29:01 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Marlene Sheetz
7722 Lile Ave
Saint Louis, MO 63117
sheetzm2@gmail.com
(314) 644-4151

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Martha Lowry \(mtlowry6246@sbcglobal.net\) Sent You a Personal Message](mailto:mtlowry6246@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:24:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Martha Lowry
105 Forest Bend Pl
Hot Springs, AR 71913
mtlowry6246@sbcglobal.net
(501) 463-4072

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Martha Strother \(gogreen7@yahoo.com\) Sent You a Personal Message](mailto:gogreen7@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:07:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Martha Strother
31 Glenmere Dr
Little Rock, AR 72204
gogreen7@yahoo.com
(501) 614-9688

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Marty Koenig \(naturelove77@gmail.com\) Sent You a Personal Message](mailto:naturelove77@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:58:16 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Marty Koenig
3908 Juniata St
Saint Louis, MO 63116
naturelove77@gmail.com
(314) 776-1463

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Ann Hilgeman \(mhilgeman@csjssl.org\)](mailto:mhilgeman@csjssl.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:31:02 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Ann Hilgeman
2 Nazareth Ln
Saint Louis, MO 63129
mhilgeman@csjssl.org
(314) 487-3950

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Chaudet \(srmarychaudet@hotmail.com\)](mailto:srmarychaudet@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:41:33 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Chaudet
2710 S Grand Blvd
Saint Louis, MO 63118
srmarychaudet@hotmail.com
(314) 723-0264

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Cornell \(mt.cornell@gmail.com\) Sent You a Personal Message](mailto:mt.cornell@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:03:47 PM

Dear Arkansas Department of Environmental Quality,

Stop coal pollution now! All living things deserve to breathe clean air.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Cornell
5635 Waterman Blvd Apt 12
Saint Louis, MO 63112
mt.cornell@gmail.com
(314) 203-9605

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Dobberstein \(maryjunk4005@gmail.com\) Sent You a Personal Message](mailto:maryjunk4005@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:51:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Dobberstein
4112 Federer St
Saint Louis, MO 63116
maryjunk4005@gmail.com
(314) 752-2944

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Dobberstein \(marebear4005@aol.com\) Sent You a Personal Message](mailto:marebear4005@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:11:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Dobberstein
4112 Federer St
Saint Louis, MO 63116
marebear4005@aol.com
(314) 752-2944

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Drevdahl \(drevdahl@uark.edu\) Sent You a Personal Message](mailto:drevdahl@uark.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:58:14 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mary Drevdahl
735 E Edna St
Fayetteville, AR 72703
drevdahl@uark.edu
(479) 443-3502

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Hellwig \(mzhellwig@gmail.com\) Sent You a Personal Message](mailto:mzhellwig@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:35:21 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mary Hellwig
6108 Washington Blvd. #301
Saint Louis, MO 63112
mzhellwig@gmail.com
(314) 281-0938

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Jo Stein \(maryjo.stein@doc.org\)](mailto:maryjo.stein@doc.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:48:44 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mary Jo Stein
1354 Tamm Ave
Saint Louis, MO 63139
maryjo.stein@doc.org
(314) 644-5375

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Kriegshauser \(periwinkle5103@sbcglobal.net\)](mailto:periwinkle5103@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 1:03:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mary Kriegshauser
5103 Donovan Ave
Saint Louis, MO 63109
periwinkle5103@sbcglobal.net
(314) 352-5155

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Stein \(steinsrm@doc.org\) Sent You a Personal Message](mailto:Mary_Stein@steinsrm@doc.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:33:39 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mary Stein
1354 Tamm Ave
Saint Louis, MO 63139
steinsrm@doc.org
(314) 644-5375

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Yopp \(myopp@paragould.net\) Sent You a Personal Message](mailto:myopp@paragould.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:55:56 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Yopp
1600 N 20th St
Paragould, AR 72450
myopp@paragould.net
(870) 239-9616

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Maureen Kelleher \(mekelleher@msn.com\) Sent You a Personal Message](mailto:mekelleher@msn.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:24:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Maureen Kelleher
9930 Edmil Ave
Saint Louis, MO 63114
mekelleher@msn.com
(314) 428-8886

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Megan Gasnier \(megan.gasnier@gmail.com\) Sent You a Personal Message](mailto:megan.gasnier@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:28:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Megan Gasnier
4211 Brandy Dr
Benton, AR 72015
megan.gasnier@gmail.com
(501) 626-5548

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Berg \(michael.berg+dupe@sierraclub.org\)](mailto:michael.berg+dupe@sierraclub.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:35:59 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Berg
1459 Gregg Ave
Saint Louis, MO 63139
michael.berg+dupe@sierraclub.org
(314) 456-1954

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Berg \(michael.berg@sierraclub.org\)](mailto:michael.berg@sierraclub.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:52:32 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Berg
1459 Gregg Ave.
Saint Louis, MO 63139
michael.berg@sierraclub.org
(314) 456-1954

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Garner \(michael.garner744@gmail.com\) Sent You a Personal Message](mailto:michael.garner744@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:45:39 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Garner
3140 N Malinda Dr
Fayetteville, AR 72703
michael.garner744@gmail.com
(479) 409-3706

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Hartupee \(michaelhartupee@gmail.com\) Sent You a Personal Message](mailto:michaelhartupee@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:33:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Hartupee
5922 Nashville Ave
Saint Louis, MO 63110
michaelhartupee@gmail.com
(573) 701-3979

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Olenjack \(stcknstl@att.net\) Sent You a Personal Message](mailto:stcknstl@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 8:39:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Olenjack
6515 Winona Ave
Saint Louis, MO 63109
stcknstl@att.net
(314) 555-5555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Sean Graves \(msg996@gmail.com\) Sent You a Personal Message](mailto:msg996@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:41:09 AM

Dear Arkansas Department of Environmental Quality,

Coal energy is archaic and needs to transition now into cleaner energy.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Sean Graves
3411 Hidden Valley Dr
Little Rock, AR 72212
msg996@gmail.com
(203) 613-3526

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Sheridan \(msheridan41417@gmail.com\) Sent You a Personal Message](mailto:msheridan41417@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:33:14 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Sheridan
10083 Sakura Dr
Saint Louis, MO 63128
msheridan41417@gmail.com
(314) 278-8989

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michele Isam \(hypatia755@sbcglobal.net\)](mailto:hypatia755@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:44:51 PM

Dear Arkansas Department of Environmental Quality,

Pollution doesn't stop at the state line!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michele Isam
4020 Delor St
Saint Louis, MO 63116
hypatia755@sbcglobal.net
(314) 296-8614

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michele Langston \(faeryraindancer@otbp.org\) Sent You a Personal Message](mailto:faeryraindancer@otbp.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 11, 2018 3:03:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Michele Langston
22116 Highway 107 Lot 28
Jacksonville, AR 72076
faeryraindancer@otbp.org
(919) 924-8356

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michelle Schultz \(damps44@att.net\) Sent You a Personal Message](mailto:damps44@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:37:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Michelle Schultz
44 Lake Forest Dr
Saint Louis, MO 63117
damps44@att.net
(314) 251-4173

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michelle Snyder \(snydercreativem@gmail.com\) Sent You a Personal Message](mailto:snydercreativem@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:05:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michelle Snyder
10124 Natural Trl
North Little Rock, AR 72113
snydercreativem@gmail.com
(501) 258-6487

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mindy Rouff \(mmrouff@gmail.com\) Sent You a Personal Message](mailto:mmrouff@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:30:07 PM

Dear Arkansas Department of Environmental Quality,

My husband has asthma and it sickens me that there has been technology available for 20 years that reduces smog yet you aren't using it. Stop polluting my city!
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mindy Rouff
3726 Hartford St
Saint Louis, MO 63116
mmrouff@gmail.com
(917) 749-5372

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Monica Mabry \(mmabry@acxiom.com\) Sent You a Personal Message](mailto:mmabry@acxiom.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:59:28 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Monica Mabry
1507 Prince St
Conway, AR 72034
mmabry@acxiom.com
(501) 336-8091

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nan Renaud \(nan.renaud@att.net\) Sent You a Personal Message](mailto:nan.renaud@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:30:34 PM

Dear Arkansas Department of Environmental Quality,

I had no idea this was happening. I am originally from St Louis living in Little Rock. Cease and desist now!!!!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nan Renaud
1401 N Pierce St
Little Rock, AR 72207
nan.renaud@att.net
(501) 539-0052

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nancy Bush \(ncybu@charter.net\) Sent You a Personal Message](mailto:ncybu@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:36:08 PM

Dear Arkansas Department of Environmental Quality,

WE ALL DESERVE CLEAN AIR. If I had a dog, you wouldn't want me to let his poo foul your air. We're neighbors so you should do the neighborly thing and clean up your emissions. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nancy Bush
9023 Argyle Ave
Saint Louis, MO 63114
ncybu@charter.net
(999) 999-9999

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nancy Hanway \(nhanway@mac.com\) Sent You a Personal Message](mailto:nhanway@mac.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 9:23:18 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nancy Hanway
1061 E Missouri Way
Fayetteville, AR 72701
nhanway@mac.com
(651) 224-2744

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nancy Schick \(nancyschick@gmail.com\) Sent You a Personal Message](mailto:nancyschick@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 2:57:16 PM

Dear Arkansas Department of Environmental Quality,

Coal is dead - these companies just don't know it. Get with the future; clean up your mess.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nancy Schick
2849 Laclede Station Rd
Saint Louis, MO 63143
nancyschick@gmail.com
(314) 791-5242

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nancy Thompson \(nancythompson7277@sbcglobal.net\)](mailto:nancythompson7277@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:18:38 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Nancy Thompson
7277 N Roland Blvd
Saint Louis, MO 63121
nancythompson7277@sbcglobal.net
(314) 952-9048

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nancy Torno \(antorno@hotmail.com\) Sent You a Personal Message](mailto:antorno@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:23:17 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Nancy Torno
5945 Southcrest Way
Saint Louis, MO 63129
antorno@hotmail.com
(314) 570-1181

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Natalie Mannering \(onawah@gmail.com\) Sent You a Personal Message](mailto:onawah@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:20:46 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Natalie Mannering
100 Victoria Woods Blvd Apt 13
Eureka Springs, AR 72632
onawah@gmail.com
(479) 555-1212

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nathan Fisher \(nperryfisher@yahoo.com\) Sent You a Personal Message](mailto:nperryfisher@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:42:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Nathan Fisher
7330 Winchester Dr
Saint Louis, MO 63121
nperryfisher@yahoo.com
(507) 258-2322

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nathaniel Carroll \(nathaniel.carroll@gmail.com\) Sent You a Personal Message](mailto:nathaniel.carroll@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:57:02 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nathaniel Carroll
41 S Schlueter Avenue
Saint Louis, MO 63135
nathaniel.carroll@gmail.com
(314) 502-4703

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nicole Roberts \(nroberts314@gmail.com\)](mailto:nroberts314@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:20:36 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nicole Roberts
2388 Sandra Sue Dr
Saint Louis, MO 63114
nroberts314@gmail.com
(314) 398-2388

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nina Corbin \(relnina47@att.net\) Sent You a Personal Message](mailto:relnina47@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:47:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Nina Corbin
4715 W. 29th
Little Rock, AR 72204
relnina47@att.net
(501) 666-8670

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Pamela Justice \(pajustice1973@gmail.com\) Sent You a Personal Message](mailto:pajustice1973@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:32:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Pamela Justice
11915 S Pleasant Valley Rd
Gentry, AR 72734
pajustice1973@gmail.com
(479) 220-5188

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Pamela Kell \(blues164@yahoo.com\) Sent You a Personal Message](mailto:blues164@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:42:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Pamela Kell
4323 Dewey Ave
Saint Louis, MO 63116
blues164@yahoo.com
(618) 541-9910

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Pamela Marks \(pamela.marks@att.net\) Sent You a Personal Message](mailto:pamela.marks@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:02:07 PM

Dear Arkansas Department of Environmental Quality,

SAVE OUR ENVIRONMENT!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Pamela Marks
2700 Missouri Ave
Saint Louis, MO 63118
pamela.marks@att.net
(314) 614-4576

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [PaMeLa MeInHaRdT \(p.meinhardt@hotmail.com\)](mailto:p.meinhardt@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:58:44 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

PaMeLa MeInHaRdT
3912 Crosby Drive
Saint Louis, MO 63123
p.meinhardt@hotmail.com
(314) 638-7553

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Patricia Depriest \(tishd@sbcglobal.net\) Sent You a Personal Message](mailto:tishd@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:49:48 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Patricia Depriest
424 Midland St
Little Rock, AR 72205
tishd@sbcglobal.net
(501) 940-7481

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Patricia Lackey \(lackeys@prodigy.net\)](mailto:lackeys@prodigy.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:31:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Patricia Lackey
131 Lindbergh Place Dr
Saint Louis, MO 63146
lackeys@prodigy.net
(314) 780-1323

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Patrick Keough \(paddykeo@sbcglobal.net\) Sent You a Personal Message](mailto:paddykeo@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:02:58 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Patrick Keough
7344 Coronado Ave
Saint Louis, MO 63116
paddykeo@sbcglobal.net
(314) 402-5477

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Patrick Quigley \(pquigs@gmail.com\) Sent You a Personal Message](mailto:pquigs@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:42:46 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Patrick Quigley
1035 Brownell Ave
Saint Louis, MO 63122
pquigs@gmail.com
(314) 578-3462

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Patti Beavers \(pbeavers2003@yahoo.com\) Sent You a Personal Message](mailto:pbeavers2003@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:42:37 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Patti Beavers
1290 Fox Run Ln
Elkins, AR 72727
pbeavers2003@yahoo.com
(479) 643-2841

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Pattie Heitzman \(wldrns20@aol.com\) Sent You a Personal Message](mailto:wldrns20@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:14:48 PM

Dear Arkansas Department of Environmental Quality,

As a constituent using Energy I would like for you to keep the air clean for ALL of us. Please do your job and don't weaken any regulations!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Pattie Heitzman
4009 Highplains Dr
Rogers, AR 72756
wldrns20@aol.com
(479) 216-4056

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Paul April \(psapril@charter.net\) Sent You a Personal Message](mailto:psapril@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:02:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Paul April
1100 Yale Ave
Saint Louis, MO 63117
psapril@charter.net
(314) 644-4876

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Paul Meers \(psmeers@gmail.com\) Sent You a Personal Message](mailto:psmeers@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 8:51:46 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Paul Meers
74 Novacaine Dr
Heber Springs, AR 72543
psmeers@gmail.com
(501) 206-7436

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Paul Ohlendorf \(pohlendorf@charter.net\) Sent You a Personal Message](mailto:pohlendorf@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, January 22, 2018 2:54:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Paul Ohlendorf
6480 Oakland Ave
Saint Louis, MO 63139
pohlendorf@charter.net
(314) 647-5971

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Paulette and Robert Bliss \(paulettebliss@gmail.com\) Sent You a Personal Message](mailto:paulettebliss@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:22:35 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Paulette and Robert Bliss
320 Union Blvd Apt 2
Saint Louis, MO 63108
paulettebliss@gmail.com
(314) 361-8690

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Paulette Zimmerman \(pzimmerman@ssndcp.org\) Sent You a Personal Message](mailto:pzimmerman@ssndcp.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:30:06 PM

Dear Arkansas Department of Environmental Quality,

Over my many years of teaching high school, I have seen the number of students suffering from asthma rise dramatically, especially in urban areas. This is unacceptable and you have the means to correct the situation. Act on behalf of people rather than profits.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Paulette Zimmerman
5254A Oleatha Ave
Saint Louis, MO 63139
pzimmerman@ssndcp.org
(314) 351-4427

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Pauline Michael \(pmic916@gmail.com\)](mailto:pmic916@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:39:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Pauline Michael
6808 Hawthorne Rd
Little Rock, AR 72207
pmic916@gmail.com
(224) 766-1045

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Peggy Kachulis \(packmo2@aol.com\) Sent You a Personal Message](mailto:packmo2@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 9:12:49 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Peggy Kachulis
2904 Wingate Ct
Saint Louis, MO 63119
packmo2@aol.com
(314) 968-8612

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Peggy Moody \(pmoody53@gmail.com\) Sent You a Personal Message](mailto:pmoody53@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:35:31 PM

Dear Arkansas Department of Environmental Quality,

I recently opened an account to give my solar to your mix. Please do not sully my clear renewable energy with dirty coal that pollutes and creates health issues particularly for children. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Peggy Moody
317 Marion County 5034
Yellville, AR 72687
pmoody53@gmail.com
(870) 449-4132

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Peter Allan Childs \(badd-pitt@sbcglobal.net\) Sent You a Personal Message](mailto:badd-pitt@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:58:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Peter Allan Childs
86 Hillside Dr Apt 102
Holiday Island, AR 72631
badd-pitt@sbcglobal.net
(918) 849-1998

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Philip Fredericks \(earthcare@pgtc.com\) Sent You a Personal Message](mailto:earthcare@pgtc.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:22:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Philip Fredericks
13060 Aristocrat Rd
West Fork, AR 72774
earthcare@pgtc.com
(479) 761-3394

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Phyllis Goicoechea \(phyIngroovy@gmail.com\) Sent You a Personal Message](mailto:Phyllis.Goicoechea@phyIngroovy@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 9:07:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Phyllis Goicoechea
7600 Angell Rd
Rogers, AR 72756
phyIngroovy@gmail.com
(479) 426-2140

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rachel Ammons \(t.chikn@gmail.com\) Sent You a Personal Message](mailto:t.chikn@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:14:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rachel Ammons
1103 3rd terrace
Barling, AR 72923
t.chikn@gmail.com
(479) 434-3122

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rachel Hale \(rachbhale@gmail.com\) Sent You a Personal Message](mailto:rachbhale@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 5:43:04 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rachel Hale
516 E 9th St
Little Rock, AR 72202
rachbhale@gmail.com
(501) 766-6926

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rachel Hendrix \(ravenousrachel@hotmail.com\) Sent You a Personal Message](mailto:ravenousrachel@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:17:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rachel Hendrix
401 S Pine St
Little Rock, AR 72205
ravenousrachel@hotmail.com
(928) 897-7477

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rachel Roberts \(rachelshareshian@gmail.com\) Sent You a Personal Message](mailto:rachelshareshian@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 11:28:42 PM

Dear Arkansas Department of Environmental Quality,

Please show wisdom and love instead of greed.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rachel Roberts
23 Warson Ter
Saint Louis, MO 63124
rachelshareshian@gmail.com
(314) 991-7734

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rebecca Corley \(footholdfarm@yahoo.com\) Sent You a Personal Message](mailto:Rebecca.Corley@footholdfarm@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, December 21, 2017 6:39:29 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rebecca Corley
HCR 70 Box 592
Jasper, AR 72641
footholdfarm@yahoo.com
(870) 861-5552

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rebecca Richardson \(rrichreba@yahoo.com\) Sent You a Personal Message](mailto:rrichreba@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 1:27:27 PM

Dear Arkansas Department of Environmental Quality,

Like many others, I suffer from asthma. Pollutants mean that I rarely get a break from breathlessness. Pollution kills slowly. I am dying in St Louis.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rebecca Richardson
9935 Meppen Dr
Saint Louis, MO 63128
rrichreba@yahoo.com
(314) 402-3402

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Renee Sutherland \(baumsuth.renee@gmail.com\)](mailto:baumsuth.renee@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:38:50 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Renee Sutherland
431 Lake Hamilton Drive, #C 10
Hot Springs, AR 71913
baumsuth.renee@gmail.com
(713) 408-9857

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Bonin \(rbonin@vt.edu\)](mailto:rbonin@vt.edu) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:21:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Bonin
11435 Daykin Dr
Saint Louis, MO 63146
rbonin@vt.edu
(314) 997-1111

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rhonda Leifheit \(rhondaleifheit@icloud.com\) Sent You a Personal Message](mailto:rhondaleifheit@icloud.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:56:43 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rhonda Leifheit
2726 Ellendale Ave
Saint Louis, MO 63143
rhondaleifheit@icloud.com
(314) 644-0641

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Boggeman \(jimboggeman@sbcglobal.net\) Sent You a Personal Message](mailto:jimboggeman@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 12:01:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Boggeman
6148 Washington Blvd
Saint Louis, MO 63112
jimboggeman@sbcglobal.net
(314) 725-2967

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Chism \(r.d.chism@gmail.com\) Sent You a Personal Message](mailto:r.d.chism@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:41:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Chism
209 Chisum Dr
Mountain Home, AR 72653
r.d.chism@gmail.com
(309) 267-9221

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Chism \(r.chism@comcast.net\)](mailto:r.chism@comcast.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:28:33 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Chism
209 Chisum Dr
Mountain Home, AR 72653
r.chism@comcast.net
(309) 267-9221

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Dietzen \(drdietzen@gmail.com\) Sent You a Personal Message](mailto:drdietzen@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:42:20 PM

Dear Arkansas Department of Environmental Quality,

Unbelievable that this technology has not been already required. Renewable energy and end-user conservation alternatives should be pursued as well.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Dietzen
362 Cadden Springs Rd
El Dorado, AR 71730
drdietzen@gmail.com
(870) 863-6444

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Finley \(richkat9@gmail.com\) Sent You a Personal Message](mailto:richkat9@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:39:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Richard Finley
8902 Mayflower Rd
Little Rock, AR 72205
richkat9@gmail.com
(501) 223-9129

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rita Mauchenheimer \(ramauch@hotmail.com\) Sent You a Personal Message](mailto:ramauch@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:40:30 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Rita Mauchenheimer
6029 Pershing Ave
Saint Louis, MO 63112
ramauch@hotmail.com
(314) 862-8039

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robbi Courtaway \(stlspirits@outlook.com\)](mailto:stlspirits@outlook.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:57:14 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robbi Courtaway
110 E Rose Ave
Saint Louis, MO 63119
stlspirits@outlook.com
(314) 625-6853

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Brewer \(rlb84@icloud.com\)](mailto:rlb84@icloud.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:47:28 PM

Dear Arkansas Department of Environmental Quality,

Coal is the fuel of the past. Time to move forward.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robert Brewer
517 S Lytton Ave
Fayetteville, AR 72701
rlb84@icloud.com
(479) 575-0061

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Brewer \(rlb84@icloud.com\)](mailto:rlb84@icloud.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:41:04 PM

Dear Arkansas Department of Environmental Quality,

You claimed that air quality would be the new focus of the EPA. Now's the time to prove it.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robert Brewer
517 S Lytton Ave
Fayetteville, AR 72701
rlb84@icloud.com
(479) 575-0061

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Pankratz \(rpankratz@hotmail.com\) Sent You a Personal Message](mailto:rpankratz@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:51:01 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robert Pankratz
801 N Hanley Rd
Saint Louis, MO 63130
rpankratz@hotmail.com
(314) 899-9854

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Pekel \(rjpekel@cox.net\) Sent You a Personal Message](mailto:rjpekel@cox.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:24:56 AM

Dear Arkansas Department of Environmental Quality,

It is far past time for clean energy - wind and solar. Let's embrace the 21st century, not go backwards. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robert Pekel
5862 S 45th St
Rogers, AR 72758
rjpekel@cox.net
(479) 586-7192

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Plunkett \(robertatfs@aol.com\) Sent You a Personal Message](mailto:robertatfs@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Saturday, December 23, 2017 12:30:08 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robert Plunkett
10909 Greyfriar Ln
Fort Smith, AR 72908
robertatfs@aol.com
(479) 806-4262

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Thomas \(bob.thomas1958@yahoo.com\) Sent You a Personal Message](mailto:bob.thomas1958@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:26:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robert Thomas
747 N Forest Ave
Saint Louis, MO 63119
bob.thomas1958@yahoo.com
(314) 239-4060

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robin Lenogue \(robin.lenogue@hotmail.fr\) Sent You a Personal Message](mailto:robin.lenogue@hotmail.fr)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, December 29, 2017 4:49:12 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robin Lenogue
PO Box 1684
Fayetteville, AR 72702
robin.lenogue@hotmail.fr
(479) 301-1886

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robin Whitten \(rdwhitten@windstream.net\) Sent You a Personal Message](mailto:rdwhitten@windstream.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:21:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robin Whitten
49 Barney Rd
Enola, AR 72047
rdwhitten@windstream.net
(501) 336-4978

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Roger Hall \(rogerhall68@gmail.com\) Sent You a Personal Message](mailto:rogerhall68@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:42:15 PM

Dear Arkansas Department of Environmental Quality,

This is not the way you treat your neighbors.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Roger Hall
9809 Brooks Lane
Little Rock, AR 72205
rogerhall68@gmail.com
(501) 744-8514

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Roger Mccurley \(mccurleyr@gmail.com\) Sent You a Personal Message](mailto:mccurleyr@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:24:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Roger Mccurley
6503 Arsenal St
Saint Louis, MO 63139
mccurleyr@gmail.com
(314) 781-3969

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Roy and Jill Moed \(jamoed@gmail.com\) Sent You a Personal Message](mailto:jamoed@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 7:31:48 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Roy and Jill Moed
725 S Skinker Blvd Apt 7S
Saint Louis, MO 63105
jamoed@gmail.com
(314) 725-6602

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ruth Karbalai \(jumanji59@aol.com\) Sent You a Personal Message](mailto:jumanji59@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:13:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Ruth Karbalai
7712 Williamsburg Rd
Fort Smith, AR 72903
jumanji59@aol.com
(479) 651-6260

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sally Morgan \(sallymorgan.stl@gmail.com\)](mailto:SallyMorgan.stl@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:04:59 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sally Morgan
21 Country Squire Ct
Saint Louis, MO 63146
sallymorgan.stl@gmail.com
(314) 993-2019

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Samantha Blanchard \(sammijoblanchard@gmail.com\) Sent You a Personal Message](mailto:sammijoblanchard@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:26:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Samantha Blanchard
5 Bardon Ln
Bella Vista, AR 72714
sammijoblanchard@gmail.com
(816) 804-9456

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Samantha Smith \(sl.smith944@gmail.com\)](mailto:sl.smith944@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:10:24 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Samantha Smith
931 Faulkner St
Conway, AR 72032
sl.smith944@gmail.com
(501) 548-7524

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Samantha Winner \(sleew1042@gmail.com\)](mailto:sleew1042@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:31:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Samantha Winner
15352 Putman Rd
Rogers, AR 72756
sleew1042@gmail.com
(479) 903-1022

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sandi Walters \(sandikayewalters@icloud.com\) Sent You a Personal Message](mailto:sandikayewalters@icloud.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:56:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sandi Walters
PO Box 85
Beaver, AR 72613
sandikayewalters@icloud.com
(479) 310-6035

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sandra Davis \(sandrakayedavis@gmail.com\) Sent You a Personal Message](mailto:sandrakayedavis@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:03:40 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sandra Davis
6 Eagle Shore Dr
Conway, AR 72032
sandrakayedavis@gmail.com
(501) 231-7027

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sandy Lynn \(sandinista72@yahoo.com\) Sent You a Personal Message](mailto:sandinista72@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, December 22, 2017 8:48:03 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sandy Lynn
7631 Lynn Ave
Saint Louis, MO 63130
sandinista72@yahoo.com
(314) 555-5555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sara Edgar \(sara.edgar@sierraclub.org\)](mailto:sara.edgar@sierraclub.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:58:34 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sara Edgar
3164 Portis Ave
Saint Louis, MO 63116
sara.edgar@sierraclub.org
(314) 497-8757

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sara Nelson \(saranell92@gmail.com\) Sent You a Personal Message](mailto:saranell92@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 25, 2018 11:39:27 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Sara Nelson
3206 Cherokee St
Saint Louis, MO 63118
saranell92@gmail.com
(314) 954-0715

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Scarlett Burroughs \(scarburro@gmail.com\) Sent You a Personal Message](mailto:scarburro@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:57:43 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Scarlett Burroughs
300 Thayer ST
Little Rock, AR 72205
scarburro@gmail.com
(501) 749-8035

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shannon Evans \(isabella818@hotmail.com\) Sent You a Personal Message](mailto:isabella818@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:27:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shannon Evans
209 Levin St
Hot Springs, AR 71901
isabella818@hotmail.com
(501) 538-8233

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shari Farrar \(shari.farrar@gmail.com\) Sent You a Personal Message](mailto:shari.farrar@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:05:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Shari Farrar
8521 Dugan Way
Hackett, AR 72937
shari.farrar@gmail.com
(479) 255-9332

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sharon Blackwell \(shaybwell@sbcglobal.net\) Sent You a Personal Message](mailto:shaybwell@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:59:32 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Sharon Blackwell
824 S Sappington Rd
Saint Louis, MO 63126
shaybwell@sbcglobal.net
(314) 971-0626

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sharon O'Grady \(sharonorgs@msn.com\)](mailto:sharonorgs@msn.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, December 21, 2017 1:44:38 PM

Dear Arkansas Department of Environmental Quality,

You must know about the technology that prevents this pollution. Such pollution is going to make life increasingly difficult for generations to come. It is not going to go away.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Sharon O'Grady
7654 Natural Bridge Rd
Saint Louis, MO 63121
sharonorgs@msn.com
(307) 399-1938

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sheila Campbell \(sbcampbell@charter.net\) Sent You a Personal Message](mailto:sbcampbell@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 1:56:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sheila Campbell
518 E Jefferson Ave
Saint Louis, MO 63122
sbcampbell@charter.net
(314) 822-3832

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shelia Carruth \(shecarruth@yahoo.com\) Sent You a Personal Message](mailto:shecarruth@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:40:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shelia Carruth
102 Baker
West Helena, AR 72390
shecarruth@yahoo.com
(870) 228-2784

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shelley Buonaiuto \(goodhelp@cybermesa.com\)](mailto:goodhelp@cybermesa.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:58:22 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shelley Buonaiuto
13866 Pin Oak Rd
Fayetteville, AR 72704
goodhelp@cybermesa.com
(479) 445-6772

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sheri Snyder \(dreamcatcherco@sbcglobal.net\)](mailto:dreamcatcherco@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 9:52:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sheri Snyder
6201 Radom Ave
Saint Louis, MO 63116
dreamcatcherco@sbcglobal.net
(314) 481-0786

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sherlene Watkins \(sherlene1949@gmail.com\)](mailto:sherlene1949@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:04:07 PM

Dear Arkansas Department of Environmental Quality,

We must be proactive in protecting the air quality and water quality.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sherlene Watkins
1126 Pleasant Hill Rd
Mulberry, AR 72947
sherlene1949@gmail.com
(208) 965-8117

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sherry Johnson \(sjohnson.lrar@gmail.com\) Sent You a Personal Message](mailto:sjohnson.lrar@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:16:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sherry Johnson
2701 Aldersgate Rd
Little Rock, AR 72205
sjohnson.lrar@gmail.com
(501) 308-2128

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shirley Crenshaw \(shirlcrenshaw1@yahoo.com\) Sent You a Personal Message](mailto:shirlcrenshaw1@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:07:29 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shirley Crenshaw
1411 Willow Brook Cv
Saint Louis, MO 63146
shirlcrenshaw1@yahoo.com
(314) 994-2181

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shirley Crenshaw \(shirlcrenshaw1@yahoo.com\) Sent You a Personal Message](mailto:shirlcrenshaw1@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 7:33:48 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shirley Crenshaw
1411 Willow Brook Cv Apt 10
Saint Louis, MO 63146
shirlcrenshaw1@yahoo.com
(314) 994-2181

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shirley Ferguson \(skferg@juno.com\) Sent You a Personal Message](mailto:skferg@juno.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:06:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shirley Ferguson
8675 Rosalie Ave
Saint Louis, MO 63144
skferg@juno.com
(314) 962-1768

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shirley Pharis \(sptaurus5146@aol.com\) Sent You a Personal Message](mailto:sptaurus5146@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:08:59 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shirley Pharis
212 Taylor Park Dr
Little Rock, AR 72211
sptaurus5146@aol.com
(501) 219-9575

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stacy Clark \(bookhousegirl79@gmail.com\) Sent You a Personal Message](mailto:Stacy.Clark@bookhousegirl79@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:45:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stacy Clark
1900 Deerwood Dr
Jonesboro, AR 72404
bookhousegirl79@gmail.com
(870) 931-5458

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stephanie Holbert \(sshaw3@my.hpu.edu\)](mailto:sshaw3@my.hpu.edu) [Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:10:58 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stephanie Holbert
1588 Highway 62 412
Highland, AR 72542
sshaw3@my.hpu.edu
(870) 847-3785

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stephanie Johnson \(sjohnson704@gmail.com\) Sent You a Personal Message](mailto:sjohnson704@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:57:01 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Stephanie Johnson
3900 Dave Ward Dr Ste 1900
Conway, AR 72034
sjohnson704@gmail.com
(501) 548-7372

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stephen Eveld \(stepheneveld22@gmail.com\)](mailto:stepheneveld22@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:11:13 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Stephen Eveld
4172 Russell Blvd., Apt. 2E
St. Louis, MO 63110
stepheneveld22@gmail.com
(207) 468-0642

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stephen Hooks \(glen.hooks@sierraclub.org\) Sent You a Personal Message](mailto:glen.hooks@sierraclub.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:00:43 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stephen Hooks
1308 W 2nd St
Little Rock, AR 72201
glen.hooks@sierraclub.org
(501) 301-8280

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stephen Kille \(junk2mud@gmail.com\) Sent You a Personal Message](mailto:junk2mud@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:32:37 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stephen Kille
2925 Greenmont Ct
Imperial, MO 63052
junk2mud@gmail.com
(636) 867-5309

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Steve Disch \(spcdisch@aol.com\)](mailto:spcdisch@aol.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:39:35 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Steve Disch
2381 Fairroyal Dr
Saint Louis, MO 63131
spcdisch@aol.com
(314) 440-0870

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Steve Hooper \(stepahoop@yahoo.com\) Sent You a Personal Message](mailto:stepahoop@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:32:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Steve Hooper
329 Glenstone Dr
Mountain Home, AR 72653
stepahoop@yahoo.com
(870) 425-8294

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Steven Sloan \(ssloan.om@gmail.com\)](mailto:ssloan.om@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:44:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Steven Sloan
4530 Shenandoah Ave
Saint Louis, MO 63110
ssloan.om@gmail.com
(314) 302-9120

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Steven Strode \(strodestevenw@comcast.net\)](mailto:strodestevenw@comcast.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 11:31:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Steven Strode
104 Charter Ct
Sherwood, AR 72120
strodestevenw@comcast.net
(501) 551-9796

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stewart Scholl \(scottys@comcast.net\) Sent You a Personal Message](mailto:scottys@comcast.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:35:49 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stewart Scholl
611 Edswood Rd
Little Rock, AR 72223
scottys@comcast.net
(501) 821-2743

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sue Leahy \(sleahy@sbcglobal.net\)](mailto:sleahy@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 1:36:16 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Sue Leahy
2833 Manderly Dr
Saint Louis, MO 63144
sleahy@sbcglobal.net
(314) 962-2318

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Susan M. Hardin \(whizcats@sbcglobal.net\)](mailto:whizcats@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:28:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Susan M. Hardin
804 Konrad Ct
Little Rock, AR 72223
whizcats@sbcglobal.net
(501) 821-4073

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Susan Kaiser \(konya210@yahoo.com\)](mailto:konya210@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:36:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Susan Kaiser
2444 Helen Ave
Saint Louis, MO 63144
konya210@yahoo.com
(314) 725-5881

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Suzanne Huesgen \(suwho8@gmail.com\) Sent You a Personal Message](mailto:suwho8@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:38:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Suzanne Huesgen
2107 s. Grand #604
St Louis, MO 63104
suwho8@gmail.com
(314) 320-9594

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Susie Getzschman \(getschs@gmail.com\) Sent You a Personal Message](mailto:getschs@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:17:04 PM

Dear Arkansas Department of Environmental Quality,

Sop working against the health of the people of the United States!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Susie Getzschman
2662 McKnight Crossing Ct
Saint Louis, MO 63124
getschs@gmail.com
(314) 716-3898

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sylvia Amsler \(apegirl_amsler@hotmail.com\) Sent You a Personal Message](mailto:apegirl_amsler@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 9:41:07 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Sylvia Amsler
215 Crystal Ct
Little Rock, AR 72205
apegirl_amsler@hotmail.com
(501) 663-4691

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Teighlor Chaney \(teighlorchaney@gmail.com\) Sent You a Personal Message](mailto:teighlorchaney@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:27:41 PM

Dear Arkansas Department of Environmental Quality,

As an Arkansas resident I care not only about keeping my state clean, but the U.S, and the entire world! We need to recognize the damage we do and find solutions to alleviate the pain we cause. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Teighlor Chaney
1 Howard Ln
Little Rock, AR 72206
teighlorchaney@gmail.com
(501) 239-0557

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Teri Patrick \(contactteri@gmail.com\) Sent You a Personal Message](mailto:Teri.Patrick@contactteri@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 8:43:01 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Teri Patrick
9 Athena Ct
Little Rock, AR 72227
contactteri@gmail.com
(501) 804-5021

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terri Green \(jagtyg93@yahoo.com\) Sent You a Personal Message](mailto:jagtyg93@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:39:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terri Green
5002 S 28th St
Paragould, AR 72450
jagtyg93@yahoo.com
(870) 897-3814

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terri Jones \(terrinej62@gmail.com\) Sent You a Personal Message](mailto:terrinej62@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:36:03 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terri Jones
309 W Houston St
Greenwood, AR 72936
terrinej62@gmail.com
(479) 252-6023

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terry Kippenberger \(tmkipp@att.net\) Sent You a Personal Message](mailto:tmkipp@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:09:12 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terry Kippenberger
7150 Princeton Ave
Saint Louis, MO 63130
tmkipp@att.net
(314) 721-8090

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terry Tremwel \(terry@trem-wel.com\)](mailto:terry@trem-wel.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 12:44:28 AM

Dear Arkansas Department of Environmental Quality,

Xcel Energy in Colorado got 96 bids at a median price of \$18.10 per MWH for over 42 GW of wind alone and 11 bids on wind plus battery storage at a median price of \$21 per MWH for a total of 5.7 GW. The incremental increase from the storage is less than the cost of a gas turbine peaker plant. This is presumably due to the extremely low cost of electricity from wind in Colorado, while natural gas peakers are the source of the most expensive marginal electricity prices because of the inefficiency of peakers in burning NG. For solar PV, Xcel got 152 bids at a median price of \$29.50 per MWH for a total of almost 30 GW of total bids, and 87 bids on solar PV and battery storage at a median price of \$36 per MWH for almost 17 GW of total bids. The last are similar to merely operating the dirty coal plants at White Bluff and Independence. Arkansas has better solar resources than Colorado. The wind plus storage bids are cheaper than the operating cost of the White Bluff coal plant. SW EPCO shows that Arkansas utilities can access some of the cheapest wind electricity in the world with Capacity Factors above 50%.

SWEPCO to save customers over \$5 billion by buying 1.4 GW of 50% CF wind power from Oklahoma. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terry Tremwel
515 W Skyline Dr
Fayetteville, AR 72701
terry@trem-wel.com
(479) 414-0956

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terry Tremwel \(terry@trem-wel.com\)](mailto:terry@trem-wel.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 1:02:23 AM

Dear Arkansas Department of Environmental Quality,

Xcel Energy in Colorado got 96 bids at a median price of \$18.10 per MWH for over 42 GW of wind alone and 11 bids on wind plus battery storage at a median price of \$21 per MWH for 5.7 GW. Merely operating the dirty coal plant at White Bluff is more expensive. The incremental increase from the storage is less than the cost of a gas turbine peaker plant. This is due to the extremely low cost of electricity from wind in Colorado, while natural gas peakers have the most expensive electricity prices because of the inefficiency of peakers in burning NG. For solar PV, Xcel got 152 bids at a median price of \$29.50 per MWH for almost 30 GW, and 87 bids on solar PV and battery storage at a median price of \$36 per MWH for almost 17 GW. Arkansas has better solar resources than Colorado. SWEPCO shows that Arkansas utilities can access some of the cheapest wind electricity in the world with a CFs above 50%, will save customers over \$5 billion by buying 1.4 GW of wind power from Oklahoma. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terry Tremwel
515 W Skyline Dr
Fayetteville, AR 72701
terry@trem-wel.com
(479) 414-0956

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terry Tremwel \(terry@trem-wel.com\)](mailto:terry@trem-wel.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 12:03:41 AM

Dear Arkansas Department of Environmental Quality,

In addition, Xcel Energy in Colorado got 96 bids at a median price of \$18.10 per MWH for over 42 GW of wind alone and 11 bids on wind plus battery storage at a median price of \$21 per MWH for a total of 5.7 GW. The incremental increase from the storage is less than the cost of a gas turbine peaker plant. This is presumably due to the extremely low cost of electricity from wind in Colorado, while natural gas peakers are the source of the most expensive marginal electricity prices because of the inefficiency of peakers in burning NG. For solar PV, Xcel got 152 bids at a median price of \$29.50 per MWH for a total of almost 30 GW of total bids, and 87 bids on solar PV and battery storage at a median price of \$36 per MWH for almost 17 GW of total bids. The last are similar to merely operating the dirty coal plants at White Bluff and Independence. Arkansas has better solar resources than Colorado. So, the wind plus storage bids are cheaper than the operating cost alone of the White Bluff or Independence coal plants. SWEPCO proved that Arkansas utilities have access to some of the cheapest and most reliable wind electricity in the world with Capacity Factors above 50%.

Also, SWEPCO reports that they are going to save their customers over \$5 billion by buying 1400 MW of 50% CF wind power from Western Oklahoma. This size is comparable to each of the double units White Bluff and Independence.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terry Tremwel
515 W Skyline Dr
Fayetteville, AR 72701
terry@trem-wel.com
(479) 414-0956

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the

sender information.

From: [Terry Tucker \(anotherboy@gmail.com\) Sent You a Personal Message](mailto:anotherboy@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 9:25:41 AM

Dear Arkansas Department of Environmental Quality,

This plant has been in operation for 30 years, still spewing pollution into the atmosphere. Quit polluting Mother Earth.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terry Tucker
2957 W Country Club Rd
Searcy, AR 72143
anotherboy@gmail.com
(501) 268-1687

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Thomas Calhoun \(tom.calhoun3@gmail.com\) Sent You a Personal Message](mailto:tom.calhoun3@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:30:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Thomas Calhoun
316 Maderas Dr
Hot Springs Village, AR 71909
tom.calhoun3@gmail.com
(501) 765-4827

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Thomas Franck \(tom@talbotheirs.com\) Sent You a Personal Message](mailto:tom@talbotheirs.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:51:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Thomas Franck
2304 Ballard Rd
Cabot, AR 72023
tom@talbotheirs.com
(901) 326-7028

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Thomas Mcginnis \(ppjn@aol.com\) Sent You a Personal Message](mailto:ppjn@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, January 23, 2018 1:36:32 PM

Dear Arkansas Department of Environmental Quality,

We as human beings are now at a particular time in our history to make decisions that will guarantee whether or not we will have a future at all. Those of us with the power to make changes that will save lives still seem more preoccupied with the kind of profiteering off of toxic energy sources that will ultimately poison our planet while simultaneously destroying the resources (air/food/water) that no living being can survive without. When smoke and toxic fumes dissipate into our air...It is still there. When oil, coal ash, fracking chemicals, and nuclear waste leaks into our oceans, lakes, rivers, and groundwater...It is still there. When any of these toxins seep into our earth...It is still there.

"Out of sight" may mean "out of mind" to those lacking common sense, but the more we pour poisons into our environment, the more we will feel and see the effects...and ultimately all life will end without a sustainability agenda that all humans must honor. The path we are already on leads only towards a slow suicide on a planetary scale...and it picks up speed every day we ignore the truth.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Thomas Mcginnis
7361 Stanford Ave
Saint Louis, MO 63130
ppjn@aol.com
(314) 918-2630

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Thomas Sanger \(tsanger@charter.net\) Sent You a Personal Message](mailto:tsanger@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 5:09:23 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Thomas Sanger
4346 Juniata St
Saint Louis, MO 63116
tsanger@charter.net
(314) 707-9676

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Thomas Williams \(tchiefw@aol.com\) Sent You a Personal Message](mailto:tchiefw@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 12:20:12 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Thomas Williams
PO Box 510507
Saint Louis, MO 63151
tchiefw@aol.com
(314) 479-2331

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Tina Pryor \(tinaslilfarm@yahoo.com\) Sent You a Personal Message](mailto:tinaslilfarm@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:44:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Tina Pryor
654 Cook St
Ward, AR 72176
tinaslilfarm@yahoo.com
(501) 843-1366

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Tom Utley \(tutley@eef.com\) Sent You a Personal Message](mailto:tutley@eef.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:21:45 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Tom Utley
321 Charles St
Little Rock, AR 72205
tutley@eef.com
(501) 920-7211

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Tommi West \(twest7@hotmail.com\)](mailto:twest7@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:15:51 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Tommi West
1201 Military Rd Ste 2
Benton, AR 72015
twest7@hotmail.com
(501) 317-7018

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Tonya hi Russell \(tonyalynnette97@yahoo.com\) Sent You a Personal Message](mailto:tonyalynnette97@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:27:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Tonya hi Russell
6003 Leabrook Ln
Sherwood, AR 72120
tonyalynnette97@yahoo.com
(501) 351-7998

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Tracy Floeh \(tracy@paylifeforward.com\) Sent You a Personal Message](mailto:tracy@paylifeforward.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:52:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Tracy Floeh
7400 Teasdale Ave
Saint Louis, MO 63130
tracy@paylifeforward.com
(314) 853-9653

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Trina Walls \(trinawalls40@gmail.com\) Sent You a Personal Message](mailto:trinawalls40@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:29:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Trina Walls
311 Maple St
Star City, AR 71667
trinawalls40@gmail.com
(870) 370-4737

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [A Lenox \(ajcl7@yahoo.com\) Sent You a Personal Message](mailto:ajcl7@yahoo.com)
To: [Treece, Tricia](#)
Subject: You Must Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:31:32 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

A Lenox
7269 Princeton Ave
Saint Louis, MO 63130
ajcl7@yahoo.com
(314) 555-5555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.



Arkansas Electric Cooperative Corporation

Reliable • Affordable • Responsible

1 Cooperative Way
P.O. Box 194208
Little Rock, Arkansas 72219-4208
(501) 570-2200

Submitted electronically to treecep@adeq.state.ar.us on February 2, 2018

Tricia Treece
Office of Air Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

RE: Comments on Proposed Revisions to the 2008 Regional Haze State Implementation Plan

Dear Ms. Treece:

Arkansas Electric Cooperative Corporation (AECC) respectfully submits these comments on the Proposed Revisions to the 2008 Regional Haze State Implementation Plan (SIP). As the owner or co-owner of seven electricity generating units discussed in the proposal, AECC has much interest in the outcome of this plan.

AECC's ownership of these units is described below.

- 100% of Carl E. Bailey Generating Station Unit 1;
- 100% of John L. McClellan Generating Station Unit 1;
- 50% of Flint Creek Power Plant Unit 1;
- 35% of White Bluff Steam Electric Station Units 1 and 2; and
- 35% of Independence Steam Electric Station Units 1 and 2.

AECC supports ADEQ in its decision to replace the federal implementation plan (FIP)¹ with a SIP. AECC believes that, as proposed, the SIP is a very beneficial improvement over the FIP – not only for AECC and its members but also the state as a whole.

AECC agrees with ADEQ that no add-on controls beyond best available retrofit technology (BART) controls are necessary for reasonable progress during the 2008-2018 planning period.² AECC agrees that installation of add-on controls is neither reasonable nor necessary to achieve reasonable progress for the 1st planning period. This is especially true since monitoring data

¹ Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Final Rule (81 FR 66332, September 27, 2016)

² Proposed Revisions to the 2008 Regional Haze State Implementation Plan at 46 (Issued by ADEQ on October 31, 2017)

demonstrates that Arkansas' two Class I areas are currently meeting their Reasonable Progress Goals and are expected to continue to meet those goals through the second planning period.³

AECC requests that ADEQ edit the language describing the White Bluff plant as "installed in 1974." The two units at the White Bluff plant meet EPA's definition of "in existence" in 1974 which makes them BART-eligible; however, the two units were not commissioned until 1980 (Unit 1) and 1981 (Unit 2).

Specifically, in the second paragraph in Section D on page 21 of the proposed SIP, AECC requests that "installed in 1974" be changed to "in existence in 1974".

AECC requests that ADEQ remove any language that may indicate that the two Independence units are nearing the end of their useful lives. The term "aging" is used to describe the Independence plant on page 47 of the proposed SIP. AECC believes that these units are designed to operate for 60 or more years if maintained properly; therefore, given the commissioning dates of these units, they have several decades of useful life remaining.

AECC requests that the word "aging" be eliminated from the description of the Independence plant on page 47 of the proposed SIP.

This concludes AECC's comments.

Sincerely,



Stephen Cain
Manager – Environmental Compliance

xc: Jennifer Loiacano

³ *State of the Air in Arkansas* at pp. 35 and 36. (Issued by ADEQ on December 2, 2016.)



Arkansas
Environmental
Federation

Industries for the Environment

Plaza West – Suite 835 – 415 North McKinley Street

Little Rock, AR 72205

Phone: 501-374-0263 Fax: 501-374-8752

www.environmentark.org

February 2, 2018

Ms. Tricia Treece
Office of Air Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

Re: Revisions to Arkansas Regional Haze State Implementation Plan (AR RH SIP)

Dear Ms. Treece:

The Arkansas Environmental Federation (AEF) is a non-profit association with over 200 members, primarily Arkansas businesses and industries that manufacture products, provide services, and employ skilled workers in Arkansas while also insuring that their operations comply with all federal and state environmental, safety and health regulations. As such, the AEF and its members have an ongoing interest in the State's Regional Haze SIP. We respectfully submit the following analyses:

The U.S. Environmental Protection Agency (EPA) has recently granted reconsideration to certain aspects of the 2017 Regional Haze Rule Revisions¹. In light of this reconsideration, as well as the ongoing legal challenges to these 2017 revisions, ADEQ should avoid reliance on the 2017 revisions and associated draft guidance in the development of this Regional Haze SIP.

ADEQ takes inconsistent positions in its Petition for Reconsideration of the FIP and the proposed replacement SIP regarding the need for a reasonable progress analysis. Arkansas is already below the glidepath for the first planning period, so no reasonable progress analysis is necessary. Arkansas appealed the FIP based on the imposition of controls even though the State was already meeting the reasonable progress goals EPA established in the FIP, but the State is now relying upon the same assessment that it appealed in crafting the replacement SIP. The State should continue to find that a reasonable progress analysis is not necessary to evaluate controls where evidence indicates that Arkansas will achieve reasonable progress without any controls.

The threshold issue when addressing reasonable progress is whether further actions are *necessary* to ensure that visibility improvement is continuing on or below the glidepath. The CAA requires implementation plans to “contain such emission limits, schedules of compliance and other measures as

¹ <https://www.epa.gov/visibility/epas-decision-revisit-aspects-2017-regional-haze-rule-revisions> (Jan. 18, 2018)

may be necessary to make reasonable progress.” See 42 U.S.C. § 7491(b)(2) (emphasis added). Consistent with this, EPA’s Reasonable Progress Guidance² makes clear that reasonable progress controls may not be necessary in the first planning period, noting that, “[g]iven the significant emissions reductions that we anticipate to result from BART” and other Clean Air Act programs “it may be all that is necessary to achieve reasonable progress in the first planning period.”). Reasonable Progress Guidance at 4-1. See also, *id.* at 1-4 (“[Y]ou should take into account the fact that the long-term goal of no manmade impairment encompasses several planning periods. It is reasonable for you to defer reductions to later planning periods in order to maintain a consistent glidepath toward the long term goal.”). ADEQ may require additional controls only if further action beyond BART and other CAA programs is *necessary* for reasonable progress in this planning period.

ADEQ’s current approach also may limit its ability to change course in the second and subsequent planning periods. An EPA approval of ADEQ’s decision to perform an unnecessary reasonable progress analysis may limit ADEQ’s discretion if it were to determine in a future planning period that a reasonable progress analysis is unnecessary under similar conditions (i.e., visibility improvement is on or below the glide path based on emissions reductions already occurring so that further controls are not needed). ADEQ might be forced to assess reasonable progress controls even if visibility improvement exceeds the goals, increasing the likelihood that future unnecessary controls would be imposed upon Arkansas point sources.

ADEQ’s focus on a source-specific reasonable progress analysis sets a precedent that could force more sources to install controls in the second planning period. EPA’s guidance makes it clear that states have flexibility in evaluating the statutory factors and including other factors determined to be relevant but ADEQ has focused its analysis narrowly and failed to consider other important factors. More troubling, ADEQ’s approach endorses the very Regional Haze Rule revisions that EPA has adopted which limits state discretion in conducting reasonable progress analyses. This is particularly troubling for Arkansas given that it is already below the glidepath for the first planning period. ADEQ is unnecessarily setting a precedent that may be difficult to avoid for future planning periods.

If ADEQ determines a reasonable progress analysis nonetheless is required, then it should be a broader analysis than the one ADEQ conducted, looking at more sources and at all relevant factors rather than a source-specific analysis. Specifically, such an analysis should look at all relevant sources as well as beyond the four statutory reasonable progress factors: (1) non-air quality environmental impacts, (2) cost of compliance, (3) time necessary for compliance, and (4) RUL. See 42 U.S.C. § 7491(g)(1).

ADEQ is not limited to consideration of the four factors mandated by the CAA. Instead, ADEQ has authority to consider other relevant factors, and it should do so here. EPA’s Reasonable Progress Guidance, which applies to the first planning period, is clear that the four statutory factors are the *minimum* that ADEQ must consider. In other words, when determining reasonable progress, states can consider other factors that it has found to be relevant. See Reasonable Progress Guidance at 5-1 (“In determining reasonable progress, CAA § 169A(g)(1) requires States to take into consideration a number of factors. However, you have flexibility in how to take into consideration these statutory factors and any other factors that you have determined to be relevant.”). ADEQ also is not limited to an analysis that mirrors a BART analysis in analyzing reasonable progress controls. For example, EPA has explained

² U.S. EPA, *Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program* (June 1, 2007) (hereinafter Reasonable Progress Guidance”). Available at: https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/20070601_wehrum_reasonable_progress_goals_reghaze.pdf.

that the cost of compliance factor for reasonable progress purposes – one of the factors that overlaps with a BART analysis – “can be interpreted to encompass the cost of compliance for individual sources or source categories, and more broadly the implication of compliance costs to the health and vitality of industries within a state.” Reasonable Progress Guidance, at 5-1.

In summary, ADEQ should:

- Continue to find that a reasonable progress analysis is not necessary to evaluate controls where evidence indicates that Arkansas will achieve reasonable progress without any controls; and
- Resist the application of source-specific reasonable progress analysis under the circumstances, i.e. visibility improvement is on or below the glide path based on emissions reductions already occurring so that further controls are not needed.

Thank you for your attention to this matter and the opportunity to comment on the pending revisions to the Arkansas Regional Haze State Implementation Plan.

Sincerely,

Charles M. Miller

Charles M Miller
Executive Director

Treece, Tricia

From: Annee Littell <anneelittell@yahoo.com>
Sent: Monday, December 18, 2017 3:48 PM
To: Treece, Tricia
Subject: Regional Haze: SIP Revision

I am writing in to express my outrage that the Arkansas Department of Environmental Quality (ADEQ) is proposing to weaken the plan that the EPA created for our state. Clean air is essential to the health of the people of Arkansas and also to the health of the animals and plants of our state. ADEQ should be holding the power companies that are polluting our air to higher standards not trying to allow them to continue with pollution business as usual. Please scrap this weak plan and adopt the stronger plan that the EPA wrote for us. I understand that ADEQ failed to come up with our own plan earlier which necessitated that the EPA write a plan for us. ADEQ is not living up to its name, that's for sure. Please put in place changes that will improve the air quality in our wild areas as well in the whole state.

Annee Littell, 517 E. Johnson St., Fayetteville, AR 72701 479 521-2164

From: [DAN SCHEIMAN](#)
To: [Treece, Tricia](#)
Subject: Arkansas State Implementation Plan for Regional Haze
Date: Monday, January 22, 2018 8:54:06 PM

Ms. Treece,

I am writing to express my concern regarding revisions to Arkansas's Regional Haze SIP.

Haze reduction is more than a decade overdue in Arkansas, yet ADEQ's proposed plan will delay haze reduction even further. ADEQ should not reject the robust EPA plan in favor a plan that will result in dirtier air and less haze reduction in our parks. If not for ADEQ's decade of delay and obstruction, we would be well into implementing the EPA's haze reduction plan and improving visibility in our Arkansas parks and wilderness areas that I cherish.

I ask that ADEQ revise its proposed plan to include scrubbers on the massive White Bluff and Independence coal-burning power plants. SWEPCO's Flint Creek coal-burning power plant installed a scrubber last summer, and now it is time for White Bluff and Independence to have scrubbers. I also ask that ADEQ's plan retain source-specific NOx limits instead of the trading program.

ADEQ should stop delaying haze reduction and do its job! Be a proponent for high air quality.

Sincerely,

Daniel Scheiman

Little Rock, AR

From: [Andrew Jewell](#)
To: [Treece, Tricia](#)
Subject: Clean Air Act Hearing
Date: Friday, January 19, 2018 7:38:37 AM

Ms. Treece,

My name is Mason Jewell and I am a junior at the University of Arkansas. It has come to my attention that the ADEQ's Haze Reduction plan required by the Clean Air Act has some major issues. By not requiring scrubbers at coal-burning power plants we are ensuring that haze, and the harmful particles that make it up, continue to damage both the aesthetic beauty of our Natural State, and the health of the people, plants, and animals that call it home.

An emissions trading program in lieu of point-source limits defeats the purpose of the initiative. Power plants will continue to release harmful emissions into the air, and while the statewide average may be reduced, those areas surrounding each plant will get the same amount of, if not more, pollution.

As a college student and now majority age citizen, actions like these from an institution that is supposed to protect my environment, *my home*, are worrisome. I hope that your organization will make the decision that is in the best interest of the state and its people, not the power companies. My generation is watching and planning for the inevitable repairs that will have to be made to existing societal systems. Don't add this issue to a growing legacy of environmental blunders. It's not too late.

Sincerely,
Mason Jewell

Mason Jewell
University of Arkansas, Fayetteville
B.S. Biological Engineering
Spanish & Sustainability Minor

From: mjb@conwaycorp.net
To: [Treece, Tricia](#)
Subject: Clean Air Act
Date: Thursday, January 18, 2018 9:15:45 PM

Guys,

We need cleaner air and water, not less so. I want to climb Pinnacle and not see haze in every direction. I want to save more elderly and children from premature deaths due to exposure to particulate matter. I'd like to eat the fish I catch without fear of exposure to too much mercury. Please do your jobs and put the needs of the majority of Arkansans over the greed of the few that profit from polluting. We can grow our economy and invest in clean energy jobs and have cleaner air and water. It's not either/or.

sincerely,

Matthew Bintliff



Domtar
Ashdown Mill
285 Hwy 71 South
Ashdown, AR 71822
Tel.: (870) 898-2711
kelley.crouch@domtar.com

Submitted electronically to Treecep@adeq.state.ar.us

February 2, 2018

Ms. Tricia Treece
Office of Air Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

Re: Proposed Revisions to the Arkansas State Implementation Plan – Regional Haze SIP
Revisions for 2008-2018 Planning Period, October 2017

Dear Ms. Treece:

Domtar appreciates the opportunity to provide comment on the Arkansas Department of Environmental Quality (ADEQ) proposed revisions to the Arkansas State Implementation Plan (SIP) addressing Regional Haze SIP revisions for the 2008 to 2018 planning period (the 1st planning period). As noted in these comments, we are respectfully asking ADEQ to revise portions of the proposed SIP to ensure consistency with positions previously taken by the State in challenging the EPA's Arkansas regional Haze Federal Implementation Plan.

Domtar is a leading provider of a wide variety of wood fiber-based products, including communication, specialty and packaging papers, market pulp and absorbent hygiene products. The foundation of our business is a network of fiber converting assets that produce papergrade, fluff and specialty pulps. While most of our pulp production is consumed internally to manufacture paper and consumer products, we are also a large volume pulp vendor, with significant amounts of both market pulp and fluff pulp sold to customers around the globe. Domtar is the largest integrated marketer of uncoated freesheet paper in North America. With approximately 9,700 employees serving more than 50 countries around the world, Domtar is driven by a commitment to turn sustainable wood fiber into useful products that people rely on every day. Domtar operates pulp and paper mills and personal care facilities in the U.S., Canada, Spain, and Sweden. In the U.S. we operate in the following states: Arkansas, Illinois, Kentucky, Georgia, Michigan, Missouri, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas and Wisconsin.

Our Ashdown Mill, located in Ashdown, Arkansas, is one of the largest of Domtar's thirteen pulp and paper operations in North America. We are the largest employer in Ashdown providing about 850 local jobs and providing significant economic support for the local community. Ashdown's pulp and paper products are sold into global markets competing with low cost producers from other jurisdictions. Due to the continued decline in paper markets, the Ashdown Mill has recently undergone a major manufacturing process change with the conversion of a paper machine to manufacture fluff pulp. While the Ashdown Mill self-generates much of our manufacturing energy needs using renewable biomass and combined heat and power, we are still a net purchaser of electricity from our local utility.

Since the Ashdown Mill operates in highly competitive global markets, we continually look for ways to manage costs. As a large ratepayer, we are concerned our electricity costs could increase and our manufacturing costs could also increase due to approaches selected to address Regional Haze requirements for the 2008 to 2018 planning period and beyond.

The Regional Haze visibility program differs from most Clean Air Act programs in its focus on aesthetic rather than human health concerns. The Arkansas SIP proposal addresses Regional Haze requirements for sulfur dioxide and particulate matter at Arkansas power plants, evaluates controls necessary for ensuring reasonable progress toward natural visibility conditions, and sets reasonable progress goals for the first planning period ending in 2018. The SIP proposal also establishes a long-term strategy for improving visibility.

In January 2017, U.S Environmental Protection Agency (EPA) finalized amendments to The Requirements for State Plans for the Protection of Visibility. In this final rule, EPA changed requirements states must meet for the reasonable progress goals in the second and subsequent implementation periods. These changes were described as clarifications and streamlining of the visibility program. However, many of these revisions expand the scope of the program, adversely effects individual sources, and add significant burden to states. In addition, these changes can lead to certain stationary sources being targeted, resulting in competitive imbalance and market distortions. In the end, these so-called "clarifications" will cause states to "re-tool" the Regional Haze Program.

Several entities petitioned EPA to reconsider the 2017 final rule. The rule also is being legally challenged. EPA recently announced its decision to revisit aspects of the 2017 Regional Haze amendments and intends to commence notice and comment rulemaking to address the final rule.

Given the uncertain fate of the 2017 final rule and the likelihood that some or most of the rule may change, it is premature for Arkansas to rely on aspects of this rule and/or draft guidance for the proposed SIP. Domtar is concerned that moving forward now will only result in being required to withdraw the SIP changes and redo the effort to conform to the revised rule. This stop/start approach is not likely to achieve results helpful to the Arkansas business community and the residents of Arkansas.

In the proposed SIP, ADEQ is taking a position that is inconsistent with the position Arkansas has taken in challenging the EPA Arkansas Regional Haze Federal Implementation Plan. Since Arkansas' Class I areas are already meeting and exceeding the uniform rate of progress (URP) or "glide path" for this 1st planning period, no reasonable progress analysis is needed. Moreover if recent trends in actual observation data continue, the 2064 goals will be achieved well in advance. ADEQ's proposed approach for reasonable progress is inappropriate and not necessary and furthermore sets a bad precedent that may limit the State's flexibility for future planning periods. While Domtar is not directly affected by ADEQ's reasonable progress evaluation proposal for the 1st planning period, we will be indirectly affected through an inevitable increase in electric power prices. As such, Domtar is concerned with ADEQ's approach in the proposed SIP. ADEQ should continue to find that a reasonable progress assessment to evaluate controls is not necessary since Arkansas will achieve reasonable progress and is meeting its glide path with no additional controls needed.

Domtar requests ADEQ revise portions of the proposed SIP that are inconsistent with positions taken by Arkansas in challenging the EPA's Arkansas regional Haze Federal Implementation Plan and that rely on draft guidance and/or the challenged 2017 rule.

Thank you for the opportunity to comment on the proposed rule. Please contact me if you have any questions about these comments or would like to further discuss.

Sincerely,

A handwritten signature in black ink that reads "Kelley R. Crouch". The signature is written in a cursive style with a long horizontal flourish at the end.

Kelley Crouch
Environmental Manager



Energy and Environmental Alliance

o f A r k a n s a s

February 2, 2018

Ms. Tricia Treece

Treecep@adeq.state.ar.us

Office of Air Quality

Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR 72118

Re: Comments on Proposed Revisions to Arkansas Regional Haze State Implementation Plan (AR RH SIP)

Dear Ms. Treece:

The Energy and Environmental Alliance of Arkansas (“EEAA”) is an ad-hoc association of Arkansas’ investor-owned, municipal, and independent electric utilities and other energy companies formed to advocate, communicate and encourage energy and environmental policies that promote sound and predictable regulation of Arkansas’ utility industry, and support an economically viable and environmentally secure future for all Arkansans, including access to reliable and affordable energy resources.

Members of EEAA own part or all of several facilities directly impacted by the Draft Revisions to the State Implementation Plan (“SIP”) related to Regional Haze. In particular, EEAA members own or operate the Flint Creek Electric Power Plant (“Flint Creek”), the White Bluff Steam Electric Station (“White Bluff”), the Independence Steam Electric Station (“Independence”), and the Lake Catherine Plant (“Lake Catherine”). Accordingly, EEAA is critically interested in the development of the State’s Regional Haze SIP, and respectfully submits the following comments.

On October 31, 2017, the Arkansas Department of Environmental Quality (“ADEQ”) publicly released draft revisions to certain disapproved portions of the 2008 Arkansas Regional

Haze State Implementation Plan (“SIP”) (“Draft SIP”). The Draft SIP addresses certain best available retrofit technology (“BART”) and reasonable progress controls for Arkansas sources during the first planning period. If the Draft SIP is approved by EPA, the applicable BART and reasonable progress requirements in the Arkansas Regional Haze Federal Implementation Plan (“Final FIP”) would be withdrawn.¹ 81 Fed. Reg. 66,332 (Sept. 27, 2016).

Arkansas is already below the glidepath for the first planning period, so no reasonable progress analysis is necessary. ADEQ takes inconsistent positions in its Petition for Reconsideration of the FIP and the Draft SIP regarding the need for a reasonable progress analysis. Arkansas is already below the glidepath for the first planning period, so no reasonable progress analysis is necessary. Arkansas appealed the FIP based on the imposition of controls even though the State was already meeting the reasonable progress goals EPA established in the FIP. The *necessity* of controls for achieving visibility improvements at or below the glidepath is a threshold issue when addressing reasonable progress. The CAA requires implementation plans to “contain such emission limits, schedules of compliance and other measures as may be **necessary** to make reasonable progress.” See 42 U.S.C. § 7491(b)(2) (emphasis added). The State position should remain that no controls are necessary where evidence shows that Arkansas will achieve reasonable progress without any controls.

In addition, the Regional Haze program is intended to be a gradual phasing in of measures to improve visibility, and does not demand the best controls for all sources. Conducting an unnecessary reasonable progress analysis now could also limit ADEQ’s ability to take advantage of technological developments, improvements in economic performance, and other improvements in subsequent planning periods. It would thus become more likely that unnecessarily stringent and costly controls would be imposed upon Arkansas sources without measurable benefits.

ADEQ should take full advantage of available regulatory flexibility. EPA’s guidance makes it clear that states have flexibility in evaluating the statutory factors and

¹ In 2016, EPA promulgated the FIP to address the disapproved portions of Arkansas’ regional haze plan.

including other factors determined to be relevant. “In determining reasonable progress, CAA § 169A(g)(1) requires States to take into consideration a number of factors. However, you have flexibility in how to take into consideration these statutory factors and any other factors that you have determined to be relevant.” *See Reasonable Progress Guidance at 5-1.*² ADEQ’s focus on a source-specific reasonable progress analysis ignores “the implication of compliance costs to the health and vitality of industries within a state.” Reasonable Progress Guidance at 5-1. Rather than perform a source-specific reasonable progress analysis under the time constraints associated with this SIP development period, ADEQ and sources within the state should be given an opportunity to consider more broadly the complete set of relevant factors to be considered, and allowed to await resolution of the challenges to EPA’s 2017 state planning requirements.

ADEQ should consider all relevant specific operational information presented by a Permittee. ADEQ failed to utilize critically important specific facility information provided by a Permittee (Entergy) regarding the planned operating conditions of permitted facilities. In particular, Entergy has stated it has planned a specific cease to use coal date and agreed to accept an enforceable restriction in that regard. However, this key operational fact was not considered by ADEQ in analyzing the cost-effectiveness of certain control options. ADEQ must consider all available information provided in developing its Long-Term Strategy, including planned controls, and planned retirement dates. 40 C.F.R. §§ 51.308(d)(3). The measures must be made enforceable to make the SIP durable and less susceptible to legal challenge.

ADEQ should avoid re-opening already approved SIP provisions. ADEQ is attempting to rescind and re-propose certain limits that have were approved and accepted by EPA in the initial SIP submission. Those previously approved limits are already effective and are included in the Title V permits. The act of rescinding and re-proposing already approved

² U.S. EPA, *Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program* (June 1, 2007) (hereinafter Reasonable Progress Guidance”). Available at: https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/20070601_wehrum_reasonable_progress_goals_reghaze.pdf

February 2, 2018

limits, could have the unintended side-effect of making them susceptible to a second round of challenges by parties seeking to oppose them.

EEAA appreciates the opportunity to comment on the Draft SIP. The final SIP will impact Arkansas utilities, other industries, and citizens for decades to come. EEAA urges ADEQ to broadly consider all relevant factors in determining reasonable progress, avoid unnecessary controls, take into account all relevant facility information provided by permittees, and avoid re-opening previously approved SIP provisions. These steps should assist ADEQ in developing a final SIP that is legally supportable and that provides regulatory certainty. EEAA Members appreciate the progress that ADEQ has made in helping return this program to the State of Arkansas and its citizens.

Sincerely,



G. Alan Perkins
PPGMR Law, PLLC
P.O. Box 251618
Little Rock, AR 72225-1618
(501) 603-9000
alan@ppgmrlaw.com

*Energy and Environmental
Alliance of Arkansas*

GAP/nf

cc: Brian Bond, AEP/SWEPCO tbond@aep.com
Janet Henry, AEP/SWEPCO jhenry@aep.com
Bill Phillips, Arkansas Municipal Power Assoc. bill@phillipsmanagement.net
Brent Ross, Associated Electric Cooperative, Inc. bross@aeci.org
Richard Arnold, Conway Corp. Richie.Arnold@conwaycorp.com
Elizabeth Dumm, Empire District edumm@empiredistrict.com
Rick Henley, Jonesboro City Water & Light rhenley@jonesborocwl.org
Jason Carter, North Little Rock Electric jcarter@northlittlerock.ar.gov
Rob Ratley, OGE Energy Corp. ratleyra@oge.com
Greg Cook, Plum Point gcook@ppmsllc.com
Todd Pederson, West Memphis Utility Comm. tpedersen@westmemphisutilities.com
Paul Means, Entergy pmeans@entergy.com
Kelly McQueen, Entergy kmcqueen@entergy.com

From: [Carol Bitting](#)
To: [Treece, Tricia](#)
Subject: Haze Plan
Date: Friday, January 19, 2018 7:38:45 AM

Tricia Treece, Office of Air Quality, ADEQ

Ms Treece,

I would like to submit my comments to the requirement of the 1999 Clean Air Act that requires states to take action to reduce smog/haze in certain parks and wilderness.

First, why are we so far behind? Does Arkansas prefer to ignore responsibility? Arkansas was once a leader in environmental quality why have we now become an inadequately educated environmental agency that hasn't begun with the basic plan and already implemented our smog and haze reduction where we know it exists. How many of our streams and lakes have high levels of coal particulates making it unsafe to eat the fish? I have watched this list grow yearly, it is time to act and I hope you will quickly. How much does Arkansas receive yearly from EPA, 60 plus million?

Arkansans depend on air and the quality of the air reflects the quality of the health of the citizens and those that visit. Pollutants lift, drift, rain down or settle with cooler air temperatures into valleys and lands that may be inside not only national parks, but state parks, streams, lakes and rivers and all lands.

I ask that ADEQ revise its proposed plan to include scrubbers on White Bluff and Independence, and to retain source-specific NOx limits instead of the trading program.

The last few years have shown me Arkansas has lagged in its support of clean water and air quality. I think this directly relates to the health of its citizens. Please take into account the highest quality of education and utilize what knowledge we have to make a future that can make a difference in the lives of all Arkansans.

Carol Bitting
HC73 Box 182 A
Marble Falls, Ar 72648



February 2, 2018

Filed via Email and U.S. Mail

Ms. Tricia Treece, Office of Air Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

RE: Comments on the State of Arkansas's "Revisions to the Arkansas Regional Haze State Implementation Plan" prepared by the ADEQ – October 2017

Dear Ms. Treece:

The Louisiana Electric Utility Environmental Group ("LEUEG") hereby submits the following comments related to the draft revisions to the Arkansas Regional Haze State Implementation Plan ("SIP"). LEUEG appreciates the opportunity to provide these comments to the Arkansas Department of Environmental Quality ("ADEQ") and requests that ADEQ include this letter in the administrative record for this regulatory evaluation.

On October 31, 2017, ADEQ released for public review a draft revision to certain disapproved portions of the 2008 Arkansas Regional Haze SIP (the "Proposed SIP"). The Proposed SIP addresses best available retrofit technology ("BART") and reasonable progress controls for sources in Arkansas for the first planning period. It is our understanding that EPA's approval of the Proposed SIP will result in the withdrawal of the applicable BART and reasonable progress requirements in the Arkansas Regional Haze Federal Implementation Plan ("Final FIP") promulgated by the U.S. Environmental Protection Agency ("EPA") in 2016. *See*, 81 Fed. Reg. 66,332 (Sept. 27, 2016).

As discussed in the comments below, LEUEG believes that ADEQ should amend the Proposed SIP to improve and clarify certain sections set forth therein.

Comment 1 – ADEQ is not legally required to conduct a reasonable progress analysis on a source-specific basis and, for this Proposed SIP, should not do so. Instead, other relevant factors should be considered by ADEQ in the Proposed SIP to justify reasonable progress.

Section 169A(a) of the federal Clean Air Act sets forth statutory requirements relating to the protection of visibility in federal Class I areas, including directing EPA to "promulgate regulations to assure reasonable progress toward meeting the national goal" of prevention of

visibility impairment. *See*, 42 U.S.C. § 7491(a). CAA §169A(b) further directs SIPs “to contain such emission limits, schedules of compliance and other measures as may be necessary to make reasonable progress toward meeting the national goal specified in [CAA §169A(a)], including ... a long term strategy ... for making reasonable progress toward meeting the national goal specified in [CAA §169A(a)].” With respect to reasonable progress factors, CAA §169A(g)(1) states:

in determining reasonable progress there shall be taken into consideration the costs of compliance, the time necessary for compliance, and the energy and nonair quality environmental impacts of compliance, and the remaining useful life of any existing source subject to such requirements.

42 U.S.C. § 7491(g)(1). To comply with this mandate, EPA established regulations and guidance relating to reasonable progress, including a document entitled “Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program,” dated June 1, 2007 (EPA’s “*Reasonable Progress Guidance*”). This guidance document, which applies to the first planning period, is clear that the four statutory factors set forth above (*i.e.*, cost of compliance, time necessary for compliance, energy and non-air impacts, and remaining useful life) must be considered by states in a reasonable progress analysis. However, when determining reasonable progress, the Reasonable Progress Guidance is also clear that states have the authority to consider other relevant factors. For instance, Section 5.0 of EPA’s reasonable progress guidance concerning applying the statutory factors to potentially affected stationary sources states:

In determining reasonable progress, CAA § 169A(g)(1) requires States to take into consideration a number of factors. However, you have flexibility in how to take into consideration these statutory factors and any other factors that you have determined to be relevant.

Reasonable Progress Guidance, p. 5-1. Section 4.2 of the same guidance further states:

After determining the amount of emissions reductions of visibility impairing pollutants that may be expected from implementation of other CAA programs, you will be ready to identify any additional measures that are reasonable. The [Reasonable Haze Rule] gives States wide latitude to determine additional control requirements, and there are many ways to approach identifying additional reasonable measures; however, you must at a minimum, consider the four statutory factors. Based on the contribution from certain source categories and the magnitude of their emissions you may determine that little additional analysis is required to determine further controls are not warranted for that category. As discussed further in section 5, you have considerable flexibility in how you take these factors into consideration.

Id., p. 4-2 (emphasis added).

Based on the foregoing, ADEQ is not limited to consideration of the four factors mandated by the CAA on a source-specific basis. Instead, ADEQ is specifically authorized by EPA's guidance to consider other relevant factors. In addition, there is no requirement that the analysis mirror a best available retrofit technology ("BART") analysis. In fact, EPA confirmed this in a 2006 guidance document in which it states: "The reasonable progress demonstration ... is not a source-specific demonstration like the BART assessment." Rather, the "reasonable progress demonstration involves the test of a strategy." *See*, EPA's "Additional Regional Haze Questions," Q.1, p. 9 (Sep. 27, 2006 Revision). As discussed below, LEUEG believes it is appropriate for ADEQ to consider other factors to satisfy its reasonable progress goals in the Proposed SIP.

Comment 2 – Because Arkansas is already meeting its reasonable progress goals, a “source-specific” reasonable progress analysis is not required and should not be included in the Proposed SIP.

Based on our review of the Proposed SIP and supporting data, Arkansas is already meeting its reasonable progress goals ("RPGs") for the first planning period and is requiring eligible sources to meet BART limits. For this reason, no additional controls are necessary to assure reasonable progress for Arkansas' first planning period.

The threshold issue when addressing reasonable progress is whether further actions in addition to other requirements that will reduce emissions, such as BART, are *necessary* to ensure that visibility improvement is continuing on or below the glide path. As noted in Comment 1, the Clean Air Act states that implementation plans must "contain such emission limits, schedules of compliance and other measures as may be necessary to make reasonable progress." *See*, 42 U.S.C. § 7491(b)(2) (Emphasis added). Consistent with this mandate, EPA's *Reasonable Progress Guidance* makes clear that reasonable progress controls may not be necessary in the first planning period. In Section 4.1 of the guidance, EPA states:

Given the significant emissions reductions that we anticipate to result from BART, the CAIR, and the implementation of other CAA programs, including the ozone and PM_{2.5} NAAQS, for many States this will be an important step in determining your RPG, and it may be all that is necessary to achieve reasonable progress in the first planning period for some States.

Id., p. 4-1. In addition, EPA states the following in Section 1.2 addressing the meaning of the term "reasonable progress goal":

In deciding what amount of emissions reduction is appropriate in setting the RPG, you should take into account the fact that the long-term goal of no manmade impairment encompasses several planning periods. It is reasonable for you to defer reductions to later planning periods in order to maintain a consistent glidepath toward the longterm goal.

Id., p. 1-4. Thus, ADEQ should require additional controls only if further action is determined to be *necessary* for reasonable progress. Based on our review of the Proposed SIP and supporting documents, ADEQ has not made this determination. Rather, for the first planning period, controls beyond BART are not necessary for reasonable progress based on the current air quality in Arkansas's Class I areas and supporting air quality data. Visibility improvement in Arkansas's Class I areas is on such an accelerated pace that the rate of progress towards the visibility goal exceeds the Uniform Rate of Progress ("URP") necessary to remedy visibility impairment at Caney Creek Wilderness Area ("CACR") and Upper Buffalo Wilderness Area ("UPBU") by 2064. Arkansas already has achieved visibility improvements in its Class I areas that surpass the RPGs in the Final FIP for the first planning period, rendering the imposition of additional reasonable progress controls unnecessary for the first planning period.

Analysis by ADEQ demonstrated that visibility in Caney Creek and Upper Buffalo very likely will meet the levels EPA ultimately finalized as the RPGs for 2018, even in the absence of additional controls. *See*, Arkansas Department of Environmental Quality, *State Implementation Plan Review for the Five-Year Regional Haze Progress Report*, at 55-56 (May 2015). EPA also recognized in its Proposed FIP that Arkansas' Class I areas were projected to meet the URPs for the first planning period, even without controls on stationary sources. These predictions have been confirmed by more recent IMPROVE data for 2016, which show that visibility measurements in both CACR and UPBU were better than the RPGs in the FIP.

Because Arkansas is already meeting its reasonable progress goals, additional controls are unnecessary and should not be required in the Proposed SIP. If ADEQ intends to require a source-specific reasonable progress analysis, this determination should be fully justified by the agency in the final SIP.

Comment 3 – ADEQ is unnecessarily taking inconsistent positions in this Proposed SIP and its *Petition for Reconsideration* of the Final FIP promulgated by EPA in 2016.

In addition to being legally unnecessary, ADEQ's assessment of reasonable progress control options despite Arkansas' substantial progress toward the national visibility goal is counter to its own pending petitions for reconsideration and review of the Final FIP. In its administrative petition requesting that EPA reconsider the Final FIP, ADEQ urges EPA to "reconsider whether controls on Independence are necessary under the Clean Air Act because 2015 monitoring data shows that Arkansas is currently meeting the reasonable progress goals set in the FIP and will continue to meet those goals for the remainder of the first planning period." Administrative Petition for Reconsideration and Request for Stay of ADEQ at 3 (Nov. 23, 2016). Similarly, in its opening brief in the litigation challenging the Final FIP, ADEQ argues that "[t]he Final [FIP] should be vacated because EPA ignored evidence that Arkansas would achieve reasonable progress—and natural visibility before 2064—without any additional controls." Opening Br. for Arkansas at 36, *Arkansas v. EPA*, No. 16-4270 (8th Cir.). These assertions are inconsistent with ADEQ's interpretation of the reasonable progress requirements of the CAA. In fact, ADEQ is arguably requiring in the Proposed SIP what it is challenging EPA for doing in the Final FIP.

It is also possible that ADEQ's current approach could limit its ability to change course in the second and subsequent planning periods. An EPA approval of ADEQ's decision to perform an unnecessary reasonable progress analysis may limit ADEQ's discretion if it decides not to perform a reasonable progress analysis under similar conditions in the future. In this scenario, ADEQ might be forced to assess reasonable progress controls even if visibility *exceeds* the goals, increasing the likelihood that unnecessary controls would be imposed upon Arkansas stationary sources.

In light of the foregoing, ADEQ should revise the Proposed SIP to eliminate the four-factor analysis and determine that no controls are necessary for the evaluated utilities given the observed visibility improvements at Arkansas's Class I areas. Based on the most recent air quality monitoring data, no further measures are *necessary* for Arkansas to make reasonable progress toward the Regional Haze Program national goal in the first planning period, so a reasonable progress analysis is not required. Such a determination would be consistent with EPA's guidance that reductions may be deferred "to later planning periods in order to maintain a consistent glidepath toward the long-term goal." *Reasonable Progress Guidance*, p. 1-4.

If you have any questions concerning these comments, I can be reached at the above address or by email at kyle@beall.law.

Very truly yours,



Kyle B. Beall
LEUEG Legal Counsel

From: [Teri Patrick](#)
To: [Treece, Tricia](#)
Subject: Re: Arkansas Regional Haze SIP Comment Period Extension
Date: Wednesday, January 24, 2018 7:26:54 AM

My comment: Strengthen protections from any and all pollutants. We owe this to our children and their children.

Thank you,
Teri Patrick
Little Rock

On Thu, Jan 18, 2018 at 9:21 AM, Treece, Tricia <treecep@adeq.state.ar.us> wrote:

You are receiving this email because we have received either a comment or a request for extension of the public comment period from you regarding the Arkansas Regional Haze State Implementation Plan revision proposed on October 31, 2017. Your comments have been entered into the record for the proposed state implementation plan revision.

This is to inform you that ADEQ has extended the public comment period for the [Arkansas Regional Haze State Implementation Plan](#). The new deadline for comments is 11:59 P.M. (Central Time) on February 2, 2018. A public hearing is scheduled for January 19, 2018. Details regarding the public hearing and comment period extension are included in the attached press release.

Thanks,

Tricia Jackson Treece

SIP/Planning Section Supervisor, Policy and Planning Branch

Office of Air Quality

Arkansas Department of Environmental Quality

5301 Northshore Drive

North Little Rock, AR 72118

[501-682-0055](tel:501-682-0055) (office)

From: [Hester, Bart](#)
To: [Carol Bitting](#)
Cc: [Treece, Tricia](#)
Subject: Re: Haze Plan
Date: Friday, January 19, 2018 7:43:52 AM

Ms Teece,

Thank you for your work serving our great state.

Please do not revise ADEQ's proposed plan to include scrubbers on White Bluff and Independence, nor retain source-specific NOx limits instead of the trading program.

The people of AR love our natural state but they also love having a job. I believe ADEQ is doing an increasingly better job striking that difficult balance.

Sincerely,

Bart Hester

Sent from my iPhone

On Jan 19, 2018, at 7:10 AM, Carol Bitting <lcbitting@gmail.com<<mailto:lcbitting@gmail.com>>> wrote:

Tricia Treece, Office of Air Quality, ADEQ

Ms Treece,

I would like to submit my comments to the requirement of the 1999 Clean Air Act that requires states to take action to reduce smog/haze in certain parks and wilderness.

First, why are we so far behind? Does Arkansas prefer to ignore responsibility? Arkansas was once a leader in environmental quality why have we now become an inadequately educated environmental agency that hasn't begun with the basic plan and already implemented our smog and haze reduction where we know it exists. How many of our streams and lakes have high levels of coal particulates making it unsafe to eat the fish? I have watched this list grow yearly, it is time to act and I hope you will quickly. How much does Arkansas receive yearly from EPA, 60 plus million?

Arkansans depend on air and the quality of the air reflects the quality of the health of the citizens and those that visit. Pollutants lift, drift, rain down or settle with cooler air temperatures into valleys and lands that may be inside not only national parks, but state parks, streams, lakes and rivers and all lands.

I ask that ADEQ revise its proposed plan to include scrubbers on White Bluff and Independence, and to retain source-specific NOx limits instead of the trading program.

The last few years have shown me Arkansas has lagged in its support of clean water and air quality. I think this directly relates to the health of its citizens. Please take into account the highest quality of education and utilize what knowledge we have to make a future that can make a difference in the lives of all Arkansans.

Carol Bitting
HC73 Box 182 A
Marble Falls, Ar 72648

From: [Tom Utley](#)
To: [Treece, Tricia](#)
Subject: RE: Regional Haze : SIP Revision
Date: Tuesday, December 26, 2017 2:41:36 PM
Attachments: [image001.png](#)

I understand the State of Arkansas is suing to stop the EPA plan requiring White Bluff and Independence coal burning power plants to install modern pollution control. And with the support of ADEQ, intends to replace it with a weaker plan. I cannot understand how an agency whose reason for being is largely to protect the citizens of the state (and those in other states as well) could support such a measure. If I'm misunderstanding the gist of the argument for replacing a strong plan with a weaker one, please inform me.

Regards,

Tom Utley
Sr. Project Manager, PMP
Euronet
17300 Chenal Pkwy, Ste 200
Little Rock, AR
72223

Office: 501.218.7211
Mobile: 501.920.7211
Email: tutley@eef.com



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From: [Beverly Edwards](#)
To: [Treece, Tricia](#)
Subject: Regional Haze in Arkansas
Date: Friday, January 19, 2018 7:38:37 AM

Mr. Beverly C. D. Edwards, Jr.
2905 West Highway 88
Oden, Arkansas 71961

January 18, 2018

Arkansas Department of Environmental Quality

Dear ADEQ:

A massive amount of regional haze in Arkansas is caused by exhaust pollution from coal fired electric power plants in Arkansas. Coal should be eliminated as a fuel in our electric power plants. Natural gas, wind turbine farms and solar farms should replace coal as the fuel to be used.

Sincerely,

Bev Edwards

From: [John Lampson](#)
To: [Treece, Tricia](#)
Subject: Regional Haze State Implementation Plan Comments
Date: Friday, January 19, 2018 1:22:43 PM

ADEQ,

The fact that this department is even considering not doing everything it can to make our coal plants as clean as possible is ridiculous. Your website states "We protect, enhance and restore the natural environment for the well-being of all Arkansas." However, the plan you have chosen to pursue directly contradicts your mission for the protection of Arkansas.

Scrubbers should be required at all plants, and the fact that you are even considering not installing them is shameful. There is no reason not to make the air as clean as possible. With the national government failing on all aspects to protect the environment, and even going as far as reversing regulations in the name of increasing profits for a few CEO's, it falls to the state and local governments to do everything they can to help protect our natural resources.

It is also critical to ensure that there are source-specific NOx limits are in place in order to protect those living near the polluting plants.

This department has repeatedly ignored the requests and desires of the people in its decisions on environmental regulations. It is time for you to start moving in the right direction and start protecting the natural state. Listen to the will of the people and do what is best for everyone.

Protect this land we all call home,

Garrett Lampson

--

John Garrett Lampson
President, University of Arkansas Cycling Club
B.S. Biological Engineering
Sustainability and Natural Resources Management Minor



From: [Gladys Sutliff](#)
To: [Treece, Tricia](#)
Subject: REGIONAL HAZE: SIP REVISION
Date: Monday, December 25, 2017 11:32:03 AM

I would ask that you reread your mission statement. I also ask that you drop your opposition to reducing smog in our parks. My tax dollars going into your budget of over \$4 mil need to be allocated to doing more to reduce this problem. I am also wondering why you seem to be in Entergy's back pocket. They are one of the biggest producers of industrial pollution. This is a serious problem and if ADEQ doesn't give serious consideration to clean air, this will be brought to the attention of the media. I, for one, do not want my tax dollars going to an ineffective organization.

Sincerely,
Gladys Sutliff

From: [Jenni Duncan](#)
To: [Treece, Tricia](#)
Subject: REGIONAL HAZE: SIP REVISION
Date: Wednesday, December 27, 2017 7:21:14 AM

Hello, I want to register my opinion about the haze plan for our area. I want the ADEQ to drop opposition to a plan to reduce air pollution in our parks. We need stronger policies and enforcement to ensure that air is safe for our children and natural environment. Please take actions that will reduce the haze here and keep us looking like the Natural State and enjoying the natural beauty for generations to come.

--

Jenni Duncan
501.551.2141

Treece, Tricia

From: Keaton Smith (kwsmith1200@gmail.com) Sent You a Personal Message <automail@knowwho.com>
Sent: Monday, December 18, 2017 10:30 AM
To: Treece, Tricia
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Keaton Smith
88 E 4th St
Fayetteville, AR 72701
kwsmith1200@gmail.com
(479) 879-7922

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Janine Perlman \(jpandjf@swbell.net\) Sent You a Personal Message](mailto:jpandjf@swbell.net)
To: [Treece, Tricia](#)
Subject: Please stop Entergy plants from polluting Arkansas and Missouri!
Date: Wednesday, January 17, 2018 6:09:28 PM

Dear Arkansas Department of Environmental Quality,

New data show that the Clean Air Act has saved 80,000 more lives than initially estimated. As a biomedical scientist, and someone whose never-smoking family has severe asthma due to air pollution, I implore you MAKE OUR AIR CLEANER!!!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Janine Perlman
14817 Willy Ln
Alexander, AR 72002
jpandjf@swbell.net
(501) 555-1010

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lori Homstad \(lhomstad@yahoo.com\) Sent You a Personal Message](mailto:lhomstad@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop polluting Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:34:59 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Lori Homstad
2220 Waverly Avenue
Springdale, AR 72762
lhomstad@yahoo.com
(479) 263-0945

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Trudi Rust \(trudirust@yahoo.com\)](mailto:trudirust@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 6:06:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Trudi Rust
3650 S Wilson Hollow Rd
Fayetteville, AR 72701
trudirust@yahoo.com
(479) 442-3067

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Veronica Clarke \(queeniev@gmail.com\) Sent You a Personal Message](mailto:queeniev@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:45:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Veronica Clarke
3770 Glenbrook Loop
Springdale, AR 72764
queeniev@gmail.com
(479) 225-7443

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Victoria Rich \(vicki.rich@sbcglobal.net\)](mailto:vicki.rich@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:40:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Victoria Rich
455 Ridgcorde Pl
Saint Louis, MO 63141
vicki.rich@sbcglobal.net
(314) 997-3933

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Virginia Diliberti \(desertginny@yahoo.com\) Sent You a Personal Message](mailto:desertginny@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 8:17:38 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Virginia Diliberti
705 Weston Cir
Cave Springs, AR 72718
desertginny@yahoo.com
(479) 248-2929

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Walter Boyd \(waltboyd@usa.net\)](mailto:waltboyd@usa.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:02:54 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Walter Boyd
18 Royale Dr
Van Buren, AR 72956
waltboyd@usa.net
(479) 474-5329

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [William and Elizabeth Etges \(williametges@cox.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:08:45 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

William and Elizabeth Etges
1132 N Eastwood Dr
Fayetteville, AR 72701
williametges@cox.net
(479) 444-0849

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [William Hiers \(wshnlr@gmail.com\)](mailto:wshnlr@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:55:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

William Hiers
21 Prospect Trl
North Little Rock, AR 72118
wshnlr@gmail.com
(501) 812-0452

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [William Ragar \(wragar@pmidpi.com\) Sent You a Personal Message](mailto:wragar@pmidpi.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:12:28 PM

Dear Arkansas Department of Environmental Quality,

Even Exxon, China, India and are divesting from coal to safe renewables. We all know coal is dead. We need to retrain the coal workers to make solar panels and wind turbines. Do the right thing. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

William Ragar
640 Whittington Ave
Hot Springs, AR 71901
wragar@pmidpi.com
(501) 256-3461

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [William Selbert \(wselbert@slpl.org\) Sent You a Personal Message](mailto:wselbert@slpl.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:43:39 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

William Selbert
3248 Patterson Place Dr
Saint Louis, MO 63129
wselbert@slpl.org
(314) 520-8737

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [William Sherman \(cen22939@centurytel.net\)](mailto:cen22939@centurytel.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:05:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

William Sherman
106 Flintridge Dr
Mountain Home, AR 72653
cen22939@centurytel.net
(870) 405-4220

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Xochi Kaplan \(ryxochi@yahoo.com\) Sent You a Personal Message](mailto:ryxochi@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:19:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Xochi Kaplan
1779 N Hartford Dr
Fayetteville, AR 72701
ryxochi@yahoo.com
(479) 283-2135

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Yvonne Segal \(feelingheart@hotmail.com\)](mailto:feelingheart@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 8:00:42 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Yvonne Segal
3656 S Dead Horse Mountain Rd
Fayetteville, AR 72701
feelingheart@hotmail.com
(479) 263-3511

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Yvonne Segal \(yvonne@promolife.com\) Sent You a Personal Message](mailto:yvonne@promolife.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:18:03 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Yvonne Segal
PO Box 385
Fayetteville, AR 72702
yvonne@promolife.com
(479) 263-3511

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Aaron Baldwin \(aaronbaldwin10@gmail.com\) Sent You a Personal Message](mailto:aaronbaldwin10@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:40:36 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Aaron Baldwin
316 Fern Ave
Little Rock, AR 72205
aaronbaldwin10@gmail.com
(501) 310-8259

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Adam Schaffer \(adamschaffer2@yahoo.com\) Sent You a Personal Message](mailto:adamschaffer2@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, December 28, 2017 3:09:58 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Adam Schaffer
1807 NW Buckskin Ave
Bentonville, AR 72712
adamschaffer2@yahoo.com
(479) 283-0318

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Adolfo Garnica \(checkadg@gmail.com\)](mailto:checkadg@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:04:58 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Adolfo Garnica
22 Ouachita Dr
Maumelle, AR 72113
checkadg@gmail.com
(501) 851-1266

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Adrienne Taylor \(adrienne32055@aol.com\) Sent You a Personal Message](mailto:adrienne32055@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:39:34 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Adrienne Taylor
45 LedgeLawn Dr
Little Rock, AR 72212
adrienne32055@aol.com
(501) 351-6550

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Agnes Hollifield \(aggistl@yahoo.com\) Sent You a Personal Message](mailto:aggistl@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:56:55 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Agnes Hollifield
11 Lenox Pl
Saint Louis, MO 63108
aggistl@yahoo.com
(314) 367-0002

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Al Brooks \(aljaneb@gmail.com\) Sent You a Personal Message](mailto:AlBrooks@aljaneb@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:31:03 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Al Brooks
9734 Penny Ln
Waldron, AR 72958
aljaneb@gmail.com
(479) 637-4471

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Alice Ault \(aaault1090@att.net\)](mailto:aaault1090@att.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:49:20 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Alice Ault
450 Fairview Ave
Saint Louis, MO 63119
aaault1090@att.net
(314) 961-1090

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Alice Bloch \(abloch45@gmail.com\)](mailto:abloch45@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 7:10:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Alice Bloch
7228 Shaftesbury Ave
Saint Louis, MO 63130
abloch45@gmail.com
(314) 725-0629

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Alice Harrison \(partsman@conwaycorp.net\)](mailto:partsman@conwaycorp.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:34:03 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Alice Harrison
1917 Duncan St
Conway, AR 72034
partsman@conwaycorp.net
(501) 327-5806

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Amanda Roberts \(miacmom2006@gmail.com\)](mailto:miacmom2006@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:12:12 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Amanda Roberts
808 E Main St
Batesville, AR 72501
miacmom2006@gmail.com
(870) 834-8198

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Amy Hereford \(a.hereford@yahoo.com\)](mailto:a.hereford@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:07:19 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Amy Hereford
6400 Minnesota Ave
Saint Louis, MO 63111
a.hereford@yahoo.com
(314) 972-4763

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Amy Patton \(amy.patton@sbcglobal.net\)](mailto:amy.patton@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:35:56 AM

Dear Arkansas Department of Environmental Quality,

So the "Natural State" is working towards a new motto - the "Toxic State". That should really encourage businesses to invest in doing business in Arkansas. I'm sure it'll be quite the enticement for corporations and employees alike.

And I'm sure our healthcare system in America will take care of these issues without any problems.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Amy Patton
4607 Walkers Corner Rd
Scott, AR 72142
amy.patton@sbcglobal.net
(479) 466-5097

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Andrew Heaslet \(andy.heaslet@sierraclub.org\) Sent You a Personal Message](mailto:andy.heaslet@sierraclub.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:59:42 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Andrew Heaslet
3510 S Compton
St Louis, MO 63118
andy.heaslet@sierraclub.org
(636) 352-9488

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Andy Winger \(andy_winger@yahoo.com\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 6:52:13 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Andy Winger
1110 Sunflower St
Centerton, AR 72719
andy_winger@yahoo.com
(469) 877-0979

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Angela Miller \(almiller@wustl.edu\)](mailto:almiller@wustl.edu) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:25:43 PM

Dear Arkansas Department of Environmental Quality,

Stop ruining our air, causing asthma in our children, and lung problems in adults!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Angela Miller
6214 Pershing Ave
Saint Louis, MO 63130
almiller@wustl.edu
(314) 488-8810

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Angelika Mueller-Rowry \(amuellerrowry@gmail.com\) Sent You a Personal Message](mailto:amuellerrowry@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:07:47 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Angelika Mueller-Rowry
6626 Crest Ave
Saint Louis, MO 63130
amuellerrowry@gmail.com
(314) 727-2282

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Anita Lasakaris \(ael500@att.net\) Sent You a Personal Message](mailto:ael500@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:43:54 PM

Dear Arkansas Department of Environmental Quality,

Missouri does not need pollution from other states. Hard enough to have Missouri's government put restraints on its polluters.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Anita Lasakaris
2331 Kratky Rd Apt E
Saint Louis, MO 63114
ael500@att.net
(314) 890-0746

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ann Jacobs \(ann@annjacobs.com\)](mailto:ann@annjacobs.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:06:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Ann Jacobs
4541 Tholozan Ave
Saint Louis, MO 63116
ann@annjacobs.com
(314) 323-8959

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ann Owen \(ann.owen@sbcglobal.net\)](mailto:ann.owen@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:41:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ann Owen
2501 N. Pierce
Little Rock, AR 72207
ann.owen@sbcglobal.net
(501) 960-0063

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Annie Eveker \(eveker@slu.edu\) Sent You a Personal Message](mailto:eveker@slu.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 9:15:14 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Annie Eveker
4725 Don Ron Dr
Saint Louis, MO 63123
eveker@slu.edu
(314) 638-9024

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Anne Philipps \(annie.philipps@gmail.com\)](mailto:annie.philipps@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:34:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Anne Philipps
6613 Devonshire Ave # A
Saint Louis, MO 63109
annie.philipps@gmail.com
(314) 458-8886

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Annette Hopkins \(annehopkins87@charter.net\)](mailto:annehopkins87@charter.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:19:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Annette Hopkins
9109 Grant Park Dr
Saint Louis, MO 63123
annehopkins87@charter.net
(314) 849-1068

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Annie Philipps \(anniephilipps@gmail.com\)](mailto:anniephilipps@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, January 22, 2018 12:22:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Annie Philipps
6613 Devonshire Ave # A
Saint Louis, MO 63109
anniephilipps@gmail.com
(314) 458-8886

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Arleen Wiley \(arleenwiley@gmail.com\) Sent You a Personal Message](mailto:arleenwiley@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:52:55 PM

Dear Arkansas Department of Environmental Quality,

Arkansas...the Natural State...will no longer BE the clean, pristine State the attracts tourists from all over the world as it does now. I am appalled that this would be done in such an allegedly Christian state,..to do something so harmful to all life.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Arleen Wiley
130 Polk Road 238
Mena, AR 71953
arleenwiley@gmail.com
(479) 243-0228

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Arthur Hoyt \(drhoyt@centurytel.net\)](mailto:drhoyt@centurytel.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:22:38 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Arthur Hoyt
PO Box 1139
Mountain Home, AR 72654
drhoyt@centurytel.net
(870) 492-2350

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ashley Lawrence \(fembomb@fembomb.com\) Sent You a Personal Message](mailto:fembomb@fembomb.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:41:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ashley Lawrence
PO Box 26447
Little Rock, AR 72221
fembomb@fembomb.com
(501) 217-0057

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Austin Bailey \(gelderbailey@gmail.com\)](mailto:gelderbailey@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:38:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Austin Bailey
62 lefever lane
Little rock, AR 72227
gelderbailey@gmail.com
(501) 944-4939

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Barbara Bagby \(b.bagby@sbcglobal.net\)](mailto:b.bagby@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:21:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Barbara Bagby
1037 Louisville Ave
Saint Louis, MO 63139
b.bagby@sbcglobal.net
(314) 644-4284

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Barbara Salmo \(barbsalmo@hotmail.com\)](mailto:barbsalmo@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:59:47 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Barbara Salmo
5116 Wilshusen Ave
Saint Louis, MO 63119
barbsalmo@hotmail.com
(314) 647-5118

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Barbara Waymire \(barbara.waymire@gmail.com\)](mailto:barbara.waymire@gmail.com) [Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:43:35 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Barbara Waymire
12201 Loganberry Dr
Alexander, AR 72002
barbara.waymire@gmail.com
(501) 455-3458

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Barry Arnold \(paramoto@att.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 11:30:17 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Barry Arnold
1315 E Nettleton Ave
Jonesboro, AR 72401
paramoto@att.net
(870) 932-2655

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Barry Haas \(bhaas@sbcglobal.net\)](mailto:bhaas@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:11:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Barry Haas
804 Konrad Ct
Little Rock, AR 72223
bhaas@sbcglobal.net
(501) 821-4097

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Becky Williams \(rcwilliams715@yahoo.com\)](mailto:rcwilliams715@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:38:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Becky Williams
PO Box 250804
Little Rock, AR 72225
rcwilliams715@yahoo.com
(501) 607-1035

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ben Kloepper \(meowlin@socket.net\) Sent You a Personal Message](mailto:meowlin@socket.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:08:49 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Ben Kloepper
729 Ruprecht Ave
Saint Louis, MO 63125
meowlin@socket.net
(555) 666-6245

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ben Sandmon,usn Ret. \(docbenusn@gmail.com\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 9:27:53 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Ben Sandmon,usn Ret.
118 Treasure Cutoff
Hot Springs, AR 71913
docbenusn@gmail.com
(501) 282-5109

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Berette Salazar \(beretsal@hotmail.com\) Sent You a Personal Message](mailto:beretsal@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:29:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Berette Salazar
461 Florence Ave
Saint Louis, MO 63119
beretsal@hotmail.com
(314) 420-5929

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Beth Carty \(bmjc@aristotle.net\) Sent You a Personal Message](mailto:bmjc@aristotle.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:02:07 PM

Dear Arkansas Department of Environmental Quality,

Please stand strong for clean air for your customers. As a major corporation, please respect the planet and its resources. In addition, please move forward with renewable energy in your strategic planning for your corporation. We, as a progressive nation along with all major world leaders, are concerned about climate change and the need to become diverse in our energy resources.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Beth Carty
2111 Settlement Rd
Little Rock, AR 72210
bmjc@aristotle.net
(501) 351-4240

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Betsy Domoto \(betsy@aldinetravel.com\) Sent You a Personal Message](mailto:betsy@aldinetravel.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:45:17 AM

Dear Arkansas Department of Environmental Quality,

Please think of the environment(s) and how this is putting you - your families and many of the rest of us in health dangers. Demand to work with your State and local areas to get the most up to date equipment and work with only the plant facilities that do so. Kindest regards,
Betsy

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Betsy Domoto
15 Mayfair Rd
Saint Louis, MO 63124
betsy@aldinetravel.com
(314) 853-3739

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Beverly Edwards, Jr. \(bcdedwards73@gmail.com\) Sent You a Personal Message](mailto:bcdedwards73@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:47:16 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Beverly Edwards, Jr.
2905 W Highway 88
Oden, AR 71961
bcdedwards73@gmail.com
(281) 703-5849

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Beverly Edwards \(bcdedwards73@gmail.com\) Sent You a Personal Message](mailto:bcdedwards73@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:31:56 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Beverly Edwards
2905 W Highway 88
Oden, AR 71961
bcdedwards73@gmail.com
(281) 703-5849

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Bill Page \(billpage2012@hotmail.com\) Sent You a Personal Message](mailto:billpage2012@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 1:04:51 PM

Dear Arkansas Department of Environmental Quality,

As an Arkansan with family in St. Louis, I am disgusted by Entergy's management of these coal plants and their effect on the air. There is no good reason for Arkansan energy sources to be considered the dirtiest.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Bill Page
1704 Dogwood Trl
Paragould, AR 72450
billpage2012@hotmail.com
(870) 476-9456

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Billie Farmer \(bjfarmer1301@comcast.net\) Sent You a Personal Message](mailto:bjfarmer1301@comcast.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:39:48 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Billie Farmer
1001 Courtyard Cottage Cir
Bryant, AR 72022
bjfarmer1301@comcast.net
(501) 481-8900

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Billy Marshall \(billyd.marshall@yahoo.com\) Sent You a Personal Message](mailto:billyd.marshall@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 11:22:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Billy Marshall
1511 Glover St
Malvern, AR 72104
billyd.marshall@yahoo.com
(501) 229-2294

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Bob Stuckmeyer \(bstuckmeyer@yahoo.com\) Sent You a Personal Message](mailto:bstuckmeyer@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:19:42 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Bob Stuckmeyer
2347 Cavendish Ln
Saint Louis, MO 63129
bstuckmeyer@yahoo.com
(314) 555-1212

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Bobbie Peel \(bobbiepeel@sbcglobal.net\)](mailto:bobbiepeel@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:54:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Bobbie Peel
4610 Arlington Ave
Fort Smith, AR 72904
bobbiepeel@sbcglobal.net
(479) 285-9801

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Bonnie Davis \(davisbg@cox.net\)](mailto:davisbg@cox.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:55:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Bonnie Davis
128 E Davidson St
Fayetteville, AR 72701
davisbg@cox.net
(479) 582-1503

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Boyce Pearson \(boycepearson@sbcglobal.net\) Sent You a Personal Message](mailto:boycepearson@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:54:13 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Boyce Pearson
14405 Pride Valley Dr
Little Rock, AR 72211
boycepearson@sbcglobal.net
(501) 312-1507

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Brad Catoe \(bradcatoe@gmail.com\) Sent You a Personal Message](mailto:bradcatoe@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:04:58 PM

Dear Arkansas Department of Environmental Quality,

I spend most of my time in arkansas. Stop using dirty energy when there are better options. Science!
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Brad Catoe
34616 Heinze Cv
Paron, AR 72122
bradcatoe@gmail.com
(202) 757-1437

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Brett Robbins \(brettdyann@yahoo.com\) Sent You a Personal Message](mailto:brettdyann@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:59:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Brett Robbins
5 Halstead Ln
Bella Vista, AR 72715
brettdyann@yahoo.com
(417) 818-4077

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Brooks Caruthers \(brookscar@yahoo.com\) Sent You a Personal Message](mailto:brookscar@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:33:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Brooks Caruthers
1000 N Cleveland St
Little Rock, AR 72207
brookscar@yahoo.com
(501) 353-2436

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cara DeFlorian \(deflorian.cara@yahoo.com\) Sent You a Personal Message](mailto:carade Florian@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:35:37 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Cara DeFlorian
15 Aleatha Cv
Cabot, AR 72023
deflorian.cara@yahoo.com
(501) 743-6120

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cara Wilsey \(carawilsey@gmail.com\) Sent You a Personal Message](mailto:carawilsey@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 1:07:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Cara Wilsey
1101 Clay St
Arkadelphia, AR 71923
carawilsey@gmail.com
(501) 282-8613

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carmen Caldwell \(robocarm@sbcglobal.net\) Sent You a Personal Message](mailto:robocarm@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:20:46 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carmen Caldwell
3 Pivot Rock Rd
Eureka Springs, AR 72632
robocarm@sbcglobal.net
(999) 999-9999

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carmen Schultz \(bumblybee@cox.net\) Sent You a Personal Message](mailto:Carmen_Schultz_(bumblybee@cox.net)_Sent_You_a_Personal_Message)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:08:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carmen Schultz
214 W Thurman St
Prairie Grove, AR 72753
bumblybee@cox.net
(479) 846-1802

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carmine Coscia \(carmine.coscia@slu.edu\)](mailto:Carmine.Coscia@slu.edu) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:54:10 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carmine Coscia
6320 Alamo Ave
Saint Louis, MO 63105
carmine.coscia@slu.edu
(314) 977-9254

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carol Gardner \(mindfulnow.cg@gmail.com\)](mailto:Carol.Gardner@mindfulnow.cg@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:18:13 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carol Gardner
PO Box 205
Rudy, AR 72952
mindfulnow.cg@gmail.com
(336) 432-4231

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carol Robinson \(caroldierkes@charter.net\) Sent You a Personal Message](mailto:caroldierkes@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:26:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carol Robinson
1050 Etherton Dr
Saint Louis, MO 63126
caroldierkes@charter.net
(314) 968-4820

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carole Schuster \(schustercarole@yahoo.com\) Sent You a Personal Message](mailto:schustercarole@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:43:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carole Schuster
1723 N Oakland Ave
Fayetteville, AR 72703
schustercarole@yahoo.com
(479) 595-2638

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [carol small \(carol.small@gmail.com\) Sent You a Personal Message](mailto:carol.small@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 4:39:59 PM

Dear Arkansas Department of Environmental Quality,

We should be at 100% renewables!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

carol small
915 Prospect Avenue
Hot Springs, AR 91901
carol.small@gmail.com
(501) 282-7299

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carole Scott \(ssnhrty@aol.com\) Sent You a Personal Message](mailto:ssnhrty@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:36:23 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Carole Scott
521 Westgate Ave
Saint Louis, MO 63130
ssnhrty@aol.com
(314) 725-6217

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carole Von Eschen \(cvstcave@gmail.com\)](mailto:cvstcave@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 6:40:21 AM

Dear Arkansas Department of Environmental Quality,

You are hurting our people!!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carole Von Eschen
4402 Arco Ave
Saint Louis, MO 63110
cvstcave@gmail.com
(314) 571-9172

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Caroline Pufalt \(carolinepufalt@gmail.com\) Sent You a Personal Message](mailto:carolinepufalt@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:55:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Caroline Pufalt
7530 Delmar Blvd
Saint Louis, MO 63130
carolinepufalt@gmail.com
(314) 721-7207

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carolyn Geffken \(c.geffken@sbcglobal.net\)](mailto:c.geffken@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:29:23 PM

Dear Arkansas Department of Environmental Quality,

We need to make coal clean, or, it will need to go! Consumers would pay a few more cents to breath fresh air. But the technology needs to be used.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Carolyn Geffken
6301 Evergreen Dr
Little Rock, AR 72207
c.geffken@sbcglobal.net
(501) 664-4310

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Carrie Losten \(carrielosten@gmail.com\) Sent You a Personal Message](mailto:carrielosten@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:08:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Carrie Losten
4840 Trinity Crossing Dr.
Conway, AR 72034
carrielosten@gmail.com
(501) 269-1425

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Catherine Beaver \(ninetails426@gmail.com\) Sent You a Personal Message](mailto:ninetails426@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:31:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Catherine Beaver
2687 Highway 71 N
Mena, AR 71953
ninetails426@gmail.com
(479) 394-3171

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Catherine Betz \(rosabetz@gmail.com\)](mailto:rosabetz@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:41:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Catherine Betz
3952 Cleveland Ave
Saint Louis, MO 63110
rosabetz@gmail.com
(618) 580-3825

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Catherine Pellerito \(ma05@centurytel.net\) Sent You a Personal Message](mailto:ma05@centurytel.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:52:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Catherine Pellerito
610 Thicket Ln
Lake Saint Louis, MO 63367
ma05@centurytel.net
(636) 625-4550

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cathy Sullins \(cactuscats@aol.com\) Sent You a Personal Message](mailto:cactuscats@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:15:42 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Cathy Sullins
4518 Oakland Ave Fl 2
Saint Louis, MO 63110
cactuscats@aol.com
(314) 737-3052

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cecelia Thompson \(cthomps@uark.edu\) Sent You a Personal Message](mailto:Cecelia.Thompson@uark.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:32:12 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Cecelia Thompson
PO Box 101
Lead Hill, AR 72644
cthomps@uark.edu
(479) 595-1932

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Char Leverette \(phatkhat@centurylink.net\) Sent You a Personal Message](mailto:phatkhat@centurylink.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:50:19 PM

Dear Arkansas Department of Environmental Quality,

Entergy is also much more expensive than our rural coops. They are pocketing a huge amount of profit. This profiteering on the backs of their customers and their neighbors is unacceptable. Clean it up NOW. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Char Leverette
1011 Simstown Rd
Evening Shade, AR 72532
phatkhat@centurylink.net
(501) 757-0116

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Charles Hughes \(dochughesbooks@gmail.com\)](mailto:dochughesbooks@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:10:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Charles Hughes
2709 Mockingbird Ln
Arkadelphia, AR 71923
dochughesbooks@gmail.com
(870) 246-8557

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Charles Rush \(jadespring1@hotmail.com\)](mailto:jadespring1@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:31:59 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Charles Rush
20 Brixton Ln
Bella Vista, AR 72714
jadespring1@hotmail.com
(479) 713-9885

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Charles Sisco \(cpsisco@cox.net\)](mailto:cpsisco@cox.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:52:40 AM

Dear Arkansas Department of Environmental Quality,

Keep Arkansas "The Natural State".

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Charles Sisco
PO Box 65
Springdale, AR 72765
cpsisco@cox.net
(479) 445-6550

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Charles Stephen Lee \(tbjexploration@gmail.com\) Sent You a Personal Message](mailto:tbjexploration@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:05:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Charles Stephen Lee
5517 Cross Ln
Fort Smith, AR 72904
tbjexploration@gmail.com
(479) 221-7057

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Chicana Cook \(thickestmami@yahoo.com\)](mailto:thickestmami@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 03, 2018 7:57:19 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Chicana Cook
1167 Watts Ave
Saint Louis, MO 63130
thickestmami@yahoo.com
(314) 265-2854

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Chris Mihill \(cmihill@sbcglobal.net\)](mailto:cmihill@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:08:38 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Chris Mihill
7730 Devonshire Ave
Saint Louis, MO 63119
cmihill@sbcglobal.net
(314) 647-8004

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Chris Sanders \(chris.e.sanders@gmail.com\)](mailto:chris.e.sanders@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:52:07 PM

Dear Arkansas Department of Environmental Quality,

As someone with family members in both AR and MO, this is extremely upsetting. If you're going to continue to burn dirty coal rather than converting to cleaner technologies, at least add catalytic reduction to your power plants!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Chris Sanders
11915 Mattox Ct
Saint Louis, MO 63131
chris.e.sanders@gmail.com
(314) 997-5904

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christina Garrett \(ninag1089@aol.com\) Sent You a Personal Message](mailto:ninag1089@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:38:36 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Christina Garrett
3400 S Bowman Rd
Little Rock, AR 72211
ninag1089@aol.com
(501) 838-8110

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christina Latzer \(cel3m8@mail.umsl.edu\) Sent You a Personal Message](mailto:cel3m8@mail.umsl.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 8:34:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Christina Latzer
1325 Andrew Dr
Saint Louis, MO 63122
cel3m8@mail.umsl.edu
(314) 835-9137

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christina Mullinax \(christinamullinax@gmail.com\)](mailto:ChristinaMullinax@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:36:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Christina Mullinax
3219 W Markham St
Little Rock, AR 72205
christinamullinax@gmail.com
(501) 352-5328

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christine Carlson \(ccarlson_89@yahoo.com\) Sent You a Personal Message](mailto:ccarlson_89@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:27:13 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Christine Carlson
1561 N Lexington Dr
Centerton, AR 72719
ccarlson_89@yahoo.com
(513) 560-4093

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christopher Pinne, SJ \(cpinne@gmail.com\) Sent You a Personal Message](mailto:cpinne@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:42:46 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Christopher Pinne, SJ
3601 Lindell Blvd.
Saint Louis, MO 63108
cpinne@gmail.com
(314) 633-4554

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Christopher Warren \(c2warren@yahoo.com\) Sent You a Personal Message](mailto:c2warren@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 7:08:44 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Christopher Warren
5805 Stonewall Rd
Little Rock, AR 72207
c2warren@yahoo.com
(310) 745-7669

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cindy Bushue \(bushue@charter.net\) Sent You a Personal Message](mailto:bushue@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:57:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Cindy Bushue
860 Dielman Rd
Saint Louis, MO 63132
bushue@charter.net
(555) 555-5555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cindy English \(cid1555@yahoo.com\) Sent You a Personal Message](mailto:Cindy.English@yaho.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:19:03 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Cindy English
2426 Grist Mill Rd
Little Rock, AR 72227
cid1555@yahoo.com
(501) 224-3402

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cindy Gross \(cjgross10@gmail.com\) Sent You a Personal Message](mailto:cjgross10@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:17:06 AM

Dear Arkansas Department of Environmental Quality,

We all deserve clean air!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Cindy Gross
3137 Allen Ave
Saint Louis, MO 63104
cjgross10@gmail.com
(314) 772-0803

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Colleen Fitzpatrick \(collfitz@yahoo.com\) Sent You a Personal Message](mailto:collfitz@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Saturday, January 20, 2018 7:51:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Colleen Fitzpatrick
7322 Drexel Dr
Saint Louis, MO 63130
collfitz@yahoo.com
(210) 413-8044

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Corlita Bonnarens \(cbonnarens@mercysc.org\)](mailto:cbonnarens@mercysc.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:26:55 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Corlita Bonnarens
2039 N Geyer Rd
Saint Louis, MO 63131
cbonnarens@mercysc.org
(314) 909-4610

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Curtis Stuck \(cstuck1091@gmail.com\) Sent You a Personal Message](mailto:cstuck1091@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:23:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Curtis Stuck
909 Holmes Road, K-173
Searcy, AR 72143
cstuck1091@gmail.com
(918) 297-6950

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cynthia Stillwell \(macmspike@hotmail.com\) Sent You a Personal Message](mailto:macmspike@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 5:02:13 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Cynthia Stillwell
892 Emiline Rd
Salem, AR 72576
macmspike@hotmail.com
(870) 895-2360

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Cynthia Yandell \(yandell_cynthia@yahoo.com\) Sent You a Personal Message](mailto:yandell_cynthia@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:50:38 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Cynthia Yandell
706 north 18th Street #7, 4
Fort Smith, AR 72901
yandell_cynthia@yahoo.com
(615) 601-8394

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dan and Mary Cornell \(mt.cornell@gmail.com\) Sent You a Personal Message](mailto:mt.cornell@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 9:04:37 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Dan and Mary Cornell
5635 Waterman Blvd Apt 12
Saint Louis, MO 63112
mt.cornell@gmail.com
(314) 203-9605

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Daniel Berg \(danielralphberg@hotmail.com\) Sent You a Personal Message](mailto:danielralphberg@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 8:58:34 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Daniel Berg
1455 Gregg Ave
Saint Louis, MO 63139
danielralphberg@hotmail.com
(314) 602-4599

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Daniel Bertram \(raven1003@gmail.com\) Sent You a Personal Message](mailto:raven1003@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:12:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Daniel Bertram
323 Walnut St
Little Rock, AR 72205
raven1003@gmail.com
(501) 399-7333

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Daniel Conford \(daniel8email@yahoo.com\) Sent You a Personal Message](mailto:daniel8email@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:32:42 PM

Dear Arkansas Department of Environmental Quality,

Your children breathe air too.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Daniel Conford
4046 Magnolia Pl
Saint Louis, MO 63110
daniel8email@yahoo.com
(201) 696-7101

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Danny Jenkins \(saneh8t@hotmail.com\) Sent You a Personal Message](mailto:saneh8t@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:19:57 AM

Dear Arkansas Department of Environmental Quality,

Write laws for health not wealth.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Danny Jenkins
404 N Assembly Dr
Fayetteville, AR 72701
saneh8t@hotmail.com
(479) 236-6021

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Darena Yielding \(julieyielding55@gmail.com\) Sent You a Personal Message](mailto:julieyielding55@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:07:28 PM

Dear Arkansas Department of Environmental Quality,

Arkansas protect our state and Missouri from pollution, Stop the pollution
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Darena Yielding
620 Cypress Lake Rd
Beebe, AR 72012
julieyielding55@gmail.com
(501) 388-3598

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dave MacDonald \(xdavemx@gmail.com\)](mailto:xdavemx@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:27:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Dave MacDonald
14201 Kanis Rd
Little Rock, AR 72223
xdavemx@gmail.com
(321) 480-6426

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [David Cox \(satchmo11@att.net\) Sent You a Personal Message](mailto:satchmo11@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 5:47:27 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

David Cox
3403 Falcon Rd
Springdale, AR 72762
satchmo11@att.net
(479) 422-0131

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [David Freeburg \(dfreeburg@charter.net\) Sent You a Personal Message](mailto:dfreeburg@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 7:59:06 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

David Freeburg
12 Alden Ln
Saint Louis, MO 63141
dfreeburg@charter.net
(314) 395-0074

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [David Mccullough \(davidmccullough@gmail.com\) Sent You a Personal Message](mailto:davidmccullough@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:55:38 PM

Dear Arkansas Department of Environmental Quality,

It is long past time to reign in the emissions from coal plants. Coal does NOT have a place in our time if we will not strengthen the pollution regulations.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

David Mccullough
5336 N Grandview St
Little Rock, AR 72207
davidmccullough@gmail.com
(501) 666-0009

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [David Neil \(davidneil@charter.net\)](mailto:davidneil@charter.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:42:00 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

David Neil
7346 Tulane Ave
Saint Louis, MO 63130
davidneil@charter.net
(314) 863-0417

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [David Nilles \(davenil@att.net\) Sent You a Personal Message](mailto:davenil@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:49:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

David Nilles
6712 Evergreen Dr
Little Rock, AR 72207
davenil@att.net
(501) 590-3555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dawn Nahlen \(newnahlen@yahoo.com\) Sent You a Personal Message](mailto:newnahlen@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:31:57 PM

Dear Arkansas Department of Environmental Quality,

Please consider the people impacted by your actions -- or inactions -- and make the responsible, morally correct decision to enforce regulations that reduce or mitigate emissions. Thank you.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dawn Nahlen
6420 Hopi Dr
North Little Rock, AR 72116
newnahlen@yahoo.com
(501) 223-0183

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Deanna White \(deannalwhite32@gmail.com\)](mailto:deannalwhite32@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:59:25 PM

Dear Arkansas Department of Environmental Quality,

We must back clean energy everywhere.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Deanna White
63 Brannon Landing Rd
Conway, AR 72032
deannalwhite32@gmail.com
(501) 339-5498

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Deanna White \(deannalwhite32@gmail.com\)](mailto:deannalwhite32@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:38:37 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Deanna White
63 Brannon Landing Rd
Conway, AR 72032
deannalwhite32@gmail.com
(501) 339-5498

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Deborah Dorsch \(ddorsch@aol.com\) Sent You a Personal Message](mailto:ddorsch@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:39:54 PM

Dear Arkansas Department of Environmental Quality,

We in Arkansas can do better!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Deborah Dorsch
10635 Prairie Creek North Rd
Rogers, AR 72756
ddorsch@aol.com
(609) 290-3334

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Denise Baker \(3loons@charter.net\) Sent You a Personal Message](mailto:3loons@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, December 21, 2017 7:34:42 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Denise Baker
PO Box 432031
Saint Louis, MO 63143
3loons@charter.net
(314) 803-4696

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dennis Wolff \(d_wolff59@yahoo.com\)](mailto:d_wolff59@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:38:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dennis Wolff
590 S. Main St.
Cave Springs, AR 72718
d_wolff59@yahoo.com
(479) 203-7443

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dian Copeland \(dianwc@cablelynx.com\)](mailto:dianwc@cablelynx.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 1:26:42 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dian Copeland
124 Charles Thomas Blvd
Searcy, AR 72143
dianwc@cablelynx.com
(501) 279-0529

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Diana Eckholdt \(dje1935@yahoo.com\) Sent You a Personal Message](mailto:dje1935@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 25, 2017 2:29:17 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Diana Eckholdt
3221 N Florissant Ave
Saint Louis, MO 63107
dje1935@yahoo.com
(314) 240-5530

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Diana Glixman \(glixmandiana@yahoo.com\)](mailto:glixmandiana@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:47:43 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Diana Glixman
7150 Amherst Ave
Saint Louis, MO 63130
glixmandiana@yahoo.com
(314) 961-9258

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Don Hamilton \(dirk1745@gmail.com\) Sent You a Personal Message](mailto:dirk1745@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:33:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Don Hamilton
1 Glenleigh Dr
Little Rock, AR 72227
dirk1745@gmail.com
(501) 225-1959

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Donna Griffin \(donnaofgriffin@gmail.com\) Sent You a Personal Message](mailto:donnaofgriffin@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:18:01 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Donna Griffin
1420 Justin Ct
Siloam Springs, AR 72761
donnaofgriffin@gmail.com
(870) 512-8980

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Donna Springer \(dsprin5574@aol.com\)](mailto:dsprin5574@aol.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 26, 2017 7:58:22 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Donna Springer
5931 Suson Pl Apt 4
Saint Louis, MO 63139
dsprin5574@aol.com
(314) 752-4064

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Donovan Netherland \(dnetherland@live.com\)](mailto:Donovan.Netherland@live.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:41:38 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Donovan Netherland
PO Box 1081
Fayetteville, AR 72702
dnetherland@live.com
(479) 435-1109

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dorothy Funk \(dfunklr@comcast.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:04:50 PM

Dear Arkansas Department of Environmental Quality,

Please require cleaner air standards so I, and many other asthma sufferers, will be able to breathe!!!
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Dorothy Funk
5 Longlea Dr
Little Rock, AR 72212
dfunklr@comcast.net
(501) 227-4862

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dteven Jarvis \(sjarvis@sjarvis.com\) Sent You a Personal Message](mailto:sjarvis@sjarvis.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:14:33 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Dteven Jarvis
2409 E. Tall Oaks Dr.
Fayetteville, AR 72703
sjarvis@sjarvis.com
(479) 582-4228

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dustin Sotnyk \(dsotnyk@gmail.com\)](mailto:dsotnyk@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:58:04 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dustin Sotnyk
5609 Oleatha Ave
Saint Louis, MO 63139
dsotnyk@gmail.com
(618) 210-5566

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Dwight Rezny \(dwightauto@hotmail.com\) Sent You a Personal Message](mailto:dwightauto@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:59:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Dwight Rezny
104 Graeser Acres
Saint Louis, MO 63146
dwightauto@hotmail.com
(314) 522-9449

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ed and Carol Schlachtenhaufen \(ecschla2@gmail.com\) Sent You a Personal Message](mailto:ecschla2@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 3:33:53 PM

Dear Arkansas Department of Environmental Quality,

I love living in Arkansas...please stop spoiling our beautiful country.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ed and Carol Schlachtenhaufen
19 Durango Way
Hot Springs Village, AR 71909
ecschla2@gmail.com
(352) 728-4214

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ed Daigle \(misteredaigle@gmail.com\) Sent You a Personal Message](mailto:misteredaigle@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:59:20 PM

Dear Arkansas Department of Environmental Quality,

P.S. We can live without coal but not without the planet!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ed Daigle
199 Quest Ln
Marshall, AR 72650
misteredaigle@gmail.com
(501) 548-2492

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Edward Hejtmanek \(ehejtmanek1949@msn.com\) Sent You a Personal Message](mailto:ehejtmanek1949@msn.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:36:44 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Edward Hejtmanek
1622 W Markham Rd
Fayetteville, AR 72701
ehejtmanek1949@msn.com
(479) 442-5675

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Eileen Joyce \(efjoyce@att.net\)](mailto:efjoyce@att.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:39:29 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Eileen Joyce
1308 Cove View Ln
Little Rock, AR 72211
efjoyce@att.net
(501) 221-1616

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elaine Burns \(elena.centli@gmail.com\) Sent You a Personal Message](mailto:elena.centli@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:47:38 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Elaine Burns
3824 Culberhouse
Jonesboro, AR 72401
elena.centli@gmail.com
(870) 972-5009

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elaine Potter \(epotter43@live.com\) Sent You a Personal Message](mailto:epotter43@live.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, December 21, 2017 12:59:14 PM

Dear Arkansas Department of Environmental Quality,

Why? Why do we need to pollute? Why? How can you sleep at night? Don't answer to me, tell your grandchildren how we are so lazy that we don't mind ruining everything we touch. Good luck to the next generation because we don't care what we leave you!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Elaine Potter
419 E 10th St
Little Rock, AR 72202
epotter43@live.com
(501) 372-7232

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elaine Scott \(elainescott8@me.com\)](mailto:elainescott8@me.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:50:56 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Elaine Scott
621 North Pine St.
Little Rock, AR 72205
elainescott8@me.com
(501) 664-3210

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elissa Ellis \(april-elissa@sbcglobal.net\)](mailto:april-elissa@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:26:23 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Elissa Ellis
9 Crockett Rd
Plumerville, AR 72127
april-elissa@sbcglobal.net
(501) 626-9539

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elizabeth Wedel \(wedgio@sbcglobal.net\) Sent You a Personal Message](mailto:wedgio@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 4:16:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Elizabeth Wedel
16 Calanas Ln
Hot Springs, AR 71909
wedgio@sbcglobal.net
(501) 922-6464

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Elyse Partee \(monah202@gmail.com\) Sent You a Personal Message](mailto:monah202@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 9:46:20 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Elyse Partee
202 SW "O" Street
Bentonville, AR 72712
monah202@gmail.com
(479) 273-2456

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Emily Adams \(emilyeadams@gmail.com\) Sent You a Personal Message](mailto:emilyeadams@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:33:58 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Emily Adams
4101 Shaw Blvd
Saint Louis, MO 63110
emilyeadams@gmail.com
(314) 435-5771

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Erica Williams \(ericaw0@yahoo.com\) Sent You a Personal Message](mailto:ericaw0@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:51:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Erica Williams
9204 Cloverhill Rd
Little Rock, AR 72205
ericaw0@yahoo.com
(501) 626-3555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Erma Noiel \(ermanoiel@windstream.net\) Sent You a Personal Message](mailto:ermanoiel@windstream.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 2:08:35 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Erma Noiel
6109 Timbercreek Dr
Texarkana, AR 71854
ermanoiel@windstream.net
(870) 772-0030

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Eva Coffee \(koko72927@hotmail.com\)](mailto:koko72927@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:45:40 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Eva Coffee
536 W Main St
Booneville, AR 72927
koko72927@hotmail.com
(479) 763-6345

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Faebyan Whittle \(faebyanwhittle3@gmail.com\) Sent You a Personal Message](mailto:faebyanwhittle3@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:46:13 PM

Dear Arkansas Department of Environmental Quality,

We get it. You want to make money but we want an environment our grandchildren can not only survive, but flourish. There is a way to do the right thing and be wealthy. You just have to decide. So what do you choose? Health or wealth?

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Faebyan Whittle
3373 W Cornell Dr
Fayetteville, AR 72704
faebyanwhittle3@gmail.com
(501) 831-5640

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Felisa Womble \(felidarocs@yahoo.com\) Sent You a Personal Message](mailto:felidarocs@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:21:29 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Felisa Womble
722 willow st
North Little rock, AR 72114
felidarocs@yahoo.com
(501) 462-2109

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Fran Alexander \(fran@deane-alexander.com\)](mailto:fran@deane-alexander.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:11:46 PM

Dear Arkansas Department of Environmental Quality,

Why should my grandchild's very breath subsidize a coal plant's bottom line? Her asthma is not her fault---it's yours, Entergy. Shame on your criminality! Try finding some morals and ethics in your company.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Fran Alexander
1946 N Fox Hunter Rd
Fayetteville, AR 72701
fran@deane-alexander.com
(479) 442-5307

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Frances Lipschitz \(otomom77@gmail.com\) Sent You a Personal Message](mailto:otomom77@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:26:24 PM

Dear Arkansas Department of Environmental Quality,

Not only are these plants environmentally unsound, they are an embarrassment to our state!!
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Frances Lipschitz
3420 Hill Rd
Little Rock, AR 72205
otomom77@gmail.com
(501) 960-6794

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Francine Cantor \(frcantor@mac.com\) Sent You a Personal Message](mailto:frcantor@mac.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:41:00 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Francine Cantor
11700 Tarrytown Dr
Saint Louis, MO 63141
frcantor@mac.com
(314) 974-5387

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Francine Glass \(fran813@gmail.com\) Sent You a Personal Message](mailto:fran813@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:12:23 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Francine Glass
8737 Villa Crest Dr
Saint Louis, MO 63126
fran813@gmail.com
(314) 843-0791

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Fred Bach \(fbach@centurytel.net\) Sent You a Personal Message](mailto:fbach@centurytel.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:22:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Fred Bach
821 Christensen Road
Mountain Home, AR 72653
fbach@centurytel.net
(870) 492-4715

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Fred Longino \(flongino@gmail.com\) Sent You a Personal Message](mailto:flongino@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:58:22 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Fred Longino
7 Nisa Ln
Hot Springs Village, AR 71909
flongino@gmail.com
(501) 922-1054

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Frederick Goldthorpe \(fred.goldthorpe@gmail.com\)](mailto:fred.goldthorpe@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:50:27 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Frederick Goldthorpe
91 High Point Dr
Mayflower, AR 72106
fred.goldthorpe@gmail.com
(501) 516-2956

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gamin Davis \(arkietrekker@sbcglobal.net\)](mailto:arkietrekker@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:29:39 PM

Dear Arkansas Department of Environmental Quality,

Let's preserve Arkansas' beauty and natural resources by NOT allowing companies to muddy up our skies and water!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gamin Davis
3103A Adrian Ave
Springdale, AR 72764
arkietrekker@sbcglobal.net
(479) 305-3235

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gary Davis \(davisgl@mac.com\) Sent You a Personal Message](mailto:davisgl@mac.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:38:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gary Davis
3634 Juniata St
Saint Louis, MO 63116
davisgl@mac.com
(314) 335-7468

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gay Signoff \(gsignoff@sbcglobal.net\) Sent You a Personal Message](mailto:gsignoff@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:48:47 PM

Dear Arkansas Department of Environmental Quality,

I have lived in Arkansas for the past 30 years. I am appalled to know that you have used the money I pay Entergy for services every month has not been used to better the life and welfare of Arkansas. I beg you to end coal pollution and smog that harms the Natural State and its inhabitants. Clean up the emissions from the Entergy plants!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Gay Signoff
5814 McMurtrey Dr
North Little Rock, AR 72118
gsignoff@sbcglobal.net
(501) 753-0000

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Geoffrey Pruitt \(geoffrey.pruitt@gmail.com\) Sent You a Personal Message](mailto:geoffrey.pruitt@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:36:01 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Geoffrey Pruitt
6818 Virginia Ave
Saint Louis, MO 63111
geoffrey.pruitt@gmail.com
(314) 650-2689

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gerry Archibald \(garchibald@live.com\) Sent You a Personal Message](mailto:garchibald@live.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:42:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gerry Archibald
7 Newcastle Ln
Bella Vista, AR 72714
garchibald@live.com
(720) 883-3626

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gerry Segal \(gerryasegal@gmail.com\) Sent You a Personal Message](mailto:gerryasegal@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:36:05 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gerry Segal
PO Box 385
Fayetteville, AR 72702
gerryasegal@gmail.com
(479) 263-0604

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ginny Masullo \(masullo.ginny1@gmail.com\)](mailto:masullo.ginny1@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 1:35:48 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ginny Masullo
1837 N Ruppel Rd
Fayetteville, AR 72704
masullo.ginny1@gmail.com
(479) 530-0280

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ginny Masullo \(masullo.ginny1@gmail.com\)](mailto:masullo.ginny1@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:20:42 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ginny Masullo
1837 N Ruppel Rd
Fayetteville, AR 72704
masullo.ginny1@gmail.com
(479) 530-0280

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gladys Tiffany \(gladystiffany@yahoo.com\) Sent You a Personal Message](mailto:gladystiffany@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:40:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gladys Tiffany
105 N Willow Ave
Fayetteville, AR 72701
gladystiffany@yahoo.com
(479) 935-4422

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Glenda Hollis \(gkhollis@hotmail.com\) Sent You a Personal Message](mailto:gkhollis@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 3:01:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Glenda Hollis
PO Box 1963
Fayetteville, AR 72702
gkhollis@hotmail.com
(479) 249-9906

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gloria Bond \(gbond20586@prodigy.net\)](mailto:gbond20586@prodigy.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:57:05 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Gloria Bond
4418 Crestland Dr
Saint Louis, MO 63121
gbond20586@prodigy.net
(314) 381-7754

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gloria Mcgee \(gloria.mcgee@sbcglobal.net\)](mailto:gloria.mcgee@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:57:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gloria Mcgee
1900 Jean St
Springdale, AR 72762
gloria.mcgee@sbcglobal.net
(479) 751-8102

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Glorian Mcguire \(glorianmcguire@gmail.com\)](mailto:Glorian.Mcguire@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:10:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Glorian Mcguire
836 Mary Meadows Ln
Saint Louis, MO 63141
glorianmcguire@gmail.com
(314) 432-4036

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gloria Miller \(drmom36@gmail.com\)](mailto:drmom36@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:40:36 AM

Dear Arkansas Department of Environmental Quality,

Stop destroying our planet

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gloria Miller
16 Cumbrian Dr
Bella Vista, AR 72714
drmom36@gmail.com
(254) 709-5948

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gordon Messling \(touchingback@gmail.com\)](mailto:touchingback@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:19:12 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gordon Messling
28 S College Ave Ste 2
Fayetteville, AR 72701
touchingback@gmail.com
(479) 571-3020

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gregory Mennemeier \(greg.mennemeier@gmail.com\) Sent You a Personal Message](mailto:greg.mennemeier@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:12:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gregory Mennemeier
5235 Windsor Pkwy
Saint Louis, MO 63116
greg.mennemeier@gmail.com
(314) 301-9625

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gregory Thomas \(tingdr@aol.com\)](mailto:tingdr@aol.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:14:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Gregory Thomas
14578 Goshen Tuttle Rd
Elkins, AR 72727
tingdr@aol.com
(479) 422-8528

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gretchen Hines \(gretchenhines1992@gmail.com\) Sent You a Personal Message](mailto:gretchenhines1992@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:29:24 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gretchen Hines
203 Morgan street
Newark, AR 72562
gretchenhines1992@gmail.com
(870) 321-2886

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Gretchen Waddell Barwick \(gretchen.waddellbarwick@sierraclub.org\) Sent You a Personal Message](mailto:gretchen.waddellbarwick@sierraclub.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:00:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Gretchen Waddell Barwick
1400 McCausland Ave
Saint Louis, MO 63117
gretchen.waddellbarwick@sierraclub.org
(314) 954-7108

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Guy Amsler \(guyamsler@yahoo.com\) Sent You a Personal Message](mailto:guyamsler@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:32:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Guy Amsler
2100 Rebsamen Park Rd Apt 422A
Little Rock, AR 72202
guyamsler@yahoo.com
(501) 580-8302

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Harvey Cantor \(hecantor@me.com\) Sent You a Personal Message](mailto:hecantor@me.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:40:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Harvey Cantor
11700 Tarrytown Dr
Saint Louis, MO 63141
hecantor@me.com
(314) 570-1387

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Heather Beck \(mom2beckboys@yahoo.com\) Sent You a Personal Message](mailto:mom2beckboys@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:33:08 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Heather Beck
37 Green Meadows Dr.
Vilonia, AR 72173
mom2beckboys@yahoo.com
(940) 257-4639

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Heather Drain \(heathermariedrain@gmail.com\) Sent You a Personal Message](mailto:heathermariedrain@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 9:27:53 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Heather Drain
PO Box 9238
Fayetteville, AR 72703
heathermariedrain@gmail.com
(479) 957-1234

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Heather Hammig \(souphammig@gmail.com\) Sent You a Personal Message](mailto:souphammig@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:26:35 PM

Dear Arkansas Department of Environmental Quality,

We must all work for the collective good. Breathing clean air has to be among the most basic issues for a good quality of life.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Heather Hammig
1800 N Barrington Dr
Fayetteville, AR 72701
souphammig@gmail.com
(479) 251-1510

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Helen Ludbrook \(helenludbrook@att.net\)](mailto:helenludbrook@att.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:02:58 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Helen Ludbrook
1422 Lawnwood Dr
Saint Louis, MO 63131
helenludbrook@att.net
(314) 965-3438

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Henry Carraro \(hcarraro@hughes.net\)](mailto:hcarraro@hughes.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:13:36 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Henry Carraro
12401 Arch Street
Little Rock, AR 72206
hcarraro@hughes.net
(501) 261-1854

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Herb Huebner \(huebnerhr@live.com\) Sent You a Personal Message](mailto:huebnerhr@live.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:34:00 PM

Dear Arkansas Department of Environmental Quality,

People here are getting ill from the smog, and its important for all polluters, in STL and in surrounding states, to eliminate unhealthful emissions from their power plants as soon as possible.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Herb Huebner
2066 Rurline Dr
Saint Louis, MO 63146
huebnerhr@live.com
(314) 873-6633

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Holly Goodrich \(avIntes@hotmail.com\) Sent You a Personal Message](mailto:avIntes@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:08:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Holly Goodrich
5536 Poinciana Blvd
Saint Louis, MO 63123
avIntes@hotmail.com
(360) 213-4344

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Holly Hope \(holly_hope@sbcglobal.net\) Sent You a Personal Message](mailto:holly_hope@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:50:27 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Holly Hope
210 Dennison St
Little Rock, AR 72205
holly_hope@sbcglobal.net
(501) 681-2120

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Hosea Mcadoo \(hwmcadoo@sbcglobal.net\)](mailto:hwmcadoo@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:47:43 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Hosea Mcadoo
3829 Stone Mountain Dr
Sherwood, AR 72120
hwmcadoo@sbcglobal.net
(501) 835-6765

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Houston Taylor \(hdtaylor6@gmail.com\) Sent You a Personal Message](mailto:hdtaylor6@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 1:55:37 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Houston Taylor
PO Box 2001
Magnolia, AR 71754
hdtaylor6@gmail.com
(870) 234-6948

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Iliia Mcneal \(itsilia@gmail.com\)](mailto:itsilia@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:29:46 PM

Dear Arkansas Department of Environmental Quality,

As a citizen of the Natural state, I demand that you come into 2018 with the rest of the world and STOP ALL COAL PLANT OPERATIONS/PRODUCTION- it is disgusting and filthy and RUINING OUR 1 EARTH!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! get your life together.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Iliia Mcneal
53 Pin Oak Loop
Maumelle, AR 72113
itsilia@gmail.com
(501) 332-8825

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Irma Kennebeck \(iris63126@gmail.com\) Sent You a Personal Message](mailto:Irma.Kennebeck@iris63126@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:38:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Irma Kennebeck
8840 Glenwood Dr
Saint Louis, MO 63126
iris63126@gmail.com
(314) 849-2404

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ittikorn Meeboonlue \(ittikorn_1994@hotmail.com\) Sent You a Personal Message](mailto:ittikorn_1994@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:57:35 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Ittikorn Meeboonlue
212 Edgar Rd APT213
Saint Louis, MO 63119
ittikorn_1994@hotmail.com
(314) 755-7280

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [J Morgan Chism-Diebold \(gabbylld@sbcglobal.net\) Sent You a Personal Message](mailto:J.Morgan.Chism-Diebold@gabbylld@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, January 22, 2018 12:22:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

J Morgan Chism-Diebold
1207 E Walnut St
Rogers, AR 72756
gabbylld@sbcglobal.net
(479) 372-6115

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [J.Olgaard \(jolgaard@gmail.com\) Sent You a Personal Message](mailto:jolgaard@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:51:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

J Olgaard
4909 Laclede Ave
Saint Louis, MO 63108
jolgaard@gmail.com
(314) 799-8155

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jack Mccurdy \(crabbyoldman35@gmail.com\) Sent You a Personal Message](mailto:Jack_Mccurdy_(crabbyoldman35@gmail.com)_Sent_You_a_Personal_Message)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:05:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jack Mccurdy
2509 Captiva Dr Apt 7
Saint Louis, MO 63125
crabbyoldman35@gmail.com
(314) 845-0187

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jacob Buchowski \(jbuchow@hotmail.com\) Sent You a Personal Message](mailto:jbuchow@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:19:03 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jacob Buchowski
27 Rio Vista Dr
Saint Louis, MO 63124
jbuchow@hotmail.com
(314) 395-9266

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Brewer \(james067@centurytel.net\) Sent You a Personal Message](mailto:james067@centurytel.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:39:58 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

James Brewer
6710 Dawson Rd
Greenwood, AR 72936
james067@centurytel.net
(479) 996-4811

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Burke \(jmburke320@gmail.com\) Sent You a Personal Message](mailto:jmburke320@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:28:46 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

James Burke
295 McDonald St
West Fork, AR 72774
jmburke320@gmail.com
(479) 387-1987

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Hammons \(jham640422@aol.com\)](mailto:jham640422@aol.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:32:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

James Hammons
3004 N 16th St
Rogers, AR 72756
jham640422@aol.com
(479) 621-7922

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Phelps \(chezphelps@juno.com\) Sent You a Personal Message](mailto:chezphelps@juno.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:23:13 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

James Phelps
7511 Teasdale Ave
Saint Louis, MO 63130
chezphelps@juno.com
(314) 556-8698

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Pona \(tandemjim@charter.net\)](mailto:tandemjim@charter.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:54:24 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

James Pona
11915 Crystal Dr
Saint Louis, MO 63131
tandemjim@charter.net
(314) 432-4873

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [James Wilson \(socket312@gmail.com\)](mailto:James.Wilson(socket312@gmail.com)) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:38:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

James Wilson
8331 Highway 115
Pocahontas, AR 72455
socket312@gmail.com
(870) 647-2547

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jan Baker \(jan.baker@att.net\) Sent You a Personal Message](mailto:jan.baker@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:47:07 AM

Dear Arkansas Department of Environmental Quality,

Stop the pollution going on in our beautiful natural state.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jan Baker
11933 Rivercrest Dr
Little Rock, AR 72212
jan.baker@att.net
(501) 352-6823

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jan Nolte \(jano.four@yahoo.com\) Sent You a Personal Message](mailto:jano.four@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:01:31 PM

Dear Arkansas Department of Environmental Quality,

I really don't think Arkansas can truthfully call itself The Natural State while outgassing coal burning pollution. I grew up in Arkansas and I don't want pollution to harm me and my family, the wilderness areas nor citizens of our neighboring state Missouri. Let's focus on clean alternative energy!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jan Nolte
112 Mitchell St
Conway, AR 72034
jano.four@yahoo.com
(555) 555-5555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jan Schmidt \(jls215@aol.com\)](mailto:jls215@aol.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:58:08 AM

Dear Arkansas Department of Environmental Quality,

Stop polluting St. Louis air. Clean and healthy air is a responsibility every state owes to the other. Arkansas would expect the same from us.

Thank you.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jan Schmidt
35 Provincial Ct
Saint Louis, MO 63122
jls215@aol.com
(314) 210-5918

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jade Elledge \(jbelledge@gmail.com\) Sent You a Personal Message](mailto:jbelledge@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:45:29 PM

Dear Arkansas Department of Environmental Quality,

unacceptable. do the right thing entergy

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jade Elledge
10 Shadywood Ct
Little Rock, AR 72223
jbelledge@gmail.com
(501) 295-6234

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jane House \(jane_house@sbcglobal.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 3:47:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jane House
948 Chelsea Ave
Saint Louis, MO 63122
jane_house@sbcglobal.net
(314) 965-3486

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Janet Browne \(jebrowne@att.net\) Sent You a Personal Message](mailto:jebrowne@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 12:47:44 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Janet Browne
2712 North Taylor Street
Little Rock, AR 72207
jebrowne@att.net
(501) 664-0253

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jaquelyn Enzweiler \(fayzar@yahoo.com\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:13:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jaquelyn Enzweiler
1390 County Road 3867
Lamar, AR 72846
fayzar@yahoo.com
(479) 885-3361

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jeanne Derer \(clearwater1039@gmail.com\) Sent You a Personal Message](mailto:clearwater1039@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:45:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jeanne Derer
8840 Glenwood Dr
Saint Louis, MO 63126
clearwater1039@gmail.com
(314) 849-2404

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jeanne Van Fleet \(jeannevanfleet@yahoo.com\) Sent You a Personal Message](mailto:jeannevanfleet@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:59:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jeanne Van Fleet
838 Bourbon Red Dr
Saint Louis, MO 63131
jeannevanfleet@yahoo.com
(314) 592-7171

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jeannie True-Jenkins \(jeannie.amman@gmail.com\) Sent You a Personal Message](mailto:jeannie.amman@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:06:58 PM

Dear Arkansas Department of Environmental Quality,

Clean and Reduce the emissions now from Entergy coal plants NOW!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jeannie True-Jenkins
2840 N Susan Carol Ln
Fayetteville, AR 72703
jeannie.amman@gmail.com
(479) 856-9059

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jeff Albers \(jedal5@live.com\) Sent You a Personal Message](mailto:jedal5@live.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 8:02:04 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jeff Albers
1127 Hollin Ct
Saint Louis, MO 63131
jedal5@live.com
(314) 620-7319

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jenna Greer \(selsowner@gmail.com\) Sent You a Personal Message](mailto:selsowner@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:35:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jenna Greer
37 Greenway Dr.
Little Rock, AR 72209
selsowner@gmail.com
(501) 326-1779

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jennifer Leftwich \(jleftwi@att.net\) Sent You a Personal Message](mailto:jleftwi@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:04:58 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jennifer Leftwich
2480 Riverfront Ln
Fayetteville, AR 72703
jleftwi@att.net
(479) 935-3374

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jennifer Skates \(skatesj@yahoo.com\) Sent You a Personal Message](mailto:skatesj@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:52:22 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jennifer Skates
301 Bethel St
Hot Springs, AR 71901
skatesj@yahoo.com
(501) 276-3405

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jerriann Nielsen \(jerriann.nielsen@sbcglobal.net\)](mailto:jerriann.nielsen@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:30:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jerriann Nielsen
35 Panorama Dr
Hot Springs Village, AR 71909
jerriann.nielsen@sbcglobal.net
(501) 915-8750

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jim and Carol Woolly \(jim.carol@sbcglobal.net\)](mailto:jim.carol@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, January 22, 2018 2:00:09 PM

Dear Arkansas Department of Environmental Quality,

Coal kills!! On both a short term and long term basis.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jim and Carol Woolly
30 Pamela Dr
Little Rock, AR 72227
jim.carol@sbcglobal.net
(501) 224-5341

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jo Ann Jennier \(jjennier@msn.com\) Sent You a Personal Message](mailto:jjennier@msn.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:08:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jo Ann Jennier
100 Whitaker HI
Norman, AR 71960
jjennier@msn.com
(870) 782-4472

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jo Coscia \(jmc820@gmail.com\) Sent You a Personal Message](mailto:jmc820@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:49:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jo Coscia
6320 Alamo Ave
Saint Louis, MO 63105
jmc820@gmail.com
(314) 977-9254

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jo Johnson \(garglingdogs@outlook.com\) Sent You a Personal Message](mailto:garglingdogs@outlook.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Sunday, January 07, 2018 8:50:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jo Johnson
111 River Valley Loop
Maumelle, AR 72113
garglingdogs@outlook.com
(501) 734-8430

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joan Z Cohen \(joanzcohen@gmail.com\) Sent You a Personal Message](mailto:joanzcohen@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:45:45 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joan Z Cohen
7732 Davis Dr
Saint Louis, MO 63105
joanzcohen@gmail.com
(314) 303-6621

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [JoAnn Kulaski \(kulaski517@gmail.com\) Sent You a Personal Message](mailto:kulaski517@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 2:10:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

JoAnn Kulaski
517 East Whitefish Bay Place, #4
Fayetteville, AR 72701
kulaski517@gmail.com
(479) 595-9846

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joanna Person-Michener \(jbperson@uark.edu\) Sent You a Personal Message](mailto:jbperson@uark.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 6:27:26 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joanna Person-Michener
1823 South Hoot Owl Lane
Fayetteville, AR 72701
jbperson@uark.edu
(479) 225-6804

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jodi Barnes \(jodib9@gmail.com\)](mailto:jodib9@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 8:02:42 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jodi Barnes
112 Colonial Cir
Monticello, AR 71655
jodib9@gmail.com
(803) 318-1453

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joe Atkinson \(jfatkinsonjr@sbcglobal.net\)](mailto:jfatkinsonjr@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:42:10 AM

Dear Arkansas Department of Environmental Quality,

I have chronic bronchitis and clean air is essential to my survival. Please stop polluting my air.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joe Atkinson
2726 Reeder St
Fort Smith, AR 72901
jfatkinsonjr@sbcglobal.net
(479) 782-9620

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joe Boersma \(j.boersma@cox.net\)](mailto:j.boersma@cox.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:19:32 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joe Boersma
824 Brush Creek Rd
Springdale, AR 72762
j.boersma@cox.net
(479) 586-8521

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joe Murphy \(j.b.murphy.3.17@gmail.com\)](mailto:j.b.murphy.3.17@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:45:31 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Joe Murphy
34 Church Cir
Greenbrier, AR 72058
j.b.murphy.3.17@gmail.com
(314) 640-9664

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jo-Ed Woodward \(jodi1944@gmail.com\) Sent You a Personal Message](mailto:jodi1944@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:40:48 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Jo-Ed Woodward
PO Box 607
Mayflower, AR 72106
jodi1944@gmail.com
(501) 505-6129

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [John Glebs \(johneg@ymail.com\) Sent You a Personal Message](mailto:John.Glebs@ymail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:43:39 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

John Glebs
3868 Blow St
Saint Louis, MO 63116
johneg@ymail.com
(314) 352-1103

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [John Hickey \(johnhickey77@gmail.com\) Sent You a Personal Message](mailto:John.Hickey77@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:54:01 AM

Dear Arkansas Department of Environmental Quality,

I am the father of two teen-age boys who breathe St. Louis air every day. Please do your part to support clean air by reducing pollution from these two Arkansas coal plants.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

John Hickey
532 Mason Ave
Saint Louis, MO 63119
johnhickey77@gmail.com
(314) 961-0038

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [John Hickey \(john.hickey@sierraclub.org\)](mailto:john.hickey@sierraclub.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:59:59 AM

Dear Arkansas Department of Environmental Quality,

As the parent of two teenagers who breathe St. Louis air every day, I would like to see Arkansas act as quickly as possible.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

John Hickey
532 Mason Ave.
Saint Louis, MO 63119
john.hickey@sierraclub.org
(314) 961-0038

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [John McClellan \(iguanagate@gmail.com\) Sent You a Personal Message](mailto:John.McClellan@iguanagate@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:36:32 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

John McClellan
4007 Miami St
Saint Louis, MO 63116
iguanagate@gmail.com
(314) 664-5141

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [John Moszyk \(johnmoszyk48@hotmail.com\) Sent You a Personal Message](mailto:johnmoszyk48@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:09:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

John Moszyk
4278 Bordeaux Dr
Saint Louis, MO 63129
johnmoszyk48@hotmail.com
(314) 894-0044

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jon Cunningham \(jinsell@charter.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:07:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jon Cunningham
950 Dielman Rd
Saint Louis, MO 63132
jinsell@charter.net
(314) 993-5643

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Jonathan Kiesling \(kieslingje@gmail.com\) Sent You a Personal Message](mailto:kieslingje@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:07:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Jonathan Kiesling
819 Greeley Ave
Saint Louis, MO 63119
kieslingje@gmail.com
(314) 724-2931

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joseph Poniewaz \(jponiewaz@srgglobal.com\) Sent You a Personal Message](mailto:jponiewaz@srgglobal.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:47:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Joseph Poniewaz
5101 Milburn Rd
Saint Louis, MO 63129
jponiewaz@srgglobal.com
(314) 487-6726

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joseph Sims \(joesims1234@yahoo.com\)](mailto:joesims1234@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:33:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Joseph Sims
4563 Loughborough Ave
Saint Louis, MO 63116
joesims1234@yahoo.com
(314) 600-4653

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joseph Wankum \(jbwankum@aol.com\) Sent You a Personal Message](mailto:jbwankum@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, January 22, 2018 11:01:02 PM

Dear Arkansas Department of Environmental Quality,

The two power plants have delayed taking action for altogether too many years. The time for clean air is now.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Joseph Wankum
PO Box 11590
Conway, AR 72034
jbwankum@aol.com
(501) 327-2548

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Josh Cryar \(jscryar@gmail.com\)](mailto:jscryar@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:40:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Josh Cryar
261 Bayshore Dr
Hot Springs, AR 71901
jscryar@gmail.com
(318) 794-5181

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Josh Kuykendall \(josh2719@yahoo.com\) Sent You a Personal Message](mailto:josh2719@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:43:38 PM

Dear Arkansas Department of Environmental Quality,

Solar and Wind power are better options, and less harmful on the environment.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Josh Kuykendall
310 Porchester Dr
Saint Louis, MO 63125
josh2719@yahoo.com
(314) 803-4164

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Josiah Pleasant \(jpleasant@harding.edu\) Sent You a Personal Message](mailto:jpleasant@harding.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:18:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Josiah Pleasant
1101 E River Ave
Searcy, AR 72143
jpleasant@harding.edu
(760) 936-2848

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joy Foy \(carebear_1@sbcglobal.net\) Sent You a Personal Message](mailto:Joy.Foy@carebear_1@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:48:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Joy Foy
403 E School St
Lincoln, AR 72744
carebear_1@sbcglobal.net
(972) 505-1627

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joy Martin \(joyjoytotheworld@cs.com\) Sent You a Personal Message](mailto:joyjoytotheworld@cs.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 5:56:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Joy Martin
4143 Federer St
Saint Louis, MO 63116
joyjoytotheworld@cs.com
(314) 832-7545

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Joyce Browning \(joycebrowning@windstream.net\) Sent You a Personal Message](mailto:joycebrowning@windstream.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:56:50 PM

Dear Arkansas Department of Environmental Quality,

We need clean energy in Arkansas and everywhere else.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Joyce Browning
2024 Ash St
Texarkana, AR 71854
joycebrowning@windstream.net
(870) 772-2227

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Judy Mckinney \(judyorvmck@cox.net\) Sent You a Personal Message](mailto:judyorvmck@cox.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 3:32:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Judy Mckinney
78 Pleasant Ridge Dr
Holiday Island, AR 72631
judyorvmck@cox.net
(479) 244-6905

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Julia Correia \(juliaalinecorreia@gmail.com\) Sent You a Personal Message](mailto:juliaalinecorreia@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:07:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Julia Correia
105 Ridge Three Ct
Hot Springs, AR 71901
juliaalinecorreia@gmail.com
(501) 282-2316

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Julia Ranft \(juliaranft@mac.com\) Sent You a Personal Message](mailto:juliaranft@mac.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:29:16 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Julia Ranft
239 Hobson Ave
Hot Springs, AR 71913
juliaranft@mac.com
(501) 623-5433

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Julie Birkenmaier \(birkenjm@slu.edu\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:11:48 PM

Dear Arkansas Department of Environmental Quality,

In short, we all need clean air, and we need corporate America to do their part.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Julie Birkenmaier
1053 S Taylor Ave
Saint Louis, MO 63110
birkenjm@slu.edu
(314) 534-3951

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Julie Holley \(holleyjaw@gmail.com\) Sent You a Personal Message](mailto:holleyjaw@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:20:00 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Julie Holley
226 E Bodley Ave
Saint Louis, MO 63122
holleyjaw@gmail.com
(314) 800-5405

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [June Clabon \(juneclabon@sbcglobal.net\) Sent You a Personal Message](mailto:juneclabon@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:59:57 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

June Clabon
4004 S Highway 161 Lot 32
Jacksonville, AR 72076
juneclabon@sbcglobal.net
(501) 258-1365

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Carson \(karencrsn@yahoo.com\) Sent You a Personal Message](mailto:karencrsn@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:55:49 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Karen Carson
1110 W Callahan Dr
Rogers, AR 72758
karencrsn@yahoo.com
(479) 381-5368

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Edwards \(kj44r22e@charter.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 4:14:58 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Karen Edwards
42 Sunset Ct
Saint Louis, MO 63121
kj44r22e@charter.net
(314) 229-5796

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Gerot \(karengerot@gmail.com\) Sent You a Personal Message](mailto:karengerot@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Sunday, January 28, 2018 12:54:33 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Karen Gerot
PO Box 101
Dover, AR 72837
karengerot@gmail.com
(479) 229-1561

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Levine \(karenlevine365@yahoo.com\)](mailto:karenlevine365@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:54:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Karen Levine
1791 Boulder Springs Dr Apt A
Saint Louis, MO 63146
karenlevine365@yahoo.com
(314) 395-9927

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Sage \(karensage@sbcglobal.net\) Sent You a Personal Message](mailto:karensage@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 3:32:05 PM

Dear Arkansas Department of Environmental Quality,

Here in the Ozarks we are known for our natural beauty. We need to protect our environment now and for future generations.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Karen Sage
1311 W Birch Dr
Rogers, AR 72758
karensage@sbcglobal.net
(479) 636-9009

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Shaw \(karen@karenschawrealtor.com\)](mailto:karen@karenschawrealtor.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:48:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Karen Shaw
772 Whitfield Rd
Pearcy, AR 71964
karen@karenschawrealtor.com
(501) 538-3774

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Bartle \(karenbartle@ymail.com\) Sent You a Personal Message](mailto:karenbartle@ymail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:49:12 AM

Dear Arkansas Department of Environmental Quality,

We can no longer ignore the impact of fossil fuels on our environment. We either go on as a species developing a sustainable live syle, or we cause planet-wide extinctions.. our choice.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Karen Bartle
HC 72 Box 38
Mount Judea, AR 72655
karenbartle@ymail.com
(870) 434-5624

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karen Corley \(kmcstlouis50@gmail.com\) Sent You a Personal Message](mailto:kmcstlouis50@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:26:46 PM

Dear Arkansas Department of Environmental Quality,

I have asthma and need higher air quality, or I will have to move out of St. Louis!
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Karen Corley
342 Larkhill Ct
Saint Louis, MO 63119
kmcstlouis50@gmail.com
(314) 640-7701

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Karl Studenroth \(krskyfl@yahoo.com\)](mailto:krskyfl@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:33:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Karl Studenroth
7 Santa Maria Ln
Hot Springs Village, AR 71909
krskyfl@yahoo.com
(501) 204-4205

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kate Williams \(kltwilliams@hotmail.com\) Sent You a Personal Message](mailto:kltwilliams@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:38:08 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kate Williams
8314 Fairway Ln
Rogers, AR 72756
kltwilliams@hotmail.com
(785) 577-3474

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katherine Alexander \(katherin.alexander@sbcglobal.net\)](mailto:katherin.alexander@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:24:00 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Katherine Alexander
21 Atrayente Way
Hot Springs, AR 71909
katherin.alexander@sbcglobal.net
(501) 922-3644

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kathryn Morse \(stcatherine57@msn.com\)](mailto:stcatherine57@msn.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:09:08 PM

Dear Arkansas Department of Environmental Quality,

I live in the other direction from St. Louis. I live in South Arkansas. I moved here 4 years ago from Central Mississippi. I use a CPAP machine nightly. One filter in my CPAP machine would begin to look dirty in Mississippi after 6 months use. Another after a year. Here in South Arkansas, they look dirtier after one weeks use than what I just wrote about my Mississippi experience. Also, I am a gardener. The soil here is different and for awhile I couldn't remember what it reminded me of. It finally dawned on that the soil in South Arkansas reminds me of the ash heaps in Saltville, Virginia, that are now an EPA Superfund Site.

And, I am 60 years old and used to teach. When I visit my granddaughter's schools, I am always astounded at what to me seems like a very high number of special needs children. I am worked in schools in towns and counties with a similar number of people, but which did not have this many special needs students. Also, I see larger numbers of special needs adults that I am used to from living in cities outside of Arkansas. There seems to be something very very wrong here and I suspect it is in the environment. This is a terrible strain on individuals, their families and government programs like Social Security Disability. Taking care of our environment is the most important issue to me. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kathryn Morse
510 West 8th Street
El Dorado, AR 71730
stcatherine57@msn.com
(870) 444-4702

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kathryn Norris \(kgnor@yahoo.com\) Sent You a Personal Message](mailto:kgnor@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:42:00 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Kathryn Norris
PO Box 385
Summit, AR 72677
kgnor@yahoo.com
(479) 381-6701

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kathy Lane \(mike.kathy@sbcglobal.net\) Sent You a Personal Message](mailto:mike.kathy@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:05:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kathy Lane
8164 Pollock Rd
Rogers, AR 72756
mike.kathy@sbcglobal.net
(479) 372-6029

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kathy Martone \(kmartone@dreamagik.com\) Sent You a Personal Message](mailto:kmartone@dreamagik.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:33:08 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kathy Martone
23 Elk St
Eureka Springs, AR 72632
kmartone@dreamagik.com
(303) 394-3928

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kathy Smith \(ks6958739@gmail.com\)](mailto:ks6958739@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:57:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kathy Smith
278 Eastside Gdns
Trumann, AR 72472
ks6958739@gmail.com
(870) 227-1275

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katie Collins \(kcollinsnwa@yahoo.com\) Sent You a Personal Message](mailto:Katie.Collins@knowwho.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 3:48:42 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Katie Collins
400 Coachlight Dr
Bentonville, AR 72712
kcollinsnwa@yahoo.com
(479) 790-0270

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katie Lappe \(flopalop@gmail.com\) Sent You a Personal Message](mailto:flopalop@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 27, 2017 12:58:02 PM

Dear Arkansas Department of Environmental Quality,

Please prioritize health of people over wealth of energy companies

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Katie Lappe
3327 Pestalozzi St
Saint Louis, MO 63118
flopalop@gmail.com
(314) 497-3485

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katie Mcclelland \(krmccle@gmail.com\) Sent You a Personal Message](mailto:krmccle@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 1:48:02 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Katie Mcclelland
76 S Cedar Ave
West Fork, AR 72774
krmccle@gmail.com
(479) 236-0000

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katie O'Byrne \(katieobyne@sbcglobal.net\)](mailto:katieobyne@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 9:20:13 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Katie O'Byrne
117 Sour rock springs rd
Hot Springs, AR 71913
katieobyne@sbcglobal.net
(501) 545-1024

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Katie Parker \(kbparker@fortierinc.com\) Sent You a Personal Message](mailto:kbparker@fortierinc.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:36:45 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Katie Parker
420 Ellis RD
Pottsville, AR 72858
kbparker@fortierinc.com
(501) 548-4134

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kelly Warner \(kwarner@robbidavisagency.com\) Sent You a Personal Message](mailto:kwarner@robbidavisagency.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:48:24 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kelly Warner
281 Ross Hollow Rd
Bigelow, AR 72016
kwarner@robbidavisagency.com
(501) 330-2028

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kenneth Boyle \(kenboyle49@yahoo.com\)](mailto:kenboyle49@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:21:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kenneth Boyle
501 SW Diamond Dr Apt 13
Bentonville, AR 72712
kenboyle49@yahoo.com
(479) 306-0001

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kenneth Koniczny \(kennethkoniczny@sbcglobal.net\) Sent You a Personal Message](mailto:kennethkoniczny@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:57:27 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kenneth Koniczny
124 Lemay Gardens Dr
Saint Louis, MO 63125
kennethkoniczny@sbcglobal.net
(314) 638-5260

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kent Johnson \(kentj1948@gmail.com\) Sent You a Personal Message](mailto:kentj1948@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:58:16 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kent Johnson
12928 Midfield Ter
Saint Louis, MO 63146
kentj1948@gmail.com
(636) 399-8053

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kerry Hall \(friendsofnie@nwaonline.com\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:32:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kerry Hall
212 N East Ave
Fayetteville, AR 72701
friendsofnie@nwaonline.com
(479) 684-5526

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [KeViN MeInHaRdT \(nivekpaul4@yahoo.com\) Sent You a Personal Message](mailto:nivekpaul4@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:58:24 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

KeViN MeInHaRdT
3912 Crosby Drive
Saint Louis, MO 63123
nivekpaul4@yahoo.com
(314) 638-7553

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kevin Tennal \(ktennal@aristotle.net\) Sent You a Personal Message](mailto:ktennal@aristotle.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:34:54 PM

Dear Arkansas Department of Environmental Quality,

"We all live downstream." By caring about how our waste affects others, we will improve our own condition as well as theirs.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kevin Tennal
120 Berry St
Little Rock, AR 72205
ktennal@aristotle.net
(501) 603-0102

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kevin Thompson \(kevinkt91@gmail.com\) Sent You a Personal Message](mailto:kevinkt91@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 1:35:56 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kevin Thompson
5318A Lansdowne Ave
Saint Louis, MO 63109
kevinkt91@gmail.com
(314) 737-0247

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kim Lovely \(kimbc@yahoo.com\) Sent You a Personal Message](mailto:kimbc@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:40:56 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kim Lovely
200 Fletcher Pl
Russellville, AR 72802
kimbc@yahoo.com
(479) 890-4575

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kimberly Campbell \(kimberlycampbell1130@gmail.com\)](mailto:kimberlycampbell1130@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:30:56 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Kimberly Campbell
613 N 7th St
Paragould, AR 72450
kimberlycampbell1130@gmail.com
(870) 627-8338

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kimberly Stroncsek \(hsfaery@gmail.com\) Sent You a Personal Message](mailto:hsfaery@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:17:33 PM

Dear Arkansas Department of Environmental Quality,

Stop the pollution. Be responsible. Do no harm!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Kimberly Stroncsek
138 Amber St
Hot Springs, AR 71901
hsfaery@gmail.com
(501) 802-4397

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kirk Rhoads \(kirkrhoads@hotmail.com\) Sent You a Personal Message](mailto:kirkrhoads@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:05:17 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kirk Rhoads
101 Elk Way
Mountain Home, AR 72653
kirkrhoads@hotmail.com
(870) 656-7887

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kris Monahan \(krismonahan@att.net\) Sent You a Personal Message](mailto:krismonahan@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 24, 2018 7:15:20 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Kris Monahan
5728 Tholozan Ave
Saint Louis, MO 63109
krismonahan@att.net
(314) 481-6745

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kristen Riedinger \(chatterboxpwns@gmail.com\) Sent You a Personal Message](mailto:chatterboxpwns@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:22:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kristen Riedinger
6515 Wydown Blvd
Saint Louis, MO 63105
chatterboxpwns@gmail.com
(630) 488-2427

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Kristin Wages \(kmwages@gmail.com\)](mailto:kmwages@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:01:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Kristin Wages
900 Westminster
Cave Springs, AR 72718
kmwages@gmail.com
(479) 200-8841

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Larry Trochtenberg \(laro12@att.net\) Sent You a Personal Message](mailto:laro12@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:07:02 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Larry Trochtenberg
156 Forest Brook Ln
Saint Louis, MO 63146
laro12@att.net
(314) 432-5247

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Allers-Lowry \(laura@stlouisearthday.org\) Sent You a Personal Message](mailto:laura@stlouisearthday.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:47:12 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Laura Allers-Lowry
5659 Tholozan Ave
Saint Louis, MO 63109
laura@stlouisearthday.org
(314) 800-7328

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Neuman-Howe \(a728laura@hotmail.com\)](mailto:a728laura@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:04:55 PM

Dear Arkansas Department of Environmental Quality,

We want healthier air for everybody!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Laura Neuman-Howe
834 Louwen Dr
Saint Louis, MO 63124
a728laura@hotmail.com
(314) 283-5236

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Stanley \(lvls@comcast.net\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:23:21 PM

Dear Arkansas Department of Environmental Quality,

As good neighbors we should stop this.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Laura Stanley
1109 N Polk St
Little Rock, AR 72205
lvls@comcast.net
(501) 951-0578

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Stefacek \(lstefacek@yahoo.com\) Sent You a Personal Message](mailto:lstefacek@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:59:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Laura Stefacek
5626 Oleatha Ave
Saint Louis, MO 63139
lstefacek@yahoo.com
(314) 353-1904

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Timby \(laurab2053@gmail.com\)](mailto:laurab2053@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:29:38 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Laura Timby
PO Box 25
Gilbert, AR 72636
laurab2053@gmail.com
(870) 439-2968

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Laura Wright \(lwright21@slu.edu\) Sent You a Personal Message](mailto:lwright21@slu.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:54:01 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Laura Wright
5714 Walsh St
Saint Louis, MO 63109
lwright21@slu.edu
(573) 864-6593

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lauren Daniel \(laurendaniel98@gmail.com\)](mailto:laurendaniel98@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:39:19 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Lauren Daniel
2730 Dave Ward Dr
Conway, AR 72035
laurendaniel98@gmail.com
(501) 606-2534

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lauren Rapp \(laurenapp@gmail.com\) Sent You a Personal Message](mailto:laurenapp@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:47:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Lauren Rapp
2201 Stephen Ct
Saint Louis, MO 63110
laurenapp@gmail.com
(314) 306-2187

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Leo Bierling \(lcbier1@hotmail.com\) Sent You a Personal Message](mailto:lcbier1@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:01:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Leo Bierling
10025 Zenith Ct
Saint Louis, MO 63123
lcbier1@hotmail.com
(314) 544-4694

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Leslie Lewis \(leslew365@yahoo.com\) Sent You a Personal Message](mailto:leslew365@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 1:19:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Leslie Lewis
615 Jamison St
Blytheville, AR 72315
leslew365@yahoo.com
(870) 762-5499

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Linda Caldwell \(sedonan@msn.com\) Sent You a Personal Message](mailto:sedonan@msn.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:07:30 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Linda Caldwell
26 Mission Hills Ln
Eureka Springs, AR 72631
sedonan@msn.com
(479) 200-1752

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Linda Padgett \(hogrockinglinda@cox.net\)](mailto:hogrockinglinda@cox.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:34:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Linda Padgett
5719 S Berry Farm Dr
Rogers, AR 72758
hogrockinglinda@cox.net
(479) 569-0807

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Linda Swaty \(lswati2002@yahoo.com\) Sent You a Personal Message](mailto:Linda Swaty (lswati2002@yahoo.com) Sent You a Personal Message)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 6:23:04 AM

Dear Arkansas Department of Environmental Quality,

The health of Arkansans and Missourians is at stake.

It is the duty of the coal plants to have rigorous cleanup plans that actually protect the residents of Arkansas and Missouri. Take the responsible course of action!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Linda Swaty
751 N Woodlawn Ave
Saint Louis, MO 63122
lswati2002@yahoo.com
(314) 822-2934

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Linda Wigger Kraft \(createcenter@gmail.com\) Sent You a Personal Message](mailto:createcenter@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:28:56 PM

Dear Arkansas Department of Environmental Quality,

My dear friend suffers from asthma. Her health is threatened by polluted air your company is responsible for.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Linda Wigger Kraft
7275 Creveling Dr # 63130
Saint Louis, MO 63130
createcenter@gmail.com
(314) 866-1136

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lisa Hayes \(lisa.lynn.hayes@gmail.com\)](mailto:lisa.lynn.hayes@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 11:03:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Lisa Hayes
6105 Delmar Blvd
Saint Louis, MO 63112
lisa.lynn.hayes@gmail.com
(574) 261-8154

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lisa Tuxker \(lt269910@gmail.com\) Sent You a Personal Message](mailto:lt269910@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:08:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Lisa Tuxker
35 Brown St
Farmington, AR 72730
lt269910@gmail.com
(501) 352-0241

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lori Williamson \(sgwillia@charter.net\)](mailto:sgwillia@charter.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:39:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Lori Williamson
1024 Schulte Rd
Saint Louis, MO 63146
sgwillia@charter.net
(314) 872-3175

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lu Harding \(lu.harding@arumc.org\)](mailto:lu.harding@arumc.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:25:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Lu Harding
PO Box 96
Chidester, AR 71726
lu.harding@arumc.org
(501) 253-0851

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Luke Barnes \(lukebarnes02@gmail.com\)](mailto:lukebarnes02@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 4:27:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Luke Barnes
22 Wynona St
Fort Smith, AR 72901
lukebarnes02@gmail.com
(479) 353-8597

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lynae Wachter \(lynaelacostelo@hotmail.com\) Sent You a Personal Message](mailto:lynaelacostelo@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:00:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Lynae Wachter
3316 Calvert Ave
Saint Louis, MO 63114
lynaelacostelo@hotmail.com
(314) 429-5572

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Lynne Clifton \(lynneclifton@att.net\) Sent You a Personal Message](mailto:LynneClifton@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:47:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Lynne Clifton
424 Keightly Dr
Little Rock, AR 72207
lynneclifton@att.net
(501) 940-4308

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Madelin Pajas \(mpajas@cox.net\) Sent You a Personal Message](mailto:mpajas@cox.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 7:25:48 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Madelin Pajas
31 Oniell Ln
Bella Vista, AR 72715
mpajas@cox.net
(479) 321-8887

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Madeline Marquette \(madgs@sbcglobal.net\) Sent You a Personal Message](mailto:madgs@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:57:26 PM

Dear Arkansas Department of Environmental Quality,

Thank you for taking these actions to keep the world healthy for our children.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Madeline Marquette
7818 Valley Forge Rd
Fort Smith, AR 72903
madgs@sbcglobal.net
(479) 478-7021

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mara Stoll \(ribomara@gmail.com\) Sent You a Personal Message](mailto:ribomara@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:40:52 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mara Stoll
418 Heathstone Ln
Saint Louis, MO 63122
ribomara@gmail.com
(314) 629-1022

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [MarÃa Dabrowski \(maria.i.dabrowski@wustl.edu\) Sent You a Personal Message](mailto:MarÃa_Dabrowski_(maria.i.dabrowski@wustl.edu)_Sent_You_a_Personal_Message)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:32:33 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Maria Dabrowski
6600 Washington Ave Apt 114
Saint Louis, MO 63130
maria.i.dabrowski@wustl.edu
(847) 507-2404

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [MarÅa Dabrowski \(maria.i.dabrowski@wustl.edu\) Sent You a Personal Message](mailto:maria.i.dabrowski@wustl.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:39:49 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Maria Dabrowski
6600 Washington Ave Apt 114
Saint Louis, MO 63130
maria.i.dabrowski@wustl.edu
(847) 507-2404

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Marcia Mcmichael \(ark3m@sbcglobal.net\)](mailto:ark3m@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:46:54 PM

Dear Arkansas Department of Environmental Quality,

Incredible that Arkansas, The Natural State, is still a pollutant!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Marcia Mcmichael
5 Lucir Ln
Hot Springs Village, AR 71909
ark3m@sbcglobal.net
(501) 915-0190

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Margaret Lincourt \(margaret@usscanman.com\) Sent You a Personal Message](mailto:margaret@usscanman.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:01:49 PM

Dear Arkansas Department of Environmental Quality,

We need to protect the health and lives of Americans. We cannot do that and simultaneously support coal fired plants in Arkansas. Please, please end coal pollution being generated by Arkansas plants. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Margaret Lincourt
2605 Charter Oak Dr
Little Rock, AR 72227
margaret@usscanman.com
(501) 224-2443

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Margean Kastner \(margeankastner@gmail.com\) Sent You a Personal Message](mailto:margeankastner@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 12:26:37 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Margean Kastner
1767 Robin Knoll Ct
Saint Louis, MO 63146
margeankastner@gmail.com
(314) 721-4848

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Margot Cameron \(margotcameron@gmail.com\) Sent You a Personal Message](mailto:margotcameron@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:19:20 PM

Dear Arkansas Department of Environmental Quality,

This is quite a nasty reality....the "Natural State". We should be ashamed.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Margot Cameron
114 N Summit St
Little Rock, AR 72205
margotcameron@gmail.com
(501) 612-5118

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Marian Beightol \(bxrldy2@aol.com\) Sent You a Personal Message](mailto:bxrldy2@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:27:45 PM

Dear Arkansas Department of Environmental Quality,

you must do a better job of reducing the pollution that is emitted from your coal plants. It affects both humans and the environment.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Marian Beightol
2579 E Meandering Way
Fayetteville, AR 72701
bxrldy2@aol.com
(479) 973-0017

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Marjorie Ivey \(m_ivey@sbcglobal.net\)](mailto:m_ivey@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 9:45:43 PM

Dear Arkansas Department of Environmental Quality,

Anyone with respiratory issues knows that clean air is a vital part of living and all agencies need to recognize their responsibility to achieve clean air.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Marjorie Ivey
28 Godwin Ln
Saint Louis, MO 63124
m_ivey@sbcglobal.net
(314) 993-2334

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mark Anthony \(ants126@hotmail.com\) Sent You a Personal Message](mailto:ants126@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:27:45 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Mark Anthony
126 Lakeside Ln
Hot Springs, AR 71901
ants126@hotmail.com
(501) 622-8900

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mark Mcandrew \(mpmcandrew@me.com\)](mailto:mpmcandrew@me.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:47:46 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mark Mcandrew
6221 Northwood Ave Apt 1E
Saint Louis, MO 63105
mpmcandrew@me.com
(615) 661-4529

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mark Meinhardt \(mark7649@gmail.com\)](mailto:mark7649@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:58:13 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mark Meinhardt
3912 Crosby Dr
Saint Louis, MO 63123
mark7649@gmail.com
(314) 638-7553

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Marlene Sheetz \(sheetzm2@gmail.com\) Sent You a Personal Message](mailto:sheetzm2@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:29:01 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Marlene Sheetz
7722 Lile Ave
Saint Louis, MO 63117
sheetzm2@gmail.com
(314) 644-4151

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Martha Lowry \(mtlowry6246@sbcglobal.net\) Sent You a Personal Message](mailto:mtlowry6246@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:24:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Martha Lowry
105 Forest Bend Pl
Hot Springs, AR 71913
mtlowry6246@sbcglobal.net
(501) 463-4072

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Martha Strother \(gogreen7@yahoo.com\) Sent You a Personal Message](mailto:gogreen7@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:07:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Martha Strother
31 Glenmere Dr
Little Rock, AR 72204
gogreen7@yahoo.com
(501) 614-9688

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Marty Koenig \(naturelove77@gmail.com\) Sent You a Personal Message](mailto:naturelove77@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:58:16 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Marty Koenig
3908 Juniata St
Saint Louis, MO 63116
naturelove77@gmail.com
(314) 776-1463

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Ann Hilgeman \(mhilgeman@csjssl.org\)](mailto:mhilgeman@csjssl.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:31:02 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Ann Hilgeman
2 Nazareth Ln
Saint Louis, MO 63129
mhilgeman@csjssl.org
(314) 487-3950

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Chaudet \(srmarychaudet@hotmail.com\)](mailto:srmarychaudet@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:41:33 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Chaudet
2710 S Grand Blvd
Saint Louis, MO 63118
srmarychaudet@hotmail.com
(314) 723-0264

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Cornell \(mt.cornell@gmail.com\) Sent You a Personal Message](mailto:mt.cornell@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:03:47 PM

Dear Arkansas Department of Environmental Quality,

Stop coal pollution now! All living things deserve to breathe clean air.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Mary Cornell
5635 Waterman Blvd Apt 12
Saint Louis, MO 63112
mt.cornell@gmail.com
(314) 203-9605

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Dobberstein \(maryjunk4005@gmail.com\) Sent You a Personal Message](mailto:maryjunk4005@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:51:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mary Dobberstein
4112 Federer St
Saint Louis, MO 63116
maryjunk4005@gmail.com
(314) 752-2944

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Dobberstein \(marebear4005@aol.com\) Sent You a Personal Message](mailto:marebear4005@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:11:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mary Dobberstein
4112 Federer St
Saint Louis, MO 63116
marebear4005@aol.com
(314) 752-2944

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Drevdahl \(drevdahl@uark.edu\) Sent You a Personal Message](mailto:drevdahl@uark.edu)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:58:14 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Mary Drevdahl
735 E Edna St
Fayetteville, AR 72703
drevdahl@uark.edu
(479) 443-3502

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Hellwig \(mzhellwig@gmail.com\) Sent You a Personal Message](mailto:mzhellwig@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:35:21 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Hellwig
6108 Washington Blvd. #301
Saint Louis, MO 63112
mzhellwig@gmail.com
(314) 281-0938

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Jo Stein \(maryjo.stein@doc.org\)](mailto:maryjo.stein@doc.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:48:44 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Jo Stein
1354 Tamm Ave
Saint Louis, MO 63139
maryjo.stein@doc.org
(314) 644-5375

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Kriegshauser \(periwinkle5103@sbcglobal.net\)](mailto:periwinkle5103@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 1:03:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Kriegshauser
5103 Donovan Ave
Saint Louis, MO 63109
periwinkle5103@sbcglobal.net
(314) 352-5155

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Stein \(steinsrm@doc.org\) Sent You a Personal Message](mailto:Mary_Stein@steinsrm@doc.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:33:39 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Stein
1354 Tamm Ave
Saint Louis, MO 63139
steinsrm@doc.org
(314) 644-5375

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mary Yopp \(myopp@paragould.net\) Sent You a Personal Message](mailto:myopp@paragould.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:55:56 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mary Yopp
1600 N 20th St
Paragould, AR 72450
myopp@paragould.net
(870) 239-9616

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Maureen Kelleher \(mekelleher@msn.com\) Sent You a Personal Message](mailto:mekelleher@msn.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 7:24:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Maureen Kelleher
9930 Edmil Ave
Saint Louis, MO 63114
mekelleher@msn.com
(314) 428-8886

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Megan Gasnier \(megan.gasnier@gmail.com\) Sent You a Personal Message](mailto:megan.gasnier@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:28:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Megan Gasnier
4211 Brandy Dr
Benton, AR 72015
megan.gasnier@gmail.com
(501) 626-5548

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Berg \(michael.berg+dupe@sierraclub.org\)](mailto:michael.berg+dupe@sierraclub.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:35:59 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Berg
1459 Gregg Ave
Saint Louis, MO 63139
michael.berg+dupe@sierraclub.org
(314) 456-1954

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Berg \(michael.berg@sierraclub.org\) Sent You a Personal Message](mailto:michael.berg@sierraclub.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:52:32 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Michael Berg
1459 Gregg Ave.
Saint Louis, MO 63139
michael.berg@sierraclub.org
(314) 456-1954

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Garner \(michael.garner744@gmail.com\) Sent You a Personal Message](mailto:michael.garner744@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:45:39 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Garner
3140 N Malinda Dr
Fayetteville, AR 72703
michael.garner744@gmail.com
(479) 409-3706

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Hartupee \(michaelhartupee@gmail.com\) Sent You a Personal Message](mailto:michaelhartupee@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:33:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Hartupee
5922 Nashville Ave
Saint Louis, MO 63110
michaelhartupee@gmail.com
(573) 701-3979

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Olenjack \(stcknstl@att.net\) Sent You a Personal Message](mailto:stcknstl@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 8:39:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Michael Olenjack
6515 Winona Ave
Saint Louis, MO 63109
stcknstl@att.net
(314) 555-5555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Sean Graves \(msg996@gmail.com\) Sent You a Personal Message](mailto:msg996@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:41:09 AM

Dear Arkansas Department of Environmental Quality,

Coal energy is archaic and needs to transition now into cleaner energy.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michael Sean Graves
3411 Hidden Valley Dr
Little Rock, AR 72212
msg996@gmail.com
(203) 613-3526

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michael Sheridan \(msheridan41417@gmail.com\) Sent You a Personal Message](mailto:msheridan41417@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:33:14 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Michael Sheridan
10083 Sakura Dr
Saint Louis, MO 63128
msheridan41417@gmail.com
(314) 278-8989

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michele Isam \(hypatia755@sbcglobal.net\)](mailto:hypatia755@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:44:51 PM

Dear Arkansas Department of Environmental Quality,

Pollution doesn't stop at the state line!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michele Isam
4020 Delor St
Saint Louis, MO 63116
hypatia755@sbcglobal.net
(314) 296-8614

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michele Langston \(faeryraindancer@otbp.org\) Sent You a Personal Message](mailto:faeryraindancer@otbp.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 11, 2018 3:03:51 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michele Langston
22116 Highway 107 Lot 28
Jacksonville, AR 72076
faeryraindancer@otbp.org
(919) 924-8356

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michelle Schultz \(damps44@att.net\) Sent You a Personal Message](mailto:damps44@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:37:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michelle Schultz
44 Lake Forest Dr
Saint Louis, MO 63117
damps44@att.net
(314) 251-4173

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Michelle Snyder \(snydercreativem@gmail.com\) Sent You a Personal Message](mailto:snydercreativem@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:05:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Michelle Snyder
10124 Natural Trl
North Little Rock, AR 72113
snydercreativem@gmail.com
(501) 258-6487

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Mindy Rouff \(mmrouff@gmail.com\) Sent You a Personal Message](mailto:mmrouff@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:30:07 PM

Dear Arkansas Department of Environmental Quality,

My husband has asthma and it sickens me that there has been technology available for 20 years that reduces smog yet you aren't using it. Stop polluting my city!
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Mindy Rouff
3726 Hartford St
Saint Louis, MO 63116
mmrouff@gmail.com
(917) 749-5372

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Monica Mabry \(mmabry@acxiom.com\) Sent You a Personal Message](mailto:mmabry@acxiom.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:59:28 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Monica Mabry
1507 Prince St
Conway, AR 72034
mmabry@acxiom.com
(501) 336-8091

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nan Renaud \(nan.renaud@att.net\) Sent You a Personal Message](mailto:nan.renaud@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:30:34 PM

Dear Arkansas Department of Environmental Quality,

I had no idea this was happening. I am originally from St Louis living in Little Rock. Cease and desist now!!!!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nan Renaud
1401 N Pierce St
Little Rock, AR 72207
nan.renaud@att.net
(501) 539-0052

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nancy Bush \(ncybu@charter.net\) Sent You a Personal Message](mailto:ncybu@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:36:08 PM

Dear Arkansas Department of Environmental Quality,

WE ALL DESERVE CLEAN AIR. If I had a dog, you wouldn't want me to let his poo foul your air. We're neighbors so you should do the neighborly thing and clean up your emissions. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Nancy Bush
9023 Argyle Ave
Saint Louis, MO 63114
ncybu@charter.net
(999) 999-9999

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nancy Hanway \(nhanway@mac.com\) Sent You a Personal Message](mailto:nhanway@mac.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 9:23:18 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Nancy Hanway
1061 E Missouri Way
Fayetteville, AR 72701
nhanway@mac.com
(651) 224-2744

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nancy Schick \(nancyrschick@gmail.com\) Sent You a Personal Message](mailto:nancyrschick@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 2:57:16 PM

Dear Arkansas Department of Environmental Quality,

Coal is dead - these companies just don't know it. Get with the future; clean up your mess.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Nancy Schick
2849 Laclede Station Rd
Saint Louis, MO 63143
nancyrschick@gmail.com
(314) 791-5242

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nancy Thompson \(nancythompson7277@sbcglobal.net\)](mailto:nancythompson7277@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 10:18:38 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nancy Thompson
7277 N Roland Blvd
Saint Louis, MO 63121
nancythompson7277@sbcglobal.net
(314) 952-9048

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nancy Torno \(antorno@hotmail.com\) Sent You a Personal Message](mailto:antorno@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:23:17 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Nancy Torno
5945 Southcrest Way
Saint Louis, MO 63129
antorno@hotmail.com
(314) 570-1181

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Natalie Mannering \(onawah@gmail.com\) Sent You a Personal Message](mailto:onawah@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:20:46 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Natalie Mannering
100 Victoria Woods Blvd Apt 13
Eureka Springs, AR 72632
onawah@gmail.com
(479) 555-1212

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nathan Fisher \(nperryfisher@yahoo.com\) Sent You a Personal Message](mailto:nperryfisher@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:42:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nathan Fisher
7330 Winchester Dr
Saint Louis, MO 63121
nperryfisher@yahoo.com
(507) 258-2322

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nathaniel Carroll \(nathaniel.carroll@gmail.com\) Sent You a Personal Message](mailto:nathaniel.carroll@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:57:02 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nathaniel Carroll
41 S Schlueter Avenue
Saint Louis, MO 63135
nathaniel.carroll@gmail.com
(314) 502-4703

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nicole Roberts \(nroberts314@gmail.com\)](mailto:nroberts314@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 10:20:36 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nicole Roberts
2388 Sandra Sue Dr
Saint Louis, MO 63114
nroberts314@gmail.com
(314) 398-2388

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Nina Corbin \(relnina47@att.net\) Sent You a Personal Message](mailto:relnina47@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:47:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Nina Corbin
4715 W. 29th
Little Rock, AR 72204
relnina47@att.net
(501) 666-8670

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Pamela Justice \(pajustice1973@gmail.com\) Sent You a Personal Message](mailto:pajustice1973@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:32:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Pamela Justice
11915 S Pleasant Valley Rd
Gentry, AR 72734
pajustice1973@gmail.com
(479) 220-5188

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Pamela Kell \(blues164@yahoo.com\) Sent You a Personal Message](mailto:blues164@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:42:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Pamela Kell
4323 Dewey Ave
Saint Louis, MO 63116
blues164@yahoo.com
(618) 541-9910

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Pamela Marks \(pamela.marks@att.net\) Sent You a Personal Message](mailto:pamela.marks@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:02:07 PM

Dear Arkansas Department of Environmental Quality,

SAVE OUR ENVIRONMENT!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Pamela Marks
2700 Missouri Ave
Saint Louis, MO 63118
pamela.marks@att.net
(314) 614-4576

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [PaMeLa MeInHaRdT \(p.meinhardt@hotmail.com\)](mailto:p.meinhardt@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:58:44 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

PaMeLa MeInHaRdT
3912 Crosby Drive
Saint Louis, MO 63123
p.meinhardt@hotmail.com
(314) 638-7553

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Patricia Depriest \(tishd@sbcglobal.net\) Sent You a Personal Message](mailto:tishd@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:49:48 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Patricia Depriest
424 Midland St
Little Rock, AR 72205
tishd@sbcglobal.net
(501) 940-7481

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Patricia Lackey \(lackeys@prodigy.net\) Sent You a Personal Message](mailto:lackeys@prodigy.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:31:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Patricia Lackey
131 Lindbergh Place Dr
Saint Louis, MO 63146
lackeys@prodigy.net
(314) 780-1323

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Patrick Keough \(paddykeo@sbcglobal.net\) Sent You a Personal Message](mailto:paddykeo@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:02:58 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Patrick Keough
7344 Coronado Ave
Saint Louis, MO 63116
paddykeo@sbcglobal.net
(314) 402-5477

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Patrick Quigley \(pquigs@gmail.com\) Sent You a Personal Message](mailto:pquigs@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:42:46 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Patrick Quigley
1035 Brownell Ave
Saint Louis, MO 63122
pquigs@gmail.com
(314) 578-3462

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Patti Beavers \(pbeavers2003@yahoo.com\) Sent You a Personal Message](mailto:pbeavers2003@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:42:37 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Patti Beavers
1290 Fox Run Ln
Elkins, AR 72727
pbeavers2003@yahoo.com
(479) 643-2841

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Pattie Heitzman \(wldrns20@aol.com\)](mailto:wldrns20@aol.com) [Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:14:48 PM

Dear Arkansas Department of Environmental Quality,

As a constituent using Energy I would like for you to keep the air clean for ALL of us. Please do your job and don't weaken any regulations!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Pattie Heitzman
4009 Highplains Dr
Rogers, AR 72756
wldrns20@aol.com
(479) 216-4056

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Paul April \(psapril@charter.net\) Sent You a Personal Message](mailto:psapril@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:02:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Paul April
1100 Yale Ave
Saint Louis, MO 63117
psapril@charter.net
(314) 644-4876

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Paul Meers \(psmeers@gmail.com\)](mailto:psmeers@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 8:51:46 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Paul Meers
74 Novacaine Dr
Heber Springs, AR 72543
psmeers@gmail.com
(501) 206-7436

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Paul Ohlendorf \(pohlendorf@charter.net\) Sent You a Personal Message](mailto:pohlendorf@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, January 22, 2018 2:54:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Paul Ohlendorf
6480 Oakland Ave
Saint Louis, MO 63139
pohlendorf@charter.net
(314) 647-5971

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Paulette and Robert Bliss \(paulettebliss@gmail.com\) Sent You a Personal Message](#)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:22:35 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Paulette and Robert Bliss
320 Union Blvd Apt 2
Saint Louis, MO 63108
paulettebliss@gmail.com
(314) 361-8690

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Paulette Zimmerman \(pzimmerman@ssndcp.org\) Sent You a Personal Message](mailto:pzimmerman@ssndcp.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:30:06 PM

Dear Arkansas Department of Environmental Quality,

Over my many years of teaching high school, I have seen the number of students suffering from asthma rise dramatically, especially in urban areas. This is unacceptable and you have the means to correct the situation. Act on behalf of people rather than profits.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Paulette Zimmerman
5254A Oleatha Ave
Saint Louis, MO 63139
pzimmerman@ssndcp.org
(314) 351-4427

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Pauline Michael \(pmic916@gmail.com\) Sent You a Personal Message](mailto:pmic916@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:39:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Pauline Michael
6808 Hawthorne Rd
Little Rock, AR 72207
pmic916@gmail.com
(224) 766-1045

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Peggy Kachulis \(packmo2@aol.com\) Sent You a Personal Message](mailto:packmo2@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 9:12:49 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Peggy Kachulis
2904 Wingate Ct
Saint Louis, MO 63119
packmo2@aol.com
(314) 968-8612

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Peggy Moody \(pmoody53@gmail.com\) Sent You a Personal Message](mailto:pmoody53@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:35:31 PM

Dear Arkansas Department of Environmental Quality,

I recently opened an account to give my solar to your mix. Please do not sully my clear renewable energy with dirty coal that pollutes and creates health issues particularly for children. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Peggy Moody
317 Marion County 5034
Yellville, AR 72687
pmoody53@gmail.com
(870) 449-4132

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Peter Allan Childs \(badd-pitt@sbcglobal.net\) Sent You a Personal Message](mailto:badd-pitt@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:58:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Peter Allan Childs
86 Hillside Dr Apt 102
Holiday Island, AR 72631
badd-pitt@sbcglobal.net
(918) 849-1998

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Philip Fredericks \(earthcare@pgtc.com\) Sent You a Personal Message](mailto:earthcare@pgtc.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:22:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Philip Fredericks
13060 Aristocrat Rd
West Fork, AR 72774
earthcare@pgtc.com
(479) 761-3394

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Phyllis Goicoechea \(phylnegroovy@gmail.com\) Sent You a Personal Message](mailto:Phyllis.Goicoechea@phylnegroovy@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 9:07:20 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Phyllis Goicoechea
7600 Angell Rd
Rogers, AR 72756
phylnegroovy@gmail.com
(479) 426-2140

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rachel Ammons \(t.chikn@gmail.com\) Sent You a Personal Message](mailto:t.chikn@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:14:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rachel Ammons
1103 3rd terrace
Barling, AR 72923
t.chikn@gmail.com
(479) 434-3122

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rachel Hale \(rachbhale@gmail.com\) Sent You a Personal Message](mailto:rachbhale@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 5:43:04 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Rachel Hale
516 E 9th St
Little Rock, AR 72202
rachbhale@gmail.com
(501) 766-6926

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rachel Hendrix \(ravenousrachel@hotmail.com\) Sent You a Personal Message](mailto:ravenousrachel@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:17:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Rachel Hendrix
401 S Pine St
Little Rock, AR 72205
ravenousrachel@hotmail.com
(928) 897-7477

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rachel Roberts \(rachelshareshian@gmail.com\) Sent You a Personal Message](mailto:rachelshareshian@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 11:28:42 PM

Dear Arkansas Department of Environmental Quality,

Please show wisdom and love instead of greed.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rachel Roberts
23 Warson Ter
Saint Louis, MO 63124
rachelshareshian@gmail.com
(314) 991-7734

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rebecca Corley \(footholdfarm@yahoo.com\) Sent You a Personal Message](mailto:Rebecca.Corley@footholdfarm@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, December 21, 2017 6:39:29 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rebecca Corley
HCR 70 Box 592
Jasper, AR 72641
footholdfarm@yahoo.com
(870) 861-5552

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rebecca Richardson \(rrichreba@yahoo.com\) Sent You a Personal Message](mailto:rrichreba@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 1:27:27 PM

Dear Arkansas Department of Environmental Quality,

Like many others, I suffer from asthma. Pollutants mean that I rarely get a break from breathlessness. Pollution kills slowly. I am dying in St Louis.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Rebecca Richardson
9935 Meppen Dr
Saint Louis, MO 63128
rrichreba@yahoo.com
(314) 402-3402

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Renee Sutherland \(baumsuth.renee@gmail.com\) Sent You a Personal Message](mailto:baumsuth.renee@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:38:50 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Renee Sutherland
431 Lake Hamilton Drive, #C 10
Hot Springs, AR 71913
baumsuth.renee@gmail.com
(713) 408-9857

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Bonin \(rbonin@vt.edu\)](mailto:rbonin@vt.edu) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:21:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Bonin
11435 Daykin Dr
Saint Louis, MO 63146
rbonin@vt.edu
(314) 997-1111

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rhonda Leifheit \(rhondaleifheit@icloud.com\) Sent You a Personal Message](mailto:rhondaleifheit@icloud.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:56:43 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rhonda Leifheit
2726 Ellendale Ave
Saint Louis, MO 63143
rhondaleifheit@icloud.com
(314) 644-0641

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Boggeman \(jimboggeman@sbcglobal.net\) Sent You a Personal Message](mailto:jimboggeman@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 12:01:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Boggeman
6148 Washington Blvd
Saint Louis, MO 63112
jimboggeman@sbcglobal.net
(314) 725-2967

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Chism \(r.d.chism@gmail.com\) Sent You a Personal Message](mailto:r.d.chism@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:41:11 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Chism
209 Chisum Dr
Mountain Home, AR 72653
r.d.chism@gmail.com
(309) 267-9221

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Chism \(r.chism@comcast.net\)](mailto:r.chism@comcast.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:28:33 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Chism
209 Chisum Dr
Mountain Home, AR 72653
r.chism@comcast.net
(309) 267-9221

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Dietzen \(drdietzen@gmail.com\) Sent You a Personal Message](mailto:drdietzen@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:42:20 PM

Dear Arkansas Department of Environmental Quality,

Unbelievable that this technology has not been already required. Renewable energy and end-user conservation alternatives should be pursued as well.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Dietzen
362 Cadden Springs Rd
El Dorado, AR 71730
drdietzen@gmail.com
(870) 863-6444

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Richard Finley \(richkat9@gmail.com\) Sent You a Personal Message](mailto:richkat9@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:39:50 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Richard Finley
8902 Mayflower Rd
Little Rock, AR 72205
richkat9@gmail.com
(501) 223-9129

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Rita Mauchenheimer \(ramauch@hotmail.com\) Sent You a Personal Message](mailto:ramauch@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 11:40:30 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Rita Mauchenheimer
6029 Pershing Ave
Saint Louis, MO 63112
ramauch@hotmail.com
(314) 862-8039

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robbi Courtaway \(stlspirits@outlook.com\)](mailto:stlspirits@outlook.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:57:14 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robbi Courtaway
110 E Rose Ave
Saint Louis, MO 63119
stlspirits@outlook.com
(314) 625-6853

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Brewer \(rlb84@icloud.com\)](mailto:rlb84@icloud.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 8:47:28 PM

Dear Arkansas Department of Environmental Quality,

Coal is the fuel of the past. Time to move forward.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robert Brewer
517 S Lytton Ave
Fayetteville, AR 72701
rlb84@icloud.com
(479) 575-0061

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Brewer \(rlb84@icloud.com\)](mailto:rlb84@icloud.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:41:04 PM

Dear Arkansas Department of Environmental Quality,

You claimed that air quality would be the new focus of the EPA. Now's the time to prove it.
In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robert Brewer
517 S Lytton Ave
Fayetteville, AR 72701
rlb84@icloud.com
(479) 575-0061

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Pankratz \(rpankratz@hotmail.com\) Sent You a Personal Message](mailto:rpankratz@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:51:01 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robert Pankratz
801 N Hanley Rd
Saint Louis, MO 63130
rpankratz@hotmail.com
(314) 899-9854

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Pekel \(rjpekel@cox.net\) Sent You a Personal Message](mailto:rjpekel@cox.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 6:24:56 AM

Dear Arkansas Department of Environmental Quality,

It is far past time for clean energy - wind and solar. Let's embrace the 21st century, not go backwards. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Robert Pekel
5862 S 45th St
Rogers, AR 72758
rjpekel@cox.net
(479) 586-7192

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Plunkett \(robertatfs@aol.com\) Sent You a Personal Message](mailto:robertatfs@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Saturday, December 23, 2017 12:30:08 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Robert Plunkett
10909 Greyfriar Ln
Fort Smith, AR 72908
robertatfs@aol.com
(479) 806-4262

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robert Thomas \(bob.thomas1958@yahoo.com\) Sent You a Personal Message](mailto:bob.thomas1958@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:26:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Robert Thomas
747 N Forest Ave
Saint Louis, MO 63119
bob.thomas1958@yahoo.com
(314) 239-4060

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robin Lenogue \(robin.lenogue@hotmail.fr\) Sent You a Personal Message](mailto:robin.lenogue@hotmail.fr)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, December 29, 2017 4:49:12 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Robin Lenogue
PO Box 1684
Fayetteville, AR 72702
robin.lenogue@hotmail.fr
(479) 301-1886

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Robin Whitten \(rdwhitten@windstream.net\) Sent You a Personal Message](mailto:rdwhitten@windstream.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:21:04 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Robin Whitten
49 Barney Rd
Enola, AR 72047
rdwhitten@windstream.net
(501) 336-4978

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Roger Hall \(rogerhall68@gmail.com\) Sent You a Personal Message](mailto:rogerhall68@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:42:15 PM

Dear Arkansas Department of Environmental Quality,

This is not the way you treat your neighbors.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Roger Hall
9809 Brooks Lane
Little Rock, AR 72205
rogerhall68@gmail.com
(501) 744-8514

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Roger Mccurley \(mccurleyr@gmail.com\) Sent You a Personal Message](mailto:mccurleyr@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:24:55 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Roger Mccurley
6503 Arsenal St
Saint Louis, MO 63139
mccurleyr@gmail.com
(314) 781-3969

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Roy and Jill Moed \(jamoed@gmail.com\) Sent You a Personal Message](mailto:jamoed@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 7:31:48 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Roy and Jill Moed
725 S Skinker Blvd Apt 7S
Saint Louis, MO 63105
jamoed@gmail.com
(314) 725-6602

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Ruth Karbalai \(jumanji59@aol.com\) Sent You a Personal Message](mailto:jumanji59@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:13:09 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Ruth Karbalai
7712 Williamsburg Rd
Fort Smith, AR 72903
jumanji59@aol.com
(479) 651-6260

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sally Morgan \(sallymorgan.stl@gmail.com\)](mailto:SallyMorgan.stl@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:04:59 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sally Morgan
21 Country Squire Ct
Saint Louis, MO 63146
sallymorgan.stl@gmail.com
(314) 993-2019

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Samantha Blanchard \(sammijoblanchard@gmail.com\) Sent You a Personal Message](mailto:sammijoblanchard@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:26:41 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Samantha Blanchard
5 Bardon Ln
Bella Vista, AR 72714
sammijoblanchard@gmail.com
(816) 804-9456

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Samantha Smith \(sl.smith944@gmail.com\)](mailto:sl.smith944@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:10:24 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Samantha Smith
931 Faulkner St
Conway, AR 72032
sl.smith944@gmail.com
(501) 548-7524

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Samantha Winner \(sleew1042@gmail.com\)](mailto:sleew1042@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:31:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Samantha Winner
15352 Putman Rd
Rogers, AR 72756
sleew1042@gmail.com
(479) 903-1022

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sandi Walters \(sandikayewalters@icloud.com\) Sent You a Personal Message](mailto:sandikayewalters@icloud.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:56:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sandi Walters
PO Box 85
Beaver, AR 72613
sandikayewalters@icloud.com
(479) 310-6035

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sandra Davis \(sandrakayedavis@gmail.com\) Sent You a Personal Message](mailto:sandrakayedavis@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:03:40 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sandra Davis
6 Eagle Shore Dr
Conway, AR 72032
sandrakayedavis@gmail.com
(501) 231-7027

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sandy Lynn \(sandinista72@yahoo.com\) Sent You a Personal Message](mailto:sandinista72@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, December 22, 2017 8:48:03 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sandy Lynn
7631 Lynn Ave
Saint Louis, MO 63130
sandinista72@yahoo.com
(314) 555-5555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sara Edgar \(sara.edgar@sierraclub.org\)](mailto:sara.edgar@sierraclub.org) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:58:34 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sara Edgar
3164 Portis Ave
Saint Louis, MO 63116
sara.edgar@sierraclub.org
(314) 497-8757

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sara Nelson \(saranell92@gmail.com\) Sent You a Personal Message](mailto:saranell92@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 25, 2018 11:39:27 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sara Nelson
3206 Cherokee St
Saint Louis, MO 63118
saranell92@gmail.com
(314) 954-0715

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Scarlett Burroughs \(scarburro@gmail.com\) Sent You a Personal Message](mailto:scarburro@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:57:43 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Scarlett Burroughs
300 Thayer ST
Little Rock, AR 72205
scarburro@gmail.com
(501) 749-8035

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shannon Evans \(isabella818@hotmail.com\) Sent You a Personal Message](mailto:isabella818@hotmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:27:52 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shannon Evans
209 Levin St
Hot Springs, AR 71901
isabella818@hotmail.com
(501) 538-8233

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shari Farrar \(shari.farrar@gmail.com\) Sent You a Personal Message](mailto:shari.farrar@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:05:07 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shari Farrar
8521 Dugan Way
Hackett, AR 72937
shari.farrar@gmail.com
(479) 255-9332

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sharon Blackwell \(shaybwell@sbcglobal.net\) Sent You a Personal Message](mailto:shaybwell@sbcglobal.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 7:59:32 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sharon Blackwell
824 S Sappington Rd
Saint Louis, MO 63126
shaybwell@sbcglobal.net
(314) 971-0626

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sharon O'Grady \(sharonorgs@msn.com\)](mailto:sharonorgs@msn.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, December 21, 2017 1:44:38 PM

Dear Arkansas Department of Environmental Quality,

You must know about the technology that prevents this pollution. Such pollution is going to make life increasingly difficult for generations to come. It is not going to go away.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Sharon O'Grady
7654 Natural Bridge Rd
Saint Louis, MO 63121
sharonorgs@msn.com
(307) 399-1938

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sheila Campbell \(sbcampbell@charter.net\) Sent You a Personal Message](mailto:sbcampbell@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 1:56:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Sheila Campbell
518 E Jefferson Ave
Saint Louis, MO 63122
sbcampbell@charter.net
(314) 822-3832

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shelia Carruth \(shecarruth@yahoo.com\) Sent You a Personal Message](mailto:shecarruth@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:40:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Shelia Carruth
102 Baker
West Helena, AR 72390
shecarruth@yahoo.com
(870) 228-2784

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shelley Buonaiuto \(goodhelp@cybermesa.com\)](mailto:goodhelp@cybermesa.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:58:22 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shelley Buonaiuto
13866 Pin Oak Rd
Fayetteville, AR 72704
goodhelp@cybermesa.com
(479) 445-6772

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sheri Snyder \(dreamcatcherco@sbcglobal.net\)](mailto:dreamcatcherco@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 9:52:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

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Sincerely,

Sheri Snyder
6201 Radom Ave
Saint Louis, MO 63116
dreamcatcherco@sbcglobal.net
(314) 481-0786

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sherlene Watkins \(sherlene1949@gmail.com\)](mailto:sherlene1949@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:04:07 PM

Dear Arkansas Department of Environmental Quality,

We must be proactive in protecting the air quality and water quality.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sherlene Watkins
1126 Pleasant Hill Rd
Mulberry, AR 72947
sherlene1949@gmail.com
(208) 965-8117

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sherry Johnson \(sjohnson.lrar@gmail.com\) Sent You a Personal Message](mailto:sjohnson.lrar@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 7:16:57 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sherry Johnson
2701 Aldersgate Rd
Little Rock, AR 72205
sjohnson.lrar@gmail.com
(501) 308-2128

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shirley Crenshaw \(shirlcrenshaw1@yahoo.com\) Sent You a Personal Message](mailto:shirlcrenshaw1@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:07:29 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Shirley Crenshaw
1411 Willow Brook Cv
Saint Louis, MO 63146
shirlcrenshaw1@yahoo.com
(314) 994-2181

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shirley Crenshaw \(shirlcrenshaw1@yahoo.com\) Sent You a Personal Message](mailto:shirlcrenshaw1@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 7:33:48 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shirley Crenshaw
1411 Willow Brook Cv Apt 10
Saint Louis, MO 63146
shirlcrenshaw1@yahoo.com
(314) 994-2181

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shirley Ferguson \(skferg@juno.com\) Sent You a Personal Message](mailto:skferg@juno.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 9:06:10 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shirley Ferguson
8675 Rosalie Ave
Saint Louis, MO 63144
skferg@juno.com
(314) 962-1768

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Shirley Pharis \(sptaurus5146@aol.com\) Sent You a Personal Message](mailto:sptaurus5146@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:08:59 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Shirley Pharis
212 Taylor Park Dr
Little Rock, AR 72211
sptaurus5146@aol.com
(501) 219-9575

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stacy Clark \(bookhousegirl79@gmail.com\) Sent You a Personal Message](mailto:Stacy.Clark@bookhousegirl79@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 10:45:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stacy Clark
1900 Deerwood Dr
Jonesboro, AR 72404
bookhousegirl79@gmail.com
(870) 931-5458

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stephanie Holbert \(sshaw3@my.hpu.edu\)](mailto:sshaw3@my.hpu.edu) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:10:58 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stephanie Holbert
1588 Highway 62 412
Highland, AR 72542
sshaw3@my.hpu.edu
(870) 847-3785

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stephanie Johnson \(sjohnson704@gmail.com\) Sent You a Personal Message](mailto:sjohnson704@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:57:01 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stephanie Johnson
3900 Dave Ward Dr Ste 1900
Conway, AR 72034
sjohnson704@gmail.com
(501) 548-7372

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stephen Eveld \(stepheneveld22@gmail.com\)](mailto:stepheneveld22@gmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 8:11:13 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stephen Eveld
4172 Russell Blvd., Apt. 2E
St. Louis, MO 63110
stepheneveld22@gmail.com
(207) 468-0642

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stephen Hooks \(glen.hooks@sierraclub.org\) Sent You a Personal Message](mailto:glen.hooks@sierraclub.org)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 4:00:43 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stephen Hooks
1308 W 2nd St
Little Rock, AR 72201
glen.hooks@sierraclub.org
(501) 301-8280

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stephen Kille \(junk2mud@gmail.com\) Sent You a Personal Message](mailto:junk2mud@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:32:37 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Stephen Kille
2925 Greenmont Ct
Imperial, MO 63052
junk2mud@gmail.com
(636) 867-5309

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Steve Disch \(spcdisch@aol.com\)](mailto:spcdisch@aol.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 6:39:35 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Steve Disch
2381 Fairroyal Dr
Saint Louis, MO 63131
spcdisch@aol.com
(314) 440-0870

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Steve Hooper \(stepahoop@yahoo.com\) Sent You a Personal Message](mailto:stepahoop@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:32:15 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Steve Hooper
329 Glenstone Dr
Mountain Home, AR 72653
stepahoop@yahoo.com
(870) 425-8294

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Steven Sloan \(ssloan.om@gmail.com\) Sent You a Personal Message](mailto:ssloan.om@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:44:40 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Steven Sloan
4530 Shenandoah Ave
Saint Louis, MO 63110
ssloan.om@gmail.com
(314) 302-9120

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Steven Strode \(strodestevenw@comcast.net\)](mailto:strodestevenw@comcast.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 11:31:54 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Steven Strode
104 Charter Ct
Sherwood, AR 72120
strodestevenw@comcast.net
(501) 551-9796

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Stewart Scholl \(scottys@comcast.net\) Sent You a Personal Message](mailto:scottys@comcast.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 11:35:49 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Stewart Scholl
611 Edswood Rd
Little Rock, AR 72223
scottys@comcast.net
(501) 821-2743

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sue Leahy \(sleahy@sbcglobal.net\)](mailto:sleahy@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 1:36:16 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sue Leahy
2833 Manderly Dr
Saint Louis, MO 63144
sleahy@sbcglobal.net
(314) 962-2318

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Susan M. Hardin \(whizcats@sbcglobal.net\)](mailto:whizcats@sbcglobal.net) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 10:28:06 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Susan M. Hardin
804 Konrad Ct
Little Rock, AR 72223
whizcats@sbcglobal.net
(501) 821-4073

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Susan Kaiser \(konya210@yahoo.com\)](mailto:konya210@yahoo.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:36:53 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Susan Kaiser
2444 Helen Ave
Saint Louis, MO 63144
konya210@yahoo.com
(314) 725-5881

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Suzanne Huesgen \(suwho8@gmail.com\) Sent You a Personal Message](mailto:suwho8@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:38:18 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Suzanne Huesgen
2107 s. Grand #604
St Louis, MO 63104
suwho8@gmail.com
(314) 320-9594

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Susie Getzschman \(getschs@gmail.com\) Sent You a Personal Message](mailto:getschs@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 12:17:04 PM

Dear Arkansas Department of Environmental Quality,

Sop working against the health of the people of the United States!

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Susie Getzschman
2662 McKnight Crossing Ct
Saint Louis, MO 63124
getschs@gmail.com
(314) 716-3898

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Sylvia Amsler \(apegirl_amsler@hotmail.com\)](mailto:apegirl_amsler@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 9:41:07 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Sylvia Amsler
215 Crystal Ct
Little Rock, AR 72205
apegirl_amsler@hotmail.com
(501) 663-4691

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Teighlor Chaney \(teighlorchaney@gmail.com\) Sent You a Personal Message](mailto:teighlorchaney@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 8:27:41 PM

Dear Arkansas Department of Environmental Quality,

As an Arkansas resident I care not only about keeping my state clean, but the U.S, and the entire world! We need to recognize the damage we do and find solutions to alleviate the pain we cause. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Teighlor Chaney
1 Howard Ln
Little Rock, AR 72206
teighlorchaney@gmail.com
(501) 239-0557

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Teri Patrick \(contactteri@gmail.com\) Sent You a Personal Message](mailto:Teri.Patrick@contactteri@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, December 20, 2017 8:43:01 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Teri Patrick
9 Athena Ct
Little Rock, AR 72227
contactteri@gmail.com
(501) 804-5021

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terri Green \(jagtyg93@yahoo.com\) Sent You a Personal Message](mailto:jagtyg93@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:39:28 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terri Green
5002 S 28th St
Paragould, AR 72450
jagtyg93@yahoo.com
(870) 897-3814

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terri Jones \(terrinej62@gmail.com\) Sent You a Personal Message](mailto:terrinej62@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:36:03 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terri Jones
309 W Houston St
Greenwood, AR 72936
terrinej62@gmail.com
(479) 252-6023

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terry Kippenberger \(tmkipp@att.net\) Sent You a Personal Message](mailto:tmkipp@att.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 12:09:12 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppm, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terry Kippenberger
7150 Princeton Ave
Saint Louis, MO 63130
tmkipp@att.net
(314) 721-8090

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terry Tremwel \(terry@trem-wel.com\)](mailto:terry@trem-wel.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 12:44:28 AM

Dear Arkansas Department of Environmental Quality,

Xcel Energy in Colorado got 96 bids at a median price of \$18.10 per MWH for over 42 GW of wind alone and 11 bids on wind plus battery storage at a median price of \$21 per MWH for a total of 5.7 GW. The incremental increase from the storage is less than the cost of a gas turbine peaker plant. This is presumably due to the extremely low cost of electricity from wind in Colorado, while natural gas peakers are the source of the most expensive marginal electricity prices because of the inefficiency of peakers in burning NG. For solar PV, Xcel got 152 bids at a median price of \$29.50 per MWH for a total of almost 30 GW of total bids, and 87 bids on solar PV and battery storage at a median price of \$36 per MWH for almost 17 GW of total bids. The last are similar to merely operating the dirty coal plants at White Bluff and Independence. Arkansas has better solar resources than Colorado. The wind plus storage bids are cheaper than the operating cost of the White Bluff coal plant. SW EPCO shows that Arkansas utilities can access some of the cheapest wind electricity in the world with Capacity Factors above 50%.

SWEPCO to save customers over \$5 billion by buying 1.4 GW of 50% CF wind power from Oklahoma. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terry Tremwel
515 W Skyline Dr
Fayetteville, AR 72701
terry@trem-wel.com
(479) 414-0956

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terry Tremwel \(terry@trem-wel.com\)](mailto:terry@trem-wel.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 1:02:23 AM

Dear Arkansas Department of Environmental Quality,

Xcel Energy in Colorado got 96 bids at a median price of \$18.10 per MWH for over 42 GW of wind alone and 11 bids on wind plus battery storage at a median price of \$21 per MWH for 5.7 GW. Merely operating the dirty coal plant at White Bluff is more expensive. The incremental increase from the storage is less than the cost of a gas turbine peaker plant. This is due to the extremely low cost of electricity from wind in Colorado, while natural gas peakers have the most expensive electricity prices because of the inefficiency of peakers in burning NG. For solar PV, Xcel got 152 bids at a median price of \$29.50 per MWH for almost 30 GW, and 87 bids on solar PV and battery storage at a median price of \$36 per MWH for almost 17 GW. Arkansas has better solar resources than Colorado. SWEPCO shows that Arkansas utilities can access some of the cheapest wind electricity in the world with a CFs above 50%, will save customers over \$5 billion by buying 1.4 GW of wind power from Oklahoma. In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terry Tremwel
515 W Skyline Dr
Fayetteville, AR 72701
terry@trem-wel.com
(479) 414-0956

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Terry Tremwel \(terry@trem-wel.com\)](mailto:terry@trem-wel.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Thursday, January 18, 2018 12:03:41 AM

Dear Arkansas Department of Environmental Quality,

In addition, Xcel Energy in Colorado got 96 bids at a median price of \$18.10 per MWH for over 42 GW of wind alone and 11 bids on wind plus battery storage at a median price of \$21 per MWH for a total of 5.7 GW. The incremental increase from the storage is less than the cost of a gas turbine peaker plant. This is presumably due to the extremely low cost of electricity from wind in Colorado, while natural gas peakers are the source of the most expensive marginal electricity prices because of the inefficiency of peakers in burning NG. For solar PV, Xcel got 152 bids at a median price of \$29.50 per MWH for a total of almost 30 GW of total bids, and 87 bids on solar PV and battery storage at a median price of \$36 per MWH for almost 17 GW of total bids. The last are similar to merely operating the dirty coal plants at White Bluff and Independence. Arkansas has better solar resources than Colorado. So, the wind plus storage bids are cheaper than the operating cost alone of the White Bluff or Independence coal plants. SWEPCO proved that Arkansas utilities have access to some of the cheapest and most reliable wind electricity in the world with Capacity Factors above 50%.

Also, SWEPCO reports that they are going to save their customers over \$5 billion by buying 1400 MW of 50% CF wind power from Western Oklahoma. This size is comparable to each of the double units White Bluff and Independence.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

There is a troubling new report about the impacts of the emissions from the Entergy's plants on the people of St. Louis. The report, by scientists at Sonoma Technology Inc., demonstrates that those two plants are emitting enough pollution to make the unhealthy ozone smog problems worse in St. Louis. Smog-forming emissions from the Entergy White Bluff and Independence plants are elevating ozone levels by more than 3.6 ppb, many times the level of significance. This report further demonstrates that the Entergy plants are elevating levels of ozone in the St. Louis area 22 days per summer. The technology that could reduce smog and haze forming emissions from these coal plants - so-called "selective catalytic reduction" - has been available for more than 20 years, but these plants are not using it.

I strongly support the existing 2016 clean air plan that would require the two plants to greatly reduce their emissions, and I strongly oppose the weak plan that ADEQ is currently considering. Whether its for the sake of clearing the skies on federal lands like the Upper Buffalo Wilderness Area in Arkansas or in the Mark Twain National Forest in Missouri, or especially for the sake of protecting human health from higher levels of smog in cities like St. Louis, please clean up emissions from the Entergy coal plants as soon as possible.

Sincerely,

Terry Tremwel
515 W Skyline Dr
Fayetteville, AR 72701
terry@trem-wel.com
(479) 414-0956

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the

sender information.

From: [Terry Tucker \(anotherboy@gmail.com\) Sent You a Personal Message](mailto:anotherboy@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 9:25:41 AM

Dear Arkansas Department of Environmental Quality,

This plant has been in operation for 30 years, still spewing pollution into the atmosphere. Quit polluting Mother Earth.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Terry Tucker
2957 W Country Club Rd
Searcy, AR 72143
anotherboy@gmail.com
(501) 268-1687

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Thomas Calhoun \(tom.calhoun3@gmail.com\) Sent You a Personal Message](mailto:tom.calhoun3@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:30:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Thomas Calhoun
316 Maderas Dr
Hot Springs Village, AR 71909
tom.calhoun3@gmail.com
(501) 765-4827

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Thomas Franck \(tom@talbotheirs.com\) Sent You a Personal Message](mailto:tom@talbotheirs.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:51:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Thomas Franck
2304 Ballard Rd
Cabot, AR 72023
tom@talbotheirs.com
(901) 326-7028

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Thomas Mcginnis \(ppjn@aol.com\) Sent You a Personal Message](mailto:ppjn@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, January 23, 2018 1:36:32 PM

Dear Arkansas Department of Environmental Quality,

We as human beings are now at a particular time in our history to make decisions that will guarantee whether or not we will have a future at all. Those of us with the power to make changes that will save lives still seem more preoccupied with the kind of profiteering off of toxic energy sources that will ultimately poison our planet while simultaneously destroying the resources (air/food/water) that no living being can survive without. When smoke and toxic fumes dissipate into our air...It is still there. When oil, coal ash, fracking chemicals, and nuclear waste leaks into our oceans, lakes, rivers, and groundwater...It is still there. When any of these toxins seep into our earth...It is still there.

"Out of sight" may mean "out of mind" to those lacking common sense, but the more we pour poisons into our environment, the more we will feel and see the effects...and ultimately all life will end without a sustainability agenda that all humans must honor. The path we are already on leads only towards a slow suicide on a planetary scale...and it picks up speed every day we ignore the truth.

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Thomas Mcginnis
7361 Stanford Ave
Saint Louis, MO 63130
ppjn@aol.com
(314) 918-2630

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Thomas Sanger \(tsanger@charter.net\) Sent You a Personal Message](mailto:tsanger@charter.net)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Tuesday, December 19, 2017 5:09:23 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Thomas Sanger
4346 Juniata St
Saint Louis, MO 63116
tsanger@charter.net
(314) 707-9676

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Thomas Williams \(tchiefw@aol.com\) Sent You a Personal Message](mailto:tchiefw@aol.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Friday, January 19, 2018 12:20:12 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Thomas Williams
PO Box 510507
Saint Louis, MO 63151
tchiefw@aol.com
(314) 479-2331

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Tina Pryor \(tinaslilfarm@yahoo.com\) Sent You a Personal Message](mailto:tinaslilfarm@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:44:19 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Tina Pryor
654 Cook St
Ward, AR 72176
tinaslilfarm@yahoo.com
(501) 843-1366

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Tom Utley \(tutley@eef.com\) Sent You a Personal Message](mailto:tutley@eef.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 3:21:45 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Tom Utley
321 Charles St
Little Rock, AR 72205
tutley@eef.com
(501) 920-7211

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Tommi West \(twest7@hotmail.com\)](mailto:twest7@hotmail.com) Sent You a Personal Message
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 11:15:51 AM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Tommi West
1201 Military Rd Ste 2
Benton, AR 72015
twest7@hotmail.com
(501) 317-7018

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Tonya hi Russell \(tonyalynnette97@yahoo.com\) Sent You a Personal Message](mailto:tonyalynnette97@yahoo.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 5:27:21 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Tonya hi Russell
6003 Leabrook Ln
Sherwood, AR 72120
tonyalynnette97@yahoo.com
(501) 351-7998

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Tracy Floeh \(tracy@paylifeforward.com\) Sent You a Personal Message](mailto:tracy@paylifeforward.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 6:52:26 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Tracy Floeh
7400 Teasdale Ave
Saint Louis, MO 63130
tracy@paylifeforward.com
(314) 853-9653

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [Trina Walls \(trinawalls40@gmail.com\) Sent You a Personal Message](mailto:trinawalls40@gmail.com)
To: [Treece, Tricia](#)
Subject: Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Monday, December 18, 2017 2:29:25 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

Trina Walls
311 Maple St
Star City, AR 71667
trinawalls40@gmail.com
(870) 370-4737

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.

From: [A Lenox \(ajcl7@yahoo.com\) Sent You a Personal Message](mailto:ajcl7@yahoo.com)
To: [Treece, Tricia](#)
Subject: You Must Stop Entergy plants from polluting skies over Arkansas and Missouri
Date: Wednesday, January 17, 2018 5:31:32 PM

Dear Arkansas Department of Environmental Quality,

In reference to: "Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017"

I am very concerned about the impact of Entergy's White Bluff and Independence coal plants on the air quality of Arkansas and Missouri. There is a plan already in place from 2016 that would require both plants to clean up emissions. Unfortunately, your agency appears willing to remove those requirements and replace them with a weak new plan that will allow those plants to continue operating with high emissions.

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Sincerely,

A Lenox
7269 Princeton Ave
Saint Louis, MO 63130
ajcl7@yahoo.com
(314) 555-5555

This message was sent by KnowWho, as a service provider only, on behalf of the individual noted in the sender information.



BOUNDLESS ENERGY™

American Electric Power
1 Riverside Plaza
Columbus, OH 43215
aep.com

February 2, 2018

Ms. Tricia Treece
Office of Air Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
Little Rock, AR 72118

Re: Comments of Southwestern Electric power Company on
Proposed Revisions to the Arkansas Regional Haze SIP
For the 2008 – 2018 Planning Period (October 2017)

Dear Ms. Treece:

Southwestern Electric Power Company (SWEPCO), an operating company of the American Electric Power system, appreciates the opportunity to participate in the development of revisions to the Arkansas Regional Haze State Implementation Plan (RH SIP) for the first planning period from 2008 to 2018. SWEPCO owns and operates the Flint Creek Plant, a source regulated in this first planning period, and other sources that may be affected in future planning periods. Therefore, SWEPCO has a vital interest in the application of sound principles to evaluate the measures that might be required to achieve visibility improvements, and has supplied technical and other information to help inform ADEQ's plan development process.

The RH SIP submitted by the Arkansas Department of Environmental Quality (ADEQ) in October will allow the state to resume full control of the planning and administration of this program that will gradually improve visibility in some of the most scenic places in the country. ADEQ is best equipped to consider how to make measureable and reasonable progress toward these goals by considering the key characteristics of individual facilities, including applicability of specific technologies, economic considerations, and site-specific characteristics.

ADEQ has already successfully revised the best available control technology (BART) requirements for nitrogen oxides (NO_x) by gaining approval to rely on compliance with existing requirements under the Cross-State Air Pollution Rule to provide greater emission reductions than would otherwise be achieved through the application of source-specific BART controls. Notice of U.S. EPA's approval of that plan should be published in the *Federal Register* shortly. This revision allows BART-eligible sources to comply in an extremely cost-effective manner by making emission reductions where they are most economic, and including a wider group of facilities within the emission reduction program.

BOUNDLESS ENERGY

SWEPCO appreciates ADEQ's willingness to consider all of the technical information submitted to U.S. EPA in support of the BART determination made at the Flint Creek Plant for sulfur dioxide (SO₂). This information amply supports ADEQ's determination that the equipment already installed at Flint Creek satisfies the requirements of the regional haze program at this facility, and that achieving an SO₂ emission rate of 0.06 pounds of SO₂ per million British thermal unit (#/mmBtu) will reduce visibility impacts at Class 1 areas in Arkansas. These measures, in combination with the state-of-the-art technologies and controls already in place at the John W. Turk, Jr. Power Plant and the Mattison Power Plant, allow SWEPCO to continue providing affordable and reliable electric service to customers in Arkansas in compliance with all applicable environmental standards.

SWEPCO would like to comment on two aspects of the plan that create some concerns. First, ADEQ plans to rely on administrative consent orders to establish emission limitations for the BART-eligible facilities, rather than modifying the rules in APC&EC Regulation No. 19 Chapter 15. SWEPCO supports the use of administrative orders negotiated with the facilities as an efficient way to adopt requirements that are not currently effective. However, ADEQ proposes to repeal currently effective requirements for particulate matter that have already been approved by U.S. EPA as part of the Arkansas SIP, and replace them with identical requirements under the administrative orders. There is no need for such action, and it potentially exposes ADEQ and the facilities to legal challenges when no change is occurring.

Second, SWEPCO has reviewed the comments prepared by the Arkansas Environmental Federation, and the Energy and Environmental Association of Arkansas, and encourages ADEQ to reconsider whether any reasonable progress analysis is necessary as part of the first planning period submission. The State of Arkansas and other parties challenged U.S. EPA's aggressive interpretation of these requirements in the litigation over the federal implementation plan, and have also opposed regulatory changes that would limit state discretion. Given the excellent progress Arkansas has made in improving visibility, the better course would be to defer this analysis to the next planning period in 2021.

If you have any questions concerning these comments, please contact Brian Bond at (618) 673-3595. We appreciate the opportunity and the efforts made by ADEQ to facilitate the return of this program to the state.

Very truly yours,



Janet Henry
Deputy General Counsel
American Electric Power Service Corporation

February 2, 2018

VIA HAND DELIVERY and by
E-Mail to treecep@adeq.state.ar.us.

Ms. Tricia Treece
Office of Air Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

Re: Revisions to the Arkansas State Implementation Plan: Proposed
Regional Haze SIP Revision for 2008-2018 Planning Period, October
2017.

Dear Ms. Treece:

This firm represents the Arkansas Affordable Energy Coalition (“AAEC”). Attached please find AAEC’s comments on the Arkansas Department of Environmental Quality’s (“ADEQ”) Proposed Revisions to the Arkansas State Implementation Plan, Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017 (the “Phase II RHR SIP Revision”).

As explained in more detail in the attached comments, the AAEC is a coalition that includes electric consumers, and associations of electric consumers, that purchase power from electric utilities that own and operate electric power plants

located in the State of Arkansas that are affected by the Phase II RHR SIP.

AAEC appreciates the opportunity to submit these comments. Please let me know if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark Walters", with a stylized flourish at the end.

Mark Walters

COMMENTS OF THE ARKANSAS AFFORDABLE ENERGY COALITION

FEBRUARY 2, 2018

REVISIONS TO THE ARKANSAS STATE IMPLEMENTATION PLAN
REGIONAL HAZE SIP REVISION FOR 2008-2018 PLANNING PERIOD

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF AIR QUALITY

OCTOBER 2017

The Arkansas Affordable Energy Coalition (“AAEC” or the “Coalition”) submits the following comments on the Arkansas Department of Environmental Quality (“ADEQ”) Proposed Revisions to the Arkansas State Implementation Plan, Regional Haze SIP Revision for 2008-2018 Planning Period, October 2017 (the “Phase II RHR SIP Revision”).

AAEC is a coalition that includes electric consumers, and associations of consumers, that receive power from the electric power plants affected by the Phase II RHR SIP, namely Entergy’s White Bluff and Independence plants, and SWEPCO’s Flint Creek plant. For example, the Arkansas steel mills of AAEC members Nucor Corporation and Nucor-Yamato Steel Company (“NYS”) are significant customers of and members in the Mississippi County Electric Cooperative, Inc. (“MCECI”). MCECI is a member of Arkansas Electric Cooperatives, Inc. (“AECI”), which is a co-owner of the Independence, White Bluff, and Flint Creek plants. Much of the electricity purchased by the Nucor and NYS Arkansas mills comes from these three power plants. AAEC’s membership also includes Arkansas Electric Energy Consumers, whose members are large, industrial customers of Entergy Arkansas, Inc.

Although public utility plant owners and operators will be responsible initially for the cost of installing the pollution controls or taking other actions

required under the Phase II RHR SIP, under Arkansas law, such owners and operators are permitted to directly pass through and recover the costs and expenses of installing, operating, and maintaining pollution controls from electric utility customers and ratepayers, such as Nucor and other AAEC members, through electricity rates and tariffs filed with the Arkansas Public Service Commission. *See* Ark. Code Ann. §§ 23-4-501, -504 (authorizing an immediate utility rate surcharge to recover costs incurred by a utility to comply with environmental regulations). In addition, utility plant owners and operators must obtain regulatory approval from the Arkansas Public Service Commission and other authorities, and are permitted to recover from electric utility customers and ratepayers the cost of replacement power or capacity needed to replace the premature retirement of electric generating units, or the costs of switching fuel at such facilities. *See*, Declaration of Kurt Castleberry, January 11, 2018, ¶¶ 17-26 (copy attached hereto as Exhibit A).

In addition, AAEC's members include providers of goods and services to power plants, in particular coal-fired power plants, including those affected by the Phase II RHR SIP. These providers of goods and services would be harmed financially if, instead of installing additional controls, any of these plants were to curtail or modify operations or close pursuant to the Phase II RHR SIP.

AAEC generally supports the proposed Phase II RHR SIP, which is intended to address certain elements of the State of Arkansas's Regional Haze Rule SIP for the first Regional Haze Rule planning period that were disapproved by EPA in 2012. The first Regional Haze Rule planning period ends on December 31, 2018; consequently, the Phase II SIP should focus on and be limited to one-time BART determinations and Reasonable Progress and Long Term Strategy requirements for the planning period that ends Dec. 31, 2018. Controls, strategies, limits, determinations and other requirements that take effect after that date should not be adopted or made finally enforceable as part of the Phase II RHR SIP revision.¹

¹ To the extent that the Phase II RHR SIP relies on or utilizes elements of the Final Rule, Protection of Visibility: Amendment to Requirements of State Plans, 82 F.R. 3078 (Jan. 10, 2017) ("2017 RHR Amendments") or any guidance issued with respect to that final rule, ADEQ should consider whether those parts of the plan should be modified or deleted to avoid reliance on that final rule and associated guidance. The Phase II RHR SIP is intended to address certain elements of the State's RHR that were disapproved by EPA in 2012. EPA's disapproval of the SIP in 2012 was based on regulations and guidance that were in effect at that time; consequently, in addressing the disapproved elements of the SIP it is appropriate to use the same regulations as EPA used for its disapproval. In addition, it should be noted that the 2017 RHR Amendments are the subject of litigation in the D.C. Circuit Court of Appeals, and that EPA has recently published notice of its intent to reconsider that rule. See, <https://www.epa.gov/visibility/epas-decision-revisit-aspects-2017-regional-haze-rule-revisions> (Jan. 18, 2018).

BART DETERMINATION FOR ENTERGY'S WHITE BLUFF UNITS

AAEC supports ADEQ's determination that improved use of low sulfur coal ("LSC") constitutes Best Available Retrofit Technology for the White Bluff units. There is less than one year remaining in the first planning period, and improved use of LSC is an effective control that can actually be implemented during the first planning period. ADEQ's BART analysis and BART determination should not be premised on any plan for early retirement or cessation of use of coal at White Bluff during the next or any future planning period. Such a requirement is outside the scope of this SIP since it would not take effect during this planning period. In addition, BART does not require the premature retirement of White Bluff or fuel switching. Furthermore, early closure of White Bluff or cessation of use of coal, as contemplated in Entergy's proposed five-factor analysis as a practical matter requires Entergy and the other White Bluff co-owners to obtain the the approval of other regulatory authorities. See, Declaration of Kurt Castleberry, January 11, 2018, ¶¶ 17-26 (copy attached hereto as Exhibit A); Declaration of Jonathon F. Long, January 11, 2018, ¶¶ 9-13, (copy attached hereto as Exhibit B). Consequently, any such requirement is not practically or finally enforceable at this time, and should not be included in the Phase II RHR SIP.

ADEQ's determination of LSC as BART is supported even without taking into account Entergy's proposed early retirement date or cessation of use of coal

date. In addition, ADEQ's selection of a later date than the date contained in Entergy's five factor analysis also is supported.

The cost of controls, and "cost-effectiveness" in terms of the cost per ton of pollutants removed, is only one of five factors that must be considered in arriving at a BART determination. While a high cost/ton figure could be used to eliminate certain technologies from further consideration, over-reliance on cost-effectiveness calculations based on an arbitrary remaining useful life does not properly take into account or give proper effect to other BART factors. For example, even where a technology is determined to be cost-effective, a decision to select another cost-effective technology can be justified based on other factors, for example minimal visibility improvements. See 77 Fed.Reg. 23988, 24031 (April 29, 2012) (determining that BART was use of LSC instead of dry sorbent injection, even though DSI was determined to be cost-effective). As EPA recently stated in approving the State of Louisiana's determination of low sulfur coal as BART:

Each BART determination is dependent on the specific situation and requires consideration of a number of factors including, the characteristics of the fuel burned at the source, the existing controls, the control efficiency of available control technologies, the remaining useful life, the costs and incremental costs of controls and the anticipated visibility benefit of each potential control. The Regional Haze Rule and BART Guidelines do not require the state to select as BART a more effective technology merely because it has visibility benefits or cost effectiveness that fall within the range of previous cases, nor do they prohibit the state from choosing as BART a less

effective technology measure that falls outside the range of previous cases. The state must consider all 5 statutory factors.

(82 Fed.Reg. 60520, 60535, Dec. 21, 2017).

Entergy's most recent visibility analysis in its August 18, 2017, five factor analysis for White Bluff continued to present visibility impacts using the CALPUFF model. This modeling purports to demonstrate that the difference in visibility improvement between LSC and the most stringent control technology is less than 0.5dv. As explained in Nucor and NYS's April 8, 2015 comments on EPA's proposed Regional Haze Rule Federal Implementation Plan for Arkansas, use of CALPUFF modeling at the distances involved for the Arkansas Class I areas results in overestimation of visibility impacts by at least five (5) times if not more. See, Nucor and NYS Comments on EPA's proposed Regional Haze Rule Federal Implementation Plan, EPA Docket No. EPA-R06-OAR-2015-189, at pages 40-50 and the report of Dr. Richard McNider (copies attached as Exhibits C and C-2, respectively). Thus, in reality both the overall visibility improvement at Arkansas Class I areas from the use of control technologies, as well the difference in visibility improvement between use of LSC and use of other more expensive

technologies is negligible.² Furthermore, as Entergy noted in its five factor analysis,

Trinity and EAI assert that CALPUFF is not the most appropriate model for estimating visibility impacts. Due to its numerous inherent limitations (e.g., limited chemistry mechanism, distance limitations, blanket background ammonia values, etc.), CALPUFF does not yield reliable results. Furthermore, CALPUFF is no longer an EPA-preferred model, which further indicates CALPUFF's unreliability. More advanced models like the Comprehensive Air Quality Model with Extensions (CAMx)—if processed appropriately—can yield more reliable characterizations of visibility impairment.

See, Entergy's August 17, 2017 updated five factor analysis for White Bluff, footnote 7. Furthermore, as discussed at page 46 of the proposed Phase II RHR SIP, use of the more advanced CAMx model on the Entergy Independence plant produced modeled visibility impacts **ten (10) times less** than the modeling impacts reported using the CALPUFF model. Presumably, use of CAMx modeling for

² BART requires consideration of the "degree of visibility improvement which may reasonably be anticipated to result from the use of such technology." 42 U.S.C. §7491(g)(2). Based on (a) the acknowledged deficiencies in the CALPUFF model under the circumstances present and the parameters used for modeling the White Bluff units, (b) the analyses submitted in support of Nucor and NYS's comments on the EPA Regional Haze Rule FIP, (c) the small amount of light extinction from SO₂ at Arkansas Class I areas attributable to all Arkansas point sources, and (d) the demonstrated differential between the results of CALPUFF modeling and CAMx modeling for Entergy's sister Independence facility, the visibility improvement that may reasonably be anticipated from use of any of the evaluated technologies is an order of magnitude lower (or more) than presented in Entergy's five factor analysis (Tables 3-2, 4-6, 4-7, B-8, B-9), and is far below any perceptible visibility improvement (1.0 dv), and likely well below the 0.5 dv threshold for determining that a unit is subject to BART.

White Bluff would show similar negligible visibility improvements, i.e., ten times less than those presented in Entergy's five factor analysis and consistent with Dr. McNider's assessment and opinion. As a result, use of LSC indefinitely instead of installing some other technology or premature retirement of White Bluff is justified as BART.

In addition, use of a premature retirement date or cessation date for use of coal to determine BART for White Bluff is inappropriate in these circumstances under applicable regulations and guidance.³ EPA guidance from the 1980 RAVI BART Guidelines states:

For example, BART could alter the economics of the plant to the point where the decision would be made to cancel expansion of the facility, to reduce the scale of operation, or to change the production mix. The local employment effects, including number of jobs, dollars paid in salaries, and changes in employee skill levels required should be evaluated. The guideline does not imply that the BART decision should force a plant to the brink of shutdown. The BART decision must be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts. [emphasis supplied]

Guidelines for Determining Best Available Retrofit Technology for Coal-Fired Power Plants and Other Existing Stationary Facilities, EPA-450/3-80-009b (1980), p. 20. Appendix Y to 40 C.F.R. Part 51 states "it is not our intent to direct States

³ It should be noted that the State of Louisiana recently determined that use of low sulfur coal was BART for Entergy's coal-fired Nelson plant, and EPA has approved that determination. 82 Fed.Reg. 60520, Dec. 21, 2017. That BART determination was not based on any retirement date or cessation of coal use date.

to switch fuel forms, e.g., from coal to gas. . . . We do not consider BART as a requirement to redesign the source when considering available control alternatives. For example, where the source subject to BART is a coal-fired electric generator, we do not require the BART analysis to consider building a natural gas-fired electric turbine although the turbine may be inherently less polluting on a per unit basis.” (Appendix Y, IV.D.3, 5). Appendix Y also warns that even if control technology is cost effective “there may be cases where the installation of controls would affect the viability of continued plant operations.” Appendix Y, IV.E.3. As explained in the Declaration of Kurt Castleberry, the premature deactivation of White Bluff or Independence, will result in severe local economic impacts including loss of jobs and erosion of the local tax base. Declaration of Kurt Castleberry, January 11, 2018, ¶¶ 27-30 (copy attached hereto as Exhibit A). To the extent that the Phase II RHR SIP BART determination for White Bluff is based on a premature plant retirement date that has not been approved, but would otherwise result in significant costs that would affect the viability of continued operation of White Bluff before the end of its actual remaining useful life, the BART determination is contrary to the intent of the Clean Air Act and the BART guidelines.⁴

⁴ On the other hand, the cost analysis in Entergy’s updated five-factor analysis fails to take into account the historical and existing use of low-sulfur coal at White Bluff. As explained in the attached September 14, 2017 white paper –

In summary any early retirement date for White Bluff or an early date for cessation of coal use would require other regulatory approvals, and thus cannot be the basis for an enforceable condition in the Phase II RHR SIP. Nevertheless, because of the excessive costs of DSI or FGD when the additional costs of continued use of LSC are included, and because of the miniscule and imperceptible visibility impacts to be expected from the use of DSI or FGD, either in absolute terms or in comparison with visibility impacts from use of LSC, the indefinite use of LSC, or a longer use of LSC than proposed by Entergy, is justified as BART. Because Entergy's proposed retirement date for White Bluff or the cessation of use of coal at White Bluff is contingent, the BART determination for SO₂ at White Bluff should explicitly recognize that contingency, and rely instead on the indefinite use of LSC as BART.

“Consideration of Low-Sulfur Coal in a BART Five-Factor Analysis for the White Bluff Power Plant” which is attached hereto as Exhibit D and incorporated herein by reference - the proposed use of dry flue gas desulfurization as BART is premised on the continued use of low sulfur coal as a fuel source; consequently, the historic and ongoing costs of acquiring, transporting and using low sulfur coal (instead of a less expensive, higher heat content coal) must be added to the costs of for additional controls such as FGD or DSI, which would result in an even higher cost/ton number for those control technologies.

REASONABLE PROGRESS ANALYSIS

AAEC also supports ADEQ's analysis of the visibility glidepath and the determination that Arkansas has already achieved its Reasonable Progress goals for the first regional haze rule planning period. AAEC also agrees that as a result of this determination that no additional controls beyond BART are necessary to achieve the Arkansas Reasonable Progress goals for this planning period.⁵ In this regard, AAEC notes ADEQ's determination that only a very small portion of light extinction from SO₄ and NO₃ at the Arkansas Class I areas comes from point sources located within the State of Arkansas, and that most of the light extinction comes from sources located outside the State.⁶

With regard to ADEQ's reasonable progress analysis for Entergy's Independence plant, AAEC disagrees that additional emission limits for SO₂ are necessary in order to achieve the State's reasonable progress goals for this planning period. As indicated, the reasonable progress goals have already been met, there are only a few months left in this planning period, there is no suggestion that the Independence plant would change its use of LSC, and thus no additional

⁵ See, Nucor and NYS Comments on EPA's proposed Regional Haze Rule Federal Implementation Plan, EPA Docket No. EPA-R06-OAR-2015-189, at pages 16-19, which are attached hereto as Exhibit C, that controls under the reasonable progress analysis must be "necessary."

⁶ See, Figures 2 – 9 of the Phase II RHR SIP.

controls or emission limits are necessary for purposes of the regional haze rule.⁷

Furthermore, to the extent such controls might be necessary to continue visibility progress in the next planning period, then such controls should be considered in the SIP for that planning period – not this one.⁸ In addition, ADEQ’s reasonable progress analysis for Independence is improper because it constitutes an individual, single-source reasonable progress analysis. As explained in Nucor and NYS’s comments on EPA’s Regional Haze Rule Federal Implementation Plan for Arkansas:

Reasonable progress provisions are intended to address contributions from a wide range of sources that can be best addressed on a source-category basis. They are fundamentally different from other provisions such as those for BART and reasonably attributable visibility impairment (“RAVI”), which are specifically designed to address individual sources.

Nucor and NYS Comments on EPA’s proposed Regional Haze Rule Federal Implementation Plan, EPA Docket No. EPA-R06-OAR-2015-189, attached hereto as Exhibit C, at page 19.

⁷ AAEC notes that visibility is projected to improve in the State of Arkansas and stay well below the Uniform Rate of Progress long into the next regional haze rule planning period.

⁸ AAEC notes that ADEQ did not propose additional reasonable progress controls for Independence in the State’s Five Year Regional Haze Rule Progress Report to EPA.

In summary, because the State of Arkansas has met its reasonable progress goals for the first planning period, no additional controls, by way of emission limitations or otherwise, are necessary to achieve reasonable progress. As a result, no additional emission limitations are needed for Independence

LONG TERM STRATEGY

The AAEC also supports ADEQ's proposed Long Term Strategy. AAEC notes that there is less than a year left in the first regional haze rule planning period and that the State's reasonable progress goals have already been met. AAEC also notes that the proposed Long Term Strategy recognizes planned retirements of large power plants in Texas during 2018 that affect Arkansas Class I areas. Any future retirements of stationary sources that may occur after the end of the first planning period should be addressed in long term strategies for future planning periods.

INTERSTATE VISIBILITY TRANSPORT

AAEC also supports ADEQ's determination that no additional controls, provisions or measures are necessary in order to satisfy the so-called interstate visibility transport provisions of 42 USC §7410(a)(2)(D)(i)(II). ADEQ has not identified any measure included in any other state's implementation plan to protect

visibility that will be interfered with by emissions from any source or emissions activity within the State.

PROVISIONS OF THE ADMINISTRATIVE ORDERS

Several provisions of the proposed Administrative Order (“AO”) for Entergy should be deleted or modified consistent with the comments above. The SIP and the AO should explicitly recognize that the early closure or cessation of use of coal at White Bluff is not required in connection with the use of LSC as BART. The SIP and the AO also should explicitly recognize that no additional controls or emission limitations are necessary at Independence in order to achieve reasonable progress during the first regional haze rule planning period.

This clarification is necessary in light of ambiguous language in the AO wherein ADEQ references Entergy’s prior proposal to close or cease using coal at White Bluff by a date certain, as well as proposed emission limits for Independence that are not necessary in this regional haze rule planning period. AAEC notes that in ADEQ’s December 18, 2017 Notice of Data Availability (“NODA”) ADEQ acknowledged that “Entergy may have additional obligations regarding reliability and cost recovery with respect to the two facilities referenced in this NODA that are outside the scope of ADEQ’s authority and outside the scope of the Proposed SIP.” ADEQ December 18, 2017 NODA at page 2.

Clarification is needed to emphasize that the reference to future operation of White Bluff is informational and is not intended to create mandatory, federally enforceable requirements of the SIP that, for the reasons noted above, would be contrary to law. Specifically, paragraph 10 of the Findings of Fact should be modified to provide that no additional controls or emission limits are needed for the Independence facility in order to achieve reasonable progress during this planning period. Paragraph 3 of the Order should be modified to recognize that any early retirement or cessation of use of coal at White Bluff is contingent on other regulatory approvals for Entergy and the co-owners of White Bluff, and thus cannot be the basis of an enforceable limitation under the AO, and that BART constitutes use of LSC. Paragraph 5 of the Order should be removed or modified.

We applaud ADEQ's use of Paragraph 10 of the Order to allow modification of the Administrative Order during future regional haze rule planning periods to account for ever-changing circumstances that could materially impact future Reasonable Progress assessments or Long Term Strategies. For example the AO could be modified to include emission limitations on Independence based on the use of LSC, or to include an enforceable early retirement date or date for cessation of use of coal at White Bluff if all necessary approvals have been obtained from the Arkansas Public Service Commission and other regulatory authorities. By the same token, the AO could be modified in the future to factor-in new control

technologies or visibility measurement techniques or changes in governing regulations. These types of changed circumstances are the reason that current EPA regulations contemplate adjustments to reasonable progress determinations and long term strategies, including prior determinations and proposals in future planning periods.

In addition, the AO also should include a provision for public notice and comment on any future modifications of the AO. This will ensure that stakeholders will be able to fully scrutinize such modifications and provide the Department valuable input.

EXHIBITS

- Ex. A Declaration of Kurtis W. Castleberry, Jan. 11, 2018
- Ex. B Declaration of Jonathan E. Long, Jan. 11, 2018
- Ex. C Comments of Nucor Steel – Arkansas and Nucor-Yamato Steel Company, U.S. EPA Docket No. EPA-R06-OAR-2015-0189
- Ex. C-1 Hoffnagle, G., Accuracy of Visibility Protocol Modeling in BART Evaluations
- Ex. C-2 McNider, R., Inadequacy of CALPUFF and CALMET Protocols for Visibility Impact Analysis in the Arkansas RHR FIP, July 13, 2015
- Ex. C-3 Henry, R., Just Noticeable Differences in Atmospheric Haze, October 2002
- Ex. D Consideration of Low-Sulfur Coal in a BART Five-Factor Analysis for the White Bluff Power Plant, September 14, 2017

COMMENTS OF THE ARKANSAS AFFORDABLE ENERGY COALITION
FEBRUARY 2, 2018

REVISIONS TO THE ARKANSAS STATE IMPLEMENTATION PLAN
REGIONAL HAZE SIP REVISION FOR 2008-2018 PLANNING PERIOD

EXHIBIT A

Declaration of Kurtis W. Castleberry, Jan. 11, 2018

Declaration of Kurtis W. Castleberry
Director, Resource Planning and Market Operations, Entergy Arkansas, Inc.

**DECLARATION OF KURTIS W. CASTLEBERRY
IN SUPPORT OF MOTION TO STAY FINAL RULE OF THE
U.S. ENVIRONMENTAL PROTECTION AGENCY
BY ENTERGY ARKANSAS, INC., ENTERGY MISSISSIPPI, INC.,
ENTERGY POWER, LLC, AND ENERGY AND ENVIRONMENTAL
ALLIANCE OF ARKANSAS**

I, Kurtis W. Castleberry, hereby state as follows:

1. I am the Director of Resource Planning and Market Operations for Entergy Arkansas, Inc. ("EAI"). I am making this declaration in support of the motion by EAI, Entergy Mississippi, Inc. ("EMI"), and Entergy Power, LLC ("EPI") (collectively, the "Entergy Companies"), and Energy and Environmental Alliance of Arkansas ("EEAA") to stay the final regional haze plan for Arkansas issued by the U.S. Environmental Protection Agency ("EPA"), titled "Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan" ("Final Rule").
2. I am over 18 years of age, of sound mind, and in all respects competent to make this declaration.
3. I received a Bachelor of Science Degree in General Engineering from Arkansas Tech University in 1982. I received a Master's Degree in International Business from Webster University in 1995.
4. I have been employed by EAI and its affiliates for 35 years. EAI is an electric utility engaged in the generation, purchase, transmission, distribution and sale of electricity primarily in Arkansas. EAI provides electrical utility service to approximately 712,000 residential and commercial electric customers. EAI

owns portions of the two coal-fired electric generating units at the White Bluff Electric Power Plant ("White Bluff") and one of the two coal-fired electric generating units at the Independence Steam Electric Station ("Independence"). EAI operates both White Bluff and Independence pursuant to an agreement with the other co-owners. EAI is a regulated public utility subject to the rate and general operating jurisdiction of the Arkansas Public Service Commission ("APSC") and the Federal Energy Regulatory Commission ("FERC"). All of the stock of EAI is owned by Entergy Corporation.

5. EMI is an electric utility engaged primarily in the generation, purchase, transmission, distribution and sale of electricity in Mississippi and is a co-owner of the coal-fired electric generating units at Independence. EMI provides electrical utility service to approximately 447,000 residential and commercial electric customers. EMI is a regulated public utility subject to the rate and general operating jurisdiction of the Mississippi Public Service Commission ("MPSC") and FERC. All of the stock of EMI is owned by Entergy Corporation.
6. EPI is an electric utility company that sells electric energy at wholesale and is a co-owner of the coal-fired electric generating units at Independence. Its principal business office is located in The Woodlands, Texas. EPI is an indirect wholly owned subsidiary of Entergy Corporation.
7. In my current position, I lead EAI's Resource Planning and Market Operations team, which is responsible for the management and administration of EAI's resource planning and operations activities as a member of the Midcontinent Independent System Operator, Inc. ("MISO") Regional Transmission Organization. My team's duties include conducting resource planning activities for EAI, such as developing and implementing EAI's integrated resource plan

for meeting the load and energy requirements of EAI's customers. I also serve as the Chairman of EAI's Resource Planning and Operations Committee, which reviews and provides advisory input and recommendations on a number of planning and operational issues for EAI to the EAI President and Chief Executive Officer. My group also manages the relationship between EAI and the co-owners of Independence and White Bluff, which include, variously, EMI, EPI, Arkansas Electric Cooperative Corporation ("AECC"), East Texas Electric Cooperative ("ETEC"), and several Arkansas municipalities: the City of Conway, the City of West Memphis, the City of Jonesboro, and the City of Osceola.

8. Independence is located in Newark, Arkansas, and has two coal-fired electric generating units, the 836-megawatt ("MW") Unit 1 and the 842 MW Unit 2. Independence is owned by several co-owners, including EAI, EMI, and EPI, as well as several not-for-profit entities, such as AECC, ETEC, and the City of Osceola, and several EEAA members, including the City of Conway, the City of West Memphis, and the City Water and Light Plant of the City of Jonesboro. EAI operates both units pursuant to an Operating Agreement among the co-owners.
9. White Bluff is located in Redfield, Arkansas, and has two coal-fired electric generating units, the 815-MW Unit 1 and the 820-MW Unit 2. White Bluff is owned by several co-owners: EAI and several not-for-profit entities, such as AECC, and several members of EEAA, including the City of Conway, the City of West Memphis, and the City Water and Light Plant of the City of Jonesboro. EAI operates both units pursuant to an Operating Agreement among the co-owners.

I. **Requirements for Nitrogen Oxides Emissions Reductions at White Bluff and Independence**

10. The Final Rule requires each coal-fired unit at White Bluff and Independence to meet a nitrogen oxides (“NO_x”) emission limit of 0.15 pounds per million British thermal units (“lb/MMBtu”) on a rolling 30-boiler operating day basis at loads of 50-100 percent of maximum heat input rating (the “full load limit”), and a rolling 3-hour average limit of 671 pounds per hour (“lb/hr”) at loads of less than 50 percent of maximum heat input rating (the “low load limit”). These emission limits are based on the installation of low-NO_x burners and separated overfire air technology (“LNB/SOFA”) on each unit. These limits must be met beginning April 27, 2018.
11. EAI has completed installation of LNB/SOFA at three of the coal-fired units and is scheduled to begin installation at the fourth unit in mid-January. *See* Declaration of Bryan Sikes, Entergy Services, Inc., at ¶ 10.
12. The NO_x controls are currently not performing as anticipated and the three units where the controls have been installed are unable to reliably meet the Final Rule’s NO_x limits. *See id.* at ¶¶ 11, 15, 16. There will not even be time before the April 27, 2018 compliance deadline to properly tune the NO_x controls on the fourth unit to determine whether the controls will meet the NO_x limits. *Id.* at ¶ 11.
13. If a stay is not granted and EAI is unable to achieve compliance with the NO_x emission limits across all operating conditions at the units by April 27, 2018, EAI would need to explore temporary operational restrictions for the units that would allow the units to meet the NO_x emission limits, *see id.* at ¶ 17, which

would result in irreparable harm to EAI and its co-owners. EAI would have to inform its regional transmission operator, MISO, of the operating restrictions, which could impact MISO's dispatch of the units. Any operational restrictions that limited the units' dispatch would have negative financial impacts on EAI, its customers, and its co-owners. The financial impacts could not be calculated without a firm understanding of which operational restrictions would be effective in allowing the units to meet the NO_x emission limits, but the impacts likely would be multiple millions of dollars.

II. Requirements for Sulfur Dioxide Emissions Reductions at White Bluff and Independence and Compliance Planning Process

14. The Final Rule requires each coal-fired unit at White Bluff and Independence to meet a 50 boiler operating day rolling average sulfur dioxide ("SO₂") emission limit of 0.06 pounds per million British thermal units ("lb/MMBtu") by October 27, 2021. This emission limit is based on the installation of a dry scrubber (flue gas desulfurization ("FGD") technology) on each unit.
15. The Final Rule, if not stayed, exposes the plants' co-owners (including the Entergy Companies and their shareholders), and their customers and communities to immediate and irreparable harm. In light of the fact that the state has proposed a state implementation plan ("SIP") to replace the Final Rule, which would not require EAI to install FGD on any the units, EAI is not currently expending resources to design, procure, or install FGD at White Bluff and Independence. As a result, if a stay of the SO₂ limits is not granted and the Final Rule is not superseded, EAI would have to deactivate the White Bluff and Independence units by October 27, 2021, and obtain replacement power.
16. To plan for the possibility that the Final Rule will not be successfully superseded, either because EPA does not approve it or it is overturned through

litigation, the process to deactivate the units and obtain replacement capacity is complex and must begin in 2018. EAI and its co-owners would have to replace over 3,300 MW if the units were deactivated, which would require EAI and its co-owners (other than EPI) to undertake a resource procurement process. If constructing additional generation, likely a combined cycle gas turbine (“CCGT”), were determined to be the best option for EAI, this could not be done by October 27, 2021. *See* Declaration of Jonathan Long, Entergy Services, Inc., at ¶ 11.

III. Deactivation and Replacement Capacity Compliance Path

1. Deactivation Process

17. A decision to retire a unit can have significant implications for the remainder of the grid, some of which may require upgrades to the transmission system to ensure that the grid can be operated reliably after the generating unit is retired. Accordingly, owners/operators of a generating unit typically request that MISO perform an “Attachment Y-2 study,” which would determine, on a non-binding basis, whether the retirement of the generating unit would affect transmission system reliability, or whether the unit would need to continue to operate until transmission upgrades or other system changes to maintain reliability can be completed. In EAI’s experience, an Attachment Y-2 study takes approximately three to four months for a standard request. However, this situation is not standard, and assessing the retirement of four units totaling over 3,300 MW of capacity may take much longer. EAI would incorporate the Attachment Y-2 results into its internal economic analysis. Depending on the time needed to perform the economic analysis, coordinate with co-owners, and obtain the results of MISO’s Attachment Y-2 study, this decision-making process would take between six and nine months.

18. In addition to the Attachment Y-2 study, if a decision to deactivate is made, EAI would need to provide at least six months' notice of its intent to retire the unit to MISO. Upon receipt of the notice, MISO would conduct an "Attachment Y study" to determine if the generator can retire in a manner consistent with reliability. MISO endeavors to complete this determination within 75 days, but in EAI's experience, it has taken between four and nine months.
19. To allow sufficient time for EAI and MISO to complete these steps, the planning must begin by the second or third quarter of 2018. Although the exact cost of the deactivation planning steps over the next 12-24 months has not yet been projected, based on past experience they will cost several million dollars.

2. Replacement Capacity

20. If the units must be deactivated, the co-owners would need to replace the over 3,300 MW in electricity generation capacity from White Bluff and Independence that are necessary to meet the needs of their respective customers and to satisfy the co-owners' respective obligations to MISO. The over 3,300 MW from these two plants is enough to power approximately 500,000 homes at peak hours.¹ It represents approximately 23 percent of the total net generation in the state of Arkansas, according to 2015 data from the U.S. Energy Information Administration. Additionally, I understand that the combined 251 MW owned by the City Water and Light Plant of the City of Jonesboro represents approximately 80% of that co-owner's customers' electric

¹ This calculation assumes 10 percent line losses and 6 kW per home at the time of peak.

capacity demand and more than 65% of their energy usage. *See* Declaration of Jake Rice, III, Jonesboro City Water and Light, at ¶ 11.

21. To evaluate the best options to replace the capacity from these two power plants, EAI and its co-owners (other than EPI) each would undertake a resource planning process. Where constructing additional generation is determined to be the best option, the specific co-owner would need to begin designing, constructing, and making operational a new generating unit to provide the replacement generation, as well as seeking to obtain any required approvals, including preconstruction permitting and regulatory rate adjustment approvals. Constructing replacement capacity is a lengthy process, and approval from the APSC would be required in connection with the construction and/or purchase of a new generating unit. *See* Declaration of Jonathan E. Long at ¶¶ 11.
22. Replacement capacity and associated energy cannot be installed by the October 27, 2021, compliance deadline in the Final Rule. *Id.* Therefore, until the replacement capacity and associated energy is available, the co-owners would have to purchase replacement capacity, either through a specific agreement or through MISO's annual capacity auction, and purchase replacement energy (as opposed to replacement capacity) through the operation of MISO's day-ahead and real-time markets. The co-owners' respective customers would be exposed to the market price, and its inherent variability, for this power.
23. Being dependent on the MISO annual capacity auction and its day-ahead and real-time energy markets for such a large amount of capacity and energy would expose customers to an unacceptable level of price risk, which would include being required to pay MISO's Cost of New Entry ("CONE"). If MISO is unable to clear sufficient capacity to meet the peak load plus reserve margin

requirement for a Local Resource Zone (“LRZ”) through the annual MISO Planning Resource Auction (“PRA”), then the LRZ would clear at the CONE price. EAI would not hold an amount of capacity sufficient to meet its peak load plus reserve margin in the annual PRA. If the Arkansas LRZ cleared at the CONE price, absent EAI procuring replacement capacity under a specific agreement, its customers would be charged CONE for the capacity deficit and they also would be subjected to the volatility of prices in the day-ahead and real-time energy markets. Accordingly, if a stay of the Final Rule is not granted, EAI likely would choose to purchase replacement capacity through a specific agreement. EAI would need to begin the process in the second or third quarter of 2018 to ensure that a contract is in place for replacement capacity before October 27, 2021. However, there is no guarantee that approximately 3,300 MW of capacity would be available, regardless of the price paid.

24. To begin the process for obtaining replacement capacity, EAI would first need to develop a market solicitation request for proposals (“RFP”) for capacity and energy to replace White Bluff and Independence. This is a complex undertaking that would take approximately six months to prepare. If the RFP were completed by the first quarter of 2019, bids would then be solicited in the second to third quarter 2019. EAI would then evaluate the bids and likely hire an independent monitor to ensure fairness in the evaluation, with the goal of obtaining commercial agreements by mid-2020.
25. Regulatory approval of the commercial agreements also would be required to ensure that the regulator found the agreements to be in the public interest. This process likely would take a year or longer to complete and would entail preparation of a petition and supporting testimony for an APSC public interest proceeding, the completion of discovery, an APSC-determined procedural

schedule with multiple rounds of testimony from the APSC General Staff, the Arkansas Attorney General's office, and potentially other intervenors, a public hearing, and the issuance of a final order. The state regulatory process would take even longer if there were any challenges to the APSC's final order, which could include an administrative petition for rehearing and subsequent appeal.

26. Although the exact cost of the replacement capacity planning steps over the next 12-24 months has not yet been projected, based on past experience they will cost several million dollars.

3. Impact of Deactivation

27. Ceasing operations at White Bluff in 2021 would harm White Bluff employees and local businesses. According to research by AFCC, the White Bluff plant is estimated to support 1,237 direct and indirect jobs.² There are 115 full-time employees at White Bluff. White Bluff also employs approximately 300 contractors for at least six weeks in the spring and fall each year for planned outage support. Additionally, there are about 20 contractors that work full time in security, coal dust management, janitorial, lawn maintenance, ash management and scaffolding support.
28. Ceasing operations at Independence in 2021 would harm Independence employees and local businesses. There are 115 full-time employees at Independence. Independence also employs hundreds of contractors for

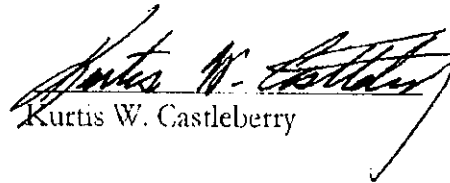
² Willie Lee Brooks, Jr., Senior Analyst, Economic & Financial Risk, *What is the Economic Impact of the White Bluff Electric Power Plant?*, at 2, Arkansas Electric Cooperative Corporation (May 30, 2014), available at <http://www.arkleg.state.ar.us/assembly/2015/Meeting%20Attachments/890/112666/HANDOUT%20%20-%20HIGHLIGHT%20%20Economic%20Impact%20of%20White%20Bluff%20Electric%20Pwr%20Plant.pdf>. No such study has been conducted for Independence.

planned outage support, and contractors who provide janitorial services, maintenance support, ash disposal services, and work on insulation and scaffolding.

29. If White Bluff and Independence were to cease operations in 2021, these employees would have to be reassigned or laid off, and the contractors would be out of work.
30. The co-owners of White Bluff also pay approximately \$2 million annually in county property taxes related to the operation of the plant. Similarly, the co-owners of Independence pay approximately \$2 million annually in county property taxes related to the operation of the plant. The total estimated value of White Bluff to its local economy is \$173 million.³ Deactivation of White Bluff and Independence would significantly reduce this local revenue.

I declare under penalty of perjury that the foregoing statements are true and correct based on my personal knowledge and information gathered and provided to me by the Entergy Companies' personnel and consultants.

Executed this 11th day of January, 2018.


Kurtis W. Castleberry

³ *Id.*

COMMENTS OF THE ARKANSAS AFFORDABLE ENERGY COALITION
FEBRUARY 2, 2018

REVISIONS TO THE ARKANSAS STATE IMPLEMENTATION PLAN
REGIONAL HAZE SIP REVISION FOR 2008-2018 PLANNING PERIOD

EXHIBIT B

Declaration of Jonathan E. Long, Jan. 11, 2018

Declaration of Jonathan E. Long
Vice President, Capital Projects, Entergy Services, Inc.

EXHIBIT B

**DECLARATION OF JONATHAN E. LONG
IN SUPPORT OF MOTION TO STAY FINAL RULE OF THE
U.S. ENVIRONMENTAL PROTECTION AGENCY
BY ENTERGY ARKANSAS, INC., ENTERGY MISSISSIPPI, INC.,
ENTERGY POWER, LLC, AND ENERGY AND ENVIRONMENTAL
ALLIANCE OF ARKANSAS**

I, Jonathan E. Long, hereby state as follows:

1. I am employed by Entergy Services, Inc. as the Vice President, Capital Projects. I am making this declaration in support of the motion by Entergy Arkansas, Inc. ("EAI"), Entergy Mississippi, Inc. ("EMI"), and Entergy Power, LLC ("EPP") (collectively, the "Entergy Companies"), and Energy and Environmental Alliance of Arkansas ("EEAA") to stay the final regional haze plan for Arkansas issued by the U.S. Environmental Protection Agency ("EPA"), titled "Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan" ("Final Rule").
2. I am over 18 years of age, of sound mind, and in all respects competent to make this declaration.
3. I received a Bachelor of Science degree in Electrical Engineering from Mississippi State University in 1982 and a Master of Business Administration from Pepperdine University in 1991. I have been employed by Entergy Services, Inc. since 2006. From 1995 to 2006, I was employed by Entergy Enterprises, Inc., an affiliate of Entergy Services, Inc. In my current position, I oversee the development and execution of major capital projects for the corporation, primarily for Entergy's fleet of fossil fuel power generation plants and Entergy's transmission system. I manage a team of project managers, project engineers and discipline engineers that develops the scope, predicted performance, cost

EXHIBIT B

and schedule for these large capital projects and oversees the projects from conception through execution.

4. Entergy Services, Inc. provides administrative, accounting, legal, engineering, and other services primarily to the Entergy utility operating companies, including EAI and EMI. Entergy Services, Inc. is wholly owned by Entergy Corporation.
5. The Independence Steam Electric Station (“Independence”) is located in Newark, Arkansas, and has two coal-fired electric generating units, the 836-megawatt (“MW”) Unit 1 and the 842-MW Unit 2. Independence is owned by several co-owners, including EAI, EMI, and EPI, as well as several not-for-profit entities, such as Arkansas Electric Cooperative Corporation (“AECC”), East Texas Electric Cooperative (“ETEC”), and the City of Osceola, and several members of EEAA, including the City of Conway, the City Water and Light Plant of the City of Jonesboro, and the City of West Memphis.
6. The White Bluff Electric Power Plant (“White Bluff”) is located in Redfield, Arkansas, and has two coal-fired electric generating units, the 815-MW Unit 1 and the 820-MW Unit 2. White Bluff is owned by several co-owners: EAI and several not-for-profit entities, such as AECC and ETEC, and several members of EEAA, including the City of Conway, the City Water and Light Plant of the City of Jonesboro, and the City of West Memphis.
7. The Final Rule requires each coal-fired unit at White Bluff and Independence to meet a 30-boiler operating day rolling average sulfur dioxide (“SO₂”) emission limit of 0.06 lb/MMBtu beginning October 27, 2021. This emission limit is based on the installation of a dry scrubber (flue gas desulfurization (“FGD”) technology) on each unit.

EXHIBIT B

8. To meet the Final Rule's SO₂ emission limits at White Bluff and Independence, EAI, as operator of all four units, must either (1) deactivate the White Bluff and Independence units by the FIP's ultimate compliance deadline of October 27, 2021, or (2) install dry flue gas desulfurization ("dry FGD") by that date. I understand that Entergy is not currently expending resources to design, procure, or install FGD at White Bluff and Independence in light of a proposed state regulation that could supersede the Final Rule. *See* Declaration of Kurtis Castleberry, Entergy Services, Inc., at ¶ 15. It is not clear whether that state regulation will be approved or, if approved, litigated and thus Entergy must act prudently and make necessary preparations for all outcomes, including compliance with the Final Rule, which remains in effect. Accordingly, if the Final Rule is not stayed, EAI must start planning to expedite development of new generation assets to replace the capacity provided by White Bluff and Independence.
9. If the units are deactivated, EAI and the co-owners would need to replace the over 3,300 MW in electricity generation capacity from White Bluff and Independence that are needed to meet the needs of their respective customers and to satisfy the co-owners' respective obligations to MISO. *See* Declaration of Jake Rice, III, Jonesboro City Water & Light, at ¶¶ 11, 16.
10. To evaluate the best options to replace the capacity from these two power plants, EAI and its co-owners (other than EPI) each would undertake a resource planning process. Where constructing additional generation is determined to be the best option, the specific co-owner would need to begin designing, obtaining preconstruction permits for, constructing, and making operational one or more new generating units to provide the replacement generation, as well as seeking to obtain any required approvals, such as regulatory approvals. Given today's

EXHIBIT B

circumstances, any new unit constructed likely would be a combined cycle gas turbine (“CCGT”). The process for constructing even a single new unit is complex.

11. Construction of any new CCGT unit likely would require construction of a new gas pipeline and, depending on where it is built, acquisition of rights-of-way. Transmission infrastructure would need to be built to connect any new unit with the grid. In addition to projects that would need to be completed to ensure reliability after the deactivation of White Bluff and Independence, as identified in ¶ 12 below, the new unit would need to be evaluated by MISO to determine the upgrades that will be necessary for the unit to deliver its output to the load that it will serve. It would take five years, at a minimum, to prepare and submit the necessary environmental permit applications, prepare requests for proposals for construction, select a vendor, and obtain the necessary permits and approvals, including approval from the Arkansas Public Service Commission, for the transmission interconnection work. As a result, this work cannot be completed by October 27, 2021. It would take until sometime in 2023, at the earliest, to complete this transmission infrastructure development.
12. Separate and apart from any replacement generation project, EAI and EMI also would need to begin planning transmission projects to maintain reliability during the period between the time White Bluff and Independence ceased operating and the replacement generation came on line (the “bridge period”). For example, without a stay of the Final Rule, EAI would have to begin identifying projects by second to third quarter of 2018 and likely would spend hundreds of thousands of dollars in scoping the projects. More significant sums would be expended next year for major project work, including procuring equipment, securing rights-of-way, and detailed engineering work.

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13. Deactivation of the units in 2021 could nonetheless cause transmission reliability issues and operational challenges if transmission projects to address the bridge period could not be completed by the time the units ceased operating. This would negatively impact EAP's customers and co-owners.

I declare under penalty of perjury that the foregoing statements are true and correct based on my personal knowledge and information gathered and provided to me by the Entergy Companies' personnel and consultants.

Executed this 11th day of January, 2018.


Jonathan E. Long

COMMENTS OF THE ARKANSAS AFFORDABLE ENERGY COALITION
FEBRUARY 2, 2018

REVISIONS TO THE ARKANSAS STATE IMPLEMENTATION PLAN
REGIONAL HAZE SIP REVISION FOR 2008-2018 PLANNING PERIOD

EXHIBIT C

Comments of Nucor Steel – Arkansas and Nucor-Yamato Steel Company,
U.S. EPA Docket No. EPA-R06-OAR-2015-0189

COMMENTS OF NUCOR STEEL – ARKANSAS
AND NUCOR-YAMATO STEEL COMPANY

Promulgation of Air Quality Implementation Plans; State of Arkansas;
Regional Haze and Interstate Visibility Transport Federal Implementation Plan;
Proposed Rule

United States Environmental Protection Agency

Docket No. EPA-R06-OAR-2015-0189

April 8, 2015

80 Fed.Reg. 18,944

Nucor Steel- Arkansas (“NSA”) and Nucor-Yamato Steel Company (“NYS”) (collectively herein “Nucor”) submit the following comments in response to the Environmental Protection Agency’s (“EPA”) “Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Proposed Rule” in Docket No. EPA-R06-OAR-2015-0189, published at 80 Fed.Reg. 18,944 on April 8, 2015 (the “Proposed FIP”). NYS and NSA operate electric arc furnace steel mills in Mississippi County, Arkansas, which produce steel products from recycled scrap metal. As a result of mills such as NSA and NYS, Nucor Corporation is one of the largest recyclers in the

nation. The cost of electric power is a significant component of the cost of producing steel in an electric arc furnace and the costs of the control technologies required under the Proposed FIP will injure NSA and NYS by increasing the cost of electric power needed to operate their facilities.

NSA and NYS both receive electrical service from Mississippi County Electric Cooperative Corporation ("MCECC"), which is a member co-operative of Arkansas Electric Cooperative Corporation ("AECC"). AECC is either an owner or co-owner of four facilities that are subject to Best Available Retrofit Technology ("BART") determinations under EPA's Proposed FIP: Entergy's White Bluff power plant ("White Bluff"), SWEPSCO's Flint Creek power plant ("Flint Creek"), AECC's Bailey power plant ("Bailey"), and AECC's McClellan power plant ("McClellan"). AECC also is a co-owner of Entergy's Independence power plant ("Independence"), for which EPA is proposing additional emission limits and controls under the Proposed FIP. These five facilities provide a large majority of the baseload generating capacity for AECC and its member cooperatives. NSA and NYS's electric power primarily comes from AECC's electric generating resources, and NSA and NYS's electricity costs are dependent on AECC's costs of maintaining and operating those generating resources, including AECC's interest in White Bluff, Independence, and Flint Creek.

As set forth herein, NSA and NYS disagree with and object to EPA's Proposed FIP. EPA's Proposed FIP does not comply with the requirements of the Clean Air Act ("CAA") because, among other things: (a) EPA has not demonstrated that its BART determinations for White Bluff and Flint Creek and its Reasonable Progress decision for Independence are necessary, (b) EPA failed to consider relevant factors in its BART and Reasonable Progress determinations for White Bluff, Flint Creek and Independence, (c) EPA failed to consider all available control technologies in its BART and Reasonable Progress determinations for White Bluff, Flint Creek and Independence, (d) EPA's determinations on cost-effectiveness of additional controls for White Bluff, Flint Creek and Independence are not justified, are unreasonable, are inconsistent and are arbitrary and capricious, (e) EPA's determinations of visibility impacts from White Bluff, Flint Creek, Independence and the other facilities involved in EPA's Proposed FIP are unreasonable and do not support its BART and RP determinations, because the CALPUFF model is unsuitable for EPA's regulatory determinations under these circumstances; thus, EPA has not demonstrated that there is a reasonable certainty that the controls required under its BART and Reasonable Progress determinations will result in an improvement in visibility, (f) EPA has unduly relied on its cost-effectiveness calculations and has not explained how its cost-

effectiveness calculations justify its BART and Reasonable Progress determinations with respect to anticipated visibility improvements; and (g) EPA has not demonstrated that any of the sources regulated in the Proposed FIP interfere with control measures in any other state's SIP, especially given the overestimation of the CALPUFF modeling results and whether there will be any reasonably certain visibility improvement from EPA's proposed control measures; thus EPA has not demonstrated that these measures are necessary in order to comply with 42 U.S.C. §7410(a)(2)(D)(i)(II). In addition, EPA did not explain how it exercised its judgment and balanced and weighed the BART and Reasonable Progress factors in arriving at its BART and Reasonable Progress determinations.

Also, EPA has failed to fully respond to Nucor's Freedom of Information Act ("FOIA") requests and has failed to grant Nucor's request to extend the time for comments on the Proposed FIP until after EPA has fully complied with those requests.¹ Presumably, the responses to those FOIA requests would be relevant to an explanation of how EPA exercised its judgment in weighing and balancing

¹ See, Nucor FOIA request dated, March 13, 2015; letter response from L. Lane at EPA dated May 19, 2015, and Nucor's counsel's letter to EPA dated July 10, 2015, attached hereto as Exhibits 1A, 1B and 1C, respectively. Nucor reserves the right to submit additional comments in this docket after EPA has fully complied with Nucor's FOIA requests.

the BART and Reasonable Progress factors.² Finally, under the clear terms of the Clean Air Act, EPA does not have the authority to initiate this rule-making and issue its Proposed FIP, because more than two years have passed since EPA disapproved Arkansas's Regional Haze Rule State Implementation Plan.

INTRODUCTION AND BACKGROUND

EPA's disapproval of the Arkansas RHR SIP together with its decision to initiate this rule-making and impose the Proposed FIP far exceeds EPA's legal authority under the Clean Air Act. EPA's actions improperly transform the structure of the regional haze program from a state-driven program grounded in cooperative federalism to a centrally controlled, federally managed program with no meaningful role for the states, regulated entities, or in the case of electric public utilities, the end users and consumers who ultimately will bear the brunt of and have to pay for EPA's determinations. Nothing in the Clean Air Act or the

² For example, in a document dated Feb. 11, 2015 at p. 20 (attached as Exhibit 2), EPA discussed an option for the Reasonable Progress Analysis for SO₂ and NO_x controls at Independence as "No Additional Controls" since the CENRAP modeling showed that all Arkansas areas were on or below the glide path; however, this option was not included in the Federal Register notice and no explanation based on the statutory factors was given why this option was discarded.

administrative record supports EPA's determination that mandates the installation of over \$2 billion in new emission controls on public utility electric generation resources that have significant social and economic value in and to the State of Arkansas

Congress enacted the Clean Air Act's regional haze provisions with a long-term goal of returning national parks and certain scenic areas to a state of natural visibility. However, Congress realized such changes could not be fully realized immediately and adopted an approach by which States would make incremental improvements over time. In fact, EPA has approved much longer reasonable progress goals for Class I areas in the State of California. For example, EPA approved almost 300 years for the Desolation Wilderness and Mohalume Wilderness, which must achieve compliance by 2307. 76 Fed.Reg. 34,608 (June 14, 2011); 76 Fed.Reg. 13,951 (March 15, 2011). Yet, EPA is attempting in its Proposed FIP to force Arkansas to achieve compliance even earlier than the national goal of 2064.

Despite the fact that real-world, measured air quality demonstrates that Arkansas is on track to meet the visibility improvements contemplated by the

Regional Haze Rule,³ EPA has unreasonably proposed to supplant the State's authority and impose a FIP that would place additional emission control requirements on a handful of sources at significant cost notwithstanding expected further emissions reductions from levels that have achieved the desired target today. Furthermore, EPA has failed to explain how these costly emissions are reasonably certain to achieve actual visibility improvements, as required by the CAA.

Congress first adopted regional haze provisions in 1977 to establish a national goal that would address haze issues in national parks and other federal "Class I areas" by adding Section 169A to the Clean Air Act. See, 42 U.S.C. § 7491. EPA has established three primary components for a state's regional haze SIP: (1) reasonable progress goals for Class I areas in the state; (2) a long-term strategy; and (3) implementation of BART for certain stationary sources. The Clean Air Act requires states to submit SIPs that contain "emission limits, schedules of compliance and other measures as may be necessary to make reasonable progress toward meeting the national goal." 42 U.S.C. § 7491(b)(2). The

³ See, Arkansas Department of Environmental Quality, "State Implementation Plan Review for the Five-Year Regional Haze Progress Report," Revised May 2015, pp. 43, 64, attached hereto as Exhibit 3.

reasonable progress goal “is a goal and not a mandatory standard which must be achieved by a particular date.” 64 Fed. Reg. 35,714, 35,733 (July 1, 1999). Further, States have considerable discretion in establishing reasonable progress goals; for instance, the Clean Air Act “requires only that a state establish reasonable progress, not the most reasonable progress.” North Dakota v. EPA, 730 F.3d 750, 768 (8th Cir. 2013).

States are required to consider four statutory factors when establishing reasonable progress goals that are “necessary” for Class I areas. 42 U.S.C. § 7491(g)(1); 40 C.F.R. § 51.308(d)(1)(i)(A). These factors are: (1) costs of compliance; (2) the time necessary for compliance; (3) the energy and nonair quality environmental impacts of compliance; and (4) the remaining useful life of any potentially affected sources. 42 U.S.C. § 7491(g)(1). Furthermore, reasonable progress goals are “interim goals that represent incremental visibility improvement over time.” See, USEPA, “Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program,” June 1, 2007, section 1.2, p. 1-2. The “first planning period” for the Arkansas Regional Haze Rule SIP extends from 2008 to 2018.

To comply with the BART requirements, states must develop “emission limitations representing BART” for a specified set of sources. 42 U.S.C. § 7491(b)(2)(A); 40 C.F.R. § 51.308(e). BART determinations must consider five statutory factors: (1) the costs of compliance; (2) the energy and nonair quality environmental impacts of compliance; (3) any existing pollution control technology in use at the source; (4) the remaining useful life of the source; and (5) the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. 42 U.S.C. § 7491(g)(2); *see* 40 C.F.R. § 51.308(e)(1)(ii)(A).

The Clean Air Act, including the regional haze program, is built on principles of cooperative federalism that require EPA to defer to states in developing implementation plans so long as necessary statutory requirements are met, and it sets forth specific time limits for action by both the States and EPA. EPA v. EME Homer City Generation, L.P., 134 S.Ct. 1584, 1600 (2014). EPA’s Proposed FIP ignores those limits and timelines and would impose a plan that ignores the primary implementation role given to Arkansas. Not only is EPA’s approach inconsistent with the Clean Air Act, it gives EPA power to arbitrarily substitute its own judgment for that of a state at virtually any stage of the implementation process.

As courts have recognized, the Clean Air Act was intended by Congress to be “a model of cooperative federalism.” Sierra Club v. Korleski, 681 F.3d 342, 343 (6th Cir. 2012); Michigan v. EPA, 268 F.3d 1075, 1083 (D.C. Cir. 2001); Florida Power & Light Co. v. Costle, 650 F.2d 579, 581 (5th Cir. 1981). Under this structure, Congress specifically found that “air pollution prevention ... is the primary responsibility of States and local governments.” 42 U.S.C. § 7401(a)(3). The Eighth Circuit recently noted that “the [Clean Air Act] grants states the primary role in determining the appropriate pollution controls within their borders.” North Dakota v. EPA, 730 F.3d at 760-61. Thus, “states have broad authority to determine the methods and particular control strategies they will use to achieve the statutory requirements.” BCCA Appeal Group v. EPA, 355 F.3d 817, 822 (5th Cir. 2003). Specifically, the states have “broad authority over BART determinations.” American Corn Growers v. EPA, 291 F.3d 1, 8 (D.C.Cir. 2002).

EPA’s role is limited to ensuring that the States’ implementation is consistent with the CAA. Florida Power & Light, 650 F.2d at 587 (“The great flexibility accorded the states under the Clean Air Act is ... illustrated by the sharply contrasting, narrow role to be played by EPA.”). Rather than establishing strict implementation requirements, EPA’s rule “requires States to determine the rate of progress for remedying existing impairment that is reasonable, taking into

consideration the statutory factors, and the informed input from all stakeholders.” 64 Fed. Reg. at 35,731; see also 40 C.F.R. § 51.308(d)(1)(i)(A). In its guidance to States, EPA emphasized that the regional haze rule “gives States wide latitude to determine additional control requirements” and, in applying the required statutory factors, the states “have flexibility in how to take into consideration these statutory factors and any other factors that you have determined to be relevant.” USEPA, “Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program,” June 1, 2007, p. 4-2, 5-1 [emphasis supplied]. Thus, EPA has explained that “[a]s long as this evaluation is done adequately and the States provide a reasoned basis for their decision, EPA will defer to the state.” 77 Fed. Reg. 40,150, 40,156 (July 6, 2012).

In the Proposed FIP, however, EPA ignores these well-established principles of cooperative federalism, disregards the right of the State of Arkansas to make BART and Reasonable Progress decisions, and imposes a radically different implementation plan based on its own independent analysis. This over-reaching is contrary to the Clean Air Act and unlawful. However, even in doing so EPA is held to the same standards as state agencies to not act arbitrarily and capriciously, to make decisions based on sound reasoning, to take into account important and relevant factors, and to act within the scope of statutory authority, which includes

demonstrating that EPA's determinations are "necessary" to achieve the requirements of 42 U.S.C. §7491. EPA has not done so.

The sole purpose of the regional haze program is to address visibility impairment. See 42 U.S.C. § 7491(a)(1). It is not a health based standard, and EPA may not require emissions reductions just for sake of doing so under the guise of imperceptible visibility improvements. Consistent with this purpose, the Clean Air Act requires that EPA's BART determination take into account, among other things, the cost of compliance and the "degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology." *Id.* § 7491(g)(2) [emphasis supplied]. EPA may not require a source "to spend millions of dollars for new technology that will have no appreciable effect on haze in any Class I area." Am. Corn Growers v. EPA, 291 F.3d 1, 7 (D.C. Cir. 2002) (vacating EPA's BART determinations because EPA left open the possibility that it could require a source to install technologies even when those technologies had no appreciable effect on visibility). Yet that is precisely what EPA has done here.

1. EPA DOES NOT HAVE THE AUTHORITY TO INITIATE RULE-MAKING,
MUCH LESS ISSUE AND FINALIZE ITS PROPOSED FIP.

Section 110(c)(1) of the CAA (42 U.S.C. §7410(c)(1)) states:

The Administrator shall promulgate a Federal implementation plan at any time within 2 years after the Administrator –

- (A) Finds that a State has failed to make a required submission or finds that the plan or plan revision submitted by the State does not satisfy the minimum criteria established under section 110(k)(1)(A), or
- (B) Disapproves a State implementation plan submission in whole or in part, unless the State corrects the deficiency, and the Administrator approves the plan or plan revision before the Administrator promulgates such Federal implementation plan.

[emphasis supplied].

EPA partially disapproved the Arkansas Regional Haze SIP on March 12, 2012 (77 Fed.Reg. 14604); however, EPA did not take any action to issue a FIP during the two year period after that disapproval. Not until April 8, 2015, more than three years after EPA's disapproval of the Arkansas SIP, did EPA even publish notice of its Proposed FIP in the Federal Register (80 Fed.Reg. 18944).

The plain language of §110(c)(1) limits EPA to a two year time-limit to issue a FIP.⁴ By initiating this rule-making and issuing its Proposed FIP after that time, EPA impermissibly ignores and does not give effect to the words “within 2 years.” Statutes must be construed in a manner that gives effect to every word.

In EPA v. EME Homer City Generation, L.P., 572 U.S. ___, 134 S.Ct. 1584 (2014), the Court examined section 110(c)(1), and held that because the clear language of that section allowed EPA to file a FIP “at any time” within the two year FIP deadline, EPA did not have to first allow states to issue SIPs under the Cross-State Air Pollution Rule (“CSAPR”). The lower court had held that the CAA required EPA to give states a reasonable period of time to comply with the reductions under the CSAPR rule, but the Supreme Court reversed. The Court stated:

[T]he CAA sets a series of precise deadlines to which the States and EPA must adhere. . . . If EPA determines a SIP to be inadequate, the Agency’s mandate to replace it with a FIP is no less absolute. . . . In other words, once EPA has found a SIP inadequate, the Agency has a statutory duty to issue a FIP “at any time” within two years . . . The

⁴ EPA has previously recognized this limitation. See, 79 Fed.Reg. 29354, 29356 (May 22, 2014) (“CAA section 110(c) provides that EPA can promulgate a FIP immediately after making the finding of failure to submit a required SIP, as late as two years after making the finding, or any time in between.” [emphasis supplied]) Furthermore, EPA’s Region 6 office also recognized that the two year deadline for an Arkansas RHR FIP had passed. See, internal EPA email dated May 9, 2014, attached hereto as Exhibit 4.

D.C. Circuit, however, found an unwritten exception to this strict time prescription for SIPs aimed at implementing the Good Neighbor Provision. . . . However sensible (or not) the Court of Appeals position a reviewing court's "task is to apply the text [of the statute], not to improve upon it. . . . The Act empowers the Agency to promulgate a FIP "at any time" within the two-year limit. . . . Carving out an exception to the Act's precise deadlines, as the D.C. Circuit did, "rewrites a decades-old statute whose plain text and structure establish a clear chronology of federal and State responsibilities." The practical difficulties cited by the Court of Appeals do not justify departure from the Act's plain text . . . We "must presume that a legislature says in a statute what it means and means in a statute what it says there."

EME Homer, 134 S.Ct. at 1600-1601 (internal citations omitted).

Congress clearly intended to give the states the primary authority to make BART and Reasonable Progress decisions. American Corn Growers v. EPA, 291 F.3d 1 (D.C.Cir. 2002); North Dakota v. EPA, 730 F.3d 750 (8th Cir. 2013). In implementing SIPs, States cannot wait indefinitely for EPA to act on State submissions or to belatedly issue FIPs; consequently, in section 7410(c)(1) Congress set a two year limit on EPA's ability to issue a FIP after a SIP disapproval. The State of Arkansas has given EPA assurances that it will continue to work to address the concerns raised by EPA in its March 12, 2012 disapproval.⁵ EPA's

⁵ See, Exhibit 3, Arkansas RHR Five Year Progress Report, transmittal letter to Hon. Ron Curry, EPA, Region VI Regional Administrator.

Proposed FIP should be withdrawn so that the State of Arkansas can revise its RHR SIP in accordance with the requirements of the CAA.

2. EPA HAS NEITHER DEMONSTRATED THAT, NOR EXPLAINED WHY, ITS BART DETERMINATIONS AND REASONABLE PROGRESS DETERMINATIONS ARE "NECESSARY" FOR ARKANSAS TO MAINTAIN REASONABLE PROGRESS.

42 USC §7491 requires that Regional Haze implementation plans contain emission limits, compliance schedules and other measures, including BART, "as may be necessary to make reasonable progress" toward meeting the CAA's visibility goals. Monitoring data shows that Arkansas has made and will continue to make reasonable progress in visibility improvements even without the controls that would be required by EPA's Proposed FIP. (Ex. 3, Arkansas Five Year RHR Progress Report, 2015; Ex. 5, ICF International, "Criteria Pollutant Modeling Analysis for Arkansas" July 28, 2014, p. 20 ("The IMPROVE data indicate that the 2018 goals have been met or nearly met in 2012.")).

Additional emission reductions from coal-fired power plants in the states surrounding Arkansas and the four Class I areas addressed in the Proposed FIP will continue Arkansas visibility improvement trends. As shown by the spreadsheet

attached hereto as Ex. 6, of the sixty-eight (68) fossil-fuel electric generating units closest to Arkansas and the four Class I areas addressed in the Proposed FIP, seventeen (17) units are scheduled for or have already been retired or converted to natural gas (4.9 GW capacity), and thirty-two (32) units have had pollution control projects announced or completed since 2010 (13.9 GW capacity). Further reductions in emissions due to the effects of other regulatory programs and developments will further support Arkansas's visibility improvement trends. (See, Ex. 3, Arkansas Five Year RHR Progress Report, 2015, p. 23-34.)

As discussed in Comments 4 and 6 below, EPA's maximum modeled visibility improvements for the affected units at White Bluff, Flint Creek and Independence are less than 1dv (the threshold of visibility) for all Class I areas.⁶ This does not even take into account the known overestimation of visibility impacts in the CALPUFF model by at least five times, and the fact that these impact levels are well below the CALPUFF model's effective limit of usefulness of 2-3 dv. Given this uncertainty, EPA has not explained how installation of these controls may reasonably be anticipated to result in actual improvement in visibility, which is the purpose of 42 USC §169A and the Regional Haze Rule – not

⁶ See, Exhibit 7, Spreadsheet of Modeled Baseline Visibility Impacts and Visibility Improvements from Proposed FIP.

just reduction of emissions for the sake of doing so. National Parks Conservation Association v. EPA, No. 12-73710, 2015 WL 3559149 (9th Cir., June 9, 2015)

As the Supreme Court recently held, federal administrative agencies must engage in “reasoned decision making”, the agency’s “decreed result must be within the scope of its lawful authority” and “the process by which it reaches the result must be logical and rational.” Michigan v. EPA, 576 U.S. _____, slip op. at 5 (June 29, 2015). Although it should be apparent, the accepted meaning of the word “necessary” is “indispensable” or “absolutely needed.” Webster’s New Collegiate Dictionary, (8th Ed.) 1973. Thus, as used in 42 U.S.C. §7491 the term “necessary” means “absolutely needed.” In view of the existing and future improvements in air quality in the areas surrounding these four Class I areas, and in view of the uncertainty that EPA’s proposed BART and Reasonable Progress controls will result in actual visibility improvements, EPA has not explained nor demonstrated that its BART and Reasonable Progress determinations are “indispensable” or “absolutely needed”, i.e., that the only way Arkansas can maintain reasonable progress and achieve the visibility goals of the CAA is to install these controls. See, North Dakota v. EPA, 730 F.3d at 768. The meaning of the word “necessary” requires EPA to take these and other relevant factors into consideration in its BART and reasonable progress determinations and to

demonstrate that these controls are indispensable. EPA has not explained how it considered these and other relevant factors in reaching its determination that its BART determinations for Flint Creek and White Bluff and its Reasonable Progress determination for Independence is “absolutely necessary” either to meet the reasonable progress goals for the planning period ending on 2018, or the national goal in 2064. Michigan v. EPA, 576 U.S. ____, (June 28, 2015).

EPA’s Proposed FIP also is improper as to Independence because it adopts an individual source-based approach to setting reasonable progress goals inconsistent with the Clean Air Act. Reasonable Progress provisions are intended to address contributions from a wide range of sources that can be best addressed on a source-category basis. They are fundamentally different from other provisions such as those for BART and reasonably attributable visibility impairment (“RAVI”), which are specifically designed to address individual sources. As the Tenth Circuit recently explained, “[n]either the Clean Air Act nor the Regional Haze Rule requires source-specific analysis in the determination of reasonable progress.” WildEarth Guardians v. EPA, 770 F.3d 919, 944 (10th Cir. 2014). Instead, the Clean Air Act discusses “classes or categories of sources” that “may reasonably be anticipated to cause or contribute significantly to impairment of visibility” and directs EPA to promulgate rules to address them. 42 U.S.C. §

7491(a)(3), (b)(1). In contrast, under the Clean Air Act, BART and Reasonably Attributable Visibility Impairment ("RAVI") provisions are applied individually to "each major stationary source" meeting certain threshold criteria. *Id.* § 7491(b)(2)(A)(c). This distinction is carried over into EPA's regulations. For example, under the Regional Haze Rule, SIPs that incorporate reasonable progress goals are intended to address "regional haze." 40 C.F.R. § 51.308(d). Regional haze is defined by EPA as "visibility impairment that is caused by the emission of air pollutants from numerous sources over a wide geographic area." *Id.* § 51.301 [emphasis added]. In contrast, EPA defines BART as an "emission limitation [that] must be applied on a case-by-case basis" *Id.* Likewise, EPA explains that its RAVI provisions are designed to address "visibility impairment that is caused by the emission of air pollutants from one or a small number of sources." *Id.* Thus, EPA's regulations treat reasonable progress goals, which address emissions from a broad range of sources, differently than the BART and RAVI provisions, which address individual sources. Consequently, EPA does not have the authority and should not have established a separate Reasonable Progress control just for Independence.

3. EPA FAILED TO CONSIDER RELEVANT FACTORS IN ITS BART AND REASONABLE PROGRESS DETERMINATIONS.

EPA has approved Ark. Code Ann. §8-4-312 as part of the Arkansas infrastructure SIP pursuant to 42 USC §7410. See, 40 C.F.R. §52.170(e), which certifies EPA's approval of Ark. Code Ann. §8-4-312 – "Factors in Exercise of Commission Powers" (identified as former Arkansas Statutes Annotated §82-1936). When a State Implementation Plan is approved by the EPA, its requirements become federal law and are fully enforceable in federal court. See, e.g., Safe Air for Everyone v. United States EPA, 488 F.3d 1088, 1091 (9th Cir. 2007); Natural Res. Def. Council, Inc. v. S. Coast Air Quality Mgmt. Dist., 651 F.3d 1066, 1069 (9th Cir. 2011); El Comite Para El Bienestar De Earlimart v. Warmerdam, 539 F.3d 1062, 1066 (9th Cir. 2008); GenOn REMA, LLC v. EPA, 722 F.3d 513, 516 (3rd Cir. 2013) ("If the EPA approves the SIPs, they become enforceable as federal law."); US Magnesium, LLC v. EPA, 690 F.3d 1157, 1159 (10th Cir. 2012) ("Approved SIPs are enforceable as federal law . . ."). Thus, Ark. Code Ann. §8-4-312 is federal law for purposes of the Clean Air Act in Arkansas and it is as equally binding on EPA as it is on the Arkansas state environmental agencies. See, e.g., United States v. Cinergy Corp., 623 F. 3d 455 (7th Cir. 2015);

Sierra Club v. Ga. Power Co., 443 F.3d 1346 (11th Cir. 2006); United States v. General Motors Corp., 702 F.Supp. 133 (D.C. Tex. 1988).

Ark. Code Ann. §8-4-312 sets out several factors that must be taken into account in decisions to regulate air quality in Arkansas, including “the economic and industrial development of the state and the social and economic value of the air contamination sources,” Ark. Code Ann. §8-4-312(14). Although the Clean Air Act requires that certain factors must be “taken into consideration” in determining BART, 42 U.S.C. §7491(g)(2), and in establishing reasonable progress goals, 42 U.S.C. §7491(g)(1), the statute does not make those factors exclusive. In fact, EPA’s BART guidelines indicate that “unusual circumstances . . . [including] the economic effects of requiring the use of a given control technology” may be considered. 40 C.F.R. Part 51, Appendix Y, IV.E.3 (70 F.R. 39,104; 39,171, July 6, 2005).

EPA’s BART and Reasonable Progress determinations for Flint Creek, White Bluff and Independence will cost over \$2 Billion and will result in significant increases in electric rates over most of the State of Arkansas for residential, commercial, governmental, agricultural and industrial customers of Entergy, SWEPCO, AECC and the municipal owners of those facilities. These three sources constitute a large part of the baseload electric generation for the State of Arkansas, and an even larger proportion of the baseload generation for AECC and its member

cooperatives. Nowhere in the Proposed FIP does EPA consider the social and economic value of these sources, and the economic effects of EPA's actions.

Not only does EPA's failure to consider the economic consequences of its BART and Reasonable Progress determinations violate Ark. Code Ann. §8-4-312 as part of EPA's approved infrastructure SIP for Arkansas, it also violates the spirit and purpose of EPA's own Environmental Justice (EJ) guidelines which requires EPA to "consider the impacts of our regulatory actions on populations documented as frequently bearing the greatest burdens imposed by environmental pollution." EPA, "Guidance on Considering Environmental Justice During the Development of Regulatory Actions", May 2015, at p. 2.⁷ These same populations that EPA's EJ guidelines seek to protect would be adversely impacted by EPA's Proposed FIP. Arkansas is the second poorest state (49/50) with a median household income of \$40,768.⁸ It has the 4th highest percentage (ranked 46/50) of poverty stricken residents.⁹ The areas in Arkansas that White Bluff, Independence and Flint Creek serve have an average of 19.2% of residents living

⁷ Available at <http://www.epa.gov/environmentaljustice/resources/policy/considering-ej-in-rulemaking-guide-final.pdf>.

⁸ U.S. Census Bureau. Accessed 7/2/15. <http://quickfacts.census.gov/qfd/states/05000.html>

⁹ Id.

below the federal poverty level. Several counties in east Arkansas that are served by these facilities have more than 30% of their residents living below the federal poverty level.¹⁰

Federal data illustrates that the poorer a household is, the more that higher energy rates harm the occupants.¹¹ In 2012, families with annual pre-tax incomes of over \$50,000 spent 9% of their household budgets on energy, compared to only 5% in 2001. Those earning between \$30,000 and \$50,000 saw an even larger percentage of their budgets consumed by rising energy costs – 17% in 2012 compared to 10% in 2001. Most drastically, families making \$10,000 to \$30,000 spent 24% of their incomes on energy in 2012 compared to 14% in 2001.¹² EPA's Proposed FIP will increase electric rates even more, and amplify these economic disparities and income inequality even further. The increases in electric rates that electricity providers would charge ratepayers in order to comply with EPA's Proposed FIP will push more Arkansans deeper into poverty.

¹⁰ Information obtained by going county by county (on above website), accessed 7/2/15.

¹¹ <http://www.forbes.com/sites/realspin/2015/06/15/epa-clean-power-plan-may-do-more-harm-than-good/> Citing: http://www.americaspower.org/sites/default/files/Energy_Cost_Impacts_2012_FINAL.pdf

¹² Id.

There is an important relationship between utility rates, poverty and poor health. One study concluded that an additional regulatory cost of \$8.9 million related to electricity use causes one additional adult death, and that such impacts are highly concentrated in lower income groups and disproportionately affect certain minority groups. The study concludes that 43% of such deaths would occur in households with incomes of less than \$15,000.¹³ The higher energy prices resulting from EPA's Proposed FIP will force many Arkansans to spend an even higher percentage of their income on electric bills, leaving them less money for food, use of heating and air conditioning, paying health insurance premiums, buying medicine, transport to work, and to see their doctors. In forcing its Proposed FIP onto Arkansas, EPA has failed to consider whether it would harm thousands of Arkansans, which likely would be the poorest Arkansans.¹⁴

EPA also failed to consider whether the economic impact of its Proposed FIP costs would lead to closure or curtailment of White Bluff, Independence, or Flint Creek resulting in local adverse economic impacts, the impact of such closures or curtailment on electric grid reliability in the State of Arkansas, and the

¹³ Exhibit 8, Klein, D., and Keeney, R., "Mortality Reductions from Use of Low-Cost Coal-Fueled Power: An Analytical Framework" (December 2002).

¹⁴ See, Exhibit 23, AECC Letter dated Sept. 26, 2014 to Hon. G. McCarthy regarding the impacts of EPA's Clean Power Plan.

State of Arkansas's interest in maintaining sufficient electric generation resources within its own borders and subject to state regulation. Under EPA's 1980 BART guidance, EPA states that BART should not be so economically onerous that it brings a facility to the brink of shutdown or substantial curtailment of operations.¹⁵ This consideration is echoed in EPA's BART Guidelines, 40 C.F.R. Part 51, Appendix Y, IV.E.3 (70 F.R. 39,104, 39,171; July 6, 2005), yet EPA did not consider whether the \$2.0+ billion cost imposed by its BART and Reasonable Progress determinations would result in the shutdown or curtailment of operations at White Bluff, Flint Creek and Independence.

Under EPA's proposed Clean Power Plan, the possible impacts of the closure or curtailment of fossil-fuel electric generating units like White Bluff, Independence and Flint Creek on electric grid reliability was deemed to be an important factor, with several regional transmission organizations commenting on the adverse impacts of EPA's 111(d) plan on grid reliability.¹⁶ Yet, EPA improperly failed to consider or take into account the impacts of its Proposed FIP on electric

¹⁵ Exhibit 9, "Guidelines for Determining Best Available Retrofit Technology for Coal-Fired Power Plant and Other Stationary Sources, USEPA," November 1980, EPA 450/3-80-009b, section 2.6.3, p. 20.

¹⁶ See, Exhibits 10A, 10B, and 10C, Southwest Power Pool and Midcontinent Independent System Operator comments, Docket No. EPA-HQ-OAR-2013-0602.

grid reliability, either regionally or within the State of Arkansas as a whole, or within discrete electric service territories within the State of Arkansas.¹⁷

EPA did not consider whether its Proposed FIP would result in economic harms and negative health impacts in Arkansas. Not only are these factors “appropriate”, as indicated above they are “necessary” and required under Ark. Code Ann. §8-4-312, EPA’s own BART Guidelines, and its EJ Guidelines. “No regulation is ‘appropriate’ if it does significantly more harm than good.” Michigan v. EPA, 576 U.S. ____ (2015). EPA should consider whether its Proposed FIP “reflects the reality that too much wasteful expenditure devoted to one problem may well mean considerably fewer resources available to deal effectively with other (perhaps more serious) problems.” Michigan v. EPA, 576 U.S. ____ (2015). Expending billions of dollars for imperceptible visibility changes under these circumstances is simply not defensible, and has not been properly justified by EPA. EPA should have considered the economic impact of the Regional Haze Rule and its BART and Reasonable Progress determinations on the ratepayers who will

¹⁷ The impact of EPA’s proposed Clean Power Plan by way of closure or curtailment of operations of White Bluff, Flint Creek or Independence would also be a relevant factor in determining the costs of compliance, remaining useful life and the visibility impacts of those sources under the Regional Haze Rule statutory factors for BART and Reasonable Progress.

be paying for these expensive controls. EPA's failure to take these and other relevant factors into consideration in its BART and reasonable progress determinations is unreasonable, and is arbitrary and capricious. Michigan v. EPA, 576 U.S. _____, (June 28, 2015).

4. EPA FAILED TO CONSIDER ALL AVAILABLE CONTROL TECHNOLOGIES, INCLUDING USE OF LOW-SULFUR COAL, IN ESTABLISHING BART, AND FAILED TO PROPERLY EVALUATE VISIBILITY IMPACTS.

According to EPA's BART Guidelines, determination of BART should proceed according to the following five steps:

1. Identify all available retrofit technologies
2. Eliminate technically infeasible options
3. Evaluate control effectiveness of remaining control technologies
4. Evaluate impacts and document the results
5. Evaluate visibility impacts

80 Fed.Reg. 18944, 18949 (April 8, 2015). After this analysis is complete, the regulatory agency still must evaluate the factors and select the best alternative. 70 Fed.Reg. 39104, 39170 (July 6, 2005). EPA did not identify or evaluate all available retrofit technologies for White Bluff and Flint Creek. In

addition, while EPA may have modeled visibility impacts from the technologies that it did consider, EPA did not adequately evaluate those visibility impacts; for example, EPA did not evaluate the cost of the technology compared to the improvement in visibility as expressed in deciviews (i.e. \$/dv).¹⁸

Low sulfur coal has been used as the fuel source for White Bluff, Flint Creek and Independence for many years. When construction of White Bluff was approved by the Arkansas Public Service Commission, it required White Bluff to use low-sulfur coal instead of high sulfur coal.¹⁹ Entergy's five-factor analysis points out that the amount of sulfur in coal is the most important factor in controlling SO₂ emissions.²⁰ EPA's own documents in support of the national Regional Haze Rule indicate that use of 0.7% low-sulfur coal reduces SO₂ emissions by over 70%.²¹ The U.S. Energy Information Administration states that low-sulfur coal may reduce SO₂ emissions by up to 85%.²² EPA has approved the use of low-sulfur coal as Best Available Control Technology for purposes of its PSD

¹⁸ The \$/dv calculation is expressly approved in the BART guidelines. 70 Fed.Reg. 39104, 39170 (July 6, 2005).

¹⁹ See, Arkansas Public Service Commission Order No. 14, Docket 73-048 U (U-2488), October 11, 1974, attached hereto as Exhibit 11.

²⁰ See, Exhibit 12, Entergy Revised BART Five-Factor Analysis for White Bluff, dated October 14, 2013, included in this Docket as document 0045, p. 5-1.

²¹ See, Exhibit 13, Hawes, T., Worksheet from EPA's docket EPA-HQ-OAR-2002-0076, document number 145.

²² See, EIA December 21, 2001 forecast, attached as Exhibit 14.

regulations. In fact EPA has approved the use of low-sulfur coal as BART for a coal-fired power plant even though it determined that Dry Sorbent Injection (“DSI”) at a cost of only \$991/ton SO₂ was “cost-effective” for that plant.²³

As indicated, White Bluff, Flint Creek and Independence have been using low-sulfur coal for many years. The charts attached as Exhibits 15A and 15B show that White Bluff’s average coal sulfur content since 2009 has been in the range of .25 - .30%; but the BART analyses relied on by EPA did not identify, much less evaluate the use of low-sulfur coal as BART.²⁴ In addition, although Entergy identified DSI as an available control technology in its BART Five-Factor analysis, that control technology was never evaluated by Entergy nor by EPA, and no explanation was given as to why DSI was not evaluated.²⁵ DSI also was identified in the Flint Creek BART Five-Factor Analysis as an available control technology, but

²³ See, EPA’s Final BART determination for PPL Corrette, 77 Fed.Reg. 23988, 24031 (April 29, 12012) which approved the use of coal with a 0.3% sulfur content as BART.

²⁴ EPA admittedly relied on the BART five-factor analyses submitted by Entergy and AEP, rather than performing its own five-factor analysis. See, Technical Support Document for EPA’s Proposed Action on the Arkansas Regional Haze Federal Implementation Plan, p. 13, footnote 13, Docket document No. 0002. Neither the White Bluff nor the Flint Creek five-factor analyses identified or considered low-sulfur coal as an available technology. Even if EPA had already decided to reject low-sulfur coal as BART, that technology should have been identified and evaluated so that the public would be able to provide meaningful comments on EPA’s Proposed FIP.

²⁵ See, Exhibit 12, p. 5-2.

also was not evaluated.²⁶ Because low-sulfur coal, DSI and other potential available systems of control were not evaluated, EPA's BART analyses did not satisfy the requirements of the BART guidelines, and thus EPA's Proposed FIP should be withdrawn. North Dakota v. EPA, 730 F.3d 750, 764 (8th Cir. 2013) (EPA BART determination vacated where EPA did not consider all available control technologies).

EPA also failed to adequately evaluate the visibility impacts of the available retrofit technologies that were identified and evaluated. Although EPA modeled numeric visibility improvements from the control technologies that were evaluated using the CALPUFF model, EPA did not explain how it weighed those visibility impacts. At most, EPA stated for a particular numerical dv improvement that it was "considerable" or "significant," however, EPA did not explain how it balanced those visibility improvements against the other BART factors to determine BART.²⁷ EPA should explain how it weighed the five BART factors and

²⁶ See, Exhibit 16, AEP BART Five-Factor Analysis for Flint Creek, September 2013, p. 5-1.

²⁷ EPA failed to evaluate the cost/dv of the various control technologies. Instead EPA appeared to simply determine whether a particular control technology was "cost-effective", and then to choose a particular control technology based only on the incremental cost difference between the control technology choices, irrespective of whether any of the evaluated control technologies was reasonably certain to result in an actual improvement in visibility.

why it made the BART determinations that it did - as well as its Reasonable Progress determinations – and why those costs are reasonable in light any “reasonably certain” visibility benefits, especially given the known shortcomings of the CALPUFF model as discussed below.²⁸

5. EPA’S DECISIONS ON COST-EFFECTIVENESS ARE UNREASONABLE, DO NOT CONSIDER RELEVANT FACTORS, ARE INCONSISTENT, AND ARE ARBITRARY AND CAPRICIOUS.

EPA is requiring control technology for White Bluff SN-01, SN-02 and Flint Creek at a cost determined by the plant operators to be \$2,913/ton SO₂, \$3,355/ton SO₂, and \$3,845/ton SO₂, respectively. These figures do not include significant costs such as AFUDC that will be incurred by the owners of those facilities and that will be recoverable ultimately from rate-payers in rate making

²⁸ See, Comment 6 below.

proceedings before the Arkansas Public Service Commission.²⁹ In addition, EPA believes that the costs of controls at Independence would be similar to the costs at White Bluff.

EPA claims that such additional costs, including AFUDC, are not allowable costs under EPA's Cost Control Manual. However, EPA's Cost Control Manual does not recognize the economic and financial realities of public utility operations, and thus it ignores important factors that should be considered.³⁰ EPA does not have any special expertise in power plant construction, public utility financing, or public utility cost recovery and rate regulation; thus its cost estimates for White Bluff, Flint Creek and Independence are not entitled to deference. See, King v. Burwell, 576 U.S. ___, slip. op. at 18-19 (June 25, 2015) (where regulatory agency does not have expertise in the field, its interpretations are not subject to deference.) The ultimate cost of EPA's BART and Reasonable Progress determinations to Entergy, AEP/SWEPCO, and AECC and its member cooperatives is limited, because they will be entitled by law to recover their costs from ratepayers, regardless of whether those costs are "allowed" under EPA's Cost Control Manual. See, Ark. Code Ann.

²⁹ See, Entergy's White Bluff and AEP's Flint Creek Final BART Five Factor Analyses, attached as Exhibits 12 and 16.

³⁰ It should be noted that EPA's Cost Control Manual is just a rough guide, with an admitted error of +/- 30%. (Docket document No. 139-3, p. 1-4)

§23-4-501 (recently amended to explicitly provide for cost recovery of AFUDC under an interim rate surcharge). Thus, for purposes of White Bluff, Flint Creek and Independence, which are public utility BART sources, the proper cost to be considered in EPA's BART and Reasonable Progress determinations is the costs that the owners of White Bluff, Flint Creek and Independence will be allowed to recover from ratepayers.

AFUDC stands for "Allowance for Funds Used During Construction." AFUDC is part of the Federal Energy Regulatory Commission Uniform System of Accounts, and is utilized by both the FERC and state regulatory commissions, including the Arkansas Public Service Commission to account for construction financing costs which are added to the cost of the plant for rate recovery when the plant is put into service. AFUDC can easily amount to tens of millions of dollars. EPA also omitted other costs in its BART and Reasonable Progress determinations that the operators of White Bluff, Flint Creek and Independence will be permitted to recover in their electric rates.³¹ Another cost to ratepayers that EPA failed to take into consideration is the rate of return that will be allowed to the owners of

³¹ See, Entergy's "Response to EPA Region 6 comments on Entergy White Bluff draft BART Report, 06/10/13", Docket Doc. No. 0043, pp. 6-10; Ex. 12, Entergy's "Response to 8/21/2013 EPA Region 6 comments on White Bluff BART FFA", Docket Doc. No. 0045, pp. 2-3.

White Bluff, Flint Creek and Independence on the total allowable costs of the control technology required by EPA. Recently, Arkansas utilities have been permitted a rate of return between 4 and 6% on the total cost. The Arkansas Public Service Commission is obligated to allow public utilities to recover their actual costs, plus a reasonable return on investment, regardless of whether those costs are recognized under EPA's Cost Control Manual. Since these costs are legally allowed under Arkansas law, they are relevant factors that should have been taken into account by EPA in its BART and Reasonable Progress determinations. Michigan v. EPA, 576 U.S. ___, slip op. at 5, 14 (June 29, 2015) (unreasonable for EPA to not take into consideration relevant factors).³²

In rejecting and adjusting Entergy's cost calculations for White Bluff, it is not clear whether EPA accounted for the differential cost of low-sulfur coal in its BART analysis. Entergy's cost calculations were based on uncontrolled SO₂ emissions of 2.0 lb/MMBtu, a level much higher than the emission rate from

³²Even EPA's adjusted and proposed cost-effectiveness numbers for White Bluff, Flint Creek and Independence exceed the upper limit of EPA's projected cost-effectiveness range of \$400 - 2,000/ton SO₂ for EPA's presumptive SO₂ BART limits in support of the national Regional Haze Rule. Exhibit 17, Technical Support Document for BART, April 2005, p. 8.

White Bluff's historical use of more-expensive low-sulfur coal.³³ EPA's BART analysis requires continued use of low sulfur coal, at a level of 0.65 to 0.68 lb. SO₂/MMBtu, based on 2009-2013 data.³⁴ EPA should explain whether it took the cost difference between low-sulfur coal and high-sulfur coal into account in its BART determination, and if not, it should do so.

EPA'S BART and Reasonable Progress determinations also are inconsistent with other EPA BART determinations, which would have been evident if EPA had evaluated visibility improvements on a \$/dv basis. When evaluated on that basis, the costs of EPA's Proposed FIP are as follows:

Flint Creek	\$65,769,250/yr./dv
White Bluff 1	\$39,337,306/yr./dv
White Bluff 2	\$42,415,424/yr./dv
Independence 1	\$64,219,337/yr./dv
Independence 2	\$52,171,663/yr./dv

³³ See, Exhibits 15A and 15B, demonstrating the reduction in SO₂ emissions and coal sulfur concentrations for White Bluff in 2009-2011, compared to 2001-2003.

³⁴ 80 Fed.Reg. 18970, April 8, 2015.

Although EPA claims that the costs of its BART and Reasonable Progress determinations are justified here, in its BART determination for the Corette facility in Montana, EPA found that costs/dv of \$30,477,272 for DSI and \$50,308,300 for a semi-dry scrubber were excessive (even though EPA determined that both of those controls were “cost-effective” on a \$/ton SO₂ basis), and determined that BART constituted the low-sulfur coal already in use at that facility.³⁵ Existing use of low-sulfur coal as BART also avoids the additional energy costs and water/land impacts of scrubber technology. This is an important factor that EPA failed to consider in its analysis of the energy and nonair quality environmental impacts of compliance that must be considered. All \$/dv calculations for White Bluff, Flint Creek and Independence based on EPA’s adjusted costs are higher than the \$/dv ratio that EPA determined was not justified in its Corette BART determination. EPA has failed to explain why it did not consider use of low-sulfur coal as BART for the Arkansas facilities, and further has failed to explain how its determinations in the Proposed FIP are justified, consistent with its Corette BART determination.

³⁵ See, Exhibit 18, Comparison of Scrubber Cost-Effectiveness in Dollars per Deciview, attached hereto as Exhibit 18. See 77 Fed.Reg. 23998 (April 20, 2012), for the explanation of EPA’s BART determination for Corette.

6. EPA'S DECISIONS ON BASELINE VISIBILITY IMPACTS AND VISIBILITY IMPROVEMENTS ARE UNREASONABLE AND DO NOT SUPPORT ITS BART AND REASONABLE PROGRESS DETERMINATIONS.

a. EPA should have used realistic data for its visibility analysis

According to EPA's BART Guidance "The baseline emissions rate should represent a realistic depiction of anticipated annual emissions for the source." 40 CFR Part 51, Appendix Y, Section IV.D.4.c. However, EPA's BART and Reasonable Progress determinations do not comply with this requirement. First, EPA's use of the maximum 24-hour recorded emissions extrapolated across the three year analysis period significantly overestimates the visibility impacts from a facility. For example, from 2001 to 2003, Entergy Independence reported maximum 24-hour SO₂ emission rates of 5,463 lb/hr and 6,337 lb/hr from Unit 1 and Unit 2, respectively. However, the average daily emission rate over that same three year period (with downtime omitted) for Unit 1 and Unit 2 is 2,927 lb/hr and 3,088 lb/hr, respectively. Actual average emissions from the facility are half of what is represented in the modeling analysis.

Additionally, EPA admits in the Regional Haze Regulations and Guidelines for Best Available Retrofit Technology Determinations that modeled impacts are overstated. Specifically, EPA states that "there are other features of our

recommended modeling approach that are likely to overstate the actual visibility effects of an individual source. Most important, the simplified chemistry in the model tends to magnify the actual visibility effects of that source.” 70 Fed.Reg. 39104, 39121 (July 6, 2005). This led the EPA to its decision to use the 98th percentile of modeled visibility values, which eliminates roughly 7 days per year from the analysis. However, this approach has no rational or generally accepted scientific basis as a way to “normalize” the emissions data. Using the same example for Entergy Independence, if the maximum 7 days of each year from 2001 to 2003 is eliminated for each unit, the maximum 24-hour emissions rates across that timeframe become 4,768 lb/hr and 5,357 lb/hr at Unit 1 and Unit 2, respectively. This is still far above the actual average daily emission rate and continues to severely overestimate the reasonable amount of emissions that would occur over an extended period of time at the facility.³⁶

In addition, EPA failed to use the most recent SO₂ emissions data for the White Bluff and Flint Creek BART determinations, relying instead on continuous emissions data from 2001-2003 to establish baseline visibility impacts. EPA

³⁶ EPA’s 98th percentile approach also does not suffice to “normalize” the maximum visibility impacts, since there is no demonstrated relationship between the modeled highest visibility impacts and the highest observed visibility impacts.

should have used 2009-2011 emissions data, which Entergy specifically proposed for its White Bluff BART Five Factor Analysis, and which reflects a significant decrease in SO₂ emissions.³⁷ Because use of low-sulfur coal is an acceptable pollution control technology, it was wrong for EPA not to accept the emissions data from 2009-2011 just because use of low-sulfur coal was not required by a permit condition. North Dakota v. EPA, 730 F.3d 750, 764 (8th Cir. 2013).

b. Use of CALPUFF under these circumstances does not support EPA's determination to require additional controls at the three coal-fired power plants at a cost approaching \$2.5 Billion

i. CALPUFF overstates visibility impacts for a variety of reasons, including failure to incorporate puff-splitting and other demonstrated meteorological mechanisms

The EPA's reliance on CALPUFF modeling results to make regulatory decisions in this case is not justified due to CALPUFF's well-known overestimation of visibility impacts.³⁸ Under the circumstances here, it is highly likely that

³⁷ See Exhibits 15A and 15B, demonstrating the reduction in SO₂ emissions and coal sulfur concentrations for White Bluff in 2009-2011, compared to 2001-2003.

³⁸ Coincidentally, the EPA Administrator on July 14, 2015 signed a proposed notice to remove CALPUFF as a model for long-range transport in EPA's Guideline on Air Quality Models in Docket No. EPA-HQ-OAR-2015-0310.

CALPUFF overestimated the visibility impacts of White Bluff, Flint Creek and Independence by at least five (5) times. One component of this overestimation is the failure to incorporate the puff-splitting option within the CALPUFF model into the development of visibility results. Appendix B of the CENRAP BART Modeling Guidelines specifically recommends that the option for incorporating puff splitting in the model not be included; yet the CALPUFF User's Manual (Scire et al. 2000) states on page 2-37 that "across-puff shear is likely to be important for well-mixed puffs after stable surface flows develop in the evening" as an example of when puff splitting should be employed. While the use of puff-splitting alone does not resolve all potential issues with regard to the accuracy of the CALPUFF model, it is a component that when eliminated will cause visibility impacts to be overestimated. CALPUFF's overestimation of visibility impacts by a factor of 2-10 times under similar circumstances has been previously identified³⁹ and is described with specific reference to EPA's Proposed FIP for Arkansas in a report by Dr. Richard T. McNider.⁴⁰ Dr. McNider's report explains that the CALPUFF protocols used in the Proposed FIP fail to account for several well-known

³⁹ See, Exhibit 19, Hoffnagle, G., "Accuracy of Visibility Protocol Modeling in BART Evaluations" (June 15, 2012); EPA Docket EPA-R08-OAR-2011-0851.

⁴⁰ See, McNider, R. "Inadequacy of CALPUFF and CALMET Protocols for Visibility Impact Analysis in the Arkansas RHR FIP," July 13, 2015, attached hereto as Exhibit 20.

meteorological phenomena and processes, and causes it to overestimate visibility impacts by a factor of 2-3 times at distances between 40-100 km. At distances beyond 100 km, CALPUFF likely overestimates visibility impacts by a factor of 5-10 based on observations of plume widths at long-range.⁴¹ Among other things, this is due to the impact of plume transport during the overnight period in which the plume is distorted by wind shear resulting in a very wide plume. By not utilizing the puff-splitting option, this wind shear effect is ignored. As noted above, the developers of CALPUFF explicitly stated that puff splitting should be used if an evening transition is encountered. Because a majority of sources affected by the Proposed FIP have plume transport times that exceed 9 to 12 hours – resulting in some measure of overnight transport – the failure to account for overnight decoupling within the model likely understates plume widths by a factor of at least five and corresponding overstatement of concentrations by a similar factor. These evening transitions and associated plume distortion are a regular part of atmospheric behavior and cannot be neglected in regulatory actions assessing the cost benefits of controls.

⁴¹ White Bluff, Flint Creek and Independence are all more than 100 km from the nearest Class I area.

As described in Dr. McNider's report, the CALPUFF and CALMET protocols employed in the Proposed FIP neglect important physical behavior that control plume growth beyond a travel distance of 40-50 km. As found in observations of power plant plumes in Tennessee, wind fluctuations at a scale above boundary layer turbulence not captured in CALMET or realized in CALPUFF likely cause a plume to grow at 2 to 3 times that produced in CALPUFF. The neglect of these intermediate scales of motion is likely part of the reason the Hoffnagle report (Ex. 19) found CALPUFF to over-estimate concentrations.

The electric generating units that are the subject of the Proposed FIPs sit at distances between 100 and 400 kilometers from the closest Class I areas. Using the dates of the 98th percentile visibility impacts, transport wind speeds were found to be generally less than 3 m/s. Thus, transport times for all plumes would have exceeded 10 hours and most transport times were 15-24 hours. Thus, almost all plumes would have encountered an evening transition and overnight transport. The following table demonstrates the distance in kilometers (km) and plume transport times for White Bluff, Flint Creek, and Independence.

Travel Time at 3m/s

Receptor	Caney Creek		Upper Buffalo		Hercules Glades		Mingo	
Facility	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)
Entergy - White Bluff	176	16.3	200	18.5	266	24.6	335	31.0
Flint Creek	204	18.9	104	9.6	153	14.2	395	36.6
Entergy - Independence	270	25.0	188	17.4	186	17.2	191	17.7

Travel Time at 2m/s

Receptor	Caney Creek		Upper Buffalo		Hercules Glades		Mingo	
Facility	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)
Entergy - White Bluff	176	24.4	200	27.8	266	36.9	335	46.5
Flint Creek	204	28.3	104	14.4	153	21.3	395	54.9
Entergy - Independence	270	37.5	188	26.1	186	25.8	191	26.5

This table demonstrates that the plume transport times for each facility and Class I area crosses into evening and overnight mixing zones. The choice of not including the puff splitting option for the FIP modeling means that CALPUFF most likely is underestimating the effects during these overnight hours, which results in

underestimating plume widths by a factor of five to ten, and corresponding overestimations of plume concentrations. This results in visibility impacts that are not accurate and should not be utilized to make regulatory decisions that have significant economic impacts.

EPA has acknowledged the shortcomings of CALPUFF and that it is primarily limited to use as a screening tool to evaluate dv changes of at least 2-3 dv. Indeed, the Hoffnagle report demonstrates that CALPUFF modeling has not been validated by real world observations and that the current regulatory version of CALPUFF used by EPA is outdated.⁴² Consequently, CALPUFF is not “sufficiently accurate to make determinations of deciview differences of 1 deciview.”⁴³

It is not appropriate under the circumstances here to rely on CALPUFF beyond use as a screening tool. Specifically, it is inappropriate to utilize CALPUFF as a screening tool to qualify a source as subject to BART and subsequently use it to determine a facility’s required implementation of a control technology at a significant financial cost. EPA in its final regional haze rules stated that “because of the scale of the predicted impacts from these sources, CALPUFF is an appropriate or a reasonable application to determine whether such a facility can

⁴² Hoffnagle, Exhibit 19 at p. 4.

⁴³ Hoffnagle, Exhibit 19 at p. 23.

reasonably be anticipated to cause or contribute to any impairment of visibility. In other words, to find that a source with a predicted maximum impact greater than 2 to 3 deciviews meets the contribution threshold adopted by the States does not require the degree of certainty in the results of the model that might be required for other regulatory purposes." 70 F.R. 39104, 39123; July 6, 2005; Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations; Final Rule [emphasis supplied]. For regulatory action such as evaluating the level of controls for a FIP, much more realistic modeling should be used to determine visibility impacts. For the Arkansas FIP, this should include at a minimum usage of the puff splitting option in CALPUFF. It should also include an evaluation of CALMET to ensure that its assimilation of winds at the 00Z and 12Z GMT times are not adversely impacting boundary layer decoupling and the development of inertial oscillations in the wind field. If at a minimum, the CALPUFF model results are overestimated by a factor of 5, the maximum 98th percentile baseline visibility impact for White Bluff, Flint Creek, or Independence would be lowered to a level that removes any reasonable likelihood that it would exceed 0.5 deciviews and thus even be subject to BART, much less result in visibility improvement that may be reasonably anticipated.

- ii. EPA does not explain the basis for its BART and Reasonable Progress determinations given the known limitations of the CALPUFF model under these circumstances

There has been no explanation or justification by EPA that demonstrates that the visibility impacts obtained from the CALPUFF model are precise enough to reliably differentiate results that are fractions of a deciview apart. In the Proposed FIP, the maximum visibility improvement reported for any single Class I area for the subject to BART units is 0.813 dv.⁴⁴ Not only is this overstated as discussed above, this is below even EPA's 1 dv level at which a discernible difference in visibility can be registered by a human.⁴⁵ In evaluating the significance of the modeled visibility improvements in the proposed FIP, EPA subjectively labels them as "considerable" (7 times), "significant" (1 time), and

⁴⁴ See Proposed FIP and Exhibit 7.

⁴⁵ See 62 Fed.Reg. 41138, 41145 (July 31, 1997) ("A one deciview change in haziness is a small but noticeable change in haziness under most circumstances when viewing scenes in mandatory Class I Federal areas."); 70 Fed.Reg. 39104, 39120 (July 6, 2005) (1.0 deciview is the "appropriate perceptibility threshold"); but see, Henry, R. "Just Noticeable Differences in Atmospheric Haze", J. Air and Waste Management Assoc. 52: 1238, 1243, attached hereto as Exhibit 21 ("A 1-deciview change is never noticeable.")

“meaningful” (1 time),⁴⁶ even though each of these impacts is below the admitted minimum level of visual perceptibility. EPA does not explain how these impacts can be considerable, significant or meaningful from a visibility standpoint, when these impacts are not able to be perceived.⁴⁷

If adjusted to account for the overestimation of the CALPUFF model and the distances and transport times involved in this case, the modeled visibility improvements would be even further below the 1dv perceptibility threshold. As explained in Dr. McNider’s report, based on the studies of observed plume width versus modeled plume width, dispersion results beyond 100 kilometers can be expected, at a minimum, to be overestimated by a factor of at least 5. This would bring the modeled visibility improvement results down to a level well below anything that would be observable and far below what CALPUFF can reasonably predict.

⁴⁶ “Considerable” - pp. 18952; 18959; 18959; 18966; 18972; 18978; 18994; “Significant” - p. 18994; “Meaningful” – p. 18952.

⁴⁷ To the extent EPA’s decisions in the Proposed FIP were based on “cumulative visibility benefits” or “total visibility benefits,” that is misleading, has no legal basis, and is not scientifically defensible. See, Exhibit 19, Hoffnagle Report, p. 3 (deciviews cannot be directly added or subtracted.)

EPA's visibility analysis in the Proposed FIP systematically overstates both the baseline visibility impacts of White Bluff, Flint Creek and Independence, and the visibility benefits that would result from installation of EPA's required controls.⁴⁸ EPA's Proposed FIP presumes greater accuracy and precision than is reasonable or that may be expected from CALPUFF under the circumstances here. The EPA has utilized a model that was developed as a screening method, and has improperly utilized it as a way to make regulatory determinations to establish mandatory control technologies. As indicated in the Hoffnagle and McNider reports, the errors in this model make it impossible to predict with a reasonable degree of confidence visibility changes at the levels involved, and call into question EPA's predictions of the tiny visibility benefits projected from installation of additional controls. As indicated, EPA has not validated that the results within CALPUFF align with any real-world data or observations; however, the Hoffnagle and McNider reports demonstrate that at the distances and transport times involved here, CALPUFF does not align with observed plume dispersion. EPA has failed to update its model or to address any of these deficiencies considering currently available state-of-the-art modeling science. EPA's consideration of visibility impacts is fundamentally flawed and should be withdrawn and corrected.

⁴⁸ As well as the other sources that were modeled using CALPUFF.

EPA's admission that CALPUFF is a reasonable tool to evaluate a facility's visibility impacts only if those impacts exceed 2 to 3 deciviews, combined with the inability of the model to make accurate determinations below the 1 deciview threshold of perceptibility, discredits the results of the baseline visibility analyses in the Proposed FIP, as well as the claimed level of visibility improvement that can reasonably be anticipated from EPA's BART and Reasonable Progress determinations. For these reasons, EPA has not adequately explained how the baseline and subsequent controlled visibility analyses in the Proposed FIP justify the selected control technologies.

7. EPA DOES NOT HAVE AUTHORITY TO REQUIRE TECHNOLOGY CONTROLS AT THESE SOURCES FOR THE PURPOSES OF "VISIBILITY" INTERSTATE TRANSPORT.

The good neighbor visibility provision in 42 U.S.C. 7410(a)(2)(D)(i)(II) prohibits interference with "measures" required to be included in another State's implementation plan to protect visibility. EPA has not demonstrated that any of these sources in its Proposed FIP are interfering with any visibility control measure in any other state's SIP. Nucor disagreed with EPA's determination to

disapprove the Arkansas interstate visibility transport SIP provisions submitted to EPA on April 2, 2008 based on the same reasoning.⁴⁹ In EPA's 2011 proposed decision to disapprove that SIP submission, EPA stated that the Clean Air Act requires states to prevent "sources in the state from emitting pollutants in amounts which will interfere with efforts to protect visibility in other states." 76 Fed.Reg. 53189, 64219. In its Proposed FIP in 2015, EPA states that the Arkansas SIP did not ensure that emissions from Arkansas sources "do not interfere with other states' visibility programs as required by section 110(a)(2)(D)(i)(II) of the CAA." 80 Fed.Reg. 18998, April 8, 2015. The visibility protection requirement of §110(a)(2)(D)(i)(II) does not protect against interference with either other states "efforts" or other states "programs." Unlike the language in §110(a)(2)(D)(i)(I), which prohibits emissions that contribute significantly to nonattainment or maintenance of a NAAQS in another state, the visibility protection requirement is narrower and only protects against interference with specific measures, that is, actions included in another state's plan to achieve a visibility goal. Reasonable progress goals, projected deciview improvements from regional efforts, and the

⁴⁹ Exhibit 22, Nucor's Comments in Docket EPA-R06-OAR-2008-0727 (without exhibits), December 2011.

like are goals or standards; they are not “measures” taken by or enforced by a state.

There is nothing in the record demonstrating that any of the sources in the Proposed FIP interfere with any measure included in any other state’s SIP for the purpose of protecting or improving visibility. To the extent that EPA’s Proposed interstate visibility transport FIP is not based on direct interference with a control measure in another state’s regional haze SIP (in contrast to interference with a regional haze related visibility goal), EPA’s interpretation is contrary to the clear and express language of Section 110. EPA’s interpretation also is contrary to the Clean Air Act’s clear direction that each state is to determine its own emission limits, schedules of compliance and other measures for sources in that state for purposes of visibility protection under section 169A. EPA’s interpretation would impermissibly give one state the power to control another state’s regional haze SIP decisions, including its BART and Reasonable Progress determinations.

Finally, even if the CAA’s good neighbor visibility provision required a state SIP to contain emission limits for sources that contribute to visibility impairment at a Class I area in another state, EPA has not demonstrated that any of the controls in its Proposed FIP are “necessary” for that purpose, considering based

on the uncertainty in the modeling that these controls will result in actual visibility improvements.

CONCLUSION

EPA does not have the authority to initiate rule-making on its Proposed FIP, much less finalize or issue its Proposed FIP. Furthermore, for the reasons stated above, the Proposed FIP is arbitrary and capricious, fails to consider relevant factors, and does not demonstrate reasoned rule-making, and should be withdrawn.

Respectfully submitted,

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and

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Exhibit list to Comments of Nucor Steel-Arkansas & Nucor Yamato Steel to EPA's Proposed RHR Federal Implementation Plan for the State of Arkansas

- 1-A 2015-03-13 EPA Arkansas RHR FOIA Request
- 1-B EPA-R6-2015-005185 – Clarification-Larger Fee Commitment
- 1-C 2015-07-10 Letter to EPA re Request Extension Comment Period
- 2 EPA's AR Regional Haze FIP Update-Feb. 11, 2015
- 3 ADEQ 5 Year Regional Haze Progress Report-Revised May 2015
- 4 Internal EPA Email dated May 9, 2014
- 5 ICF International, Arkansas Criteria Pollutant Modeling Analysis, July 28, 2014
- 6 Recent Actions at EGUs in Neighboring States
- 7 Summary of Modeled Baseline Visibility & Improvement Results from Proposed FIP
- 8 Klein & Keeney – Mortality Reductions from Use of Low Cost Power
- 9 EPA – Guidelines for Determining BART for Coal-Fired Power Plants
- 10-A SPP Reliability Impact Assessment Report dated October 8, 2014
- 10-B SPP Dec. 1, 2014 Comment Letter-Clean Power Plan
- 10-C MISO Nov. 2014 Comment Letter-Clean Power Plan
- 11 APSC Order No. 14-Docket 73-048-U (White Bluff)
- 12 Entergy's Revised BART Analysis – October 14, 2013
- 13 Hawes, T. – Calculation Worksheet-EPA Docket EPA-HQ-OAR-2002-0076; Doc. 0145
- 14 EIA, Annual Energy Outlook 2001, Dec. 21, 2001 Forecast
- 15-A Entergy White Bluff Unit 1 SO2 Emissions & Sulfur Content (2001-2011)
- 15-B Entergy White Bluff Unit 2 SO2 Emissions & Sulfur Content (2001-2011)

- 16 AEP Flint Creek BART Analysis (September 2013)
- 17 EPA Technical Support Document for BART Determinations (April 2005)
- 18 Comparison of Scrubber Cost-Effectiveness in Dollars per Deciview
- 19 Hoffnagle, G. – Accuracy of Visibility Protocol Modeling in BART Evaluations
- 20 McNider, R. – Inadequacy of CALPUFF & CALMET Protocols
- 21 Henry – Just Noticeable Differences in Atmospheric Haze
- 22 Nucor Comments – EPA Docket EPA-R06-OAR-2008-0727 (Dec. 2011)
- 23 AECC Letter dated September 26, 2014 to Hon. G. McCarthy

COMMENTS OF THE ARKANSAS AFFORDABLE ENERGY COALITION
FEBRUARY 2, 2018

REVISIONS TO THE ARKANSAS STATE IMPLEMENTATION PLAN
REGIONAL HAZE SIP REVISION FOR 2008-2018 PLANNING PERIOD

Exhibit C-1

Hoffnagle, G., Accuracy of Visibility Protocol Modeling in BART Evaluations

EXHIBIT C-1

PPL MONTANA, LLC COMMENTS

PROPOSED REGIONAL HAZE FEDERAL IMPLEMENTATION PLAN
FOR THE STATE OF MONTANA

Docket ID No. EPA-R08-OAR-2011-0851

ATTACHMENT 3

Accuracy of Visibility Protocol Modeling in BART
Evaluations, prepared by Gale F. Hoffnagle,
TRC Environmental Corporation, June 15, 2012

EXHIBIT C-1

Exhibit 19

Accuracy of Visibility Protocol Modeling in BART Evaluations

Prepared by Gale F Hoffnagle, CCM QEP
TRC Environmental Corporation

June 15, 2012

EXHIBIT C-1

Exhibit 19

EXECUTIVE SUMMARY

EPA has improperly relied upon emissions modeling that projects only very small benefits in visibility (0.085 deciviews) to justify the installation of emissions control technology for nitrogen oxides (NO_x). EPA's reliance is improper for multiple reasons. The CALPUFF modeling protocol used in the analysis neglects critical factors necessary in evaluating impacts over long distances where such minute impacts are predicted. The modeled visibility benefits estimated by EPA are not only ten times smaller than the minimum amount perceptible to a human observer, but they are demonstrably much smaller than errors found in modeled-to-measured data comparisons, and thus within the margin of error for the model. Even those results are erroneous because the model relies upon faulty data and is outdated. For NO_x, the visibility model calculates dispersion and reaction of secondary NO_x products with ammonia in the atmosphere to create nitrate particles that reduce visibility; EPA has never checked the model against actual measurements of nitrates in the atmosphere. Actual measurements of nitrates show that the assumptions in the EPA modeling protocol are invalid, resulting in an overestimation of predicted impacts. EPA's model methodology predicts visibility impacts inaccurately for several reasons. First and foremost, EPA's modeling protocol assumes a constant level of ammonia in the atmosphere available to react with NO_x. In fact, ammonia results primarily from biodegradation of vegetation, which does not occur in the cold and snow-covered winter months. Further, EPA uses the model to calculate impacts at 300 km. However, independent studies have shown the model to be unreliable at predicting impacts beyond 200 km. Finally, recent studies comparing actual measurements of nitrate in the atmosphere to predicted concentrations using the model based on the EPA modeling protocol show that the model significantly overstates actual visibility impacts.

EXHIBIT C-1

Exhibit 19

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EXHIBIT C-1

I. INTRODUCTION AND BACKGROUND

a. EPA's Proposed Rule

The proposed Federal Implementation Plan for Montana (Proposed FIP) proposes to establish revised emissions limits at Colstrip Units 1 and 2 for NO_x based upon the installation of Separated Over Fire Air (SOFA) and Selective Non-Catalytic Reduction (SNCR) at those Units. As set forth in the Proposed FIP, EPA's modeling calculations predict a degree of improvement in visibility at the Parks and Wilderness Areas (Class I areas) attributable to the installation of these technologies, as well as the incremental benefit of SNCR on top of SOFA, as follows:

TABLE 1: Projected Visibility Improvements Resulting from Controls at Colstrip (in deciviews)¹

Unit 1	SOFA	SOFA+SNCR	Incremental	Distance (km)	Angle (deg)
North Absaroka WA	0.047	0.089	0.042	252	250°
Theodore Roosevelt NP	0.182	0.264	0.082	264	340°
UL Bend WA	0.164	0.249	0.085	198	50°
Washakie WA	0.052	0.077	0.025	274	225°
Yellowstone NP	0.034	0.059	0.025	279	250°
Unit 2	SOFA	SOFA+SNCR	Incremental	Distance (km)	Angle (deg)
North Absaroka WA	0.055	0.083	0.028	252	250°
Theodore Roosevelt NP	0.19	0.269	0.079	264	340°
UL Bend WA	0.185	0.269	0.084	198	50°
Washakie WA	0.063	0.089	0.026	274	225°
Yellowstone NP	0.063	0.071	0.008	279	250°

EPA's estimated incremental benefit for the installation of SNCR on top of SOFA does not exceed 0.085 deciviews for any Class I area. This report addresses the question of whether the CALPUFF model as used by the EPA protocol can reliably be used to evaluate visibility impairment differences of the magnitude represented in this table.

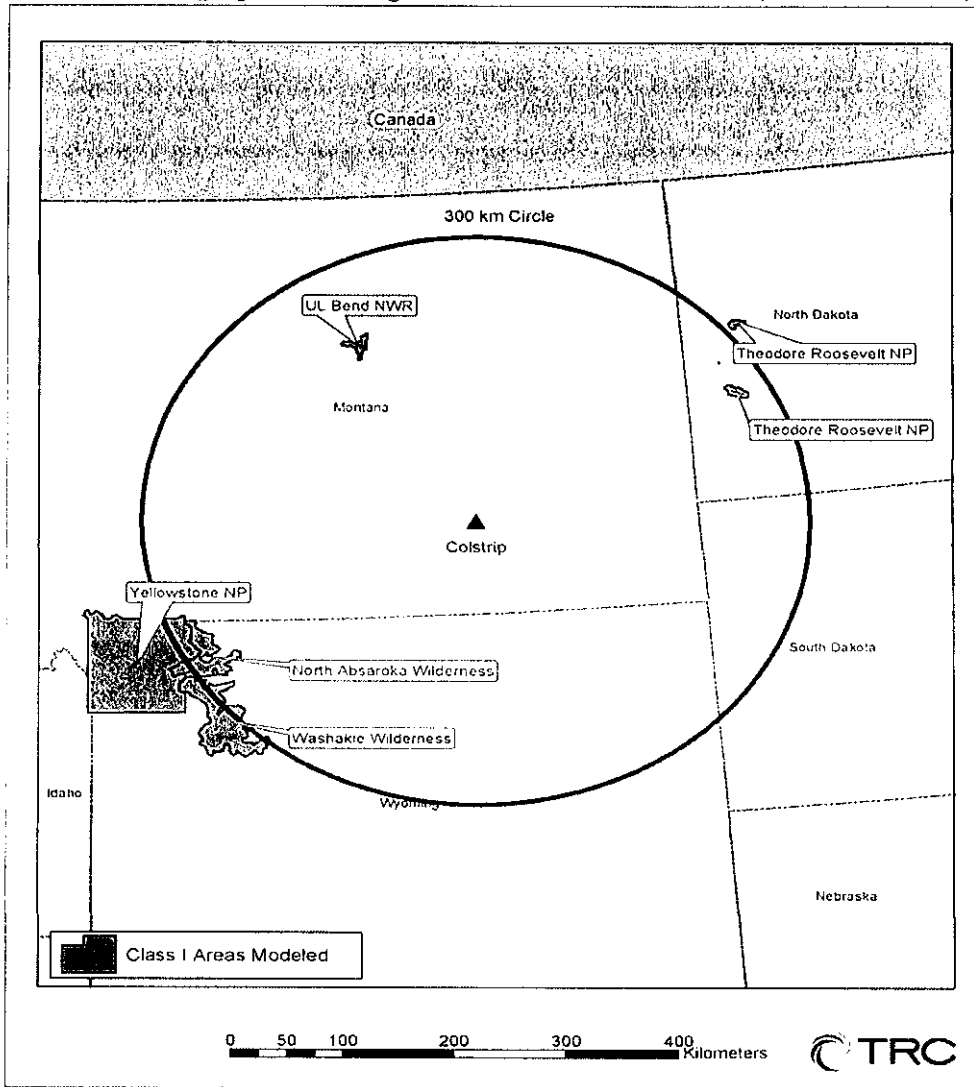
b. Class I Areas at Issue

The Class 1 areas within 300 kilometers of the Colstrip power plant are shown in Figure 1. IMPROVE measurements are taken at the South Unit of Theodore Roosevelt National Park (NP), UL Bend Wilderness Area, North Absaroka Wilderness Area and Yellowstone National Park. As shown in Figure 1, the distances to the Class I areas at issue are large and in three different wind directions.

¹ These are the values reported in the Federal Register Notice, which differ from the values reported in the University of North Carolina Modeling Report.

EXHIBIT C-1

FIGURE 1: Geographical Setting of Sources and Class I Areas (from NDDH SIP)



c. Visibility Essentials and the CALPUFF Model

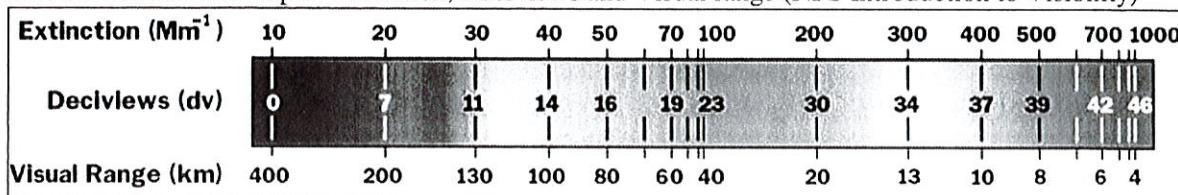
To measure changes in visibility, EPA guidance requires use of sophisticated air quality computer models. In 2003, EPA adopted the CALPUFF model as the recommended air quality model for assessing long-range (> 50 km) air quality impacts. In 2005, the agency recommended that CALPUFF be used to assess the visibility improvement associated with pollution control options considered in BART analyses.

Visibility modeling, such as the CALPUFF model, involves inputting emissions of certain pollutants such as NO_x (which in and of itself does not impair visibility), and SO₂. Visibility models calculate the dispersion of the pollutants and their atmospheric reactions with other chemicals to predict the creation of light-extinguishing particles, specifically nitrates and sulfates. Based upon the movement and location of those particles in relation to Class I areas of concern, the model predicts how those emissions will affect light extinction in those locations.

EXHIBIT C-1

Modeled light extinction is calculated in deciviews. A deciview is a scale based on the concept that 1 deciview is the minimum change in visibility perceptible to a human observer. It is a logarithmic scale similar to the Richter scale for earthquakes. That means that 10 deciviews is 100 times more light extinction than 1 deciview. The relationship between light extinction, deciview and visual range is shown in Figure 2.

FIGURE 2: Relationship of Extinction, Deciviews and Visual range (NPS Introduction to Visibility)



Light extinction (the amount of photons lost to absorption and scattering) is measured in inverse megameters, as shown above. An inverse megameter is the extinction (photons of light) that would be lost due to light extinction along a path of 1 million meters (1000 kilometers or 621 miles). The relationship between deciview and inverse megameters is as follows:

$$\text{Deciviews} = 10 \text{ times } \text{Ln} (\text{extinction in inverse megameters}/10)$$

One deciview is 11.052 inverse megameters, 0.1 deciviews is 10.1 inverse megameters and zero deciview is 10 inverse megameters. Deciviews cannot be directly added or subtracted so scientists prefer to calculate extinction in inverse megameters, and convert to deciviews. Additionally, small amounts of extinction result in negative deciviews which are not useful in describing visibility reductions. Negative deciviews mean that the visual extinction is more than an order of magnitude less than the human perception level of 1 deciview.

The human perception of visibility depends on a large number of factors, including but not limited to the amount of particulate in the air, sizes of the particulate, background or vista being viewed, color, sun angle, cloud cover, relative humidity, time of the year, groundcover (snow), etc. The methodology used by EPA is greatly simplified and does not account for all of these factors. For a given particulate concentration predicted by the model, an empirical formula developed by the National Park Service is used to convert the particulate concentration to light extinction (based on an understanding of the degree of light extinction caused by the particulates in the atmosphere). NPS corrected the empirical formula to account for relative humidity, but has failed to address other factors that have a significant impact on predicted visibility.

The EPA protocol produces model results for each day in terms of deciviews. The 24-hour (midnight to midnight) average is used to be consistent with the IMPROVE measured data, which can only measure particles on a 24 hour basis. The National Park Service has traditionally categorized the visibility of a site by using the 20% worst days of extinction and the 20% best days of extinction. If 122 samples were taken at an IMPROVE site (*i.e.* one sample every third day) then there are 24 worst case days in the 20% worst and 24 best case days in the 20% best. EPA, however, requires that the model results be provided for the 98 percentile impact of a source. This is the 8th highest value in any specific year.

EXHIBIT C-1

II. SUMMARY OF CONCERNS RELATED TO EPA'S USE OF THE 2007 CALPUFF PROTOCOL

Although EPA relies primarily on the CALPUFF model in BART analyses in order to predict the emissions benefits that might result from the installation of certain control technologies, there are several fundamental, correctable problems with CALPUFF as currently used by EPA. Those problems are outlined in this section.

a. EPA's Has Not Validated Its CALPUFF Modeling Protocol

In its Proposed FIP, EPA relies upon the CALPUFF modeling protocol to make two distinct calculations: 1) the visibility impact (in deciviews) of current emissions from BART eligible sources in Montana on Class I areas; and 2) the visibility changes that are predicted to occur if emission reductions are made at those sources. EPA assumes that the results of the modeling using this protocol are accurate and sufficiently precise to make decisions about whether investments in emission controls to achieve emissions reductions from the eligible sources are warranted as BART. However, EPA has never evaluated the validity of the CALPUFF protocol to predict particulate concentrations by comparing predicted values to those actually measured at Class I areas, notwithstanding the availability of such measured data to undertake such an analysis. Without such validation against real world data, one does not know the accuracy or precision of the model to make predictions of actual visibility impacts. Rather, EPA in its use of CALPUFF relies on theoretical assumptions that have not been tested or confirmed by EPA. As set forth in Section III below, currently available data demonstrate significant inconsistencies between modeled and measured values, calling into question whether such a validation could ever be completed, and whether it is scientifically appropriate for EPA to continue to rely upon the protocol.

b. EPA's Protocol for Modeling is Outdated

Since the 2005 time frame when EPA specified the use of the CALPUFF protocol, the state-of-the-science of visibility modeling has advanced considerably. However, EPA continues to use an old version of the CALPUFF model to assess projected impacts and improvements in visibility. Indeed, although the model has been updated and improved in 2008, 2010 and 2011, EPA relies upon the 2007 version in the Montana FIP.

Indeed, CALPUFF has evolved continuously since its initial introduction; however, EPA's model approval process has not kept pace with the development process. Studies in recent years have concluded that the currently approved version of CALPUFF over-predicts particulate nitrate formation by a significant factor. As a result, significant work has been undertaken by those in the modeling community related to the creation of CALPUFF Version 6.4, which was submitted to EPA and FLMs in November 2010, and also released to the public domain (Karamchandani, et al. (2008) and Scire, et al. (2010)). CALPUFF Version 6.4 incorporates more sophisticated handling of the atmospheric chemistry of sulfate and nitrate formation, which takes into account ozone chemistry, the inorganic gas particle equilibrium, organic aerosol formation, and aqueous phase transformation. These considerations lead to more accurate reproduction of both particulate formation and visibility impact calculations. However, EPA has thus far failed to adopt this method, and instead has continued to rely upon a protocol more than 5 years old.

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c. EPA's Model Fails to Consider Ammonia Concentrations

In order accurately to predict visibility impacts, it is essential that a model appropriately consider the degree to which atmospheric chemistry affects the ability of gaseous NO_x to react with airborne particles and convert to particulate nitrates. These reactions depend on the availability of ammonia in the atmosphere, which reacts with NO_x products to form the light extinguishing particles. The EPA model protocol assumes that a constant amount of ammonia is present in the atmosphere to react with NO_x products at all times. However, in reality, there is a strong seasonal variation of ammonia in the atmosphere. In particular, the ambient concentrations of ammonia tend to be lowest during wintertime months, precisely the time when cold meteorological conditions are most favorable to formation of nitrate. In real world conditions, ammonia in the atmosphere comes mostly from biodegradation of vegetation, which occurs in warm months and is limited in reaching the atmosphere by snow cover. Thus, chemical reactions that require the availability of ammonia to form light extinguishing nitrate particles generally is limited, especially when there is snow cover. However, the EPA model protocol assumes that there is a constant supply of ammonia available, and thus predicts that NO_x will continue without limitation to convert into light extinguishing nitrates even when in the real world there is limited ammonia available for the reactions to take place, and thus overstates the visibility impacts that could result.

With respect to Colstrip and Montana, EPA's FIP modeling used monthly varying concentrations of ammonia from 0.98 ppb to 2.69 ppb based on data from Beulah, North Dakota. The model assumes that this amount of ammonia is available everywhere in the modeling domain and is not depleted by chemical reactions. This does not correspond to the real world availability of ammonia in the atmosphere in Montana, and has the result of vastly overestimating the visibility impacts that result from emissions of nitrates in Montana. In the winter, when the temperature favors particulate nitrate formation due to low temperatures, there is almost no ammonia available, especially during any time with snow cover. In addition, any ammonia that is available is likely preferentially to react with SO_2 , and thus does not result in as much light extinction from the formation of nitrates. In the summer, when more people use the parks, visibility impairment is also much lower because NO_x gases do not react to form nitrates in high temperatures, even when ammonia is available in the atmosphere.

Because the EPA protocol assumes that there is always ammonia available (even at monthly concentrations from 0.98 ppb to 2.69 ppb), the modeling will predict formation of nitrates even when in reality there is insufficient ammonia to do so. Corrections to these (and other) issues are available and known to EPA, and new versions of CALPUFF that use much more advanced chemical mechanisms to model the formation of particulate matter, including nitrates, have been created. Indeed, a version of the model was used by the North Dakota Department of Health and submitted to EPA (this modeling work is discussed in greater detail later in this report), which used a technique known as the "ammonia limiting method" to account for real world ammonia concentrations and the corresponding effect on visibility. However, EPA has thus far declined to use protocol updates in its modeling, including the ammonia limiting method, has failed to adopt any of its own advanced chemical mechanisms, and has not provided any justification for its failure to do so.

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d. CALPUFF Use Limited as to Distance

As presently used by EPA, the CALPUFF model assumes that puffs are a coherent air parcel that are transported downwind using a single puff, even though in reality the puff can span many vertical layers and horizontal grid cells with very different wind speeds and wind directions. As a result, as puffs travel with the wind away from their source, the model has a tendency to under predict dispersion and dilution of the puff. As the distance between the location of the source and the target increases, this effect compounds, resulting in increasingly over predicted puff concentrations at greater distances than exist in nature, because the EPA modeling protocol does not allow for the puff splitting effects to be included. CALPUFF allows for rigorous calculations that split the puff into multiple puffs horizontally or vertically based on the meteorological conditions encountered, which better predicts the concentrations and directions of plumes at distances beyond one hour travel times; however, EPA has not approved the use of “puff splitting” in its protocol modeling.

EPA has been aware of these limitations for long distance modeling since as early as 1998. That year, the Interagency Workgroup on Air Quality Modeling (IWAQM) studied the ability of CALPUFF to match measured data from long range transport model experiments (EPA-454/R-98-019, December 1998) (“IWAQM Report”). These experiments were done with non-reacting tracers (gases or particles), and do not test the chemistry mechanisms in the model, instead focusing specifically on the ability of the CALPUFF model to predict plume location and concentration at a distance from emissions sources. IWAQM’s results were as follows:

TABLE 2 Long Range Transport Evaluations

Experiment	Distance	Model Results Errors	
		Angle of Error	Concentration Error
Savannah River	~100 km	25 degrees	1.4 times too high
Idaho Falls	48 km	40 degrees	Two times too high
	90 km	40 degrees	Two times too high
Great Plains	100 km	5 to 20 degrees	2.5 times too high
	600 km	25 degrees	3 times too low

As demonstrated in the chart above, as the distance between the source and the target increases, concentration error increases and the model becomes increasingly inaccurate and imprecise. Due to these findings, IWAQM concluded that CALPUFF could be used to predict concentrations “200 kilometers or less” from the source, but cautioned that: “transport beyond 200 to 300 km should be done cautiously with an awareness of the likely problems involved.” (IWAQM, at page 18). Indeed, IWAQM made clear that “at receptors that were 300 km to 1000 km from the release, CALPUFF tends to overestimate surface concentrations by a factor of 3 to 4.” *Id.*

Despite this caution, and the acknowledgement of *significant* over prediction of effects, EPA continues to use the CALPUFF model to predict very small changes in concentrations of nitrates (from which visibility impacts are then calculated in deciviews) at distances from sources greater than 200 kilometers. With respect to Colstrip, EPA has relied upon the model to predict concentrations at locations up to 300 kilometers or more from the source, resulting in systematic over prediction of nitrate concentrations at target locations. However, EPA has not

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explained how it has mitigated or otherwise accounted for the “likely problems involved” (nor has the Agency provided any justification for why such mitigation is unnecessary).

III. MEASURED VS. MODELED RESULTS - EPA CALPUFF PROTOCOL

a. Comparison of Modeled to Measured Visibility Extinction Outside Montana

The most effective way to test the accuracy and precision of EPA modeling is to compare EPA modeled predictions to measured results. When such a comparison is made, it demonstrates that EPA’s predicted impacts do not correlate with measured impacts. Visibility impairment parameters measured at Federal Class 1 areas for over two decades, and available on the Vista website under the Interagency Monitoring of Protected Visual Environments (IMPROVE) program, measure, among other things, the total sulfate and nitrate particulates in the air over 24 hours (midnight to midnight). These measurements have formed the basis of many comparisons of the modeling protocol to the measured results. These comparisons (detailed below) across many areas of the western US independently demonstrate that the modeling protocol used in EPA’s version of CALPUFF overstates measured visibility impairment resulting from nitrates due to the issues with the protocol described above.

1. Mohave Generating Station

Prior to its closure of the Mohave Generating Station (“Mohave”), EPA’s CALPUFF model predicted that the facility was the cause of visibility impacts of 2.31 deciviews in Grand Canyon National Park. However, when the plant was closed, the visibility at IMPROVE sites in the Grand Canyon National Park as close as 90 kilometers from the facility did not show any change in nitrate concentrations or visibility impacts.

Terhorst and Berkman² analyzed the measured visibility impairment on the Grand Canyon National Park, before and after the closure of the Mohave at the end of 2005. At that time, Mohave had a maximum capacity of 1590 Mw, and was 90 kilometers west of the edge of the park. The study compared measured visibility impairment for the years 2003-2005, the three years prior to shut-down, and 2006-2008, the three years following shut-down. Terhorst and Berkman determined that the differences in measured results prior to and following shutdown for the 3 IMPROVE sites in Grand Canyon National Park, as set forth in Table 3, were so small as to be considered statistically insignificant.

TABLE 3: Before and After Mohave Results - Visibility Impairment in Deciviews

IMPROVE Monitor	2003-2005	2006-2008	Difference
Meadview	8.24	8.23	0
Indian Gardens	8.92	8.86	0.1
Hance Camp	6.54	6.61	-0.14

Meadview is the closest monitor to Mohave; Indian Gardens and Hance Camp are on the South Rim. From these data the authors concluded that the reductions in emissions due to the closing of Mohave effectively were not detectable, even though EPA modeling had previously

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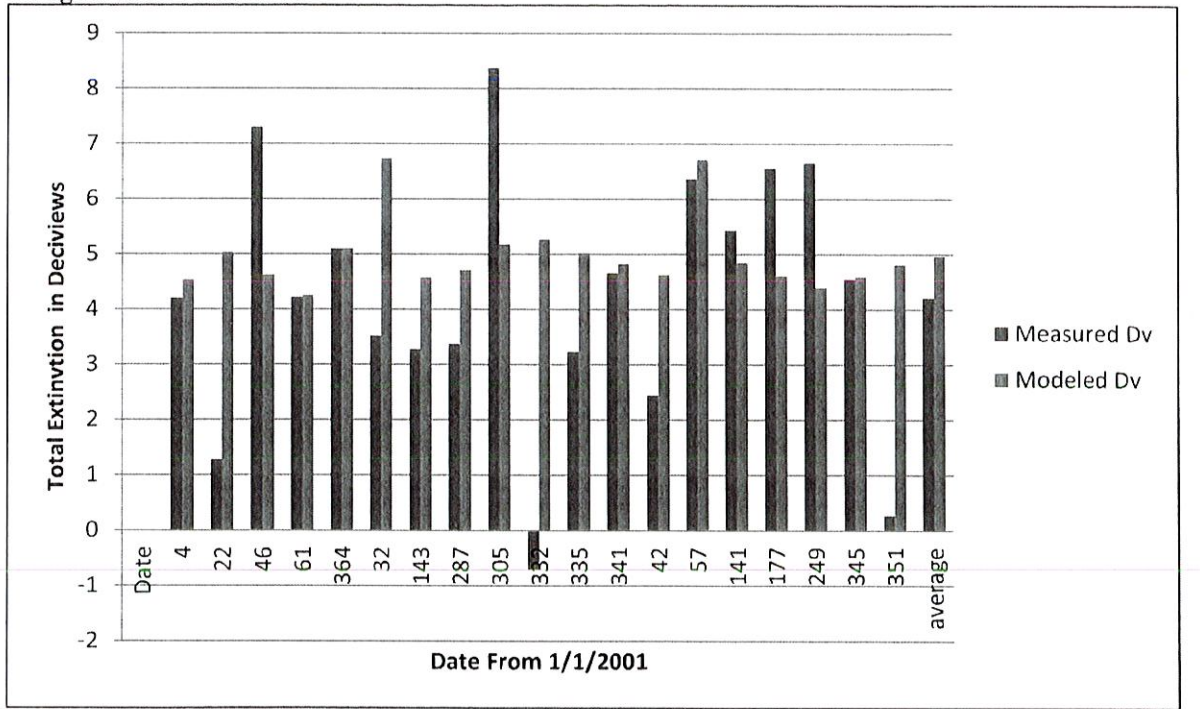
suggested that the impact from the facility on the park was more than two times the level perceptible to the human eye. This result was not unexpected because the results of intensive tracer studies (Project MOHAVE) had shown that the “correlation between measured tracer concentrations and both particulate sulfur and light extinction were virtually nil”. One would expect the same conclusions for nitrates but Terhorst and Berkman did not study nitrates.

However, the models run according to the EPA protocol -- including CALPUFF -- predicted reductions of 1.3 to 5.0% at the western edge of the park and 0.5 to 2.6% reductions at the South Rim. Indeed, the CALPUFF model analysis³ presented to the State of Nevada in 2008 using the EPA protocol for the pre-closing emissions showed a maximum visibility impairment of 3.94 deciviews over 3 years, and a 98% visibility impairment of 2.31 deciviews for Mohave. This comparison of modeled to measured values demonstrates both the over predictive nature of EPA modeling, and diminishes its reliability to be used to justify EPA’s BART decisions.

2. Craig Station

Craig Station is about 90 kilometers west of the Mt. Zirkel Wilderness Area in northwestern Colorado. In the development of the Colorado regional haze SIP, a study⁴ was completed to evaluate the protocol model performance against IMPROVE data at Mt. Zirkel. The study compared modeled impacts from Craig Station on the 25 highest days submitted by Colorado, against IMPROVE data demonstrating the measured impact of *all* sources (including those outside the state) upon the park. The comparison is shown in the following Figure 3:

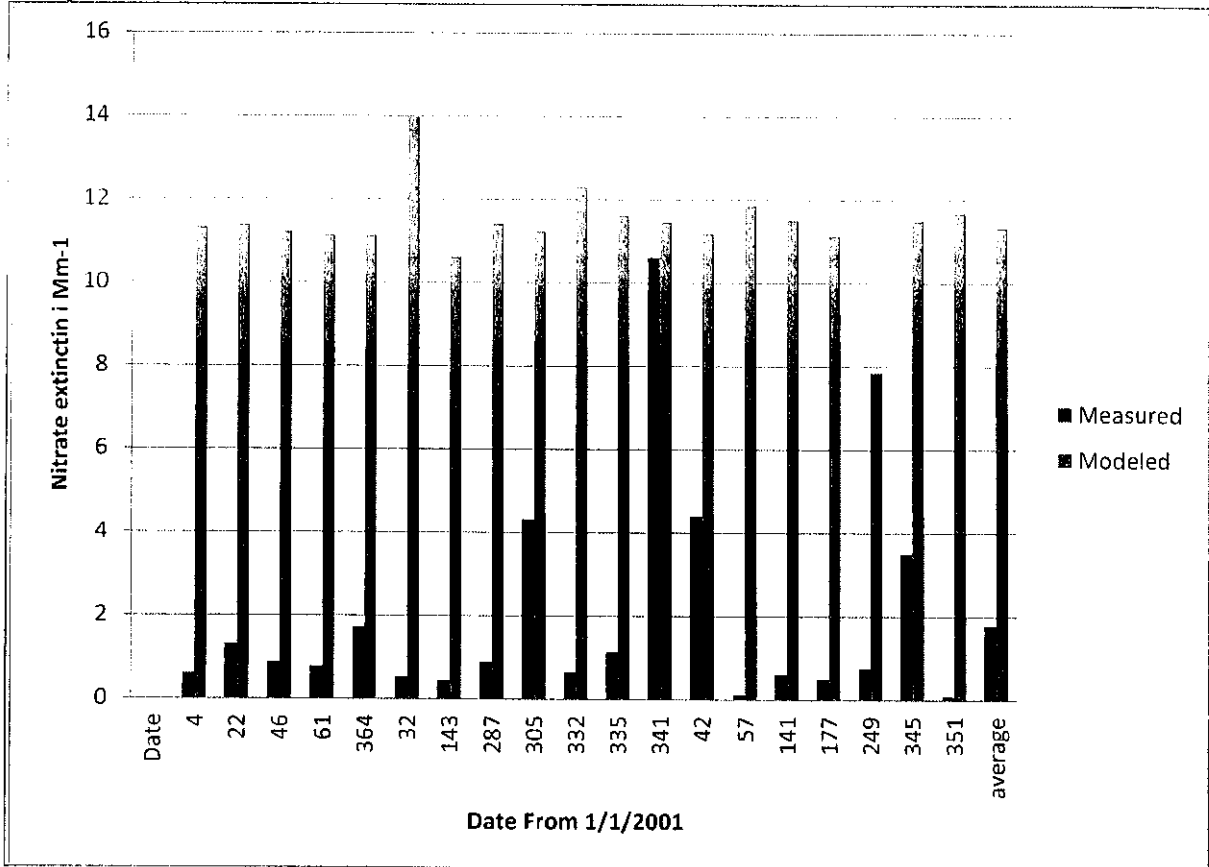
FIGURE 3: Total Extinction for Simultaneous Measured versus Modeled Days at Mount Zirkel for Craig Station: 2001-2003



As demonstrated in Figure 3, although the measured impacts at Mount Zirkel include all sources -- including mobile and point sources, and those from within and outside of the state, etc. -- the protocol model predicted that emissions from Craig Station alone would result in visibility impacts that exceeded the measured value of all sources (including Craig Station) on 14 of the 19 days, and on some of those days by significant amounts. This exceedence is particularly pronounced considering that the modeled impact of Craig Station excludes any assessment of impacts from Hayden Station, which is located between Craig and Mt. Zirkel (closer to the Class 1 Area). This analysis is based on the assumption that the Mt Zirkel IMPROVE monitor is reflective of the peak impacts within the Class I area.

The limits of the model are further emphasized through a comparison of nitrate contribution shown in Figure 4.

FIGURE 4: Nitrate Extinction: Simultaneous Measured versus Modeled days: Mount Zirkel for Craig Station 2001-2003



In this comparison, the model predicted nitrate extinction from Craig Station *alone* exceeds measured nitrate extinction from all sources combined on every one of the nineteen days. The average difference was 9.56 inverse megameters, with predicted values roughly ten times above measured. This demonstrates that the protocol model cannot be relied upon to make distinctions of 0.1 deciviews for nitrate formation.

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3. North Dakota SIP Protocol

In order to correct for known concerns with the protocol CALPUFF model and accurately estimate the impacts of sources within the state on Class I Areas, the North Dakota Department of Health (NDDH) prepared a State Implementation Plan (February 24, 2010)⁶ that modeled visibility impacts for all sources of emissions affecting Class I Areas within the state. Specifically, NDDH used Western Regional Air Partners (WRAP) data to calculate the impacts of sources outside of the State of North Dakota and non-utility sources inside the State, as well as CALPUFF to determine the impacts of utility sources inside the State.

In addition, in calculating the impacts of utility sources within the state, NDDH used state-of-the-art modifications to the CALPUFF model, which have been developed and demonstrated as effective since the 2005 protocols were developed. These new methods were implemented by NDDH in order to address a number of concerns with the model and improve accuracy and precision discussed above, including:

- Weather
 - Use of a newer National Weather Service forecast model to improve weather data in the system.
- Impacts from Other States
 - Use of CMAQ model to appropriately consider boundary conditions (what pollutants are coming into the grid); EPA's current protocol assumes zero impacts from outside the boundary.
- Concentrations of Ammonia
 - Use of hourly average ammonia concentrations rather than an annual average value; nitrate formation is enhanced by ammonia, and EPA's model fails to account for low ammonia concentrations in winter when most nitrates form.
 - Use of the "ammonia limiting method," which prevents the model from using the same ammonia multiple times to form nitrates. Studies of the efficacy of the ammonia limiting method in Wyoming have shown that the nitrate generation rate is three times too high when using a constant background of ammonia.⁷
- Distance and Wind
 - Use of puff splitting, which accounts for puffs spreading out in the vertical or horizontal directions as they move further from the source; EPA's modeling does not allow puff splitting.
 - Use of diffusion coefficients based on the actual measures of turbulence in the atmosphere. The protocol modeling requires use of the 1952 derived Pasquill-Gifford diffusion coefficients.

Having made these enhancements to the CALPUFF model, NDDH tested the model's performance against the measured IMPROVE data from the Theodore Roosevelt National Park (South Unit). The results of this comparison are shown in Table 4:

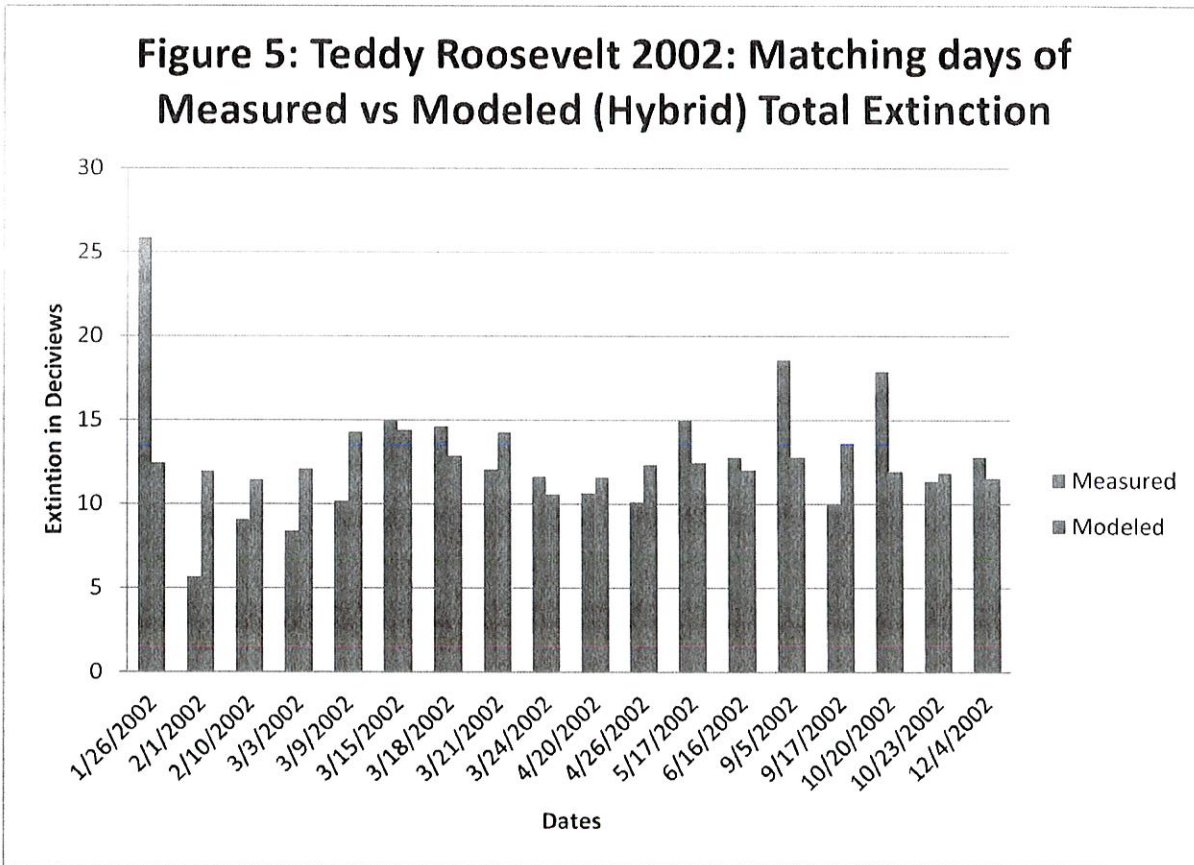
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TABLE 4: NDDH Comparison

Theodore Roosevelt South Unit	Observed ($\mu\text{g}/\text{m}^3$)	Predicted ($\mu\text{g}/\text{m}^3$)
98 th percentile	2.03	2.06
90 th percentile	1.21	1.21
Average of 20% Worst Days	1.42	1.41
Annual Average	0.53	0.53

As a demonstration of the correctness of the NDDH model results, Figure 5 shows the day by day comparisons with IMPROVE measured data at Theodore Roosevelt National Park.

FIGURE 5: Teddy Roosevelt 2002: Matching Days of Measured vs Modeled (Hybrid) Total



This comparison demonstrates that when the considerations above are taken into account in the CALPUFF modeling protocol used by EPA, measured and modeled impacts are much more closely aligned, and supports the conclusion that the problem with comparisons of the protocol modeling to measured data is the protocol itself and not the CALPUFF model. Still EPA has insisted that that the protocol model be used without any of these known enhancements to set requirements for BART. If the January 26th outlier is removed, the average difference between measured and modeled is 0.37 inverse megameters and the standard deviation is 12.6 inverse

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megameters. This means that even with substantial corrections to the protocol modeling, CALPUFF can get no closer than an average of 0.39 deciviews, which is well above 0.1 deciviews. The modeling, even when brought to the state-of-the-art science, is not sufficiently precise to make decisions based on differences of 0.1 deciviews.

U.S. EPA Region 8 responded to the NDDH SIP “hybrid” modeling in its Proposed FIP.⁸ Appendix B of that document contains a compilation of the protocol modeling for the various BART sources in North Dakota, and the results are cited in the proposed FIP as being accurate according to the BART Guidance and thus valid for use in the FIP. EPA’s comments do not state that the updated CALPUFF modeling used by NDDH is wrong or incorrect, but instead indicate that the modeling completed by NDDH should not be used for unspecified reasons. Also included in Appendix B is a memorandum from the Region 8 Regional Modeler, Gail Tonnesen, which asserts that NDDH’s modeling is not germane to EPA’s process because it evaluates current BART source impacts along with all other sources of visibility impairment rather than evaluating BART source impairment against the natural background visibility impairment as required by the protocol. However, the memo failed to address the validity or accuracy of NDDH’s modeling.

b. Comparison of Modeled to Measured Visibility Extinction at Colstrip

Analyses of measured versus modeled visibility impairment have been performed for Colstrip Units 1 and 2, and these comparisons demonstrate that defects in EPA’s CALPUFF model as described above raise significant concerns about EPA’s reliance upon the model to predict visibility impacts from Colstrip Units 1 and 2. Of particular significance when predicting the impacts of Colstrip is that the distance between the plant and the Class I Areas at issue are much larger than the other areas discussed above, and each of the Class I Areas allegedly affected by Colstrip is located in a different wind direction. As a result, due to the inability of the model accurately to predict impacts further than 200 kilometers from the source, EPA’s use of the model raises significant questions about the reliability of its predictions. In addition, EPA’s failure to consider ammonia availability or input the “ammonia limiting method” has particular impacts on an assessment of visibility in Montana, as it excludes consideration of seasonal snowfall (which results in very low levels of ammonia during the winter, when nitrates are most likely to form). Taken together with the other concerns set forth above, it is clear that EPA’s reliance on the model to predict visibility impacts from Colstrip on Class I areas up to 300 kilometers from the facility with its inadequate protocol is scientifically unsupportable; however, EPA has thus far failed to include (or explain its failure to include) known upgrades to the model that would increase the precision and accuracy of predicted visibility impacts.

The analyses set forth in this section compare measured visibility impacts from all sources at each of the four Class 1 areas for the years 2001-2003, and 24-hour average (midnight to midnight) modeled results for the Colstrip emissions during that period (2001-2003) (*See Regional Haze Modeling Assessment of Colstrip Generation Station*, TRC 2012). Current emissions and emissions with controls are lower than the 2001-2003 emissions. In order to assess more completely the visibility impairment contributions of the Colstrip facility, it is appropriate to run the model to take account of the hour-by-hour variations in the wind flow and track emitted haze-causing pollutants and the subsequently created haze particles.

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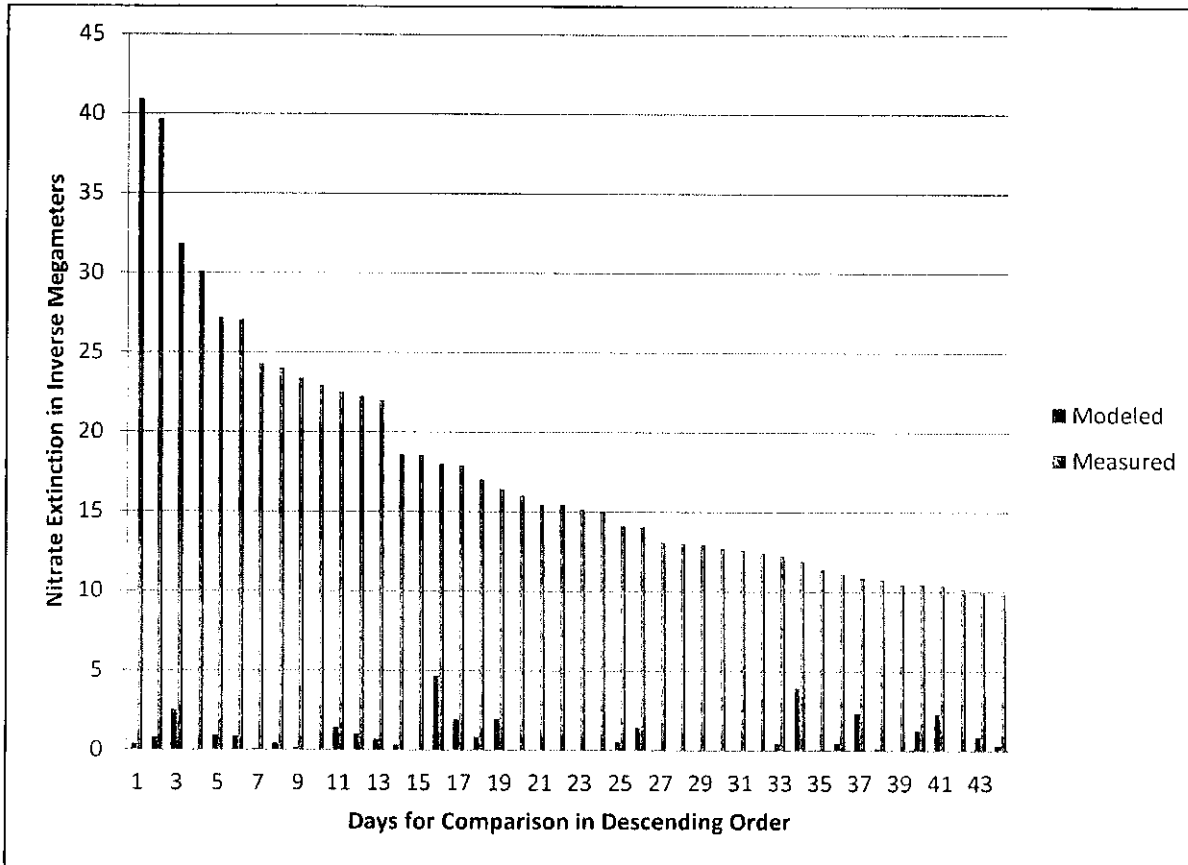
The comparisons in this section utilized the CALPUFF model with EPA Protocol. The SO₂, NO_x, and particulate matter emissions from all four Colstrip units were entered into CALPUFF using the baseline, pre-BART SIP emissions. The model yields results at each Class I Area on each day. These data were aligned with the measured data (every third day) for the purpose of the comparisons. The results of these comparisons are described for each Class 1 area separately.

The comparisons are made for the worst 20% measured days, and worst 20% modeled days (where a corresponding measurement exists). With respect to the worst 20% measured days, as depicted in the figures below, the comparison of modeled and measured impacts on those days demonstrates two points: 1) that for each of the worst 20% measured days Colstrip is a very minor contributor to overall visibility impacts; and 2) that modeled impacts from Colstrip appear to have no correlation whatsoever with the measured impacts for all sources, indicating that the model is unreliable and that Colstrip likely is not a cause of visibility impacts. With respect to the worst 20% modeled days, the comparison of measured to modeled values demonstrates that the model frequently over predicts visibility impacts, because the model regularly predicts that Colstrip alone results in greater visibility impacts than all measured sources (including Colstrip) for those days.

1. Theodore Roosevelt National Park

The comparisons of modeled and measured data for nitrates at Theodore Roosevelt National Park are depicted in the next two figures.

FIGURE 6: Nitrate Measured versus Modeled on Worst 20% Measured Days at Theodore Roosevelt IMPROVE Site



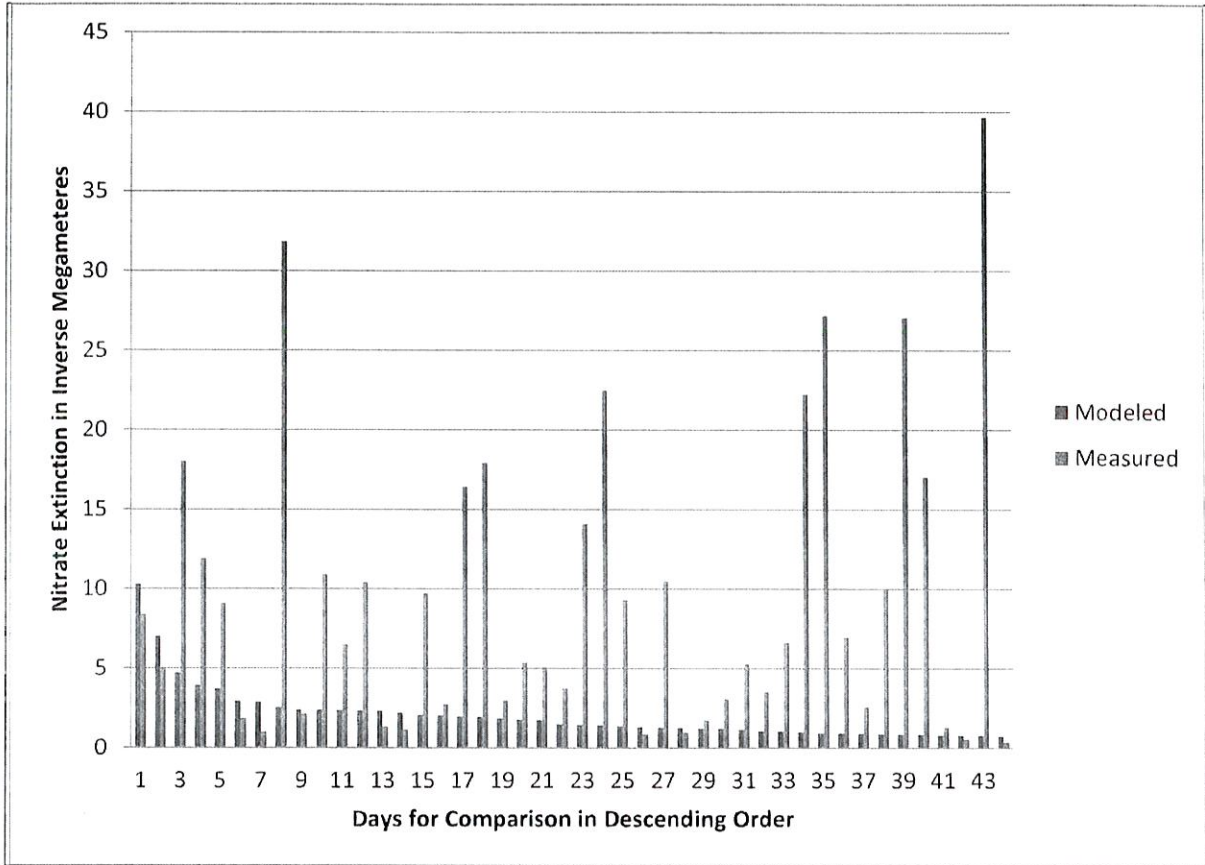
The comparison of these data demonstrates two concerns with the predicted impacts modeled by the EPA method. First, on none of the worst 20% of days are the impacts of nitrates from Colstrip *alone* a cause of more than 5 inverse megameters (-5.9 deciviews), which translates into an effect of less than zero deciviews and no perceptible impact on visibility. As a result, even as modeled under the EPA method, Colstrip cannot be determined to be a cause of visibility impairment at Theodore Roosevelt due to NO_x emissions.² Second, modeled nitrates from Colstrip do not appear to have any correlation to measured results, and predicted increases and decreases at Colstrip on certain days do not appear to have any corresponding increases or decreases in measured impacts, which would suggest that Colstrip does not in fact have any impact on the total measured nitrates in Theodore Roosevelt National Park.

This conclusion is further supported by the results when we evaluate the worst 20% modeled days (Figure 6 was the worst 20% measured days).

² The maximum measured extinction is 40.9 inverse megameters (14.1 deciviews) while the maximum modeled extinction is 4.7 inverse megameters (-7.6 deciviews) and these occur on different days. On average, the measured data is 17.7 inverse megameters (5.7 deciviews) of extinction while the average modeled extinction is about 10.1 inverse megameters (0.1 deciviews).

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FIGURE 7: Nitrate Measured versus Modeled on Worst 20% Modeled Days at Theodore Roosevelt IMPROVE Site

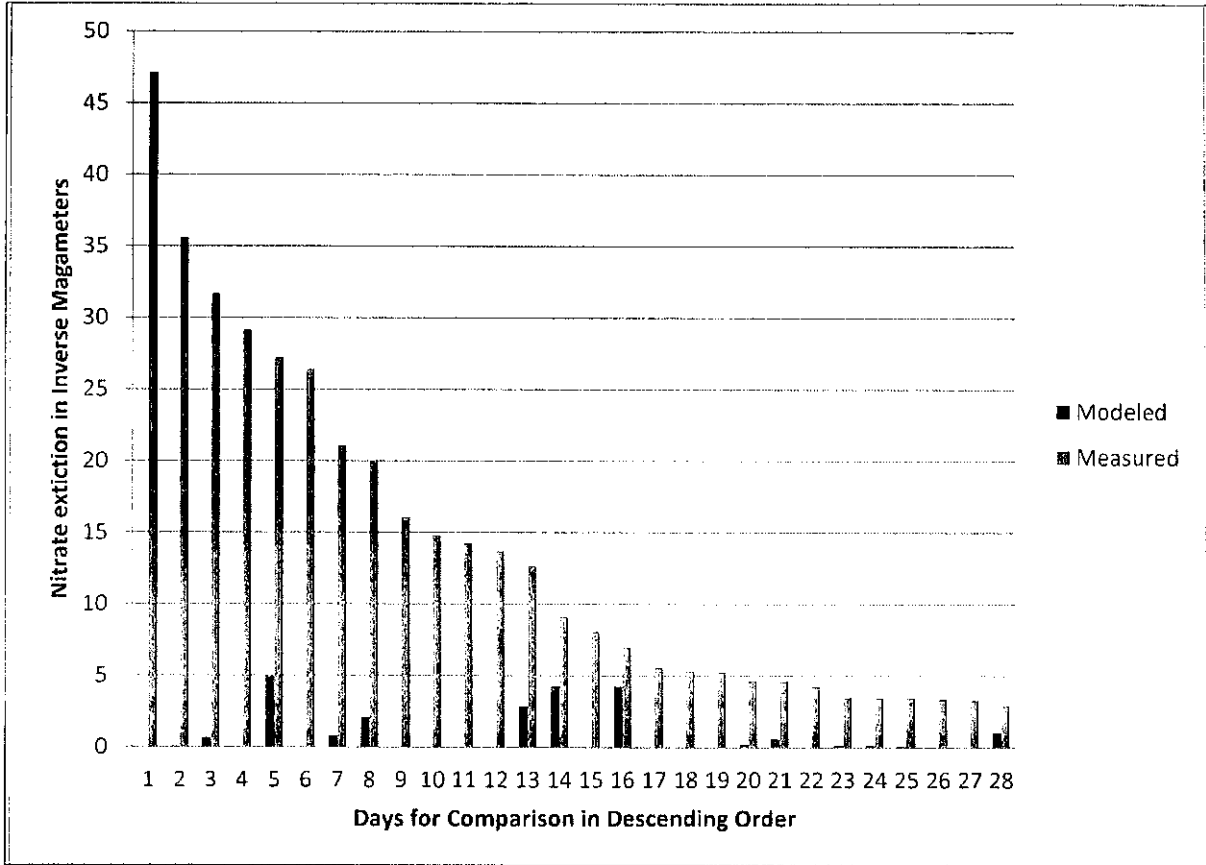


This comparison shows that on the highest two modeled days (and 9 other days) the model predicts higher nitrate extinctions at the Park from Colstrip *alone* than were actually measured from *all sources taken together*. This occurs despite the fact that it is known and recognized by EPA that there are other contributing stationary sources in Montana, in other states, and in Canada, as well as uncontrolled sources. This demonstrates that the CALPUFF model protocol leads to over prediction of nitrate extinction.

2. UL Bend Wilderness Area

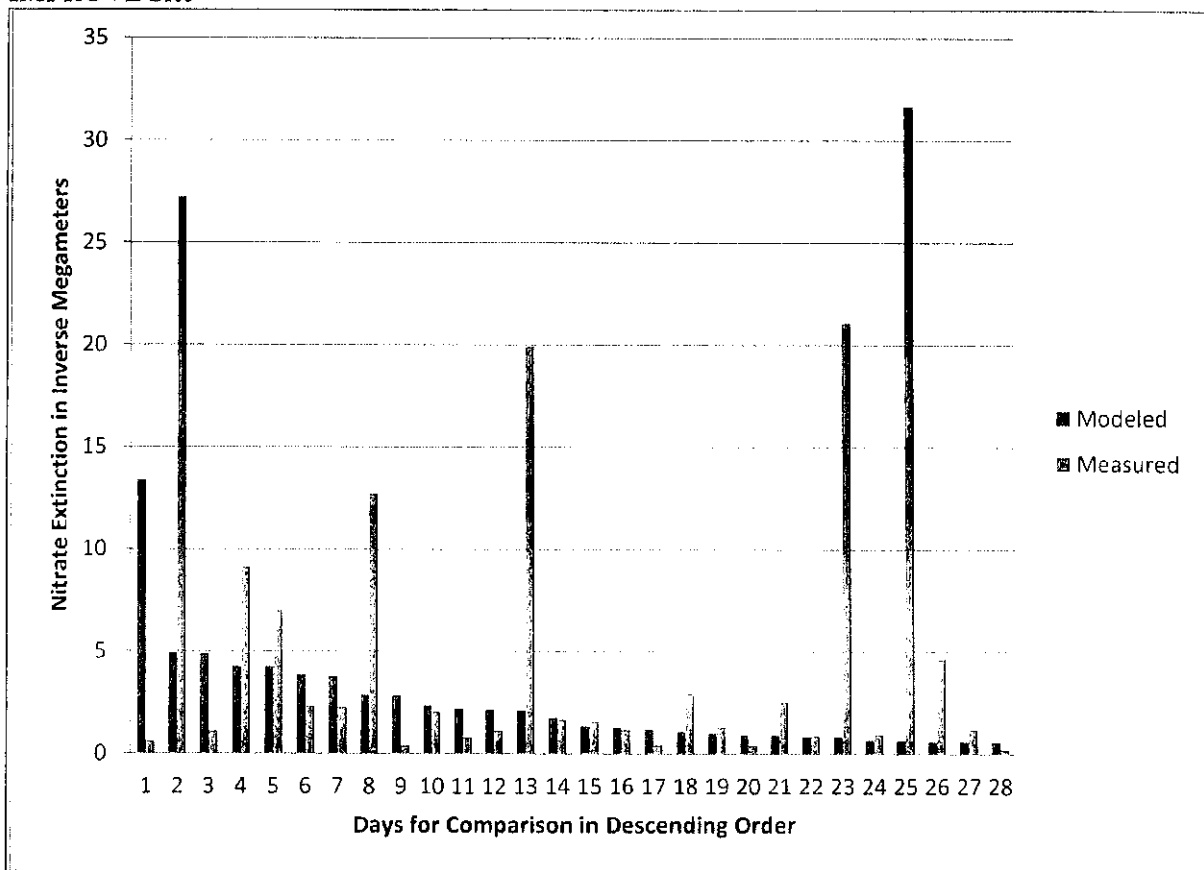
At the UL Bend Wilderness Area, almost precisely the same results and the same corresponding conclusions are presented in Figures 8 and 9. On the worst case measured days (Figure 8), even impacts modeled with EPA's over predictive protocol demonstrate that Colstrip is not responsible for perceptible visibility extinction, and on the worst case modeled days (Figure 9) the nitrate contribution of Colstrip is over predicted on many days.

FIGURE 8: Nitrate Measured versus Modeled on Worst 20% Measured Days at UL Bend IMPROVE Site



The model results for these days show that the contribution of Colstrip is minimal -- no more than 5 inverse megameters (-6.9 deciviews) on each of these days.

FIGURE 9: Nitrate Measured versus Modeled on Worst 20% Modeled Days at UL Bend IMPROVE Site

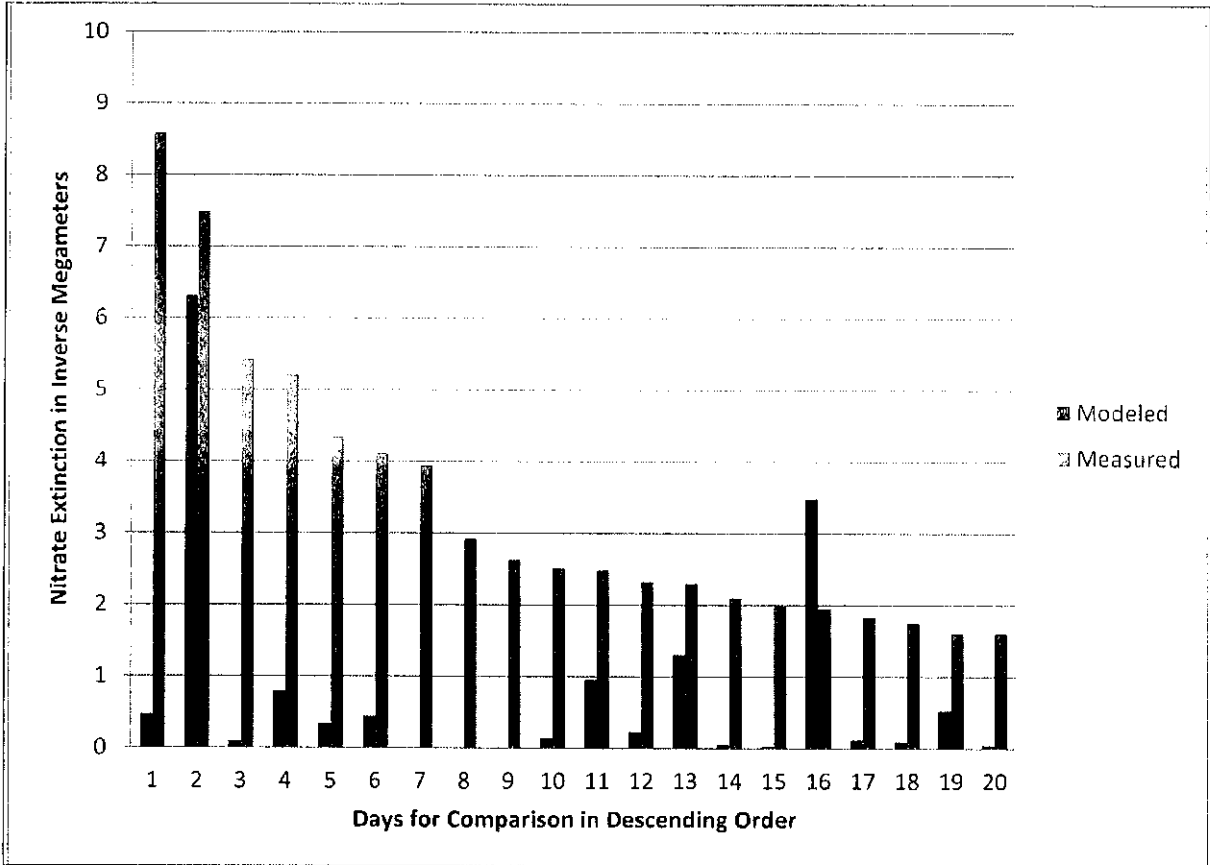


There are 11 days in this comparison where the Protocol CALPUFF modeling for Colstrip alone exceeds the actual measured data for all sources.

3. North Absaroka Wilderness Area

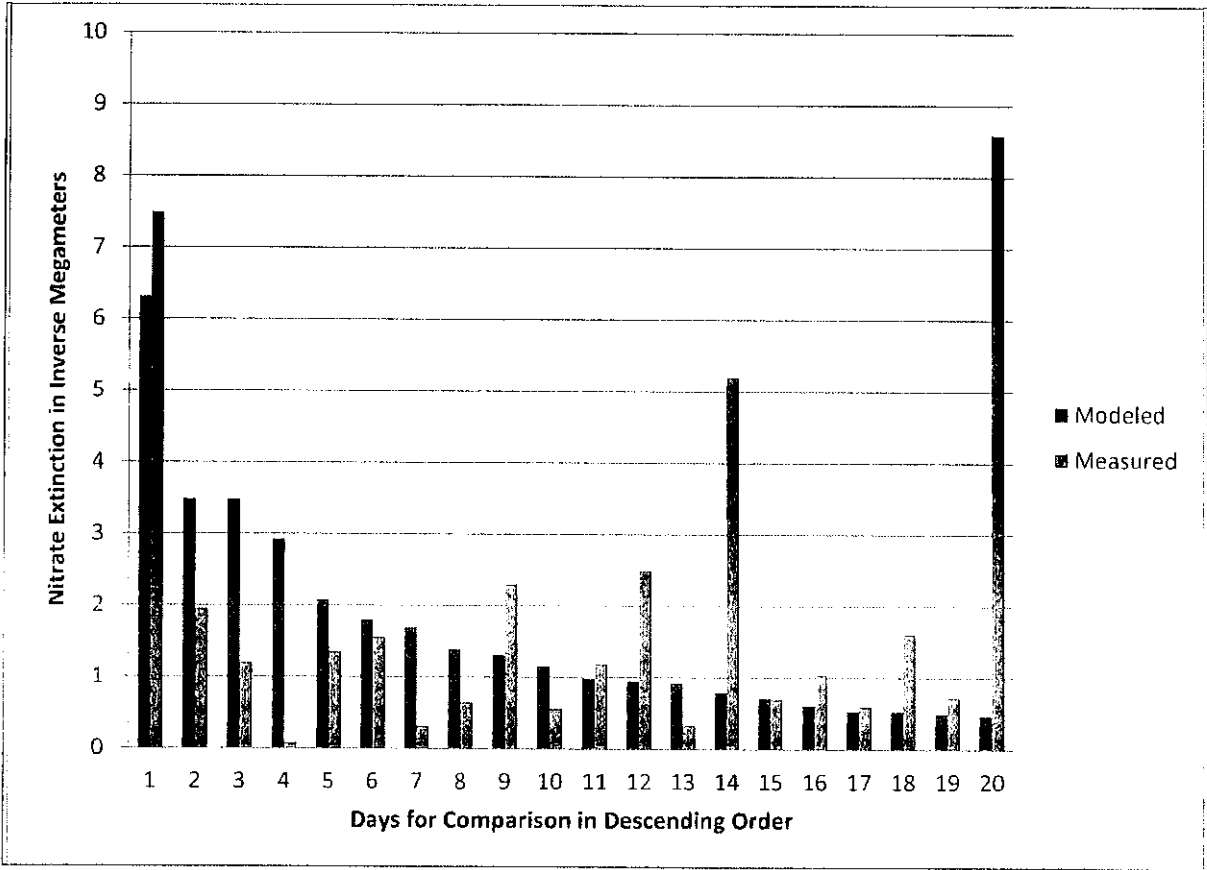
At the North Absaroka Wilderness Area the results of the same analysis are shown in Figure 10 and 11. On the worst case measured days (Figure 10), even impacts modeled with EPA's overpredictive protocol demonstrate that Colstrip is not responsible for perceptible visibility extinction, and on the worst case modeled days (Figure 11) the nitrate contribution of Colstrip is over predicted on nine of the 20 days.

FIGURE 10: Nitrate Measured versus Modeled on Worst 20% Measured Days at North Absaroka IMPROVE Site



The same pattern emerges for North Absaroka with the exception that for one day the measured and modeled are close and for one day the modeled exceeds the measured. Again, Colstrip is the only source considered, even though we know in fact that there are other stationary and area sources that contribute emissions.

FIGURE 11: Nitrate Measured versus Modeled on Worst 20% Modeled Days at North Absaroka IMPROVE Site

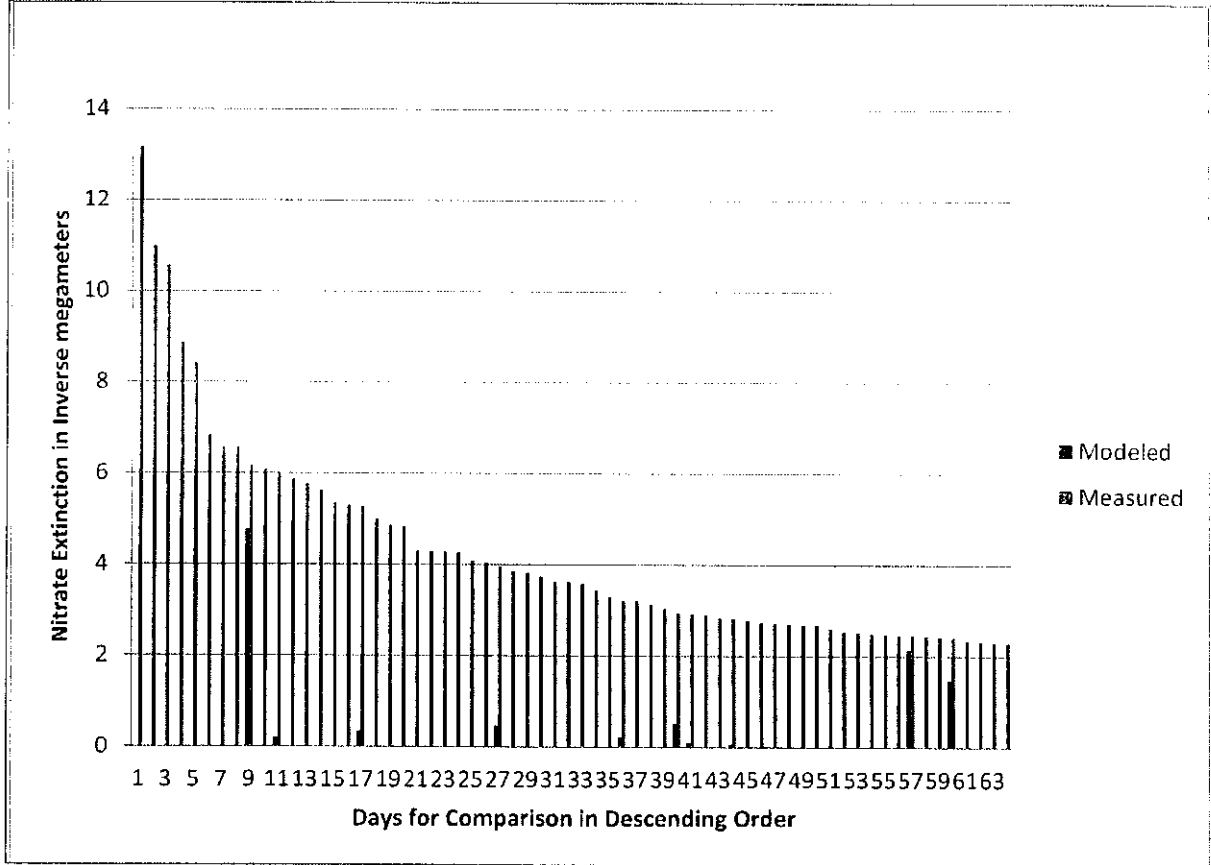


At North Absaroka there are nine days when the modeled exceeds the measured.

4. Yellowstone National Park

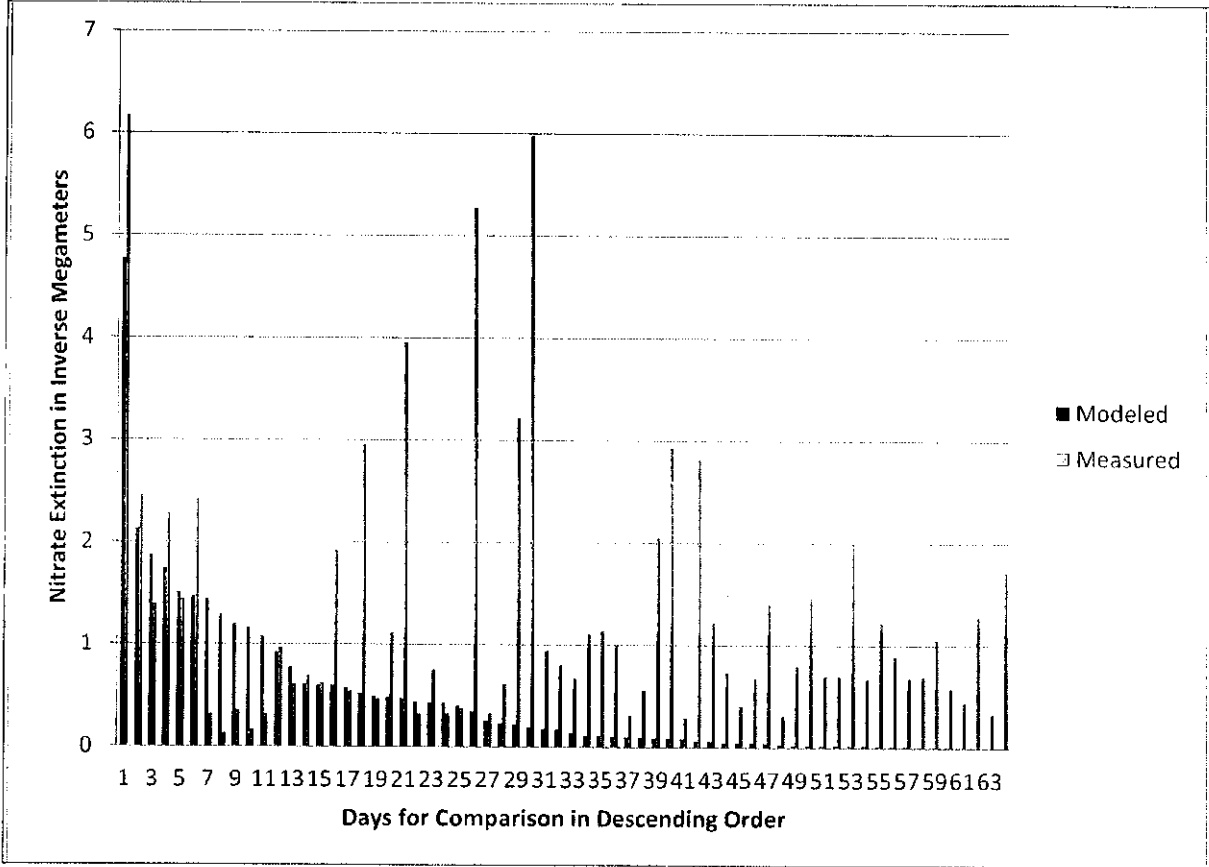
The same analysis has been done for Yellowstone National Park and the results are presented in Figures 12 and 13. On the worst case measured days (Figure 12), even impacts modeled with EPA's over predictive protocol demonstrate that Colstrip is not responsible for perceptible visibility extinction, and on the worst case modeled days (Figure 13) the nitrate contribution of Colstrip is over predicted on many days.

FIGURE 12: Nitrate Measured versus Modeled on Worst 20% Measured Days at Yellowstone IMPROVE Site



There are only three days among the 64 worst 20% of days at Yellowstone when the Protocol Model shows more than insignificant contribution. Even on those three days the contribution is well less than 0.1 deciviews (10.1 inverse megameters).

FIGURE 13: Nitrate Measured versus Modeled on Worst 20% Modeled Days at Yellowstone IMPROVE Site

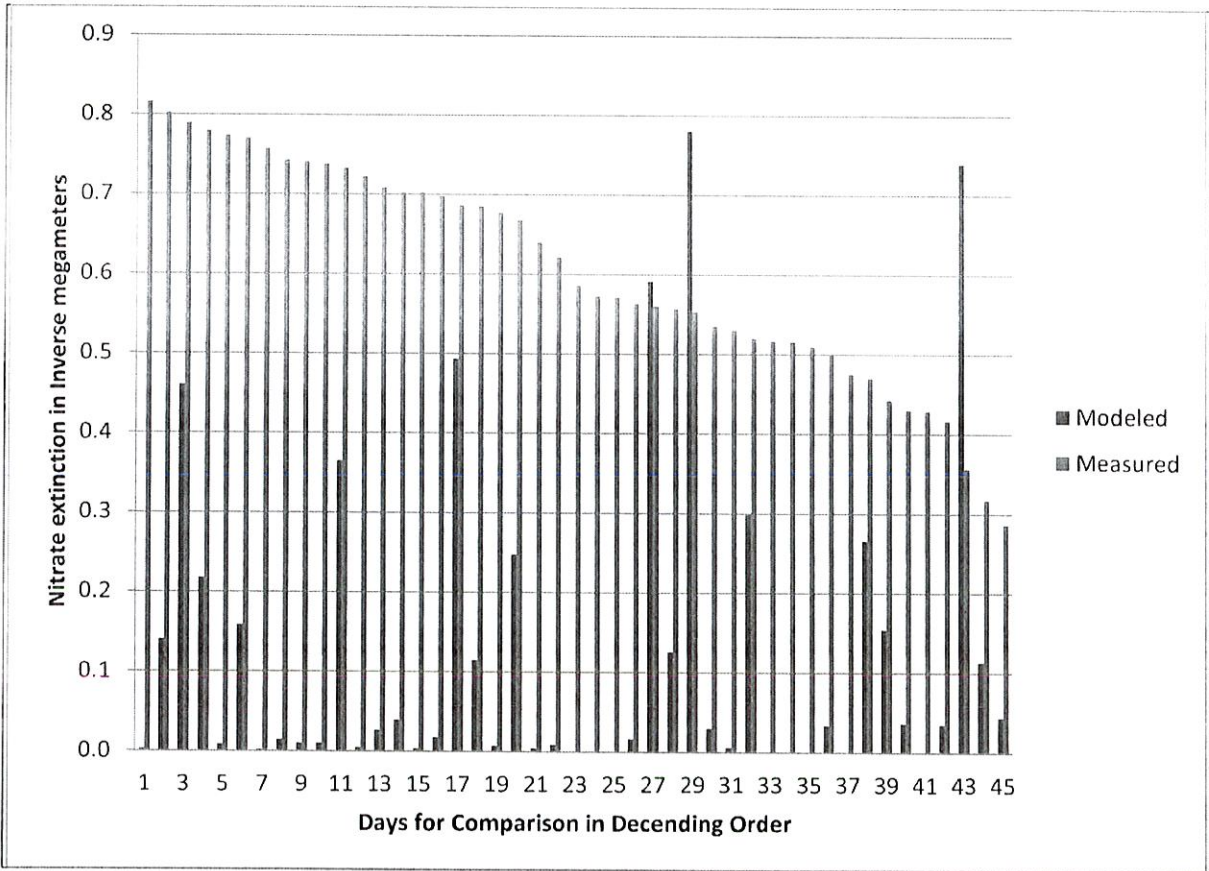


At Yellowstone there are 10 days when the modeled extinction exceeds the measured data. Again, only Colstrip emissions are considered. Thus, the modeled results for Colstrip *alone* over predict the measured nitrates on those days.

5. Comparison to 20 % Best Days

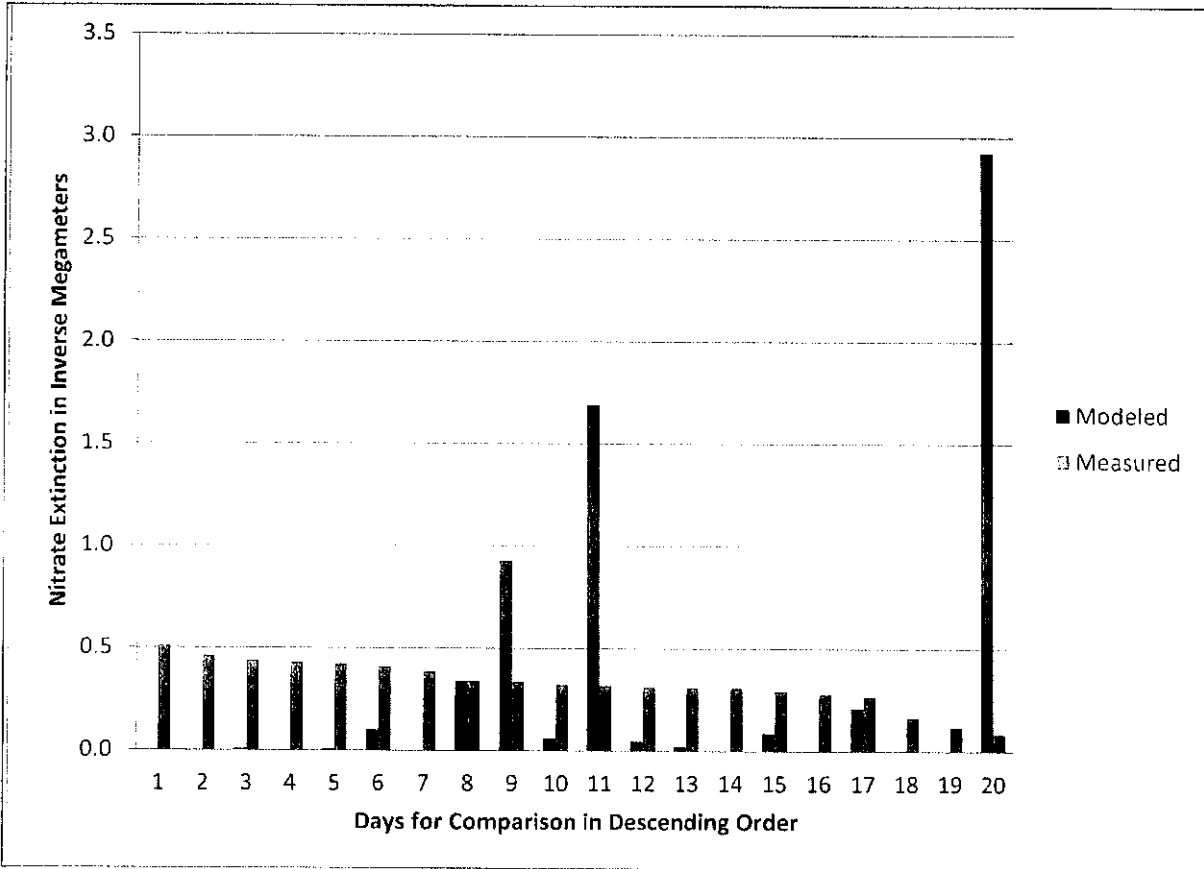
The comparisons above have focused on the Worst 20% days for the reason that the best 20% days are not very instructive about the model performance. The Best 20% modeled days have no impact at any of the individual Class I areas. That is because, on the Best 20% days, the wind is not flowing toward that Class I area and thus the model calculates zero impact. On the other hand, EPA's model continues to predict that there will be some impacts on the Park, demonstrating the inability of the model accurately to predict the impacts of wind and other factors. As an example Figure 14 is for Theodore Roosevelt National Park.

FIGURE 14: Nitrate Measured versus Modeled on Best 20% Measured Days at Theodore Roosevelt IMPROVE Site



It is important to recognize the scale of these data is all less than 1 inverse megameter. There are three days when the Protocol Model over-predicts the measured data demonstrating that the model is over predicting the impact of Colstrip because there are other sources that contribute.

FIGURE 15: Nitrate Measured versus Modeled on Best 20% Measured Days at North Absaroka IMPROVE Site



The result is the same, the model over-predicts three times and is equal to the measured on a fourth. The nitrate extinction is also very low for this site on the best days.

IV. CONCLUSIONS

The CALPUFF modeling using the EPA protocol has been demonstrated through comparison to actual data to yield over predictions from 2 to 10 times the actual measured nitrates at Class I areas across the West. This combined with EPA's use beyond the minimally reliable distance of 200 kilometers, means that the EPA modeling protocol is not sufficiently accurate to make determinations of deciview differences of 1 deciview much less 0.1 deciview.

The summary of conclusions of the comparisons set forth in this report can be described as follows:

- On the Worst 20% modeled days, the Protocol Model over predicts the measured data on enough days to conclude that the model will consistently over predict visibility based on nitrates.
- On the Worst 20% measured days the Protocol model predicts very little actual measured impact from Colstrip. This leads to the conclusion that reductions in NO_x emissions will not lead to any significant reduction in nitrate extinction at any of these Class I areas.
- Because these comparisons were done with 2001 to 2003 emissions from Colstrip and the current actual emissions are lower, the ability to affect the nitrate extinction at the Class I areas is even lower than the analyses presented here indicate.
- There are many other sources that are clearly making contributions (based on the WRAP studies), especially to the Worst 20% days. The comparison between modeled impacts from Colstrip alone versus measured impacts from *all* sources further demonstrates that the effect of reductions at Colstrip will not lead to significant improvements in nitrate extinction at any of these Class I areas.
- This analysis provides a look at the light extinction before the application of any further controls to Colstrip. After application of these controls, no real progress toward reducing light extinction at the Class I areas will be made. On top of that, this analysis still has overestimated the impact from Colstrip because the Protocol adopts methodologies that have been shown above to be incorrect, over predictive and not consistent with the measured data.

The results described above can also be summarized in the following Table.

TABLE 5: Worst Case 20% Modeled Average Nitrate Extinction

	Measured		Modeled		Modeled Percentage
	Inverse Megameters	Deciviews	Inverse Megameters	Deciviews	
Theodore Roosevelt	9.47	<0.0	2.03	<0.0	21.5%
UL Bend	5.69	<0.0	2.43	<0.0	42.7%
North Absaroka	2.00	<0.0	1.63	<0.0	81.6%
Yellowstone	1.31	<0.0	0.50	<0.0	38.2%

For the modeled worst case nitrate extinction days the measured data are very low and the modeled results show a substantially larger percentage of Colstrip impact, which reflects the over prediction in the model. In every case, the nitrate extinction is well below zero deciviews.

Control, or further control, of NO_x emissions from Colstrip will have essentially no impact (less than measurable or visible) on reducing nitrate extinction in the Class I areas.

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COMMENTS OF THE ARKANSAS AFFORDABLE ENERGY COALITION
FEBRUARY 2, 2018

REVISIONS TO THE ARKANSAS STATE IMPLEMENTATION PLAN
REGIONAL HAZE SIP REVISION FOR 2008-2018 PLANNING PERIOD

EXHIBIT C-2

McNider, R., Inadequacy of CALPUFF and CALMET Protocols for Visibility
Impact Analysis in the Arkansas RHR FIP, July 13, 2015

EXHIBIT C-2

July 13, 2015

Inadequacy of CALPUF and CALMET Protocols for Visibility Impact Analysis in the Arkansas RHR FIP

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EXECUTIVE SUMMARY

The spread rate of plumes in the atmosphere at distances beyond 10-20km are determined by physical processes which are not fully included in the CALMET/CALPUFF systems under the EPA modeling protocols employed in the Arkansas RHR FIP. For transport distances 10-100km in the real atmosphere intermediate scales of motion between those of weather systems and boundary layer turbulence determine plume spread. Plume growth studies near Nashville as part of the Southern Oxidant Study showed that inclusion of these intermediate scale motions and actual boundary layer shear produced plumes two to three times wider than when these intermediate scales are not included. These intermediate scales of motion and associated shear are not fully incorporated in models such as CALMET/CALPUFF. Evaluations by the Interagency Working Group on Air Quality modeling show that models consistently overestimate concentrations by a factor of 2-3 at distances 40km-100km and hence visibility impacts under the Arkansas FIP. This is consistent with the Nashville plume studies and points to the omission of these intermediate scales in CALMET/CALPUFF as the reason for the over-prediction of concentrations.

At distances 100-300km and beyond under light to moderate winds, plumes are likely encounter a day to night transition. As is well known in the literature, the overnight period includes decoupling of the upper part of the boundary layer which substantially distorts the plume through shear. Models that don't include this process will underestimate plume widths by factors of 5-10. The CALMET/CALPUFF systems without plume splitting ignore this fundamental process for controlling plume growth for plume travel times beyond 10-12 hours. The developers of CALPUFF also indicated that for such conditions that the plume splitting is needed. Based on transport times calculated for most of the Class I areas impacted by the energy production facilities in the Arkansas FIP, plumes will likely encounter this evening transition. Thus the modeling protocols used in the FIP are deficient in addressing these real conditions.

While tools like CALMET and CALPUFF using the restrictive EPA protocols may be useful for screening activities to test changes of 1 to 2 deciviews they are not appropriate for final regulatory actions involving billions in control cost and fractions of deciviews. The present protocols are drastically overstating the benefit of the controls because the concentrations predicted by the models impacting deciviews are being overstated substantially. In fact, the relatively small deciviews changes (especially when reduced by a factor of 2-10 due to model overestimation) are essentially insignificant and the impact of controls will be indiscernible in the real atmosphere.

EXHIBIT C-2
Exhibit 20

1. Introduction

EPA has proposed a Federal Implementation Plan (FIP) to address Regional Haze Rules for Arkansas that will entail significant costs to energy producing facilities that may exceed \$2.5 billion. It is the purpose of this brief technical report to examine whether the modeling systems used in the FIP have included the appropriate physical mechanisms that control plume growth rates at distances beyond 100km which is the distance between the energy production facilities and the visibility receptor sites.

The models that EPA used are the CALPUFF dispersion and chemistry model (Scire et al. 2000) driven by the CALMET meteorological model. These models have been developed by the air quality consulting community in conjunction with EPA to address point source air quality impacts for transport distances beyond 50km where the traditional steady state Gaussian models originally used for regulatory purposes are no longer applicable because of temporal and spatial variations in the meteorological and chemical regimes. Though they have been utilized in regulatory settings, the protocols have not been validated (Hoffnagle 2012) and the protocols and model versions used by EPA in the Arkansas FIP are out of date compared to current versions of these models and improvements made in the CALPUFF models since 2007 (see Hoffnagle 2012).

Previous attempts at evaluation of the models by the Interagency Workgroup on Air Quality Modeling (IWAQM) found consistent over-prediction (IWAQM 2005) at distances beyond 50 km. Hoffnagle 2012 also demonstrated that in evaluations of the protocols and models under the IMPROVE program that the models had significant error and overestimation of visibility impacts.

Here we describe the physical processes that are not adequately included in either the CALMET framework or the CALPUFF regulatory protocols that are likely a major source of the model and observational discrepancies found by the IWAQM and Hoffnagle . These processes are well understood by the meteorological community including the developers of CALPUFF but have not been included in the EPA BART protocols. Because they are such an endemic component of point source, impacts they cannot be ignored especially in the magnitude of the regulatory cost impacts in the Arkansas FIP.

2. Plume Growth Rates in Long-range Transport

A fundamental factor in the impact of point sources on pollutant concentration or visibility is the rate of dispersion or spread of the plume. Underestimation of plume growth rates leads to over-prediction of plume concentration and visibility impacts. Historically in near point source modeling (<20km) considerable attention was given to the role of boundary layer turbulence in controlling plume growth. (Boundary layers are the part of the atmosphere which is turbulently connected to the surface). The spatial size of turbulent fluctuations which cause mixing in the boundary layer are generally less than a kilometer or so. The size of the fluctuations is much bigger in daytime boundary layers than in nighttime boundary layers. In CALPUFF there are several different options for specifying this boundary layer turbulent diffusion. The rate of plume growth rate is dependent on both the intensity of turbulent fluctuations and their size. However, generally, the model is not very sensitive to boundary layer turbulence for long-range transport.

Theoretically (Taylor 1921, Pasquill and Smith 1983) plumes grow linearly with travel time until they reach the size of the scale of the turbulence then they slow to a growth rate proportional to time. Thus, if only boundary turbulence is controlling the plume growth then plumes would grow linearly for an hour or so then slow their growth. This behavior appears to be contained in most of the recommended turbulent options in CALPUFF.

However, observations of plume spread in the atmosphere show that plumes continue to grow linearly with time, and in fact, have periods of accelerating growth. Figure 1 shows observations of plume width of smelter plumes in Australia that could be tracked for long distances against the clean background of the Southern Hemisphere. Note that the plume width continues to grow at a least a linear rate for all travel times.

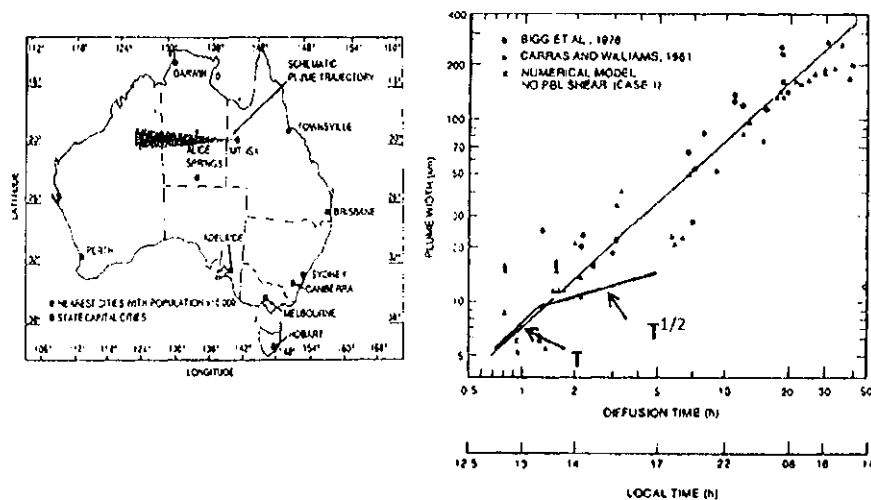


Figure 1 (left) Long-range transport experiments were made against the clean background of the Southern Hemisphere. (right) Measured plume widths continued to grow linear with time while turbulent theory says plume growth rate should slow to a $T^{1/2}$ rate. From McNider et al. 1988.

Figure 2(left) shows a simulation using a Lagrangian Particle Model (McNider et al. 1988) where only the PBL turbulence, like that used in the puff growth in CALPUFF, is employed. It shows that the plume grows much slower than observations.

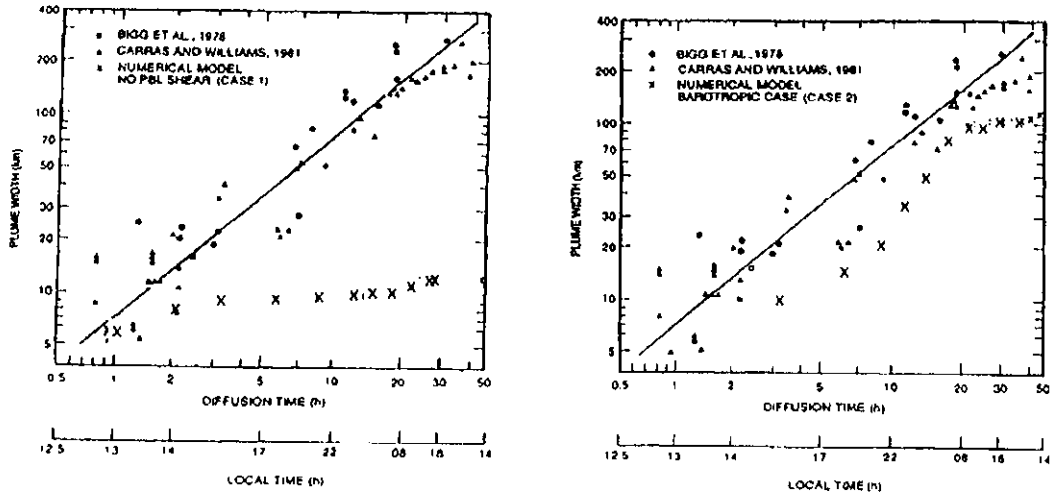


Figure 2 The black symbols along the solid black line are measurements of plume width. (left) Red X indicate model plume widths using only boundary layer turbulence. (right) Red X indicate model plume widths when boundary layer shear and inertial oscillations are included. Note that the plume width with boundary layer decoupling and shear can be 10 times the width due to turbulence alone. From McNider et al. 1988.

2.1 Diurnal Boundary Layer Decoupling Overnight

So what is causing the observed plume growth to be so much larger than that due to the boundary layer turbulence alone? In the early 1980's there was a significant scientific debate between two icons of plume modeling -- Frank Gifford and Barry Smith (who worked with Frank Pasquill) on the cause of this sustained growth. Gifford argued that it was due to larger scales of motion in the atmosphere and Smith that it was due to vertical shear in the horizontal wind. McNider et al. 1988 using a sophisticated (for the time) boundary layer model and a first principal Lagrangian particle model showed that the plume growth was maintained by the decoupling of the boundary layer overnight leading to an inertial oscillation and significant distortion of the plume by wind shear

Figure 3 shows a schematic of this process in which at sunset the upper part of the boundary layer becomes decoupled as the surface stabilizes due to night time cooling. The middle part of the boundary layer goes through the well known inertial oscillation (Blackadar 1979) leading to a low level jet. The result is that the initial well mixed plume is distorted by the shear though true dispersion (reduction in local concentration) is small. However, the end result the next day, when vertical mixing brings the upper part to the ground, is a much wider and more dilute plume. If this decoupling process and resulting shear is included in the Lagrangian Particle Model a much larger plume growth which is closer to the observed plume is found. This is illustrated in the right panel of figure 2.

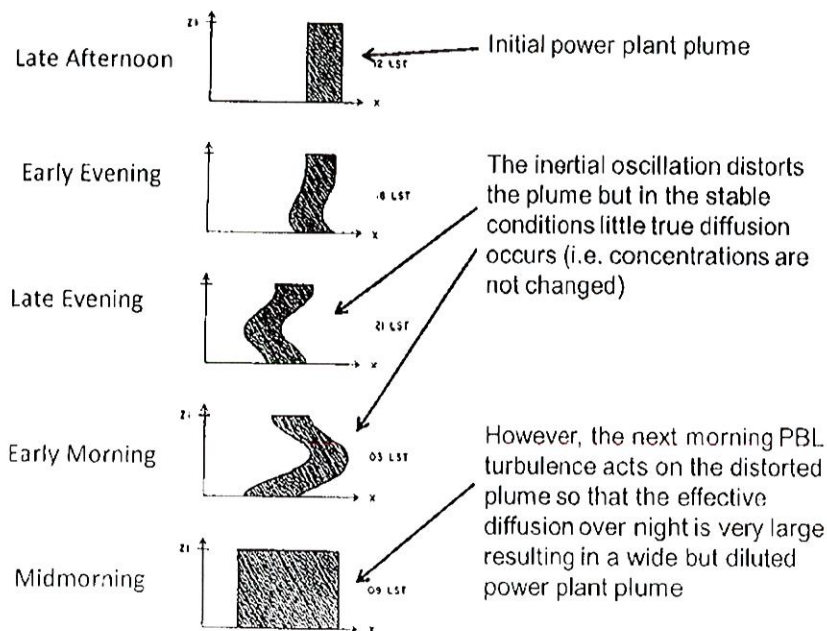


Figure 3 schematic of the role that boundary layer decoupling and the inertial oscillation have in distorting the plume after sunset leading to a much larger plume the next morning. From McNider et al. 1993.

This behavior is well known and also generally well handled in three-dimensional Eulerian grid models such as CMAQ and CAMx used in modern air pollution simulations employing wind field models such as WRF or the older MM5 model. This behavior is also well known to the developers of CALPUFF who make this statement in the CALPUFF Users Manual on the importance of the puff splitting option – **“Across-puff shear is likely to be important for well-mixed puffs after stable surface flows develop in the evening.”** (see CALPUFF users guide page 2-37 Scire et al. 2000)). Unfortunately, the EPA protocol for BART and RHR does not employ the puff splitting option. This is a significant fault in the model protocol for the transport distances used within the RHR simulations. The phenomena described and shown in figures 2-3 is a fundamental characteristic of the atmospheric boundary layer and occurs every day in which skies are reasonably clear and winds are light to moderate. It can only be neglected when transport distances (actually transport times are probably the most fundamental metric) are less than 50-100km.

A picture (or several pictures) is worth a thousand words. Figure 4 shows a series of snapshots of a plume released near Houston, Texas that undergoes the plume distortion described above as the boundary layer stabilizes in the evening. The plume depiction is from the Lagrangian Particle Model described in McNider et al. 1988 and the wind and turbulence moving the particles are from an MM5 model simulation. The plume release began at 6:00 AM August 25, 2000 and ends on 5:00 AM on August 26, As can be seen in the first frame at 7:00 PM the plume initially is small and transport distance limited under light winds even after 13 hours of transport and turbulent dispersal. The plume is generally well mixed vertically. However, as the sun sets and the surface cools, the boundary layer stabilizes. Now, the

inertial oscillation begins and the plume becomes more and more distorted overnight. By sunrise the plume has been spread over most of East Texas.

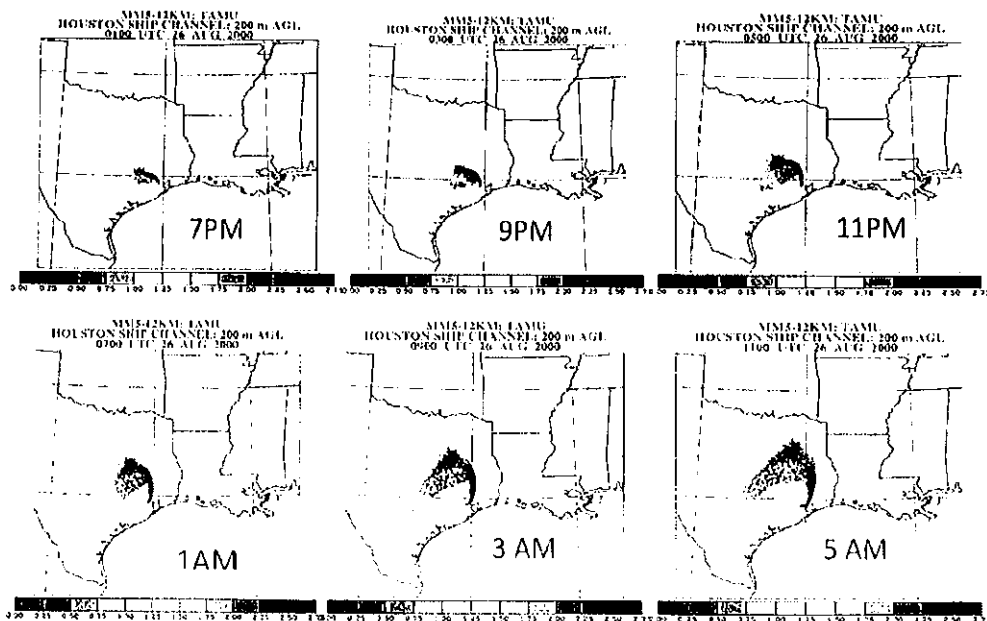


Figure 4 A series of depictions of a plume released at a site near the Houston Ship Channel with an initial release height of 200m. Pictures show the horizontal spread of the plume due to the decoupling and distortion of the plume by wind shear. Such behavior is regular characteristic of the atmospheric boundary layer but such behavior cannot be captured by CALPUFF if plume splitting is turned off. Colors give the height of the particles.

The plume behavior and decoupling shown in figure 4 is not a unique event. It is a standard part of the air pollution climatology over most of the world. The boundary layer collapse after sunset is a standard behavior when skies are reasonably clear and winds are light to moderate (see Stull 1988). For long range transport it cannot be ignored. The consistent underestimate of plume width and overestimate of concentration at longer transport distances discussed by Hoffnagle (2012) is probably in part due to these phenomena and the lack of allowing plume splitting.

The higher percentile concentrations for visibility are almost certainly going to be under relatively light to moderate winds since the dilution effect of higher winds decreases concentrations at distance (only near impacts source plume rise and building downwash might give higher concentrations at higher winds). Table 1 provides transport distances and transport times for the largest Arkansas Regional Haze Rule sources to the Class I receptors using a transport wind of 3 m/s. As can be seen, most every facility has transport times that would cross the day to night boundary before the plume reaches the receptor. Thus, neglect of the nighttime distortion and enhancement of the plume is a critical shortcoming in the FIP modeling.

Baseline Visibility Totals		(dv) - 98th Percentile	Date	Springdale, AR Wind Speed (m/s)	Little Rock, AR Wind Speed (m/s)
Caney Creek					
Flint Creek	Unit 1	0.963	9/2/2003	3.576	3.129
Entergy White Bluff	Unit 1	1.628	9/1/2001	2.235	2.235
Entergy White Bluff	Unit 2	1.695	9/1/2001	2.235	2.235
Independence	Unit 1	1.133	11/11/2001	1.788	2.235
Independence	Unit 2	1.412	11/11/2001	1.788	2.235
Average:				2.32	2.41

Baseline Visibility Totals		(dv) - 98th Percentile	Date	Springdale, AR Wind Speed (m/s)	Little Rock, AR Wind Speed (m/s)
Upper Buffalo					
Flint Creek	Unit 1	0.965	6/16/2002	2.682	1.341
Entergy White Bluff	Unit 1	1.140	7/3/2003	3.576	1.341
Entergy White Bluff	Unit 2	1.185	11/16/2001	0.894	0.894
Independence	Unit 1	0.845	8/24/2003	2.682	2.682
Independence	Unit 2	0.997	1/15/2003	4.023	3.576
Average:				2.77	2.97

Baseline Visibility Totals		(dv) - 98th Percentile	Date	Springdale, AR Wind Speed (m/s)	Little Rock, AR Wind Speed (m/s)
Hercules Glades					
Flint Creek	Unit 1	0.657	2/9/2003	2.682	1.788
Entergy White Bluff	Unit 1	1.041	7/23/2001	1.788	1.788
Entergy White Bluff	Unit 2	1.060	7/23/2001	1.788	1.788
Independence	Unit 1	0.793	12/12/2003	4.023	2.682
Independence	Unit 2	0.977	12/12/2003	4.023	2.682
Average:				2.86	2.15

Baseline Visibility Totals		(dv) - 98th Percentile	Date	Springdale, AR Wind Speed (m/s)	Little Rock, AR Wind Speed (m/s)
Mingo					
Flint Creek	Unit 1	0.631	7/28/2001	1.341	2.235
Entergy White Bluff	Unit 1	0.887	4/13/2001	1.341	2.235
Entergy White Bluff	Unit 2	0.903	4/13/2001	1.341	2.235
Independence	Unit 1	0.739	4/13/2001	1.341	2.235
Independence	Unit 2	0.883	12/20/2003	4.023	2.235
Average:				1.88	2.24

Table 1: Extraction of wind speeds associated with 98 percentile deciview impacts for major energy production facilities at Class I receptor sites. Days were determined from CALPUFF modeling results and wind speeds from Springdale and Little Rock National Weather Service observations. Provided by Hanner_Spence_and_Green_Environmental_Consultants.

Travel Time at 3m/s

Receptor	Caney Creek		Upper Buffalo		Hercules Glades		Mingo	
Facility	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)
Entergy - White Bluff	176	16.3	200	18.5	266	24.6	335	31.0
Flint Creek	204	18.9	104	9.6	153	14.2	395	36.6
Entergy - Independence	270	25.0	188	17.4	186	17.2	191	17.7

Travel Time at 2m/s

Receptor	Caney Creek		Upper Buffalo		Hercules Glades		Mingo	
Facility	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)	Distance	Travel Time (hrs)
Entergy - White Bluff	176	24.4	200	27.8	266	36.9	335	46.5
Flint Creek	204	28.3	104	14.4	153	21.3	395	54.9
Entergy - Independence	270	37.5	188	26.1	186	25.8	191	26.5

Table 2. Table shows transport distances and transport times from major energy production facilities in the Arkansas FIP. Transport times on top table are based on a 3 m/s transport wind speed. Transport times in lower table are for 2 m/s. Transport wind speeds in the 98th percentile CALPUFF runs in table 1 had an average transport speed of 2.3 m/s. Note given the transport wind speed, most plumes would encounter an evening transition before reaching the receptor.

Because of the neglect of the evening transition in the modeling protocol, it is also most certain that estimates of visibility impairments are overstated in the FIP modeling. The results above in figure 2 show plume widths may be understated by a factor of up to ten if the distortion of the plume by overnight shear is omitted. Using a more complete model such as the Lagrangian Particle Model to define plume geometry and mixing or use of CALPUFF in a plume splitting mode would produce much lower visibility

EXHIBIT C-2

Exhibit 20

impacts. Given, the well-known nature of evening boundary layer decoupling and its impact on plume spread, the use of the EPA protocols neglecting puff splitting is a serious flaw in the proposed FIP.

In addition to the neglect of puff splitting in CALPUFF there is also some concern that CALMET, through its assimilation of observed wind profiles from rawinsonde balloon data, may not capture the decoupling and inertial oscillation that distorts the plume. Models such as MM5 and WRF have in general the proper physics to produce the inertial oscillation if proper turbulence parameterizations are chosen (McNider et al. 2012). Hence, the behavior seen in the Houston plume behavior described above. There is some indication that most WRF/MM5 configurations underestimate the strength of the diurnal oscillations (see Storm et al. 2009, Gupta et al. 1997 and also discussion below).

However, the CALMET model when it uses observed wind profiles to replace or adjust the boundary layer wind field may destroy the inertial oscillation that the physical model (MM5 or WRF) is correctly simulating. This is in part because of the timing of the rawinsonde balloon observations over the U.S. These observations, by world weather convention, are carried out at 00GMT and 12GMT (Greenwich Mean Time -GMT). Over the central U.S. these observations are near 5-6 AM local time and 5 -6PM local time. Thus, the inertial oscillation which is occurring overnight is not observed by the standard balloon network. Therefore use of these balloon winds to adjust the winds in CALMET from WRF or MM5 may remove this critical factor in plume growth overnight. Thus, even if plume splitting is allowed in CALPUFF there would need to be an evaluation of CALMET to ensure it is retaining this important feature.

2.2 Neglect of Intermediate Spatial and Temporal Wind Variations

The above diurnal decoupling discussion addresses a major fault in the EPA FIP protocol for long range transport where transport times exceed 9-12 hours and are likely to cross the evening transition. There is also an issue about transport times exceeding a few hours. The IWAQM report (see IWAQM 2005) indicates that even at short transport distances (50-100km) that the models underestimate plume widths and overestimates concentrations by a factor of 1.5 to 2.5. We propose here that this error is endemic to the neglect of scales of motion which are unresolved or suppressed in the CALMET/WRF framework. Figure 5 shows a schematic of the atmospheric energy spectrum that controls transport and dispersion. There are three scales of motion which control the growth rate of plumes. The first, at small scales, is the boundary turbulence. While not explicitly resolved in the models, there has been considerable work on parameterizing turbulence and the CALPUFF offers several different parameterizations which should be sufficient. The second scale of motion that controls transport and dispersion is the resolved winds in the CALMET/WRF resolution. The largest scales of motion here are the synoptic/weather scale phenomena which are also generally well done in models due to the rawinsonde observations that go into the models. However, there is an intermediate scale of motion that controls transport and dispersion at transport distances of 10km to 100km that are not well resolved in models. Figure 5 gives a depiction of the wind energy (which impacts plume dispersion and transport) that is resolved, missing and parameterized in models.

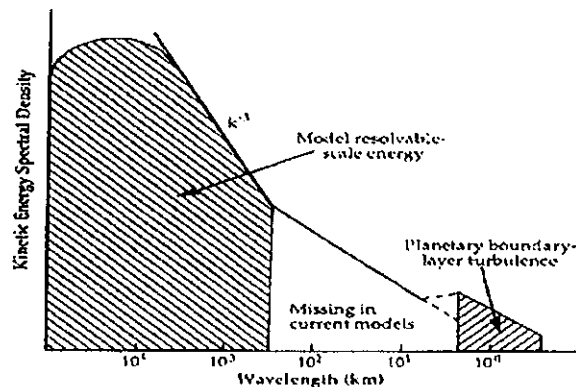


Figure 5 Schematic of the wind energy spectrum in the atmosphere. Dispersion is controlled by the scale of wind energy compared to the width of the plume. Plumes continue to grow at rates proportional to time as long as there are scales of motion of order the plume size. From Gupta et al. 1997.

Under the Southern Oxidant Study (SOS) in the Nashville field campaign there was an opportunity to use both aircraft measurements to measure plume widths and wind profilers to provide details of winds that are important to plume dispersion. Figure 6 shows the wind spectra observed by a radar profiler (see Gupta et al. 1997 for further explanation) compared to the wind spectra from an MM5 model run by EPA. It shows, as discussed above, that the model does well in capturing the synoptic scales of motion. However, the comparison shows that the model does not have near as much energy as the observations at higher frequencies such as the diurnal period. (As an aside - when the diurnal oscillation was discussed above it was indicated that models generally do well with the diurnal/inertial oscillations but here it is clear that the model diurnal signal is not as strong as the observations. This may be due too much mixing in this model run which can reduce the decoupling --see McNider et al. 2012).

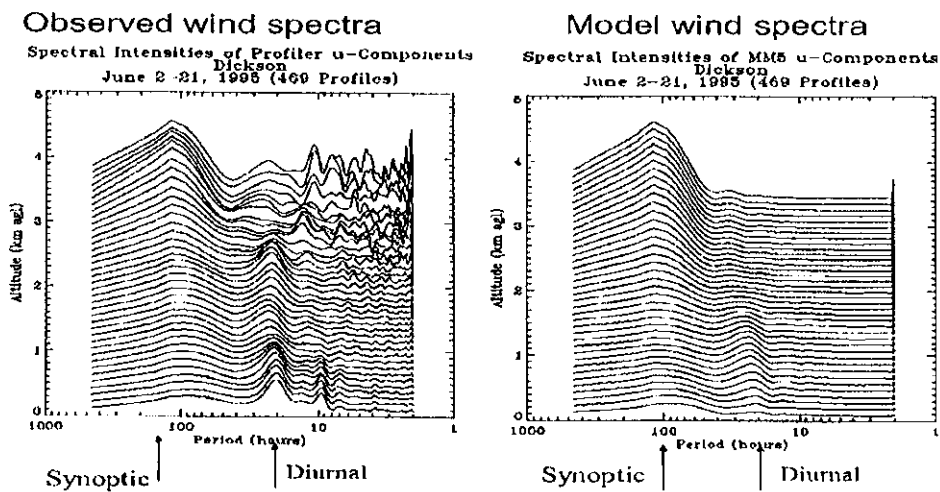


Figure 6 (left) Observed wind spectra from radar profiler near Nashville. (right) Wind spectra from a MM5 model simulation. Note that the model does well at replicating the energy at synoptic/weather scales but does not have nearly the amount of energy as the observations at higher frequencies (smaller periods).

The lack of wind energy in the model at the intermediate frequencies as seen in figure 6 can have a major impact on reducing plume growth. Plume dispersion experiments were carried out using both model winds and observed profiler winds. Figure 7 (left) shows a graphical depiction of the plumes using model winds and turbulence and figure 7 (right) using observed winds and model turbulence. This shows that using the observed winds (which have scales of motion not resolved in the model) produces a wider plume. Figure 8 provides this plume width difference more quantitatively by graphing the plume width using model winds and observed winds along with aircraft observations of plume width. It is clear that the real winds which includes shear produce a much more realistic plume width.

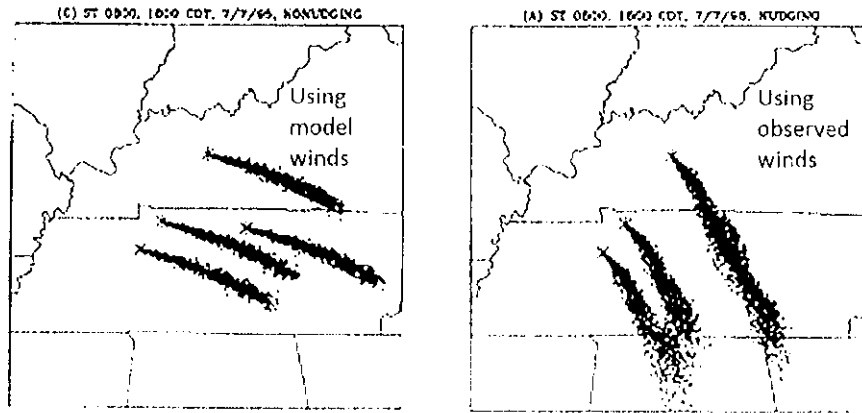


Figure 7 Depiction of modeled plumes using model winds (left) and observed winds (right). It can be seen visually that the plumes created from real winds are wider than the plumes with model winds (see Gupta et al. 1997).

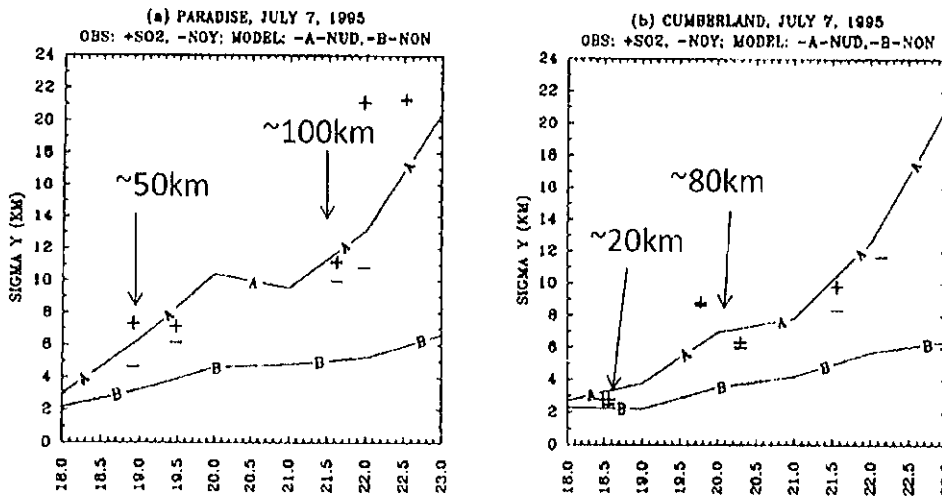


Figure 8 (left) Plume widths modeled and observed for Paradise Power plant. Symbols + and - give observed plume widths based on SO₂ and NO_y aircraft measurements. Line B gives plume widths predicted from the Lagrangian Particle Model using model winds. Line A gives plume widths from the Lagrangian Particle Model using observed winds. Note that shear and high frequency energy in the real winds produce plume widths much closer to aircraft observed widths. See Gupta et al. 1997 for details. (right) Same information as left except for Cumberland Power Plant.

It can be noted that the plume widths from the real winds are nearly twice as large as the model wind plume widths at transport distances of 50-100 km. This is consistent with the IWAQM working group results that showed model concentrations were a factor of 1.5 to 2.5 times as high as observed concentrations. Thus, it is likely at 50-100km transport distances that visibility impacts may be 2-3 times over stated as compared to reality.

Such real wind behavior is likely not captured in the CALMET/CALPUFF modeling system. It should be noted that CALMET was originally designed to try to capture the motion that was unresolved in the larger scale models, however, this increased resolution largely only reflects topography and then in a very crude manner. It is likely that the winds at higher frequencies observed in the profiler data are from a combination of small topography, land use variations, cloud shading variations etc. which are not replicated in CALMET or WRF.

3. Summary and Conclusions

The models and protocols used by EPA in the Arkansas FIP neglect well known mechanisms that increase the spread rate of plumes including both diurnal decoupling and non-model resolved wind variations. The examples shown here give the physical reasons why plumes continue to grow at much greater rates than found in the CALMET/CALPUFF systems (especially the non-puff splitting option employed). The underestimation of plume spread causes an overestimation of plume concentration and associated visibility impacts of at least a factor of 2-3 for transport distances of 50-100km and a factor 5 to 10 for overnight transport.

While tools like CALPFF and CALMET using the restrictive EPA protocols may be useful for screening activities to test changes of 1 to 2 deciviews, they are not appropriate for final regulatory actions involving billions in control cost and fractions of deciviews¹. The present protocols are overstating drastically the benefit of the controls because the concentrations predicted by the models impacting deciviews are being overstated substantially. In fact, the relatively small deciviews changes (especially when reduced by a factor of 2-10 due to model overestimation) are essentially insignificant and the impact of controls will be indiscernible in the real atmosphere.

¹ 40 CFR Part 51 July 6, 2005: Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations; Final Rule page 39123Because of the scale of the predicted impacts from these sources, CALPUFF is an appropriate or a reasonable application to determine whether such a facility can reasonably be anticipated to cause an impairment of visibility. In other words, to find that a source with a predicted impact greater than 1-2 deciviews meets the contribution threshold adopted by the States does not require the degree of certainty in the results of the model that might be required for other regulatory purposes

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Personal

Date of Birth: July 9, 1948 **Citizenship:** U.S.

Education

University of Alabama
University, Alabama
B.A. Mathematics, 1970 (Phi Beta Kappa)

Florida State University
Tallahassee, Florida
M.S. Meteorology, 1972 (Dynamic Option, Major Advisor J.J. O'Brien)

University of Virginia
Charlottesville, Virginia
Ph.D. Environmental Science, 1981 (Atmospheric Science, Major Advisor Roger Pielke)

Areas of Interest

I am an interdisciplinary scientist/mathematician. My areas of application have been quite broad, ranging from air pollution modeling, to ocean modeling, to thunderstorm initiation to model assimilation of satellite data, to crop modeling, to coupled atmosphere, ocean and ice modeling, to theoretical transport and diffusion. Particular emphasis has been on the behavior and predictability of the stable boundary layer. In relation to climate I was the initiator of the satellite temperature data set developed by John Christy and Roy Spencer. I have also been involved in the role of the stable boundary layer in climate trends

Employment History

Research Associate, Florida State University 1972-1973
Air Pollution Modeler, U. S. Environmental Protection Agency, 1973-1974
Chief of Planning and Development, Alabama Air Pollution Control Commission 1975-1983
State Climatologist, Alabama -- 1982-1999
Assistant Professor, Mathematics University of Alabama in Huntsville, 1984-1987
Associate Professor, Mathematics University of Alabama in Huntsville 1987-1992
Professor, Mathematics University of Alabama in Huntsville 1992-06/30/00
Professor, Atmospheric Science University of Alabama in Huntsville 1996-06/30/00
Interim Dean, College of Science 1998-1999
Director, Earth System Science Center, University of Alabama in Huntsville 1987-1999
Distinguished Professor of Science 1999-06/30/00
Distinguished Professor Emeritus 06/30/00-3/1/2013
Distinguished Professor Emeritus 06/30/00-3/1/2013
Executive Director, National Space Science and Technology Center (Huntsville) 2003-2004
Owner/Developer Virtual Passages, LLC -- Retailing and wholesaling a sailboat global simulator
President, Southeastern Atmospheric Modeling (SEAM), LLC
Distinguished Professor Emeritus 06/30/00-3/1/2013

Scientific Committees and Awards

Dean's Service Award -- 1999
UAH Distinguished Research Award -- 1999

EXHIBIT C-2

Exhibit 20

Fellow of the American Meteorological Society - 1998
 U. S. EPA Graduate Fellowship Awards - 1979-1980
 NASA Scientific Steering Committee - Earth Science Geostationary Platform - 1987-1988
 American Meteorological Society - Turbulence and Diffusion Committee Term - 1983-1986
 U.S. EPA/American Meteorological Society/Blue Ribbon Steering Committee for Air Quality Model
 Development 1984-1992
 American Meteorological Society - Invited Workshop on Complex Terrain, May 1983
 Alabama Water Resources Institute - Advisory Committee - 1984-1992
 Visiting Fellow – Monash University, Melbourne, Australia, summer, 1984
 Member - Transport and Diffusion Committee, NOAA Weather Modification Research Review Panel
 Chairman, Technical Advisory Committee - DOE National Institute for Global and Environmental Change
 Member - American Meteorological Society, Committee on Mountain Meteorology, 1987-1992
 Chairman - American Meteorological Society, Committee on Mountain Meteorology, 1990-1992
 Convener - Sixth Conf. on Mountain Meteorology, AMS, September 29 - October 2, 1991, Portland, Oregon
 Member - Alabama Mathematics Infrastructure Committee
 Chairman - Models and Model Evaluation Science Committee, Southern Oxidant Study
 Member - AMS Committee on Applications of Air Pollution Meteorology
 Member - Science Committee for Southern Oxidant Study
 Member - ECMWF GEWEX GABLS Workshop, Reading England, March, 2002
 Member – NRC Review Committee – Army Research Laboratory
 Chair, Alabama Universities Irrigation Initiative
 American Meteorological Society Award for Outstanding Contributions to Applied Meteorology 2013
 Member NASA Applied Sciences Air Quality Team (AQAAT) 2012-2016

Books & Articles

The Acid Rain Question in Alabama (Edited)

Advances in Geophysics, Book Chapter "The Stable Boundary Layer, Section B" authored by R. T. McNider, M. P. Singh, and S. Gupta.

Let the East Bloom Again Op-Ed in NY TIMES September 22, 2007

Peer Reviewed Publications (over 90 total) – Air Quality Emphasis

- McNider, R. T. Interpretation of meteorological pollutant roses in areas subject to nocturnal drainage winds, *Journal of the Air Pollution Control Association*, Vol. 27, pp. 236-239, 1977.
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EXHIBIT C-2

Exhibit 20

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EXHIBIT C-2

Exhibit 20

COMMENTS OF THE ARKANSAS AFFORDABLE ENERGY COALITION
FEBRUARY 2, 2018

REVISIONS TO THE ARKANSAS STATE IMPLEMENTATION PLAN
REGIONAL HAZE SIP REVISION FOR 2008-2018 PLANNING PERIOD

EXHIBIT C-3

Henry, R., Just Noticeable Differences in Atmospheric Haze, October 2002

Just-Noticeable Differences in Atmospheric Haze

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ABSTRACT

This article examines the only available experimental data taken in the natural environment on the ability of an observer to perceive small, incremental changes in the colorfulness of objects seen through atmospheric haze and estimates an appropriate just-noticeable difference (JND) from these data. This experimentally determined threshold of perception is compared to changes in the deciview scale. Based on these experimental results, the deciview scale is found to not be uniform over a wide range of visibility conditions, as has been previously claimed. In addition, a 1-deciview change never produces a perceptible change in haze, as defined by a 95% probability of producing a measurable change in the colorfulness of an object seen through the haze.

INTRODUCTION

Section 169A of the Clean Air Act sets a national goal of protecting visibility in national parks and other pristine areas. Under regulations promulgated in 1980, the U.S. Environmental Protection Agency (EPA) has taken specific regulatory action to protect visibility in the Grand Canyon National Park by reducing emissions of sulfur dioxide from the Navajo Electric Generating Station near the eastern end of the Grand Canyon and from the Mohave Power Plant at the western end. However, current concerns about visibility degradation stem from regional haze that is difficult or impossible to attribute to individual sources of air pollution. This issue is addressed by regional haze regulations that set a goal of making reasonable

progress toward improving regional visibility in five-year increments, leading to the attainment of "natural conditions" by 2064.¹ Progress is to be measured by an innovative visibility metric for regulatory purposes known as the deciview,² used instead of visual range or other visibility metrics because it "expresses uniform changes in haziness in terms of common increments across the entire range of visibility conditions, from pristine to extremely hazy conditions."¹ One goal of this article is to assess this and other claims about the deciview scale in light of actual measurements of the perception of haziness. Since the deciview scale is meant to quantify small, just-noticeable differences (JNDs) in visibility, a review of the basic concepts of thresholds and JNDs is given.

Perceptual Threshold Concepts

For all the senses, thresholds are necessary—otherwise we would be constantly distracted by small, inconsequential changes in the environment. A background of random noise, some from the environment and some produced inside our own sensory organs, would make it next to impossible to form a stable view of the world. Our vision would be like the grainy, speckled images produced by night vision cameras. On a more basic scientific level, the study of thresholds of the senses has led to a deeper understanding of sensory physiology and how our vision and other senses function. For this reason, virtually all studies of thresholds of vision have been carried out under controlled laboratory conditions.

Since laboratory conditions seldom mimic the natural environment, thresholds so determined are generally not useful in predicting perception in the complex natural world. As an example of the drastic effect that experimental conditions can have on perception, consider an experiment to determine the ability of an observer to perceive the difference in the length of two strings—or to put it another way, to determine the threshold for perception of the difference in the length of two strings, or the JND. If the two strings are widely separated when presented to the observer, the threshold will be much greater than if the two strings are presented side by side. The visual equivalent of this is the use of a split image to determine the ability to distinguish color. If two colors are seen as two halves of a disk, the JND is very small, but if one

IMPLICATIONS

Current regulations use the deciview to quantify a perceptible change in regional haze. Based on the results of this article, changes in atmospheric extinction required to meet regional haze regulations calculated using deciviews would probably be too small, sometimes much too small. In addition, these regulations require that progress be assessed over five-year intervals. In this way, the burden of reducing emissions is spread evenly over many years. However, since deciviews are not uniform in perception, it may be that the actual improvement in visibility will not be uniform.

color is presented as a full disk, followed a few seconds later by the other color, the JND will be much larger. The topic of the background on which the colors are seen is also important (e.g., if it is black or a complex scene). In general, many conditions influence thresholds; for this reason, the results of laboratory experiments should be applied with great caution to the natural environment. Thus, this article will report and analyze data taken in a unique experiment in the natural environment with a goal of determining a JND in atmospheric haze.

In the above discussion, the terms "threshold" and "JND" have been freely used, but not defined. The naïve definition of a threshold or JND is clear: It is the smallest amount, or change in, a physical stimulus that is detectable. Ideally, a 1-JND change in a stimulus such as contrast or color would always result in the observer seeing a change, and anything less would not. Of course, the senses do not work in this simple on-off manner. In actuality, as the change in the physical stimulus increases, the probability that the observer will detect the change increases as well. Thus, thresholds and JNDs have always been defined by a probability of detection. Furthermore, the sensitivity of people's senses varies from person to person and during a person's life. Even if each person had a single, idealized threshold, the response of the general population would be best described by a probability of detection.

Repeated matching by the method of adjustments is one of the oldest methods of determining a JND. Falmagne³ described this and other methods to quantify perception. Briefly, the observer is shown a target color and a variable test color and is asked to adjust the test color until it matches the target. Taking random starting points, the matching procedure is repeated as often as is practical. Since the observer has judged the matching color to be the same as the target color, the variability in the matches is a measure of a JND around the target. The standard deviation of the matches is one measure of this variability that is often used; another is the difference between the 75th and the 25th percentile of the match distribution. The method of adjustments has been replaced in laboratory studies by methods that give less control to the observer and more to the researcher and therefore improve the reproducibility of the results (unfortunately, these methods are impractical for field studies). However, JNDs are still defined by some measure related to the probability of detection. The final determination of the value of a JND or threshold is really dependent on how the measurements are made and how the data are interpreted. For the experimental data used in this article, the method of adjustments was used and a JND related to the standard deviation of repeated matches was defined.

Atmospheric Visibility Concepts

In the classical theory of atmospheric visibility, the threshold of contrast perception, that is, the threshold for perception of a large, dark object on the horizon, is assumed to be 2%.⁴ This number is somewhat arbitrary. The Federal Aviation Administration (FAA) has taken the more conservative value of 5.5% as a contrast threshold for the definition of visual range, presumably because approaching aircraft seen from a cockpit are usually neither large nor dark. The common formula for visual range, using the 2% threshold, is

$$V_R = \frac{-\ln(0.02)}{b_{ext}} = \frac{3.9}{b_{ext}} \quad (1)$$

where b_{ext} is the extinction coefficient of the atmosphere, which is assumed to be homogeneous. The extinction coefficient in the denominator of the formula can be thought of as the fraction of light that is lost as it traverses 1 m of air. For completely clear air, b_{ext} has a value of about $10 \times 10^{-6} \text{ m}^{-1}$ or 10 Mm^{-1} , or a visual range of about 390 km. More typically, particles in the air usually increase the extinction coefficient to 150–300 Mm^{-1} or more. Typical visual ranges are about 10 km in the eastern United States and 50 km or more in the western United States. Closely related to b_{ext} and visual range is the more general concept of optical depth. For a target at a distance x , this is defined as $x b_{ext}$. It is dimensionless; if b_{ext} is held constant it represents distance, and if the distance is constant, it represents changes in b_{ext} . From eq 1, the visual range corresponds to an optical depth of 3.9, and a distance of about one quarter of the visual range is equivalent to an optical depth of 1.

Despite lacking a firm psychophysical or experimental basis, the visual range defined by the 2% threshold has stood the test of time. However, while visual range has proven to be a good surrogate for atmospheric visibility for the aviation community, it is of limited value in addressing the concerns of the air quality community. Unlike aviation, where poor visibility is of greatest interest, the air quality community is primarily concerned with relatively small changes in good visibility. Pitchford and Malm² have proposed the deciview as a visibility indicator more suited to air quality regulations. If the extinction coefficient is given in Mm^{-1} , then deciview is defined as

$$v = 10 \ln(b_{ext} / 10) \quad (2)$$

Current regional haze visibility regulations state that:

- (1) A 1-deciview change in haziness is a small, but noticeable, change in haziness under most circumstances when viewing scenes in Class I areas.
- (2) Deciview units are uniform in perception over a wide range of visibility conditions; that is, a 1-deciview change is just perceptible regardless of the visibility conditions.¹

The next section describes a color matching experiment in the Great Smoky Mountains National Park. The results of this experiment are used to estimate a just-noticeable change in haze based on color perception. The validity of the claims for deciviews will be evaluated by comparison to experimental estimates of JNDs.

EXPERIMENTAL DATA

During summer 1995, a group of researchers from universities, government agencies, and private companies conducted the SouthEast Aerosol and Visibility Study (SEAVS) in the Great Smoky Mountains National Park. The SEAVS focused largely on aerosol composition,⁵ airborne particle size distribution,⁷ and the role of water in the aerosol.¹¹ However, the SEAVS had a number of other aspects, including a study of the perception of color through atmospheric haze.¹² The methods and primary results of the color perception study are described below.

The perceived colors of natural targets were quantified by color matching using a specially constructed visual colorimeter.¹³ An observer looked at some scene element, such as a barn or green field, with one eye. The observer looked with the other eye in the visual colorimeter at a color spot, which the observer adjusted to match the color of the target. The perceived color was recorded as the amount of red, green, and blue light in the color match. At the same time, the spectrum of the light coming from the target was measured by a telespectroradiometer. A color appearance model was applied to produce measures of the perceived color as recorded by the visual colorimeter and as calculated from the spectrum.¹⁴

Of most interest here are the hue and colorfulness. The hue is what most people call the color—red, green, blue, yellow, and so on. It is quantified as a mixture of pure red, green, blue, or yellow lights. The colorfulness is the degree to which the hue is expressed; it is similar to the concept of saturation. A deep red color would have a colorfulness of about 100, while a colorfulness of 10 or less is almost achromatic (i.e., white or gray).

Two observers (Mahadev and Urquito) made color matches of a set of natural targets during the SEAVS. These observers were both males in their 20s with normal color vision. Each had received extensive training in color matching using the visual colorimeter. The scattering coefficient of the atmosphere was measured by a nearby nephelometer; particle absorption was small and its contribution to the extinction coefficient ignored. The full details of the experiment are found in Mahadev.¹⁵

The perception study found that viewing through a semitransparent atmosphere affected the perception of hue and colorfulness in a highly nonlinear way. The eye appeared to split the light coming from the target into two parts, the haze and the target. The result was that as

the haze increased, the hue of the target as seen by the observer remained constant. However, because the increasing haze scattered more light into the sight path, the hue calculated from the spectrum became bluer. To the observer, the main effect of haze was to decrease the perceived colorfulness. Furthermore, the decrease in colorfulness seemed to be exponential with optical depth (optical depth is the dimensionless product of the extinction coefficient and distance):

$$M(\tau) = M_0 \exp(-\tau) \quad (3)$$

where $M(\tau)$ is the colorfulness of the object at optical depth τ and M_0 is the colorfulness at zero optical depth (i.e., no haze). M_0 is also known as the inherent colorfulness. The colorfulness of the horizon was assumed to be small enough to be taken as zero—the horizon was perceived to be white. This result implies that a JND in colorfulness can be taken to be a JND in haze.

JND in Colorfulness

Estimates of JNDs in colorfulness were based on sets of repeated color matches made during periods when the observing conditions (cloud cover, haze level, and lighting) were judged to be constant or nearly so. Observer Urquito made six sets of repeated matches.¹⁵ Figure 1 is a plot of all the repeated observations of the colorfulness of the red barn roof made by this observer versus optical depth. The exponential fit given by eq 1 is fairly good ($R^2 = 0.68$). The error bars in the figure are twice the standard deviation given in Table 1. They show that one set

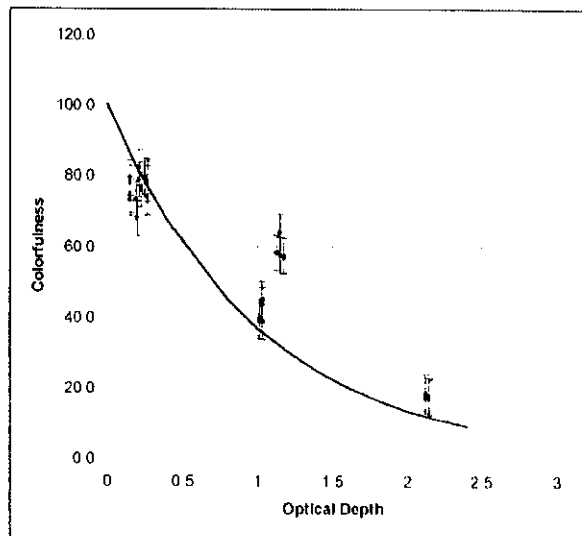


Figure 1. Colorfulness vs. optical depth for observer Urquito for repeated observations of the red barn roof. The line is an exponential fit as in eq 1, and the error bars are two times the standard deviation given in Table 2.

Table 1. Repeated measurements of the red barn roof by observer Mahadev.

Date	Time	Scattering Coefficient (Mm) ⁻¹	Visual Range (km)	Colorfulness		Spectra Hue		Perceived Hue	
				Spectra	Perceived	% Red	% Blue	% Red	% Blue
7/29/95	10 20 a.m.	37	105.7	38.0	42.2	53	47	97	3
7/29/95	10 46 a.m.	39	100.3	38.9	45.6	40	60	92	8
7/29/95	10 54 a.m.	39	100.3	39.9	45.4	38	62	99	1
7/29/95	11 03 a.m.	42	93.1	35.6	46.3	52	48	92	8
7/29/95	11 12 a.m.	42	93.1	37.5	44.9	53	47	93	7
7 25/95	11 49 a.m.	65	60.2	31.2	41.1	50	50	88	12
7 25/95	12 01 p.m.	65	60.2	30.8	45.1	42	58	84	16
7 25/95	12 12 p.m.	65	60.2	30.4	44.1	53	47	91	9
7 25/95	12 19 p.m.	65	60.2	29.4	43.0	54	46	91	9
7 25/95	12 24 p.m.	65	60.2	29.2	48.4	47	53	93	7
8 11/95	9 46 a.m.	157	24.9	37.6	29.2	19	81	97	3
8 11/95	9 57 a.m.	157	24.9	37.2	28.8	22	78	98	2
8 11/95	10 07 a.m.	157	24.9	37.5	29.2	23	77	98	2
8 11/95	10 15 a.m.	161	24.3	36.3	31.9	21	76	98	2
8 11/95	10 21 a.m.	161	24.3	36.7	29.5	23	77	98	2
8 14/95	10 12 a.m.	311	12.5	44.4	18.2	9	91	91	9
8 14/95	10 18 a.m.	312	12.5	44.6	18.4	8	92	97	3
8 14/95	10 30 a.m.	313	12.5	44.8	17.6	7	93	95	5
8 14/95	10 34 a.m.	313	12.5	44.7	18.1	7	93	94	6
8 14/95	10 38 a.m.	313	12.5	44.3	18.3	8	92	94	6
8 18/95	11 00 a.m.	595	6.6	35.3	9.7	2	98	81	19
8 18/95	10 46 a.m.	616	6.4	35.4	6.8	2	98	98	2
8 18/95	10 50 a.m.	616	6.4	35.2	9.4	2	98	91	9
8 18/95	10 53 a.m.	616	6.4	35.0	7.3	2	98	99	1
8 18/95	10 57 a.m.	616	6.4	35.7	10.0	2	98	97	3

of repeated measurements had colorfulness values that deviated much more than 2 sigma from the exponential line. However, the spread of these values about the mean was about the same as other observations for the same optical depth. This shows that the variability in the colorfulness numbers is not affected by systematic observer bias in the average colorfulness, and that the variability will be used to define the JND. The observations of the same target by the other observer are discussed in detail below.

Table 1 gives the results of five sets of repeated matches by observer Mahadev for the roof of a red barn about 3.5 km distant. Table 1 is sorted by the extinction coefficient so that one can easily see that the perceived hue did not change with increasing haze, but that the hue derived from the spectrum changed from red to blue. Colorfulness had the opposite behavior; the perceived values decreased with increasing haze and the values from the spectrum stayed about the same. Two-way

analysis of variance was applied to estimate the random error in the sets of repeated measurements in Table 1. This analysis was repeated for both observers' matches of five additional natural targets. The results are given in Table 2. The standard deviation for both observers was 2.05, as calculated from the average of the variances. Although viewing conditions were chosen to be constant, some of this variability was due to small changes in atmospheric conditions.

Based on these results, one can define the JND in colorfulness in many ways. One appropriate definition for this application is based on the following thought experiment. An observer matches a target with the visual colorimeter and determines the colorfulness to be C_1 . The extinction coefficient of the atmosphere is decreased, so the colorfulness of the target is increased by an amount ΔC .

The observer matches the target again to get the new colorfulness C_2 . A JND is defined as the value of ΔC that gives a 95% probability that $C_2 - C_1 > 0$. Assume that C_1 and C_2 are normal random variables with standard deviation s and means C_0 and $C_0 + \Delta C$, respectively (statistical analysis of the SEAVS color matching data confirms that this is a good assumption). Then $C_2 - C_1$ is a normal random variable with mean ΔC and standard deviation $2^{1/2}\sigma$. The value of ΔC needed to ensure a 95% probability that $C_1 - C_2 > 0$ is given by $2^{1/2}\sigma F(0.95)$, where $F(0.95)$ is the inverse of the cumulative standard normal distribution and is equal to 1.645. Thus, the colorfulness JND is taken to be $2^{1/2}\sigma F(0.95) = 2.326\sigma$. From Table 2, using the data for both observers gives $\sigma = 2.05$, and a 1 colorfulness JND is 4.8. This value of σ includes the effects of small random variations in natural illumination, which should be included for this application because they are inevitably present, but makes the value of a colorfulness JND a bit larger than it would be otherwise.

Table 2. Standard deviations of colorfulness for repeated matches of natural targets.

Target	Observer		Distance (km)
	M	U	
White silk	0.91	1.33	3.54
Red roof	1.93	2.41	3.54
Near green meadow	2.93	2.15	3.86
Green hills	2.15	3.46	5.15
Far green meadow	1.45	1.64	10.46
Horizon sky	1.53	1.19	
Average	1.92	2.17	
Number of observations	55	60	

Deciviews and Colorfulness JNDs

Relationships between colorfulness, deciviews, and optical depth are derived below; these will be applied to test the validity of the properties of deciviews given in the regional haze regulations.

From eqs 2 and 3, an expression for deciviews v as a function of colorfulness M is derived:

$$v = 10 \ln \left(-\frac{1}{10x} \ln \left(\frac{M}{M_0} \right) \right) \quad (4)$$

For a given optical depth and inherent colorfulness, the equations above were used to calculate the change in deciviews needed to give a 1-JND increase in colorfulness, using 4.8 as a JND. Figure 2 is a plot of the results as a function of optical depth for objects with three levels of inherent colorfulness. These levels of inherent colorfulness represent a reasonable range for natural targets.¹² As might be expected, more colorful objects are more sensitive to changes in atmospheric haze. Perhaps unexpectedly, the figure shows that landscape features at a distance corresponding to an optical depth of 1–2 are the most sensitive to changes in extinction as measured by deciviews. This range corresponds to one quarter to one half of the visual range. Landscape features outside this range are much less sensitive to changes in haze. If the deciview scale were perceptually uniform, as claimed in the regional haze rules, then the lines in the figure would be horizontal, or at least approximately so. However, the change in deciviews needed to produce a 1-JND change in colorfulness varied a great deal with optical depth and inherent colorfulness. The figure also shows that a 1-JND change in colorfulness always requires more than a 1-deciview change, sometimes much more.

DISCUSSION AND CONCLUSIONS

Regional atmospheric haze affects visibility by producing a visible haze layer that limits the visual range, reduces

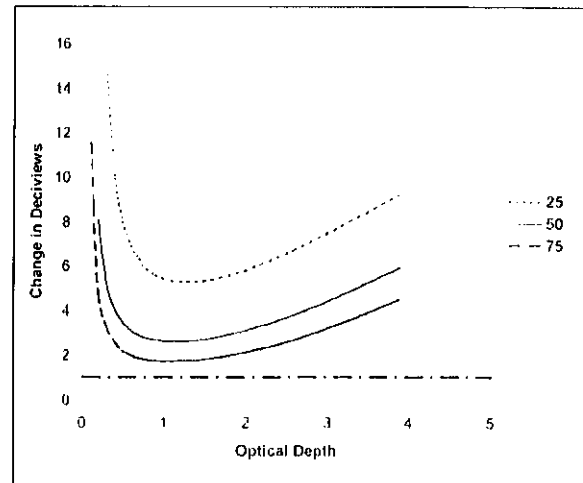


Figure 2. Change in deciviews needed to produce a just-noticeable increase in colorfulness for objects with an inherent colorfulness of 25, 50, and 75. The horizontal dashed dotted line represents what would be expected if a 1-deciview change were actually a uniform measure of haze perception.

contrast, and decreases the colorfulness of objects seen through the haze. Of these three effects of haze, the decrease in colorfulness may be the most important and sensitive visual cue. Visual range is not often useful for judging the effects of small changes in extinction. For example, a change in visual range from 50 to 60 km will not be noticed if the most distant landscape feature is at 25 km. The effect of haze on contrast is a better candidate as an indicator of change in haze; however, perceived contrast, like perceived hue, is affected in a nonlinear fashion by the semitransparent nature of haze and is not a sensitive indicator of changes in atmospheric haze.¹⁶ Experimental data have shown that colorfulness is a sensitive measure of changes in haze, so this article has used it to define just-noticeable changes in atmospheric haze.

A just-noticeable decrease in atmospheric haze is defined as a decrease in extinction that would produce a 95% probability of a measurable increase in colorfulness of an object seen through the haze. From the experimental evidence from the two young male observers, a JND in colorfulness was 4.8. For the population in general, this number is certainly too low, since all visual functions decline with age. Thus, the conclusions below about the deciview scale based on this number are understated for the general population.

Analysis of the experimental data showed that for a JND in atmospheric haze as defined above:

- (1) The deciview scale is not uniform in perception over a wide range of visibility conditions. In fact, the change in deciviews needed to be noticeable

varies greatly depending on the optical distance of the landscape feature and its inherent colorfulness.

(2) A 1-deciview change is never noticeable.

What are the implications of these results for measuring progress toward reducing regional haze using the deciview metric? This is difficult to judge because the current proposals are very complex, using particulate measurements and relative humidity to estimate the extinction coefficient and average deciviews for the 20% most-impaired and 20% least-impaired days. The goal is to show no change on the least-impaired days and improvement on the most-impaired days, leading to natural conditions by 2064.¹⁷

The results of this article highlight a possible flaw in this regulatory scheme based on the deciview metric. An unstated assumption is that the nature of the scenic vista can be ignored—that is, a given deciview change will affect the perception of all landscape features in all scenes in the same way. Figure 2 shows that this is approximately true only if all the important landscape features have nearly the same inherent colorfulness and are at distances that correspond to an optical depth of between 1 and 2, or about one quarter to one half of the visual range. In this limited case, the deciview is indeed a uniform metric. However, most scenic vistas do not fit these restrictions and, by Figure 2, will require greater decreases in extinction as measured by deciviews to show a perceptible change. The result is that the emission reductions required by the proposed regulatory analysis are likely to produce much smaller improvements in perceived effects of regional haze than expected. The EPA guidance documents provide an example of an eastern scenic vista with a baseline of 27 deciviews and natural conditions of 11.¹⁷ The decrease in extinction to reach natural conditions by 2064 is 0.35 deciview/yr, or 1.75 deciviews in five years. This five-year reduction should, according to the regulations, result in a noticeable change in regional haze. However, the results herein predict that there would very likely be no noticeable difference in any actual scenic vista in the region as a result of the required emission reductions.

Regional haze rules also call for a uniform rate of improvement in visibility (measured in deciviews) that is needed to go from current conditions to natural conditions by 2064. Since the deciview scale is not uniform in perception over a wide range of visibility conditions, this requirement is also flawed and will not result in uniform improvement in perceived visibility.

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Consideration of Low-Sulfur Coal in a BART Five-Factor Analysis for the White Bluff Power Plant

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September 14, 2017

This document outlines legal and record-based arguments for the consideration of low-sulfur coal as a means to comply with Best Available Retrofit Technology (“BART”) requirements for the White Bluff Power Plant in Arkansas, which is made up of two coal-fired boilers – SN-01 and SN-02 (also referred to as Unit 1 and Unit 2), as well as one oil-fired auxiliary boiler – SN-05.¹ It is also intended to assist in establishing positive precedent for treating low-sulfur coal as a means of BART compliance.

A few initial guiding principles and limitations drive this analysis. First, it is important to note that care should be taken to ensure that the use of low-sulfur coal to comply with BART remain as a compliance *option*, not as a forced requirement. Forced fuel switching, particularly in the context of Best Available Control Technology (“BACT”) analysis for Prevention of Significant Deterioration (“PSD”) permitting, and attempts to “redefine the source” have been a consistent and lasting problem for electric generators (and other emission sources). Second, this analysis is a legal and record-based analysis; it does not incorporate new modeling or other technical arguments that could potentially facilitate the arguments outlined below.

Background

There are five statutory factors to be considered in applying BART. These are: 1) costs of compliance; 2) the energy and nonair quality environmental impacts of compliance; 3) any existing pollution control technology in use at the source; 4) the remaining useful life of the source; and 5) the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.² In applying these factors, EPA’s BART Guidelines³ outline five steps for conduct a case-by-case BART analysis. These are: 1) identifying all available retrofit control techniques (including existing controls); 2) eliminating technically infeasible control techniques; 3) evaluating control effectiveness of remaining control techniques; 4) evaluating impacts of the control techniques (including four subparts - cost, energy impacts, non-air quality environmental impacts, and remaining useful life); and 5) determining visibility impacts in the BART determination.⁴

Entergy in 2013 prepared a five-factor analysis for White Bluff as part of this docket.⁵ Entergy did not include low-sulfur coal as a potential compliance technique/technology. In 2015 (revised in 2016), Entergy prepared a five-factor analysis for the coal-burning Nelson Power Plant in Louisiana as part of that state implementation plan (“SIP”)/federal implementation plan (“FIP”) process.⁶ The ultimate

¹ This memorandum focuses solely on the two coal-fired boilers.

² 42 U.S.C. § 7491(g)(2).

³ 40 CFR Part 51, Appendix Y to Part 51—Guidelines for BART Determinations Under the Regional Haze Rule (“BART Guidelines”).

⁴ *Id.* at IV.D.

⁵ See Trinity Consultants, Revised BART Five Factor Analysis White Bluff Steam Electric Station Redfield, Arkansas (AFIN 35-00110), October 2013. (“2013 Entergy White Bluff Five-Factor Analysis”).

⁶ Trinity Consultants, BART Five Factor Analysis Produced in Response to Section 114 Request, Nov. 9, 2015; Revised April 15, 2016. (“Entergy Nelson Five-Factor Analysis”).

conclusion of the Nelson Five-Factor Analysis was that low-sulfur coal would serve as the BART compliant control and that no additional control technologies would be required. The Nelson Five-Factor Analysis, and the low-sulfur coal conclusion, was the basis for the Louisiana Department of Environmental Quality (“LDEQ”) revised SIP BART submissions in February and June 2017.⁷ It is also the basis of EPA’s *proposed* acceptance of the LDEQ’s SIP submission.⁸ Entergy also has recently submitted an updated five-factor analysis for White Bluff to the Arkansas Department of Environmental Quality that concludes that low-sulfur coal constitutes BART.⁹ However, neither Entergy’s 2013 five-factor analysis nor its 2017 five-factor analysis for White Bluff evaluate low-sulfur coal as an existing pollution control technology. This analysis, as well as previous comments and Petitions for Reconsideration, will serve as the basis for the following discussion.

White Bluff Five-Factor Analysis and Application of the Top-Down Case-by-Case BART Analysis

While there can be some discussion or debate regarding the use of EPA’s top-down approval to conducting a case-by-case BART analysis, including that states have greater flexibility in determining a BART-analysis approach, for the purposes of this memorandum, EPA’s approach is used.

1. Identifying All Available Retrofit Control Techniques

White Bluff currently uses low-sulfur coal, as dictated by its Arkansas Public Service Commission approval.¹⁰ Use of low-sulfur coal with approximately 0.5% sulfur content as a control for SO₂ emissions was approved for White Bluff (as well as at other coal-fired power plants in Arkansas) pursuant to the Arkansas Utility Facility Environmental and Economic Protection Act, Ark. Code Ann. §23-18-501, et seq. As a result, White Bluff has been operating since its inception using low-sulfur coal as a control technology for SO₂ emissions. While not a retrofit control, it is an existing control which EPA has recognized can (and should) be considered at this stage of the process.¹¹ As referenced above, it is also a recognized control (and ultimately selected control) in Louisiana’s SIP submission for the Nelson Plant and EPA’s proposed approval. Specifically, EPA’s Technical Support Document for its proposed approval stated:

“Switching to a lower sulfur coal is a feasible method for lowering SO₂ emissions. In fact, Entergy has been purchasing lower sulfur coals and blending them in its feed stream for a number of years.”¹²

As clearly articulated by the Eighth Circuit in *North Dakota v. EPA*, EPA is obligated to consider all control technologies used at the plant, voluntarily or otherwise.¹³ Low-sulfur coal is one of those controls.

⁷ LDEQ, Regional Haze State Implementation Plan: EGU BART Analysis, Final, February 2017; LDEQ, Regional Haze State Implementation Plan: EGU BART Analysis, Revision Proposal, June 2017. (“EPA Nelson Rule Proposal”).

⁸ U.S. EPA, Approval and Promulgation of Implementation Plans; Louisiana; Regional Haze State Implementation Plan, Proposed Rule, 82 Fed. Reg. 32,294 (July 13, 2017).

⁹ Trinity Consultants, Updated BART Five-Factor Analysis for SO₂ for Units 1 and 2, August 18, 2017.

¹⁰ Arkansas Public Service Commission Order No. 14, Docket 73-048 U (U-2488), Oct. 11, 1974.

¹¹ See BART Guidelines at D.1, which includes: “The control alternatives can include not only existing controls for the source category in question but also take into account technology transfer of controls that have been applied to similar source categories and gas streams.” (emphasis added).

¹² U.S. EPA, Technical Support Document for EPA’s Proposed Action on the Louisiana State Implementation Plan for the Entergy Nelson Facility (June 2017) at 9. (“TSD for the Proposed Nelson SIP Approval”).

¹³ See *North Dakota v. EPA*, 730 F.3d 750, 764 (8th Cir. 2013), which includes:

This memorandum does not opine on the “availability” of the other control technologies identified in Entergy’s White Bluff Five-Factor Analyses, which include dry sorbent injection (“DSI”), semi-dry scrubbing, and wet scrubbing.¹⁴

2. Eliminating Technically Infeasible Control Techniques

This memorandum does not address technical issues; therefore, the technical feasibility step is not addressed, but it is assumed that all controls deemed technically feasible in the Arkansas BART FIP are feasible.

3. Evaluating Control Effectiveness Of Remaining Control Techniques

Nucor’s comments filed in the FIP rulemaking docket sufficiently summarize the effectiveness of using low-sulfur coal, including:

“Entergy’s five-factor analysis points out that the amount of sulfur in coal is the most important factor in controlling SO₂ emissions. EPA’s own documents in support of the national Regional Haze Rule indicate that use of 0.7% low-sulfur coal reduces SO₂ emissions by over 70%. The U.S. Energy Information Administration states that low-sulfur coal may reduce SO₂ emissions by up to 85%. EPA has approved the use of low-sulfur coal as Best Available Control Technology for purposes of its PSD regulations. In fact EPA has approved the use of low-sulfur coal as BART for a coal-fired power plant even though it determined that Dry Sorbent Injection (‘DSI’) at a cost of only \$991/ton SO₂ was ‘cost-effective’ for that plant.”¹⁵

In EPA’s TSD for the Proposed Nelson SIP Approval, EPA found that switching to low-sulfur fuel would allow the Nelson unit to comply with an SO₂ emission limit of 0.60 lb SO₂/MMBtu (on a 30-day rolling average); this is the emission limit ultimately memorialized in EPA’s Proposal.¹⁶ In comparison, the White Bluff power plant (which has a permitted emission allowance of 1.2 lb SO₂/MMBtu) has been able to achieve monthly average emission rates in the range of 0.46 - 0.69 lb SO₂/MMBtu at the

“Because we find no ambiguity in the kind of technologies that must be considered under § 7491(g)(2), EPA’s interpretation that it was not required to consider the existing pollution control technologies in use at the Coal Creek Station is entitled to no deference. Just as the State was required to properly consider each statutory factor in the BART analysis in the implementation of its SIP, so too was EPA in the promulgation of its FIP. Accordingly, EPA’s refusal to consider the existing pollution control technology in use at the Coal Creek Station because it had been voluntarily installed was arbitrary and capricious and its FIP promulgating SNCR as BART for the Coal Creek Station is therefore vacated.”

¹⁴ 2013 Entergy White Bluff Five-Factor Analysis at 5-1.

¹⁵ Comments of Nucor-Steel-Arkansas and Nucor-Yamato Steel Company on Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Proposed Rule, Doc. No. EPA-R06-OAR-2015-0189-0163, July 15, 2015 at 29-30, citing to: 2013 Entergy White Bluff Five-Factor Analysis at 5.-1; Hawes, T., Worksheet from EPA’s docket EPA-HQ-OAR-2002-0076, document number 145 (included as Exhibit 13 of Nucor’s comment); EIA December 21, 2001 forecast (included as Exhibit 14 of Nucor’s comment); EPA’s Final BART determination for PPL Corrette, 77 Fed.Reg. 23988, 24031 (April 29, 2012) which approved the use of coal with a 0.3% sulfur content as BART.

¹⁶ EPA Nelson Rule Proposal at 32,300.

units.¹⁷ The average monthly emission rate between 2009 and 2015 was 0.56 lb SO₂/MMBtu for Unit 1 and 0.58 lb SO₂/MMBtu for Unit 2.¹⁸

As discussed above, EPA has determined that the use of low-sulfur coal by EGUs is the most important factor and reduces SO₂ emissions by at least 70% and the Energy Information Administration has determined that use of low sulfur coal by EGUs reduces SO₂ emissions by up to 85%. Thus, White Bluff is already achieving control of its SO₂ emissions by between 70-85%. So far in 2017, the sulfur content of White Bluff's coal supply is below 0.25%.¹⁹ Entergy's most recent five-factor analysis indicates that a 0.6 lb. SO₂/MMBtu emission rate would result in an additional 8% reduction in SO₂ emissions. Thus, continued use of low sulfur coal at that emission rate would result in emissions control of up to 93%.²⁰

EPA's BART Guidelines provide that when existing control measures are already in place "it is important to involve improvements to existing controls, and not limit the control options only to those measures that involve a complete replacement of control devices."²¹ In addition, the BART Guidelines state that if existing post-combustion controls achieve removal efficiencies of at least 50%, upgrades to improve efficiency should be considered instead of replacement.²² Here, White Bluff has used low-sulfur coal as a control technology to achieve at least 70% reduction of SO₂ emissions for over 35 years. By analogy, it is reasonable to consider improving emission reductions through use of a lower sulfur coal, in contrast to replacement with FGD. In addition, as discussed below, both state and federal environmental policy favor use of a pollution prevention control, such as low-sulfur coal, over use of a removal technology such as FGD.

Clearly, the control effectiveness demonstrated at the White Bluff unit via the use of existing controls, including the use of low-sulfur control, generates emissions that are in-line – and for a great period of time – below the emission limit EPA has proposed to accept in Louisiana (and which was at the core of Entergy's Nelson Five-Factor Analysis). Low-sulfur control is an effective control.

4. Evaluating Impacts of the Control Techniques

a. Cost

EPA estimates that costs of the dry flue gas desulfurization ("FGD") technology at the White Bluff Units 1 and 2 are projected by EPA to cost \$2,565/SO₂ ton and \$2,421/SO₂ ton.²³ Other analysis finds that the actual cost-effectiveness for scrubbers would be between \$5,462-\$6,445 more expensive per ton of SO₂ reduced than EPA's estimate in the FIP.²⁴ However, neither of these cost analyses consider the cost of the historic and continued cost use of low-sulfur coal at White Bluff. The installation of

¹⁷ See Arkansas Department of Environmental Quality, Petition for Reconsideration and Request for Administrative Stay, In re: Promulgation of Air Quality Implementation Plan; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Final Rule (Nov. 22, 2016), Appendix C, ("ADEQ Petition for Reconsideration")

¹⁸ *Id.*

¹⁹ U.S. Department of Energy, Energy Information Administration, EIA Form 923.

²⁰ This is only slightly less than the 95% control level used by EPA in establishing presumptive SO₂ emission limits in App. Y.

²¹ Appendix Y, section D.6, 70 F.R. 39,164.

²² Appendix Y, Section E.4, 70 F.R. 39,171.

²³ U.S. EPA, Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Final Rule, 81 Fed. Reg. 66,332, 66,343 (Sept. 27, 2016).

²⁴ ADEQ Petition for Reconsideration, Appendix C, citing to: Review of EPA's Cost Analysis for Arkansas Regional Haze Proposed Federal Implementation Plan (2015). Prepared by Sargent & Lundy for Entergy Arkansas, Inc., Docket No. EPA-R06-OAR-2015-0189.

FGD requires the continued use of low-sulfur coal, and thus the costs of low-sulfur coal must be included in the analysis of such additional control technology. Such costs would include the differences in heat content and transportation costs for low-sulfur coal over other grades of coal, which are substantial. Entergy's most recent five-factor analysis appears only to consider the incremental price difference between 0.5% low-sulfur coal and a lower sulfur content grade of coal. Furthermore, when the historic costs of use of low-sulfur coal are included in the cost-effectiveness analysis of FGD, the costs far exceed the range of cost-effectiveness for EPA's presumptive SO₂ emissions.²⁵

Acknowledging that there are uncertainties that are not addressed in this memorandum, since White Bluff already utilizes low-sulfur coal in its operations, presumably there would be no additional costs for the continued use of low-sulfur coal and if there are any additional costs, these costs would be far less than the costs of the installation of the various control technologies discussed in the FIP (and ultimately selected for White Bluff).²⁶ Therefore, the continued use of low-sulfur coal as a control technology provides lower additional capital and operating costs (or create no additional costs all all), while still achieving emission reductions.

Further, in the proposed Nelson SIP approval, EPA has already proposed to recognize that "lower-sulfur coal still achieves some visibility benefits and at a lower annual cost" than installing dry FGD at the Nelson power plant.²⁷ Importantly, in that case, Entergy would be required to switch to low-sulfur coal (which creates costs); these costs would not be incurred at the White Bluff power plant, further increasing the cost savings of using low-sulfur coal.

b. Energy Impacts

The continued use of low-sulfur coal as BART at the White Bluff power plant avoids the additional energy impacts associated with control technologies, such as dry FGD scrubbers. Namely, technological controls require electricity to operate, generating parasitic load issue or require auxiliary power.²⁸ These parasitic loads and auxiliary power demands are not required if low-sulfur coal is continued to be used at the White Bluff power plant. Furthermore, the additional extensive costs associated with installation of FGD at White Bluff could lead to premature closure or retirement, which could affect the reliability and resiliency of the electric grid and electric supply in Arkansas, and lessen or eliminate the use of low-sulfur coal as a hedge against other fuels for generation of electricity for Arkansas utility customers.

c. Non-Air Quality Environmental Impacts

The continued use of low-sulfur coal at White Bluff power plant as a means of compliance creates no additional non-air quality environmental impacts.²⁹ In contrast, the use of FGD can create additional

²⁵ While EPA's adherence to use of its Cost Control Manual may have some utility for comparing the cost-effectiveness of various proposed control technologies, it does not address the ultimate cost of controls. The Cost Control Manual does not consider all costs associated with the installation of FGD at White Bluff, such as AFUDC. This is a real, absolute cost which must be taken into account to arrive at a proper BART determination, and it would be unreasonable not to do so. See *Michigan v. EPA*.

²⁶ In the Nelson BART analysis docket, Entergy represented that switching to low sulfur coal created a \$0.50/ton premium, resulting in a cost effectiveness of \$597/ton. See TSD for the Proposed Nelson SIP Approval at 42.

²⁷ See EPA Nelson Rule Proposal at 32,300.

²⁸ See TSD for the Proposed Nelson SIP Approval at 45.

²⁹ See TSD for the Proposed Nelson SIP Approval at 46, which found that "There are no non-air quality environmental impacts associated with switching to a lower sulfur coal."

waste due to spent reagent and has some power impacts.³⁰ Further, the White Bluff plant has been operating at lower load than it is operationally able to achieve. Additional power demands (i.e. parasitic load) of scrubbers may result in additional power generation (to offset these demands), additional waste or emissions than what would be expected without the additional control, and other associated impacts.

The Arkansas Pollution Prevention Act, Arkansas Code Ann. §8-10-201 et seq. establishes a hierarchy of waste minimization that favors pollution prevention at the source over reuse, recycling, treatment and disposal. The federal Pollution Prevention Act, 42 U.S.C. 13101, et seq. establishes as the national policy of the United States “that pollution should be prevented or reduced at the source whenever feasible.” 42 U.S.C. 13101(b). Reduction of SO₂ emissions from improved use of low-sulfur coal furthers both state and national policy by reducing pollution at the source. Installation of FGD creates a new waste stream that must be treated and disposed of, contrary to the Arkansas and federal policy. In light of this long stated state and federal policy favoring source reduction, the minimal visibility benefits that will be achieved, if any, do not weigh in favor of use of FGD; instead, the weight is in favor of increased efficiency of the use of low-sulfur coal.

d. Remaining Useful Life

There are no remaining useful life concerns or considerations with the continued use of low-sulfur coal. In contrast, requiring the installation of any control technology – particularly a control as capital intensive as a dry FGD – requires expenditures that would have to be amortized over a long period of time, that could be constrained if the useful life of the plant is unexpectedly shortened. If debt is assumed, then it may also create concerns regarding paying off these debts during the remaining useful life of the plant, if a determination is made to retire the plant earlier than expected. Furthermore, because public utility assets, such as White Bluff, are held in trust for the benefit of the public, installation of expensive controls such as FGD would require consideration of other important factors that are not implicated by continued use of low-sulfur coal.

5. Determining Visibility Impacts In the BART Determination

White Bluff currently uses low-sulfur coal. Therefore, the visibility benefits of using low-sulfur coal are already being realized. The BART statute, guidelines, case law,³¹ and other state rule proposals³² clearly allow for the consideration of existing use of low-sulfur coal in the BART analysis, and consideration of the positive visibility impacts that have been achieved via this controls. Further, these are visibility benefits that will be enjoyed for the next five years (until the October 21, 2021 compliance date established in the FIP).

EPA has admitted that due to its inherent limitations and uncertainty, CALPUFF is not useful to determine absolute visibility impacts, but only to compare the visibility impacts of different control technologies. In its response to comments on its Regional Haze Rule Federal Implementation Plan, EPA stated:

³⁰ See EPA Nelson Rule Proposal at 32,300.

³¹ See *North Dakota v. EPA* at 764.

³² See EPA Nelson Rule Proposal at 32,300, which states that “The LDEQ acknowledged that the visibility benefits of SDA and wet FGD are larger than those associated with lower-sulfur coal, but explained that lower-sulfur coal still achieves some visibility benefits and at a lower annual cost.”

While there is some uncertainty in the *absolute visibility impacts* and benefits due to the model and some of the simplifications and assumptions used in the BART guideline modeling approach, the relative level of impact is a reliable assessment of the degree of visibility impacts and benefit from the controls. Any uncertainties in meteorological conditions that govern the transport and diffusion of pollutants are less important *in comparing impacts between two control scenarios*, since the same effects will be included in both the base and the control scenario model simulations. CALPUFF modeling will be better at predicting changes in visibility impairment due to the application of controls than at predicting the absolute visibility impacts . . . The modeled magnitude of the visibility improvement is not a determinative factor in the BART determination, but only one factor and is considered on a relative basis to the baseline impact and the benefits of other controls.³³

Consequently, EPA has admitted that CALPUFF cannot support the absolute visibility impacts predicted by EPA and Entergy, especially at the distances involved for White Bluff. This is due to conditions that are not well accounted for in the CALPUFF model, but which nevertheless are present at the distances involved with White Bluff.³⁴ Even though CALPUFF may be able to distinguish visibility impacts of various control technologies, due to its limitations CALPUFF does not establish the absolute visibility impact of a particular control technology. Because deciview differences contained in the White Bluff five factor analyses are derived from the modeled absolute visibility impacts, these limitations inherent in the CALPUFF model also logically affect the differences shown in the modeled visibility impacts between two control technologies. Even with these admitted limitations, the modeled improvements in the White Bluff five factor analyses are still below the amount that is perceptible to humans and well below the 2-3 dv accuracy and precision of the CALPUFF model that EPA admits.³⁵

Due to the fact that CALPUFF is not a reliable method for determining BART under the circumstances involving White Bluff, ADEQ may look to other evidence. CENRAP modeling shows that *all* Arkansas point sources together in 2002 contributed less than 3.5% of sulfate light extinction at Arkansas Class I areas.³⁶ Given that White Bluff contributes only a fraction of statewide point source SO₂ emissions, it is likely that further reduction of SO₂ emissions from installation of FGD would reduce light extinction from sulfates at the Class I areas by substantially less than that.³⁷

In addition, the historic and continued use of low sulfur coal at White Bluff (and other Arkansas coal-fired power plants) has been sufficient to meet reasonable progress visibility requirements, as Arkansas is already at or below the regional haze glide path. 2015 monitoring data demonstrates that Arkansas is currently meeting the reasonable progress goals set in the FIP and will continue to meet those goals throughout 2018 – the first planning period.³⁸ Further, the most recent monitoring

³³ See 81 Fed. Reg. 66400, Sept. 16, 2016. (emphasis supplied).

³⁴ McNider, R., Inadequacy of CALPUFF and CALMET Protocols for Visibility Impact Analysis in the Arkansas RHR FIP, July 13, 2015.

³⁵ See 70 Fed. reg. 39104, 39123.

³⁶ See Figures 2, 3, 6 and 7, Revisions to Arkansas 2008 Regional Haze State Implementation Plan, August 2017.

³⁷ See also, Trinity Consultants' CAMx modeling report (Regional Haze Modeling Assessment Report, Independence Plant, August 4, 2015).

³⁸ See ADEQ Petition for Reconsideration at 3, citing to: Interagency Monitoring of Protected Visibility Environment, accessed at <http://vista.cira.colostate.edu/Improve/>.

data shows that visibility values for both Caney Creek and Upper Buffalo are well below both the Uniform Rate of Progress and the reasonable progress goals set by the EPA in the Regional Haze FIP.³⁹

³⁹ *Id.*

Entergy Arkansas Inc.

Comments

On the Proposed Arkansas Phase II Regional Haze Planning SIP Revision

**Submitted on:
February 2, 2018**

To:

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EXHIBITS

- Exhibit A** Entergy Arkansas Inc. Comments on the Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas, Docket No. EPA-R06-OAR-2015-0189-0166 (August 7, 2015) (attachments omitted)
- Exhibit B** Petition for Reconsideration and Request for Stay of Entergy Arkansas Inc., et al., of the Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan, Docket No. EPA-R06-OAR-2015-0189-0243 (November 23, 2016) (attachments omitted)
- Exhibit C** Trinity Consultants, *Effects of Coal-Fired Power Plant Closures in First Planning Period on Visibility in Arkansas Class I Areas* (February 2, 2018)
- Exhibit D** Sargent & Lundy, *Review of EPA's Cost Analysis for Arkansas Regional Haze Proposed Federal Implementation Plan*, Report No. SL-012913 (July 15, 2015)
- Exhibit E** Trinity Consultants, *Updated BART Five-Factor Analysis for SO₂ for Units 1 and 2* (August 18, 2017)
- Exhibit F** Petition for Reconsideration of the Revisions to the Regional Haze Rule by Southwestern Public Service Company, Entergy Services, Inc., and Cleco Power LLC, Docket No. EPA-HQ-OAR-2015-0531-0641 (March 13, 2017)
- Exhibit G** Letter from E. Scott Pruitt, EPA, to Debra J. Jezouit and Allison Watkins Mallick, Baker Botts L.L.P. (January 17, 2018)
- Exhibit H** Trinity Consultants, *CALPUFF Modeling for Low Sulfur Coal Scenario* (January 3, 2018)
- Exhibit I** Trinity Consultants, *Supplemental Information: Analysis of Reasonable Progress Arkansas Regional Haze Program First Planning Period* (February 2, 2018)

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I. Introduction

On October 31, 2017, the Arkansas Department of Environmental Quality (“ADEQ”) released for public review draft revisions to certain disapproved portions of the 2008 Arkansas Regional Haze State Implementation Plan (“SIP”) (“Draft SIP”). The Draft SIP addresses certain best available retrofit technology (“BART”) and reasonable progress controls for sources in Arkansas for the first planning period.¹ EPA’s approval of the Draft SIP would result in the withdrawal of the applicable BART and reasonable progress requirements in the Arkansas Regional Haze Federal Implementation Plan (“Final FIP”) that EPA promulgated in 2016 to address the disapproved portions of Arkansas’ regional haze plan. 81 Fed. Reg. 66,332 (Sept. 27, 2016). On December 19, 2017, ADEQ extended the public comment period on the Draft SIP to January 19, 2018, and subsequently, on January 12, 2018, ADEQ further extended the public comment period to February 2, 2018.

Entergy Arkansas, Inc. (“EAI” or “Entergy”) is an electric utility engaged primarily in the generation, purchase, transmission, distribution, and sale of electricity in portions of Arkansas. EAI provides electrical utility service to approximately 707,000 electric customers. EAI owns and operates three facilities directly impacted by the Draft SIP: the White Bluff Electric Power Plant (“White Bluff”), the Independence Steam Electric Station (“Independence”), and the Lake Catherine Plant (“Lake Catherine”).

¹ On July 8, 2017, ADEQ proposed revisions to the State’s Regional Haze SIP to address emissions of nitrogen oxides (“NOx”) from electric generating units (“EGUs”) for BART and reasonable progress purposes (“Phase I SIP”). Entergy submitted comments to ADEQ on the Phase I SIP on August 14, 2017. On January 24, 2018, EPA issued its final approval of the Phase I SIP. Approval and Promulgation of Implementation Plans; Arkansas; Approval of Regional Haze State Implementation Plan Revision for NOx for Electric Generating Units in Arkansas (prepublication version) (Jan. 24, 2018) (“Phase I SIP Approval”). Other BART requirements were previously approved by EPA in Arkansas’ regional haze plan. 77 Fed. Reg. 14,604 (Mar. 12, 2012).

Entergy largely agrees with ADEQ's proposed BART determinations, but urges ADEQ to revise its analyses and support for these determinations to account for all relevant information. Specifically, Entergy supports ADEQ's proposed BART sulfur dioxide ("SO₂") limits for White Bluff's two coal-fired electric generating units (Units 1 and 2), but urges ADEQ to revise its analysis supporting these limits to consider the date by which Entergy expects the plant will cease to use coal.²

Entergy disagrees with ADEQ's proposed determination that a reasonable progress analysis for SO₂ is required for Independence in light of the state's attainment of the reasonable progress goals for Arkansas' Class I areas during the first planning period. In the event that ADEQ proceeds with a reasonable progress analysis, ADEQ should broadly consider all relevant factors impacting the appropriateness of controls, as well as revise its consideration of the four statutory reasonable progress factors. *See* 42 U.S.C. § 7491(g)(1). Entergy also urges ADEQ to consider planned reductions at White Bluff, Lake Catherine, and Independence as part of its Long-Term Strategy ("LTS").

Finally, Entergy agrees with ADEQ that no changes to the particulate matter ("PM") BART limits are required for White Bluff or Lake Catherine, or to the SO₂ BART limit for Lake Catherine, but urges ADEQ to eliminate these limits from the Draft SIP and the draft Administrative Order ("AO").³ These limits already have been approved by EPA, are included in the plants' Title V permits and are in effect. Attempting to reissue them in the Draft SIP and make them enforceable through the AO is unnecessary and confusing.

² Entergy is prepared to take an enforceable restriction to this effect.

³ While these comments suggest some changes to the AO, Entergy anticipates that it will continue working with ADEQ to further refine the AO before finalization, as is customary for negotiated orders under the Arkansas Water and Air Pollution Control Act, § 82-1901 et seq.

II. Comments

A. ADEQ Should Finalize the Proposed White Bluff SO₂ BART Determination but Revise the BART Analysis

The Draft SIP would establish SO₂ BART emission rates for White Bluff Units 1 and 2⁴ of 0.6 lb/MMBtu, calculated as a 30-day rolling average over each boiler operating day, based on the use of low sulfur coal (“LSC”).⁵ Draft SIP at 25. Entergy supports this determination but urges ADEQ to revise its BART analysis to reflect the company’s expectation that it will cease combusting coal at White Bluff on or before December 31, 2028.

1. *ADEQ should recognize White Bluff’s expected cease-to-use-coal date when assessing Remaining Useful Life.*

In assessing Entergy’s most recent BART five-factor analysis for SO₂ controls at White Bluff,⁶ ADEQ “agrees that Entergy’s cost-effectiveness calculations are reasonable based on a remaining useful life of seven years and Entergy’s proposal to take an enforceable limit regarding the timing of their planned changes in coal-fired operations date.” *See* Draft SIP at 24. While Entergy’s BART five-factor analysis does employ a seven-year amortization period for the cost of Dry Flue Gas Desulfurization (“FGD”), this amortization period is based on a cease-to-use-coal date of 2028.⁷ Updated Five-Factor Analysis at 4-4. ADEQ adopts the seven-year amortization

⁴ ADEQ should correct its description of White Bluff’s history. The White Bluff units were not “installed in 1974” as stated in the Proposed SIP. Draft SIP at 28. Construction commenced on the White Bluff units in 1974. Commercial operation began in 1980 for Unit 1 and 1981 for Unit 2.

⁵ As explained in Section F, *infra*, LSC is not an “existing control” at White Bluff or Independence.

⁶ White Bluff Steam Electric Station, Updated BART Five-Factor Analysis for SO₂ for Units 1 and 2 (Aug. 18, 2017) (“Updated Five-Factor Analysis”). Entergy submitted the Updated Five-Factor Analysis to ADEQ on August 18, 2017, with certain information redacted as confidential business information, but released the confidential business information in a letter to ADEQ dated December 1, 2017. *See* Letter from John F. Peiserich, PPGMR Law, PLLC, to Stuart Spencer, ADEQ (Dec. 1, 2017). An unredacted version of the Updated Five-Factor Analysis is attached to these comments as Exhibit E.

⁷ Entergy employed a nine-year amortization period for Dry Sorbent Injection (“DSI”) and Enhanced DSI. Updated Five-Factor Analysis at 4-4.

period for its analysis of Dry FGD,⁸ but assumes that White Bluff will cease to use coal in 2030, rather than 2028. ADEQ calculated the seven-year amortization period based on a compliance date five years after EPA approval of the SIP. Draft SIP at 24, n.21. Assuming the replacement SIP is finalized and approved by EPA in 2018, ADEQ calculated that the compliance date for SO₂ limitations based on the projection that Dry FGD would be installed in 2023. ADEQ then assumed that Entergy's seven-year amortization period would result in a cease-to-use-coal date of 2030. The assumption that White Bluff will cease combusting coal in 2030 has no basis in the record, likely is factually inaccurate and does not reflect the information that Entergy submitted to ADEQ. ADEQ should revise the SIP to reflect Entergy's expectation that it will cease using coal at White Bluff by the end of 2028.⁹

Remaining useful life is a factor that the state must take into account: "in determining [BART] the State ... *shall* take into consideration ... the remaining useful life of the source" CAA § 169A(g)(2) (emphasis added); 40 C.F.R. § 51.308(e)(1)(ii)(A) (in determining BART, "the State *must* take into consideration ... the remaining useful life of the source...") (emphasis added). As ADEQ recognizes, the BART Guidelines plainly state that a BART determination should consider the remaining useful life of the facility. Draft SIP at 24 (citing Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations, 70 Fed. Reg. 39,104, (July 6, 2005)). Remaining useful life is critical for calculating the cost-effectiveness of control options, as the costs of controls are amortized over the expected remaining life of the unit. Entergy's Updated BART Five-Factor Analysis explicitly established the date by which EAI expects to cease burning coal at the White Bluff units, stating that Entergy "anticipates Unit 1 and

⁸ Like Entergy, ADEQ used a nine-year amortization period for DSI and Enhanced DSI. *See* Draft SIP at 23.

⁹ All references to the expectation that coal combustion will cease in 2028 refer to the end of 2028.

Unit 2 will cease to use coal by the end of year 2028, and, upon acceptance of the BART determinations contained herein in an approved SIP, is prepared to take an enforceable restriction to this effect.” Updated Five-Factor Analysis, at 4-4.

This date is consistent with Entergy’s previous analyses for White Bluff and its publicly stated expectation that it will cease using coal at both units by 2028. *See* EAI Comments on the Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas, at 2, 5, Docket No. EPA-R06-OAR-2015-0189-0166 (Aug. 7, 2015) (“EAI Arkansas FIP Comments”) (proposing “to cease all coal-fired operations at the two coal-fired units [at White Bluff] in 2027 and 2028” and to take an “enforceable commitment to that effect.”)) (attached as Exhibit A, attachments omitted); *see* Petition for Reconsideration and Request for Stay of Entergy Arkansas Inc., et al., at 5, Docket No. EPA-R06-OAR-2015-0189-0243 (Nov. 23, 2016) (“Entergy Petition for Reconsideration”) (criticizing the Final FIP for “fail[ing] to consider Entergy’s proposal to cease combusting coal in 2027 and 2028, which would limit the remaining useful coal-fired lives of the units and significantly alter the cost-effectiveness of SO₂ controls.”) (attached as Exhibit B, attachments omitted).

It is unclear why ADEQ did not use this information when assessing the remaining useful life of the units. Entergy had made public its expectation that it would cease to use coal at White Bluff by 2028, and provided ADEQ with an Updated Five-Factor Analysis indicating that all coal use would cease by 2028. Despite this, the Agency proposed a cease-to-use-coal date of 2030 in the draft AO to support the SIP, which directly conflicts with the information provided by EAI, the operator and a co-owner of the units. Neither the statute nor the regional haze regulations provide ADEQ with the authority to reassess and redefine the remaining useful life of a source.

EAI provided to ADEQ the specific date by which the White Bluff units are expected to cease to use coal, and ADEQ should take this date into account to strengthen its analysis and ensure that its final decision has a reasonable basis. Indeed, failure to consider this relevant information about the units' remaining useful life from the operator and co-owner is arbitrary. *See e.g., White Cty. Guar. Sav. & Loan Ass'n v. Farmers & Merchants Bank of Des Arc*, 262 Ark. 893, 900, 562 S.W.2d 582, 585 (1978) (an administrative action will be set aside as arbitrary and capricious when it is a “willful and unreasoning action,’ without consideration and in disregard of the facts or circumstances of the case.”) (quoting *First National Bank of Fayetteville v. Smith*, 508 F.2d 1371, 1376 (8th Cir. 1974)). *See also McQuay v. Arkansas State Bd. of Architects*, 337 Ark. 339, 347-48 (1999) (finding a state board's assessment of penalties to be arbitrary and capricious due to the board's failure to account for the date on which the violations ended).

Accordingly, ADEQ should revise its BART analysis for White Bluff Units 1 and 2 to take into account the cease-to-use coal date of 2028 that Entergy provided in the Updated Five-Factor Analysis. This would result in a five-year amortization period for the installation of Dry FGD,¹⁰ and would strengthen ADEQ's determination that Dry FGD should not be considered BART for White Bluff.

2. *In light of the limited remaining useful life, LSC is BART for White Bluff.*

ADEQ's BART analysis assesses four possible controls for White Bluff: DSI, enhanced DSI, Dry FGD,¹¹ and LSC. Entergy submitted a BART five-factor analysis for White Bluff that

¹⁰ It also would result in a seven-year amortization period for DSI and Enhanced DSI.

¹¹ ADEQ did not consider Wet FGD, noting that the difference in cost between Wet and Dry FGD is “marginal.” *See* Draft SIP at 22. (“This option was eliminated in previous analyses and in the AR RH FIP due to the small incremental difference in visibility improvement between Wet FGD and Dry FGD relative to the marginal cost difference”). EAI disagrees that the cost difference should be characterized as “marginal.” EPA estimated Dry FGD at a cost of \$2,565/ton of SO₂ removed for Unit 1 and \$2,421/ton of SO₂ removed for Unit 2, 81 Fed. Reg. at 66,386, and Wet FGD to have an average cost-effectiveness of \$3,152/ton of SO₂ removed for Unit 1 and \$3,092/ton of SO₂ removed for Unit 2, 80 Fed. Reg. 18, 944,

analyzed the same four potential controls. Based on its analysis, Entergy agrees with ADEQ that, in light of the limited remaining useful life, DSI and Dry FGD are not cost-effective at White Bluff, and that BART should be based on the use of LSC. However, ADEQ should revise its cost-effectiveness analysis in light of Entergy’s proposed remaining useful life for White Bluff and to correct certain other errors.

ADEQ calculated the average cost-effectiveness of DSI to be \$6,238 per ton for Unit 1 and \$6,211 per ton for Unit 2, and the average cost-effectiveness of “enhanced” DSI to be \$6,426 per ton for Unit 1 and \$6,384 per ton for Unit 2. White Bluff Cost Calculations Technical Support Document. It calculated the average cost-effectiveness of Dry FGD to be \$5,429 per ton for Unit 1 and \$5,387 for Unit 2. *Id.* See Table 1.

Table 1: ADEQ’s Cost-Effectiveness Calculations		
	Unit 1	Unit 2
DSI	\$6,238	\$6,211
Enhanced DSI	\$6,426	\$6,384
Dry FGD	\$5,429	\$5,387

These cost-effectiveness values exceed the amounts that EPA in the past has determined are not cost-effective.¹² For example, EPA declined to impose dry FGD as BART in Arizona,

18,972 (April 8, 2015). This is a difference of \$587/ton of SO₂ removed at Unit 1 and \$671/ton of SO₂ removed at Unit 2. EAI does not consider these differences to be marginal. However, EAI does agree that wet FGD is not a cost-effective control and should not be analyzed further.

¹² Entergy’s calculations of the costs of DSI, Enhanced DSI, and Dry FGD, assuming a nine-year remaining useful life for DSI and Enhanced DSI and a seven-year remaining useful life for Dry FGD, are *higher* than the costs calculated by ADEQ, making the control technologies even less cost-effective than ADEQ concluded. As described in its revised Five Factor Analysis for White Bluff, based on actual costs, Entergy calculated the average cost effectiveness of DSI to be \$7,081 -- \$7,148/ton, Enhanced DSI to be \$7,322 - - \$7,372/ton, and Dry FGD to be \$7,080 -- \$7,124/ton. Even accounting for EPA’s disallowed costs, the cost-effectiveness values for these controls are still too high to be considered BART: \$6,211 -- \$6,267/ton for DSI, \$6,384 -- \$6,427/ton for Enhanced DSI, and \$5,387 -- \$5,420/ton for Dry FGD. See Updated Five-Factor Analysis at 4-5.

where the average cost effectiveness was estimated to be \$5,091/ton. Proposed Arizona Regional Haze FIP, 79 Fed. Reg. 9,318, 9,331-33 (Feb. 18, 2014); Final Arizona Regional Haze FIP, 79 Fed. Reg. 52,420, 52,436 (Sept. 3, 2014). In North Dakota, EPA approved the state's determination that a cost effectiveness of \$6,525 per ton was excessive for NO_x controls and did not constitute BART. Proposed North Dakota FIP, 76 Fed. Reg. 58,570, 58,630 (Sept. 21, 2011); Final North Dakota Regional Haze FIP, 77 Fed. Reg. 20,894, 20,896 (Apr. 6, 2012). In Montana, EPA concluded that certain SO₂ controls with a cost effectiveness of \$5,442/ton and \$6,365/ton were not cost effective. Proposed Montana Regional Haze FIP, 77 Fed. Reg. 23,988, 24,047 (Apr. 20, 2012); Final Montana Regional Haze FIP; 77 Fed. Reg. 57,864, 57,866 (Sept. 18, 2012).

In comparison, ADEQ calculated LSC to cost approximately \$1,150 per ton of SO₂ reduced, Draft SIP at 23, which is cost-effective. However, ADEQ's determination that LSC is BART for the White Bluff units would be strengthened if it were based on EAI's anticipated cease-to-use coal date of 2028, since it would yield a five-year amortization period for the installation of Dry FGD at White Bluff, which would render Dry FGD at White Bluff even *more* uneconomic, at \$6,912 per ton for Unit 1 and \$6,869 for Unit 2.¹³

3. *The proposed three-year compliance period for SO₂ is appropriate.*

EAI supports ADEQ's proposal that White Bluff be allowed three years after EPA's approval of the SIP revision to meet the LSC BART limitation of a rolling 30-boiler operating day average SO₂ emission rate of 0.6 lb/mmBTU.¹⁴ See Draft SIP at 25. It is Entergy's practice to project how much coal will be needed in future years and to contract for a portion of the coal

¹³ DSI or Enhanced DSI at a seven-year amortization period would similarly be more uneconomic as BART than the costs that ADEQ calculated for these controls with a nine-year amortization period.

¹⁴ EAI similarly agrees with ADEQ that a five-year compliance period is appropriate for installation of control technology such as FGD.

supply up to three years in advance. Entergy also is required to keep a reserve supply of coals at White Bluff to ensure that the units can operate in the event of a fuel supply disruption. Accordingly, Entergy will need sufficient time to ensure that *all* its contracted coal supply meets the SO₂ BART emission rate, once finalized and approved by EPA. A three-year timeline is reasonable and complies with the Regional Haze Rule, which allows up to five years for compliance with BART. 40 C.F.R. § 51.308(e)(iv).

B. The Reasonable Progress Analysis Should Be Revised

EAI urges ADEQ to revise its reasonable progress analysis to ensure that the final SIP is legally durable and reflects the State's authority to implement the Regional Haze Program. For reasonable progress purposes, the Draft SIP would require Independence¹⁵ to meet a 30-boiler operating day rolling average SO₂ emissions limitation of 0.6 lb/MMBtu based on LSC. Draft SIP at 47. While Entergy agrees with ADEQ's determination that Dry FGD or another add-on control technology is not necessary at Independence to demonstrate that the state has made reasonable progress during the first planning period as would be required by the Final FIP, Entergy further believes that *no* assessment of reasonable progress is even required because Arkansas *already* is meeting its reasonable progress goals for the first planning period and the two Class I areas are below their glidepaths.

If ADEQ determines a reasonable progress analysis nonetheless is required, then it should be a broader analysis than the one ADEQ conducted, looking at more sources and at all relevant factors rather than a source-specific analysis focused solely on Independence. Nonetheless, in the event that the Final SIP includes a source-specific reasonable progress analysis for Independence,

¹⁵ ADEQ should revise its description of Independence's history. The Independence units were not "installed in 1983" as stated in the Draft SIP. Draft SIP at 42. Construction commenced on the Independence units in 1978. Commercial operation began in 1983 for Unit 1 and in 1984 for Unit 2.

ADEQ should correct flaws in its analysis and account for all relevant information, including the plant's anticipated cease-to-use-coal date. Revising the reasonable progress analysis consistent with Entergy's comments would result in a more robust and legally durable SIP while preserving the State's authority as the primary entity responsible for implementing the Regional Haze Program.

1. *Arkansas already is meeting its reasonable progress goals, so no reasonable progress analysis is required.*

The threshold issue when addressing reasonable progress is whether further actions are *necessary* to ensure that visibility improvement is continuing toward background levels (i.e., on or below the "glide path"). The Clean Air Act ("CAA") requires implementation plans to "contain such emission limits, schedules of compliance and other measures *as may be necessary* to make reasonable progress." See 42 U.S.C. § 7491(b)(2) (emphasis added). Consistent with this, EPA's Reasonable Progress Guidance¹⁶ makes clear that reasonable progress controls may not be necessary in the first planning period, noting that, "[g]iven the significant emissions reductions that we anticipate to result from BART" and other CAA programs "it may be all that is necessary to achieve reasonable progress in the first planning period."). Reasonable Progress Guidance at 4-1. See also, *id.* at 1-4 ("[Y]ou should take into account the fact that the long-term goal of no manmade impairment encompasses several planning periods. It is reasonable for you to defer reductions to later planning periods in order to maintain a consistent glidepath toward the longterm goal."). In sum, only if further action beyond BART and other CAA programs is *necessary* for reasonable progress may ADEQ require additional controls.

¹⁶ U.S. EPA, *Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program* (June 1, 2007) ("Reasonable Progress Guidance"). Available at https://www3.epa.gov/ttn/naaqs/aqmguides/collection/cp2/20070601_wehrum_reasonable_progress_goals_reghaze.pdf.

ADEQ has not made such a determination. Had it assessed whether controls beyond BART or other CAA programs are necessary to make reasonable progress for the first planning period, it would have concluded that they are not, and that no further analysis was required. Arkansas already has achieved visibility improvements in its Class I areas that surpass the Draft SIP's reasonable progress goals for the first planning period (*i.e.*, 22.51 dv for Upper Buffalo and 22.47 dv for Caney Creek, Draft SIP at 48, which were the same as the goals EPA set in the Arkansas FIP¹⁷), rendering the imposition of reasonable progress controls on Independence unnecessary for the first planning period.

ADEQ's analysis demonstrated that visibility in Caney Creek and Upper Buffalo was anticipated to meet the reasonable progress goals in the Draft SIP, even in the absence of controls on Independence. *See* Arkansas Department of Environmental Quality, *State Implementation Plan Review for the Five-Year Regional Haze Progress Report*, at 55-56 (May 2015). This is consistent with EPA's determination in its Proposed FIP that Arkansas' Class I areas were projected to meet the glidepath for the first planning period, even without controls on Independence, 80 Fed. Reg. at 18,992, effectively conceding that the controls are not "necessary" in the first planning period to ensure reasonable progress towards the natural visibility goal. *See* 42 U.S.C. § 7491(b)(2).¹⁸

¹⁷ EAI reserves the right to provide additional feedback on these goals in the future. It appears that ADEQ is relying on a methodology similar to that employed by EPA in the Arkansas FIP and as established by EPA in the Regional Haze Revision Rule, 82 Fed. Reg. 3,078, 3,089 (Jan. 10, 2017), both of which currently are the subject of legal challenge. *See* Draft SIP at 48. EAI disagreed with EPA's reasonable progress goals in the proposed Arkansas FIP, *see* EAI Arkansas FIP Comments at 49, and believes that its objections to EPA's methodology may be applicable here. Additional time to submit comments would allow EAI to more fully analyze ADEQ's methodology.

¹⁸ As stated below, although Entergy disagrees with ADEQ's proposed determination that LSC should be required for Independence as a reasonable progress control, Entergy would agree to take 30-boiler operating day rolling average SO₂ limits for Independence Units 1 and 2 of 0.6 lb/mmBTU.

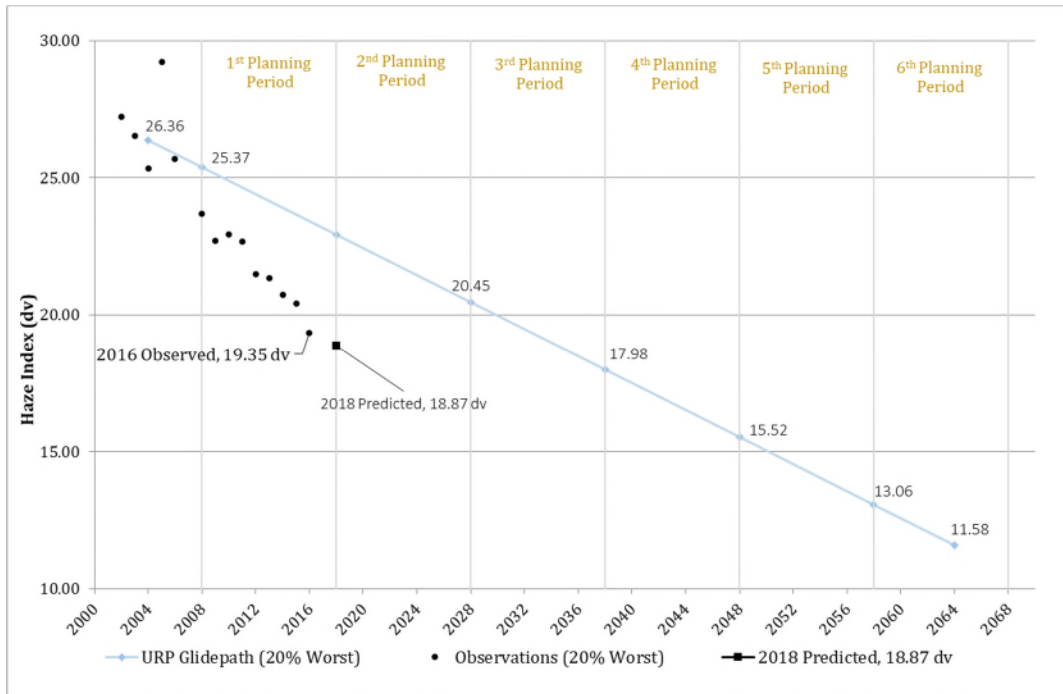
These predictions have been confirmed by more recent IMPROVE data for 2016, which show that visibility measurements in both Caney Creek and Upper Buffalo were better than the reasonable progress goals in the FIP. Entergy's Updated Analysis of Reasonable Progress at 5-1 – 5-2 (Sept. 27, 2017) ("Analysis of Reasonable Progress"). These improvements are likely to be maintained in light of the planned compliance strategies to meet the BART requirements (e.g., the cessation of coal burning by 2028 and installation of low-NO_x burners at White Bluff as well as the BART requirements imposed on other sources) and implementation of other CAA programs such as the Cross State Air Pollution Rule ("CSAPR").

Visibility at Arkansas Class I areas is expected to further improve due to the imminent retirements of five power plants in neighboring states, including the Sandow Power Plant, Big Brown Power Plant, and Monticello Power Plant in Texas. These units, which total roughly 4,100 megawatts, are scheduled to be taken offline in early 2018.¹⁹ The Deely Plant in east Texas and the Allen Plant in Tennessee also are scheduled to retire in 2018. *See* Trinity Consultants, *Effects of Coal-Fired Power Plant Closures in First Planning Period on Visibility in Arkansas Class I Areas*, at 2-1 (Feb. 2, 2018) (attached as Exhibit C). The elimination of emissions from these five power plants during the first planning period are anticipated to help ensure that Caney Creek and Upper Buffalo remain below the glidepath through the end of the first planning period and into the second planning period. Specifically, these retirements will result in emissions reductions of greater than 206,000 tons per year of SO₂ and more than 39,000 tons per year of NO_x. *Id.* These reductions are significantly higher than the emissions reductions anticipated by the Final FIP, the

¹⁹ Press Release, Luminant, *Luminant Announces Decision to Retire its Monticello Power Plant* (Oct. 6, 2017), at <https://www.luminant.com/luminant-announces-decision-retire-monticello-power-plant/>; Press Release, Luminant, *Luminant to Close Two Texas Power Plants* (Oct. 13, 2017), at <https://www.luminant.com/luminant-close-two-texas-power-plants/>.

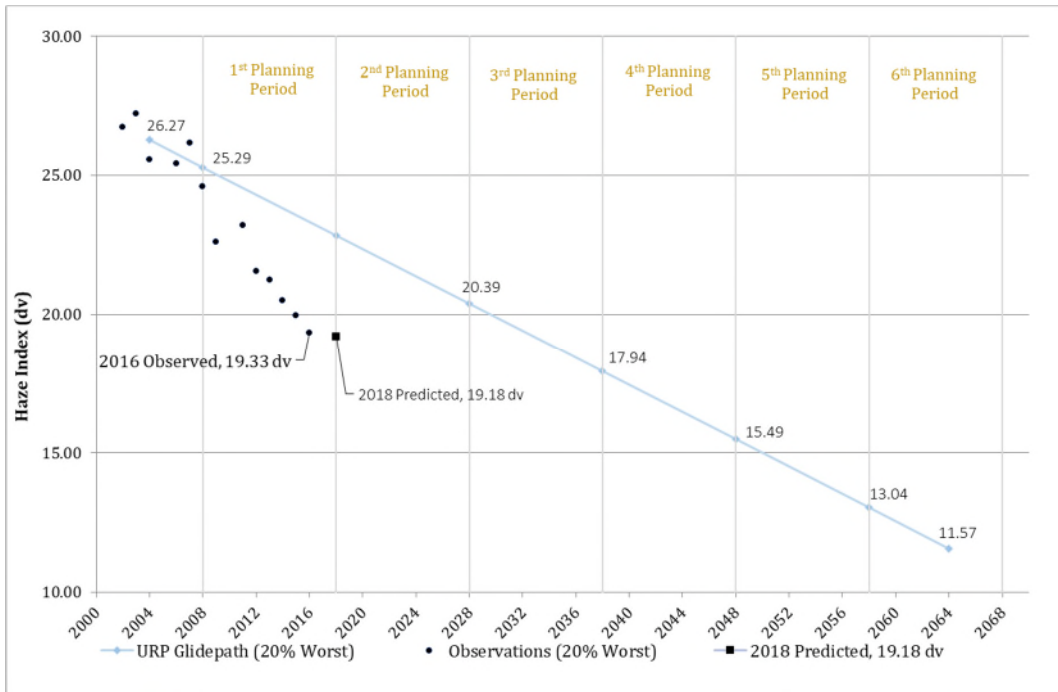
final Phase I SIP, and the Draft SIP. They also are greater than the maximum emissions from White Bluff and Independence combined. *Id.* at 2-1 – 2-2. As a result, the retirement of the four Texas plants is predicted to result in a total reduction of approximately 2.5 percent in visibility extinction at Caney Creek and about 0.8 percent at Upper Buffalo, based on EPA’s modeling for the Texas Reasonable Progress FIP.²⁰ *Id.* at 3-2. Figures 1 and 2 illustrate how these emission reductions are predicted to ensure that visibility impairment will remain well below the glidepath until the end of the second planning period. The additional reductions from the retirement of the Allen Plant will further contribute to visibility impairment remaining below the glidepath. *Id.*

Figure 1. CACR Glidepath with Observed and 2018 Predicted Haze Index



²⁰ 79 Fed. Reg. 74,818 (Dec. 16, 2014).

Figure 2. UPBU Glidepath with Observed and 2018 Predicted Haze Index



In addition to being legally unnecessary, ADEQ’s assessment of reasonable progress control options despite Arkansas’ substantial progress toward the national visibility goal conflicts with its own pending administrative petition for reconsideration and petition for judicial review of the Final FIP. In its administrative petition requesting that EPA reconsider the Final FIP, ADEQ urges EPA to “reconsider whether controls on Independence are necessary under the Clean Air Act because 2015 monitoring data shows that Arkansas is currently meeting the reasonable progress goals set in the FIP and will continue to meet those goals for the remainder of the first planning period.” Administrative Petition for Reconsideration and Request for Stay of ADEQ at 3 (Nov. 23, 2016). Similarly, in its opening brief in the litigation challenging the Final FIP, ADEQ argues that “[t]he Final [FIP] should be vacated because EPA ignored evidence that Arkansas would achieve reasonable progress—and natural visibility before 2064—without any additional controls.” Opening Br. for Arkansas at 36, *Arkansas v. EPA*, No. 16-4270 (8th Cir. Feb. 17, 2017). ADEQ’s determination is inconsistent with its interpretation of the reasonable progress

requirements of the CAA. ADEQ is challenging EPA for having made a similar determination regarding the need for reasonable progress controls in the Final FIP.

ADEQ's current approach also may limit its ability to change course in the second and subsequent planning periods. An EPA approval of ADEQ's decision to perform an unnecessary reasonable progress analysis may limit ADEQ's discretion in deciding against performing a reasonable progress analysis under similar conditions in the future. ADEQ might be forced to assess reasonable progress controls even if visibility improvement exceeds the goals, increasing the likelihood that unnecessary controls would be imposed upon Arkansas point sources.

In light of the foregoing, ADEQ should revise the SIP to conclude that no controls are necessary for Independence given the attainment of the reasonable progress goals at Arkansas's Class I areas. Based on the most recent air quality monitoring data, no further measures are *necessary* for Arkansas to make reasonable progress toward the Regional Haze Program's visibility goal in the first planning period, so a reasonable progress analysis is not required. Such a determination would be consistent with EPA's instruction that reductions may be deferred "to later planning periods in order to maintain a consistent glidepath toward the longterm goal."²¹

Reasonable Progress Guidance at 1-4.

²¹ ADEQ's decision to assess reasonable progress controls despite the fact that they are unnecessary is consistent with EPA's Regional Haze Revision Rule, 82 Fed. Reg. at 3,089, which mandates that states assess controls even before they establish their reasonable progress goals and that visibility not be considered as a factor in determining whether to require controls. For the reasons explained in this section, this is inconsistent with the CAA. Entergy Services, Inc. submitted a petition for reconsideration to EPA on this issue on March 13, 2017. *See* Petition for Reconsideration of the Revisions to the Regional Haze Rule by Southwestern Public Service Company, Entergy Services, Inc., and Cleco Power LLC, Docket No. EPA-HQ-OAR-2015-0531-0641 (Mar. 13, 2017) (attached as Exhibit F). On January 17, 2018, EPA determined that it would review the Regional Haze Revision Rule. *See* Letter from Scott Pruitt, EPA, to Debra J. Jezouit and Allison Watkins Mallick, Baker Botts L.L.P. (Jan. 17, 2018) (attached as Exhibit G). As a result, these mandates may be revised or eliminated.

2. *Any final reasonable progress assessment should broadly consider all relevant sources and factors.*

If ADEQ determines a reasonable progress analysis is required, it should perform a broader analysis than the one conducted for the Draft SIP. Specifically, such an analysis should look at all relevant sources as well as beyond the four statutory reasonable progress factors. *See* 42 U.S.C. § 7491(g)(1) (requiring the consideration of (1) non-air quality environmental impacts, (2) cost of compliance, (3) time necessary for compliance, and (4) remaining useful life).

ADEQ is not limited to consideration of the four factors mandated by the CAA; instead, states are specifically authorized by EPA’s guidance to consider other relevant factors, and Arkansas should do so here. EPA’s Reasonable Progress Guidance, which applies to the first planning period, is clear that the four statutory factors are the *minimum* that ADEQ must consider. In other words, when determining reasonable progress, states can consider other factors that it has found to be relevant. *See* Reasonable Progress Guidance at 5-1 (“In determining reasonable progress, CAA § 169A(g)(1) requires States to take into consideration a number of factors. However, you have flexibility in how to take into consideration these statutory factors and any other factors that you have determined to be relevant.”). For example, there is no requirement that the analysis mirror a BART analysis. To the contrary, EPA has stated that

[u]nlike the technical demonstration for...BART, the reasonable progress demonstration involves a test of strategy. The strategy includes a suite of controls that has been identified through the identification of pollutants and source categories of pollutants for visibility impairment—the possible controls for these pollutants (and their precursors) and source categories—the application of four statutory factors and how much progress is made with a potential strategy and is not a source-specific demonstration like the BART assessment.²²

²² EPA, Additional Regional Haze Questions, at 8 (Sept. 27, 2006 Revision).

EPA also has explained that the cost of compliance factor for reasonable progress purposes – one of the factors that overlaps with a BART analysis – “can be interpreted to encompass the cost of compliance for individual sources or source categories, and more broadly the implication of compliance costs to the health and vitality of industries within a state.” Reasonable Progress Guidance, at 5-1.

There are several other relevant factors that ADEQ should consider. Most importantly, ADEQ should look broadly at the sources contributing to visibility impairment at Class I areas instead of focusing solely on Independence. As explained in Entergy’s comments on the Proposed FIP, Arkansas point sources are relatively insignificant contributors to visibility impairment in Caney Creek and Upper Buffalo compared to most of the other regions modeled by CENRAP, and are not the largest source group contributors in Arkansas to visibility impairment in these Class I areas. *See* EAI Arkansas FIP Comments at 23-29. Of a total point source contribution of 61.85% at Caney Creek in 2002, Arkansas’ point sources contributed only 2.87%, making Arkansas the eighth highest point source contributor. Similarly, of the 60.35% total point source contribution at Upper Buffalo in 2002, Arkansas was the ninth highest point source contributor with only a 2.47% contribution. *Id.* at 26. In addition, most of Arkansas’ share of the contribution to visibility impairment comes from Arkansas area and mobile sources, not point sources. *Id. See also* Draft SIP at 39. At Caney Creek, Arkansas area sources contribute 3.75% of the overall extinction while Arkansas’ combined point source category (i.e., elevated and low-level point sources) contribute only 2.87%. EAI Arkansas FIP Comments at 29. Even more significantly, Arkansas area sources contribute 5.09% towards extinction at Upper Buffalo compared to a mere 2.47% from the combined Arkansas point sources. *Id.* Independence’s emissions, which comprise only a portion of Arkansas’ point source emissions, have an even smaller effect on light extinction in either Class

I area. As a result, installing emissions controls on Independence would not meaningfully change visibility at either Class I area. *See* EAI Arkansas FIP Comments at 23-29.

Evidence of significant contribution to visibility impairment from other sources is a valid consideration when assessing reasonable progress controls and has been approved by EPA in other similar decisions. *See, e.g.*, Proposed Rule: Approval and Promulgation of Implementation Plans; State of Alaska; Regional Haze State Implementation Plan, 77 Fed. Reg. 11,022, 11,035-36 (Feb. 24, 2012) (EPA proposing to approve Alaska’s conclusion that it is not reasonable to require reasonable progress controls, in part because emissions from natural sources contribute the most significant visibility impacts); 78 Fed. Reg. 10,546 (Feb. 14, 2013) (final approval). In fact, EPA approved ADEQ’s decision to screen out Arkansas point sources from further evaluation of NOx controls for reasonable progress purposes in light of (1) the low level of visibility impairment due to NOx emissions from those sources and (2) the fact that additional NOx controls are not anticipated to yield meaningful visibility improvements. Phase I SIP Approval at 11-12, 22-23. EPA explained that, “in cases where it has been demonstrated that a particular pollutant or source category does not contribute significantly to visibility impairment at affected Class I areas, it may be appropriate to end the analysis at that point, without the need to evaluate the four statutory factors for potential controls to address that pollutant and/or source category.” *Id.* at 26. As with NOx, Independence’s SO₂ emissions have a small contribution to visibility impairment, as demonstrated in Entergy’s CAMx modeling, and installation of SO₂ controls at Independence would have little impact on visibility. *See* EAI Arkansas FIP Comments at 32. Based on EPA’s approval of ADEQ’s NOx analysis, consideration of these factors is appropriate.

ADEQ also should assess costs in the context of effects on electricity rates. Installation of Dry FGD at Independence would cost approximately *\$1 billion*. These costs could increase

electricity rates, with significant impacts on Arkansas communities, many of which already are facing economic hardships. This is unreasonable in light of the current visibility in Arkansas' Class I areas.

3. *If the Final SIP relies on a source-specific four-factor analysis, the analysis should be revised.*

To the extent ADEQ continues to rely on an Independence-specific four-factor analysis in the final SIP, its analysis should be revised in several ways. ADEQ should revise its estimate of the costs of compliance on a dollar-per-deciview basis. ADEQ also should recognize the time necessary for compliance. Finally, and most importantly in the context of a source-specific analysis, ADEQ should account for the remaining useful life of Independence. ADEQ should revise any final four-factor analysis to account for these factors, to ensure consideration of the most up-to-date relevant information, to strengthen the SIP and its strategy for subsequent planning periods, and, simply, to comply with the requirements of the CAA. A corrected analysis including these revisions would support a determination that no controls are warranted on Independence for reasonable progress in the first planning period.²³

- (i) ADEQ should revise its estimated dollar-per-deciview costs of compliance.

Entergy agrees with ADEQ that the costs of control technologies like Dry FGD in terms of dollar-per-deciview of improvement is an important metric for assessing the cost of compliance. See Draft SIP at 45. However, ADEQ should revise its dollar-per-deciview calculations to more accurately estimate the cost of controls. ADEQ relied on cost information and modeling results from the Final FIP to calculate these values, resulting in an underestimation of costs. ADEQ

²³ Nonetheless, as explained in Section II.C, *infra*, EAI is willing to implement LSC as a SIP-strengthening measure.

estimates that the cost of Dry FGD at Independence is approximately \$67 million per dv improvement at Caney Creek, and approximately \$62 million per dv improvement at Upper Buffalo. *Id.*

As explained in Entergy's comments on the Proposed FIP, the cost of Dry FGD at Independence is actually much higher: approximately \$1.33 billion \$1.35 billion per dv improvement at Caney Creek and Upper Buffalo respectively. *See* Sargent & Lundy, *Review of EPA's Cost Analysis for Arkansas Regional Haze Proposed Federal Implementation Plan*, Report No. SL-012913, (July 15, 2015) (attached as Exhibit D). Instead of relying on CALPUFF, Entergy's calculations rely on CAMx modeling, which is a more appropriate modeling tool for assessing Regional Haze, especially reasonable progress. CALPUFF modeling vastly overstates the potential visibility improvement from controls on Independence. *See* EAI Arkansas FIP Comments at 35-41. The true costs of Dry FGD are exorbitant and cannot be justified where additional visibility improvement is not needed to remain below the glide path. *See Nat'l Parks Conservation Ass'n v. EPA*, 788 F.3d 1134, 1149 (9th Cir. 2015) ("NPCA") (upholding EPA's decision not to require reasonable progress controls because of lack of cost-effectiveness).

(ii) ADEQ should consider the actual time necessary for compliance.

Neither Dry FGD, DSI, nor LSC can be considered reasonable progress controls for Independence, as none of these controls could be implemented before the end of the first planning period in 2018. EPA's regulations require SIPs to consider "the emission reduction measures needed to achieve [reasonable progress goals] *for the period covered by the implementation plan.*" 40 C.F.R. § 51.308(d)(1)(i)(B) (emphasis added). The use of LSC cannot occur until the second planning period due to the existing coal contracts that already dictate Entergy's coal supply

through 2019.²⁴ In staying the effectiveness of EPA’s Regional Haze FIP for the state of Texas, the U.S. Court of Appeals for the Fifth Circuit explained that “[t]he emissions controls included in a state implementation plan . . . must be those designed to achieve the reasonable progress goal for the period covered by the plan,” and that the parties challenging the FIP “persuasively argue that [EPA’s requirement that power plants meet Reasonable Progress goals by installing scrubbers in 2019 and 2021] exceeds the power granted by the Regional Haze Rule.” *Texas v. EPA*, 829 F.3d 405, 429 (5th Cir. 2016). ADEQ has not explained why it is appropriate to require reasonable progress controls in a SIP for the first planning period when the controls cannot be installed or result in visibility benefits in that planning period.

(iii) ADEQ should account for the anticipated Remaining Useful Life of Independence.

ADEQ should account for the expected remaining useful coal-fired life of Independence in any final four-factor analysis, as required by the CAA. *See* 42 U.S.C. § 7491(g)(1). In its Updated Analysis of Reasonable Progress, Entergy notified ADEQ that it anticipated ceasing to combust coal at the Independence units by the end of 2030.²⁵ *See* Analysis of Reasonable Progress at 6-2. When the coal units’ expected remaining useful life is considered along with the time necessary for compliance with add-on SO₂ emissions controls (e.g. the 5-year compliance deadline in the FIP for the installation of Dry FGD), the cost of controls is unreasonable. For example, according to EAI’s analysis, as based on EPA’s control cost estimates, the cost effectiveness of Dry FGD would be approximately \$5,026/ton of SO₂ removed at Unit 1, and \$4,640/ton of SO₂ removed at Unit 2. *See* Trinity Consultants, *Supplemental Information: Analysis of Reasonable*

²⁴ ADEQ should correct its description of the fuel burned at Independence. While Independence does burn Powder River Basin sub-bituminous coal, this coal is not always from Wyoming. *See* Draft SIP at 42.

²⁵ EAI is willing to take an enforceable commitment to this effect.

Progress Arkansas Regional Haze Program, First Planning Period, at 3-1 (Feb. 2, 2018) (attached as Exhibit I).

These control costs are not reasonable, as they exceed cost effectiveness values that EPA agreed could be rejected for reasonable progress purposes for other state plans. For example, the Kentucky Regional Haze SIP used a value of \$2,000 per ton SO₂ as a screening threshold for cost effectiveness. 76 Fed. Reg. 78,194, 78,206 (Dec. 16, 2011). These control costs are especially unreasonable where the visibility already meets the reasonable progress goal. In the North Carolina Regional Haze SIP, EPA approved the state's decision not to implement reasonable progress controls due to limited improvement in visibility even though cost effectiveness values were described as ranging "from 912 to 1,922 dollars per ton of SO₂ removed (\$/ton SO₂), and the average costs per utility system ranged from \$1,231 to \$1,375/ton SO₂." 77 Fed. Reg. 11,858, 11,870 (Feb. 28, 2012). Further, EPA has indicated that control costs found to be reasonable in the BART context may nonetheless be considered too costly in the reasonable progress context. *See* Final North Dakota SIP Approval/Disapproval, 77 Fed. Reg. 20,894, 20,936 (Apr. 6, 2012) (accepting North Dakota's determination that a level of \$2,593 per ton of SO₂ removed was not reasonable and too costly in the reasonable progress context even though it is within the range EPA "ha[s] considered reasonable in the BART context").

C. ADEQ Should Consider EAI's Plans for White Bluff, Lake Catherine, and Independence as Part of its Long-Term Strategy

ADEQ asks EPA to approve the state's revised long-term strategy ("LTS"), which incorporates the proposed BART determinations and reasonable progress controls for Independence, and which would be rendered enforceable in the draft AOs included in Tab C of the Draft SIP. *See* Draft SIP at 54. ADEQ should revise the LTS to account for the anticipated cease-to-use coal dates identified by EAI for White Bluff and Independence, as well as the reduced

NOx emissions that will be achieved at White Bluff and Independence through the installation of controls that currently is ongoing. In addition, Lake Catherine Unit 4 will retire by the end of 2025, as identified in EAI's integrated resource plan and, accordingly, the planned retirement date should be included in the LTS.

These dates and reduced emission rates also should be included in the Entergy AO to make them enforceable, thereby satisfying the requirements of the Regional Haze Rule. A LTS for Regional Haze "must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals . . ." 40 C.F.R. § 51.308(d)(3). The regulation is clear that states must consider certain factors, including "emission reductions due to ongoing air pollution control programs" and "source retirement and replacement schedules." *Id.* at § 51.308(d)(3)(v). As discussed previously, Entergy anticipates that it will cease to use coal at White Bluff in 2028 and at Independence in 2030. Additionally, Entergy plans to cease operating Lake Catherine Unit 4 in 2025. Furthermore, low-NOx burners and separated overfire air technology ("LNB/SOFA") already are being installed at White Bluff and Independence, and Entergy will meet appropriate NOx emissions limits based on the testing and tuning of this equipment. Finally, although Entergy disagrees with ADEQ's proposed determination that LSC should be required for Independence as a reasonable progress control, Entergy would agree to take an SO₂ limit for Independence Units 1 and 2 based on the use of LSC at a rate of 0.6 lb/mmBTU on a 30-day rolling average as a SIP-strengthening measure.

These retirement plans, control technology installations, and SO₂ limits should be included in the LTS, pursuant to the requirements of the Regional Haze Rule. *See* Reasonable Progress Guidance at 1-4 ("The long-term strategy is the compilation of 'enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the [reasonable progress

goals],’ and is the means through which the State ensures that its [reasonable progress goal] will be met.”). Including these developments in the AO applicable to Entergy will make them enforceable, as required by the regulations, and ensure that ADEQ has a defensible long-term strategy that maintains Arkansas’ Class I areas on the glidepath.

D. ADEQ Should Not Readdress BART Determinations Previously Approved by EPA

Almost six years ago, EPA approved ADEQ’s PM BART determinations for White Bluff Units 1 and 2, and the SO₂ and PM BART determinations for the natural gas firing scenario for Lake Catherine Unit 4. 77 Fed. Reg. 14,604, 14,607 (Mar. 12, 2012). Nonetheless, ADEQ identifies these BART determinations in the Draft SIP, requests that EPA re-approve them, and proposes to include the existing PM and SO₂ requirements in the AO for these units. This is confusing, unnecessary, and re-opens these long-settled BART determinations for additional review and comment.

These BART determinations already are in effect and were included in the plants’ Title V permits as enforceable emissions limits. ADEQ has offered no basis for EPA to reevaluate these BART determinations. An opportunity for public comment on the BART limitations already was provided and EPA approved them almost six years ago. BART is a one-time requirement—neither the CAA nor EPA’s Regional Haze regulations provide a basis to review and reevaluate approved BART determinations. *See* 42 U.S.C. § 7491(g)(2) (identifying the steps for determining BART, with no mention that this analysis ever be reevaluated); 40 C.F.R. § 51.308(e) (providing no indication that a state must resubmit an implementation plan that already has been approved). EPA’s BART Guidelines similarly provide no indication that BART should be revisited. *See* 40 C.F.R. Pt. 51, App. Y.

Because the Draft SIP contains no new information about these already-approved BART limits, ADEQ has no basis to address them in its final SIP. Further, it is unnecessary to include these limits in an AO. They already are enforceable through the plants' Title V permits and have been since 2007.²⁶ ADEQ has offered no explanation as to why it would be necessary for EAI to enter into an AO establishing these limits given that they are already approved into the SIP and are separately enforceable through the plants' Title V permits.

If ADEQ is interested in moving these BART limitations into a different section or chapter of its SIP-approved regulations, it can do so through administrative changes to its regulations rather than asking EPA to eliminate them from the SIP and reapprove them. The process ADEQ has proposed in the Draft SIP is unnecessary and confusing.

E. ADEQ Should Revise the Proposed Entergy Administrative Order

ADEQ should make a number of revisions to the proposed AO for Lake Catherine, White Bluff, and Independence.²⁷ Draft SIP, Tab C: Evidence of Adoption of the Plan into Administrative Orders, *In the Matter of: Entergy Arkansas, Inc.* ("Draft EAI AO").

- Lake Catherine Unit 4 no longer has the capability to burn fuel oil; in fact, fuel oil combustion has been removed from the plant's Title V permit. In light of this, there is no need for the SIP to restrict fuel oil burning at Unit 4 until a BART determination for fuel oil has been made. *See* Draft SIP at 20; Draft EAI AO Order #7. This requirement should be removed.

²⁶ The PM limits for all three units are included in their respective permits. ADEQ's approved SO₂ determination for Lake Catherine Unit 4 was that no SO₂ limit was necessary due to natural gas combustion. 77 Fed. Reg. at 14,653.

²⁷ As explained in footnote 3, EAI reserves the right to continue to work with ADEQ on the terms of the AO.

- As discussed above in Section II.D, EPA approved PM BART determinations in 2012 for White Bluff Units 1 and 2, and SO₂ and PM BART determinations for the natural gas firing scenario for Lake Catherine Unit 4. 77 Fed. Reg. at 14,607. These limits have been incorporated into the plants' Title V permits, as appropriate. Therefore, these PM and SO₂ limits should be eliminated from the AO, as their inclusion is unnecessary.
- Finding of Fact #8 should be revised to omit the discussion of the impacts of the White Bluff and Lake Catherine units on Arkansas Class I areas, as this discussion is not accurate.
- ADEQ should eliminate the requirement in Order #8 that compliance with emissions limits for SO₂ and NO_x be determined using data from a continuous emission monitoring system ("CEMS"). This requirement would mandate the installation of a CEMS on the White Bluff Auxiliary Boiler, which is unnecessary for a unit that operates so infrequently. EPA appears to have acknowledged this given its omission of such a requirement in the Final FIP. *See* 81 Fed. Reg. at 66,416. It also could be interpreted to require CEMS for Lake Catherine Unit 4, which currently continuously monitors natural gas flow to the unit along with periodic determination of the gross calorific value ("GCV") and sulfur content of the natural gas, in accordance with 40 C.F.R. Part 75 requirements. For NO_x emissions, a NO_x correlation test is conducted once every five years to establish a NO_x emission rate vs. heat input correlation curve, which is used to calculate NO_x emissions from the unit. This procedure complies with 40 C.F.R. Part 75, Appendices D and E, and is appropriate for a peaking unit with a typical annual

capacity factor of <10%. EPA determined in the Final FIP that this methodology was acceptable. *See* 81 Fed. Reg. at 66,418.

- The AO should include the expected cease-to-use coal dates for White Bluff and Independence, and the retirement date for Lake Catherine, for the reasons discussed in Section II.C, *supra*.

F. Technical Comments

ADEQ should make the following corrections to eliminate errors or incorrect data in its calculations and technical analyses.

- **LSC is not an Existing Control.** ADEQ concludes that LSC is an “existing control” at White Bluff and Independence because the plants have achieved SO₂ emissions rates significantly lower than the permitted limits through use of LSC. This is inaccurate. ADEQ notes that White Bluff has been able to achieve monthly average emissions rates below 0.69 SO₂/MMBtu, compared with its permitted emissions rate of 1.2 lb SO₂/MMBtu, Draft SIP at 22, and that Independence has been able to achieve 30-boiler-operating-day average emissions rates in the range of 0.48–0.63 lb SO₂/MMBtu, compared with its permitted emissions rate of 0.93 lb/MMBtu. *Id.* at 43. ADEQ is improperly comparing emissions averaged on a *monthly* basis with the permit limits, which are averaged on a *3-hour* basis. The two are not comparable. Due to natural variability in the sulfur content of coal, long-term average emissions must be lower than the short-term limit to ensure compliance with a short-term 3-hour emission limit. For example, the maximum 3-hour average emission rate at White Bluff from 2014-2016 was 1.1 lb/MMBtu even though monthly averages were lower.

- **Characterization of Total Annualized Costs.** ADEQ’s calculations of annualized costs for DSI, enhanced DSI, and Dry FGD include the annualized costs for LSC. See Draft SIP at 23, Table 4; ADEQ, *White Bluff Cost Calculations*, available at <https://www.adeg.state.ar.us/air/planning/sip/regional-haze.aspx>. ADEQ provides no basis for its assumption that LSC would be implemented in addition to these other controls. Accordingly, the annualized costs for DSI, enhanced DSI, and Dry FGD should not include costs for LSC.
- **Description of Visibility Improvements from LSC at Independence.** In its Independence-specific reasonable progress analysis, ADEQ states: “Because Entergy Independence frequently achieves less than or equal to the 0.6 lb/MMBtu emission rate associated with LSC, ADEQ has not modeled visibility impacts for the LSC scenario.” Draft SIP at 46. ADEQ’s characterization of the SO₂ emission rate is misleading and should be deleted. While Entergy believes that no controls are required for reasonable progress at Independence, an SO₂ emission rate of 0.6 lb/mmBTU on a 30-day rolling average at Independence based on the use of LSC would yield a visibility improvement of 0.112 Δdv for Caney Creek and 0.302 Δdv for Upper Buffalo.²⁸
- **ADEQ should correct errors in the CENRAP-PSAT values.** ADEQ states incorrectly that “other source categories each contribute between two percent and six percent of total light extinction at Arkansas Class I areas.” Draft SIP at 29. The

²⁸ Trinity Consultants, Inc. performed CALPUFF modeling to assess the visibility impacts for the LSC scenario. See Trinity Consultants, *CALPUFF Modeling for Low Sulfur Coal Scenario* (Jan. 3. 2018), attached as Exhibit H. Although Entergy believes CAMx modeling would provide more accurate estimates of visibility improvement, Trinity did not have sufficient time to perform CAMx modeling in the time period provided for public comment on the Draft SIP.

six percent value should be corrected to seven percent. ADEQ also vaguely characterizes the contribution of natural, on-road, and non-road sources as “a very small portion of total light extinction.” ADEQ should clarify that these sources contribute approximately five percent to total light extinction, rather than providing a subjective characterization of their contribution as “very small.” Finally, values presented as “0” in Figures 6, 7, 8, and 9 should be expanded to show at least one non-zero digit, or should be footnoted to clarify that they are not zero.

III. Conclusion

Entergy appreciates the opportunity to comment on the Draft SIP, and has endeavored to suggest changes that would ensure the final SIP is legally defensible in the event of a challenge. Entergy agrees with ADEQ’s proposed BART SO₂ limits for White Bluff Units 1 and 2, but urges ADEQ to revise its underlying BART analysis, as well as its assessment of reasonable progress controls for Independence. Entergy also urges ADEQ to revise its LTS and the draft AO for Entergy’s units to ensure anticipated emission reductions are durable and enforceable. Finally, Entergy appreciates ADEQ’s consideration of the various corrections and amendments to the Agency’s proposed AO and technical analyses to support the SIP. Entergy believes its comments will assist ADEQ to develop a final SIP that is legally supportable and will provide the company with regulatory certainty.

Respectfully submitted,



Kelly M. McQueen
Assistant General Counsel – Environmental (Lead)
Entergy Services, Inc.

Exhibit B

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November 23, 2016

VIA EMAIL AND FEDEX

Mr. Ron Curry
Regional Administrator
U.S. Environmental Protection Agency
Fountain Place 12th Fl., Ste. 1200
1445 Ross Avenue
Dallas, TX 75202-2733

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Re: Petition for Reconsideration and Request for Stay of Entergy Arkansas Inc. et al.
of the Arkansas Regional Haze and Interstate Visibility Transport Federal
Implementation Plan, EPA Docket No. EPA-R06-OAR-2015-0189

Dear Administrator Curry:

Entergy Arkansas Inc., Entergy Mississippi Inc., and Entergy Power, LLC (collectively "Entergy") respectfully submit the enclosed Petition for Reconsideration and Request for Stay ("Petition") of the U.S. Environmental Protection Agency's ("EPA" or "Agency") final "Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan" ("Final FIP"). 81 Fed. Reg. 66,332 (Sept. 27, 2016).

The Petition includes exhibits that contain Confidential Business Information for Entergy and for a third party. The exhibits have been partially redacted to remove non-pertinent information and are clearly marked as "Redacted and Confidential Business Information." Entergy also is providing a copy of the exhibits without the aforementioned confidential exhibits. Due to their length, both versions of the exhibits to the Petition are being provided on the enclosed CDs. An additional copy of the Petition is enclosed to be time-stamped and returned in the attached envelope.

Thank you for your consideration of the enclosed Petition for Reconsideration and Request for Stay. If you have any questions, please contact me at (202) 639-7728.

Sincerely,



Debra J. Jezouit
Counsel to Entergy Services Inc.

Enclosures

cc: The Honorable Gina McCarthy, Administrator
U.S. Environmental Protection Agency

**BEFORE THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY**

In re:)	EPA Docket No.
)	
Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan)	EPA-R06-OAR-2015-0189
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**Petition for Reconsideration and Request for Stay of Entergy Arkansas Inc., et al., of the
Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and
Interstate Visibility Transport Federal Implementation Plan**

Entergy Arkansas Inc. (“EAI”), Entergy Mississippi Inc. (“EMI”), and Entergy Power, LLC (collectively “Entergy”) respectfully submit this petition for reconsideration and request for stay (“Petition”) of the U.S. Environmental Protection Agency’s (“EPA” or “Agency”) final “Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan” (“Final FIP”).¹ As discussed below, Entergy requests that EPA reconsider and stay elements of the Final FIP that relate to Entergy’s White Bluff and Independence plants. To avoid the significant, irreparable harms that already have begun to occur, Entergy respectfully requests that EPA take action on this Petition by February 1, 2017. The administrative stay requested by Entergy would not cause adverse visibility impacts in Arkansas’ Class I areas.

I. INTRODUCTION AND SUMMARY

The Final FIP affects four coal-fired electric generating units owned by Entergy: two at the White Bluff Electric Power Plant (“White Bluff”) and two at the Independence Steam Electric Station (“Independence”), which will impose costs on Entergy, its co-owners and its customers of approximately \$2 billion for minimal visibility benefits. Specifically, the Final FIP requires each coal-fired unit at White Bluff and Independence to meet a sulfur dioxide (“SO₂”) emission limit of 0.06 lb/MMBtu by October 27, 2021.² This emission limit is based on the installation of a dry scrubber (flue gas desulfurization (“FGD”) technology) on each unit. The Final FIP also will require each coal-fired unit to meet a nitrogen oxides (“NO_x”) emission limit of 0.15 lb/MMBtu on a rolling 30-boiler operating day basis at loads of 50-100 percent of maximum heat input rating, and a rolling 3-hour average limit of 671 lb/hr at loads of less than 50 percent of maximum heat input rating.³ These emission limits, which must be met beginning

¹ 81 Fed. Reg. 66,332 (Sept. 27, 2016).

² *Id.* at 66,339, 66,416, 66,420.

³ *Id.* at 66,416-17.

April 27, 2018, are based on the installation of low-NOx burners and separated overfire air (“LNB/SOFA”) on each unit.

The Petition must be granted because EPA failed to provide adequate notice and opportunity to comment on significant, burdensome requirements in the Final FIP that affect the requirements imposed on Entergy’s units, are of central relevance to the outcome of the Final FIP, and are not logical outgrowths of the proposed rule (“Proposed FIP”).⁴ Additionally, the Final FIP contains clear errors that must be corrected. These administrative shortcomings demand reconsideration and a stay of key elements of the Final FIP. Specifically, Entergy requests that EPA reconsider the following:

- the imposition of reasonable progress controls on Independence;
- EPA’s determination that dry FGD technology constitutes best available retrofit technology (“BART”) for White Bluff for SO₂ emissions;
- the 18-month deadline for installation of NOx controls at White Bluff and Independence;
- the adoption of source-specific NOx BART in lieu of reliance on the emissions reductions resulting from implementation of the Cross-State Air Pollution Rule (“CSAPR”);⁵ and
- the NOx limit and three-hour averaging period for NOx compliance that applies when units at White Bluff and Independence operate at low loads.

A stay of certain requirements in the Final FIP is necessary because justice so requires and to avoid irreparable harm to Entergy and its co-owners, customers, and communities while EPA reconsiders the Final FIP, and while the U.S. Court of Appeals for the Eighth Circuit (“Eighth Circuit”) considers Entergy’s petition for review of those requirements.⁶ The pollution controls at White Bluff and Independence required by the Final FIP would cost approximately \$2 billion to design, permit, purchase, and install. Absent a stay, Entergy will be forced to make a costly Hobson’s choice: (1) commence designing, permitting, purchasing, and installing the required controls immediately; or (2) commence planning to decommission White Bluff and Independence by the Final FIP compliance deadline in 2021. Either course of action causes irreparable harm. The first option would require Entergy to expend \$150 million or more just within the next 18 months that could be rendered entirely unnecessary by a grant of reconsideration. The second option would require an array of costly steps planning for decommissioning the units and would ultimately lead to a host of significant harms to Entergy and its co-owners, customers, and local economies. Furthermore, Entergy could not avoid these harms by changing course at a later date, because it will either already have expended multiple millions of dollars on equipment that will serve no purpose (if it initially selected the first option), or it will be too late to install the controls in time to meet the deadline (if it initially selected the second option).

⁴ 80 Fed. Reg. 18,944 (Apr. 8, 2015).

⁵ See Petition for Reconsideration and Request for Administrative Stay of Arkansas Department of Environmental Quality, at 5-8 (Nov. 22, 2016) (hereinafter “ADEQ Petition”).

⁶ Specifically, Entergy seeks a stay of 40 C.F.R. §§ 52.173(c)(6)-(8) with respect to White Bluff and §§ 52.173(c)(24)-(26) with respect to Independence.

A stay would avoid irreparable harm yet would have no adverse impact on visibility in either Arkansas Class I area, as monitoring data show that current visibility already is better than the reasonable progress goals (“RPGs”) established by EPA for this implementation period and that visibility in the Class I areas continues to improve.

Immediate action on this Petition is urgently needed to avoid the harms described herein. Therefore, Entergy respectfully requests that EPA take action in response to this Petition by February 1, 2017. In the absence of a grant of reconsideration and stay by that time, Entergy will consider the Petition to be denied, unless the parties have jointly agreed to a longer period of time for EPA to take action on the Petition.

II. DESCRIPTION OF PETITIONERS

EAI is an electric utility engaged primarily in the generation, purchase, transmission, distribution and sale of electricity in portions of Arkansas. EAI provides electrical utility service to approximately 712,000 electric customers, deriving 81 percent of its operating revenues from electric customers in 2015. EAI owns portions of White Bluff and Independence and operates both plants. EAI is a regulated utility company subject to the rate and general operating jurisdiction of the Arkansas Public Service Commission (“APSC”) and the Federal Energy Regulatory Commission (“FERC”). All of the common stock of EAI is owned by Entergy Corporation.

EMI is an electric utility engaged primarily in the generation, purchase, transmission, distribution and sale of electricity in portions of Mississippi, and is a co-owner of Independence. EMI provides electrical utility service to approximately 447,000 electric customers, deriving 89 percent of its operating revenues from electric customers in 2015. EMI is a regulated utility company subject to the rate and general operating jurisdiction of the Mississippi Public Service Commission and FERC. All of the common stock of EMI is owned by Entergy Corporation.

Entergy Power, LLC is an electric utility company that sells electric energy at wholesale and is a co-owner of Independence. Its principal business office is located in Little Rock, Arkansas. Entergy Power, LLC is an indirect wholly owned subsidiary of Entergy Corporation.

III. REQUEST FOR RECONSIDERATION

A. Reconsideration Is Required Under Clean Air Act Section 307(d)(7)(B).

EPA *must* grant reconsideration of a final action when a petitioner “can demonstrate to the Administrator that it was impracticable to raise [an] objection [during the period for public comment] or if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule.”⁷ In such a situation, reconsideration is mandatory, as the Clean Air Act (“CAA”) commands that EPA “*shall* convene a proceeding for reconsideration of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed.”⁸ EPA must grant this Petition because

⁷ 42 U.S.C. § 7607(d)(7)(B).

⁸ *Id.* (emphasis added).

(1) Entergy's objections are to actions EPA took in the Final FIP, or developments since the comment period closed, and thus could not have been raised during the comment period on the Proposed FIP; (2) the objections arose during the period for judicial review; and (3) the objections are of central relevance to the outcome of this rulemaking.

Reconsideration also is appropriate to correct clear errors, as the CAA provides for judicial invalidation of rules if errors are "so serious and related to matters of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made."⁹ EPA should grant this Petition to address serious errors that are of central relevance to the Final FIP.

B. EPA Should Reassess its Imposition of Reasonable Progress Controls on Independence in Light of More Recent Air Quality Data and Corrected Contribution Data.

Data that became available after the close of the public comment period on the Proposed FIP confirm that reasonable progress controls on Independence for the first planning period are wholly unnecessary. Additionally, EPA's reasonable progress analysis relies on a false characterization of Independence's contribution to visibility impairment in Class I areas. EPA should reconsider the Final FIP and the controls on Independence in light of more recent air quality data, as well as corrected data regarding Independence's contribution to visibility impairment.

According to Interagency Monitoring of Protected Visual Environments ("IMPROVE") monitoring data for 2015, which became available subsequent to the close of the comment period, visibility continues to improve at a greater rate than the uniform rate of progress ("URP") in the Caney Creek Wilderness Area ("Caney Creek") and the Upper Buffalo Wilderness Area ("Upper Buffalo").¹⁰ In addition, the recent IMPROVE data further confirm that visibility in the two Arkansas Class I areas already is better than the RPGs that EPA finalized for the areas. EPA set the RPGs for the 20 percent worst days at 22.47 deciviews ("dv") for Caney Creek and at 22.51 dv for Upper Buffalo.¹¹ The recent IMPROVE data for both Class I areas demonstrate that monitored visibility impairment in the areas already is well below EPA's RPGs, as well as Arkansas' RPGs, and that visibility impairment is continuing to trend downward.¹² Given that Caney Creek and Upper Buffalo already have surpassed the URP goals, Arkansas' RPGs, and EPA's final RPGs for the first planning period, reasonable progress controls during the first planning period are not "*necessary*" to ensure reasonable progress towards the natural visibility goal.¹³ There is simply no standard of reasonable progress that necessitates controls on

⁹ 42 U.S.C. § 7607(d)(8).

¹⁰ Assessment of Recent Class I Area IMPROVE Monitoring Data prepared by Trinity Consultants, Inc., at 3 (Aug. 8, 2016, updated Nov. 15, 2016) (hereinafter "Trinity Report") (attached as Exhibit A).

¹¹ 81 Fed. Reg. at 66,354.

¹² Trinity Report at 3. Actual visibility impairment at Caney Creek in 2015 was 20.41 dv, below Arkansas' RPG of 22.48 dv and EPA's final RPG of 22.47. Actual visibility impairment at Upper Buffalo in 2015 was 19.96 dv, below Arkansas' RPG of 22.52 and EPA's final RPG of 22.51. *Id.*

¹³ See 42 U.S.C. § 7491(b)(2) (requiring regional haze implementation plans to contain measures "necessary to make reasonable progress toward meeting the national goal").

Independence for this planning period, especially in light of the fact that the Regional Haze Program is designed to achieve its goals over a long horizon – by 2064.

EPA also should reconsider the need for NO_x controls on Independence based on a corrected understanding of the plant's contribution to visibility impairment. In the Final FIP, EPA justified the need for NO_x controls on Independence based on a false characterization of the plant's contribution to visibility impairment. EPA stated that, "Entergy's CAMx modeling shows that nitrate from Independence is responsible for 30 – 40% of the visibility impairment in Arkansas' Class I areas on 2 of the 20% worst days."¹⁴ This statement is false and must be corrected. EPA's statement indicates that on two of the 20 percent worst days, *30-40 percent of all impairment* at Arkansas' Class I areas is due to nitrates derived from NO_x emissions from Independence. In reality, *30-40 percent of the impairment on these days that is due to nitrates* is attributable to Independence. But nitrates are a minute portion of visibility impairment at Arkansas' two Class I areas. The average total nitrate contribution from Independence to visibility impairment on these days is only 0.02 percent at Upper Buffalo and 0.03 percent at Caney Creek. Thus, the actual contribution is over three orders of magnitude less than EPA stated.

Entergy had no opportunity to comment on this mischaracterization of Independence's nitrate contribution to visibility impairment, which is of central relevance to the outcome of the rule. EPA should correct this mischaracterization and clearly acknowledge that the contribution of Independence to visibility impairment in Arkansas' Class I areas is almost meaningless.

In sum, EPA should reconsider the necessity of reasonable progress controls for Independence in light of the recent IMPROVE monitoring data as well as a corrected assessment of Independence's contribution to visibility impairment in Arkansas' Class I areas.

C. The SO₂ BART Determination in the Final FIP for White Bluff Failed to Consider Critical Information.

1. EPA materially misunderstood Entergy's comments regarding EPA's proposed SO₂ BART determination for White Bluff.

The Final FIP imposes SO₂ limits on White Bluff Units 1 and 2 premised on the installation of dry FGD, which EPA found to be cost-effective based on a 30-year amortization period.¹⁵ EPA failed to consider Entergy's proposal to cease combusting coal in 2027 and 2028, which would limit the remaining useful coal-fired lives of the units and significantly alter the cost-effectiveness of SO₂ controls.¹⁶ Entergy had no notice of or opportunity to timely comment

¹⁴ 81 Fed. Reg. at 66,359.

¹⁵ *Id.* at 66,335, 66,360.

¹⁶ Entergy Arkansas Inc. Comments on the Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas, at 5 (Aug. 7, 2015) (Docket ID No. EPA-R06-OAR-2015-0189-0153) (hereinafter "EAI Comments") (attached as Exhibit B).

on EPA's failure, which was only evident in the Final FIP and EPA's associated Response to Comments.¹⁷

In the Final FIP, EPA unreasonably mischaracterized Entergy's White Bluff proposal, resulting in the Agency's failure to properly determine BART for White Bluff Units 1 and 2. EPA acknowledged that a binding requirement to cease combustion of coal at White Bluff would limit the remaining useful lives of Units 1 and 2 for the purpose of evaluating SO₂ controls, but mistakenly assumed that Entergy had not offered such a proposal. EPA explained, "If Entergy's alternative proposal had included accepting a binding requirement to burn only natural gas at White Bluff Units 1 and 2 after coal combustion ceases, or a binding requirement to completely shut down the units, *then we would agree that it would be appropriate to assume that SO₂ emissions from White Bluff will be zero beginning in 2027/2028.*"¹⁸ However, contrary to EPA's assertion, Entergy explicitly made such a commitment in its comments on the Proposed FIP:

As part of a multi-unit plan to improve visibility and to better manage its generation assets for reliability and costs, Entergy proposes to cease burning coal at White Bluff Units 1 and 2 by 2027 and 2028, one unit per year, *and is prepared to take an enforceable commitment to that effect.*¹⁹

EPA's conclusion that Entergy "does not propose...adopting a binding requirement to burn only natural gas or completely shut down the units"²⁰ is inexplicable in light of the plain language of Entergy's proposal. Because EPA determined that a binding requirement to cease burning coal would allow the Agency to assume that SO₂ emissions would be zero subsequent to the cessation of coal combustion, EPA must reconsider the SO₂ BART determination for White Bluff. Failure to do so is unreasonable and arbitrary and capricious.

EPA also asserted that Entergy's proposal to cease using coal at White Bluff appeared tied to EPA's acceptance of Entergy's separately proposed emission limits for Independence.²¹ That assertion is incorrect. Nowhere in its comments did Entergy claim that its acceptance of a binding requirement to cease burning coal at White Bluff Units 1 and 2 was contingent on EPA's agreement to the emission limits that Entergy was proposing for Independence. Although Entergy proposed an approach addressing all four coal-fired units at White Bluff and Independence and provided modeling of its proposal demonstrating that its approach would achieve virtually the same visibility benefits as EPA's Proposed FIP for significantly less cost,²² Entergy did not indicate that its proposed emission limits for Independence were a necessary element of its White Bluff proposal. In fact, in its comments, Entergy explicitly stated that the

¹⁷ 81 Fed. Reg. at 66,335, 66,360; Response to Comments for the Federal Register Notice for the State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan, at 52-54 (Aug. 31, 2016) (Docket ID No. EPA-R06-OAR-2015-0189-0187).

¹⁸ 81 Fed. Reg. at 66,356-57 (emphasis added).

¹⁹ EAI Comments at 5 (emphasis added).

²⁰ 81 Fed. Reg. at 66,356.

²¹ *Id.* at 66,358 ("Entergy's comments provide no indication that it is willing to accept a binding requirement to cease coal combustion at White Bluff by 2027/2028, unless we also accept the elements of its alternative proposal that are applicable to Independence as satisfying the reasonable progress requirements.").

²² EAI Comments at 45-46.

interim emissions reductions it offered, which included the emission limits for Independence, were a *complement* to its proposal for White Bluff.²³

2. EPA did not account for Entergy’s proposal regarding the remaining useful life of White Bluff in analyzing SO₂ controls.

Had EPA appropriately characterized Entergy’s proposal for White Bluff, EPA would have used a shorter remaining useful life for White Bluff in its BART analysis. Proper accounting of remaining useful life is critical because, as EPA acknowledged in the Final FIP, “a shorter remaining useful life [at White Bluff Units 1 and 2] might result in a conclusion that dry scrubbers are not cost-effective....”²⁴ Indeed, as explained in Entergy’s comments, Entergy’s proposal for White Bluff rendered EPA’s proposed BART determination inapplicable, requiring EPA to undertake a new BART analysis to address the remaining useful coal-fired life of the units.²⁵ Because EPA’s FGD cost-effectiveness analysis failed to take into account Entergy’s proposed binding commitment to cease combusting coal at White Bluff, a failure on which Entergy could not previously have provided comment, EPA must reconsider this issue. In doing so, EPA also should reconsider the cost-effectiveness of dry scrubbers in light of the correct control cost information, as explained in the following section.

3. Dry FGD is not cost-effective at White Bluff.

EPA calculates that installing and operating dry FGD at White Bluff would cost \$2,565 per ton of SO₂ removed for Unit 1 and \$2,421 per ton of SO₂ removed for Unit 2.²⁶ However, these cost estimates fail to account for Entergy’s proposal, discussed above, regarding the remaining useful life of the units as well as data regarding the actual cost of controls. Had this information been properly considered, EPA should have estimated that the costs per ton of SO₂ removed would range from approximately \$7,100 to \$8,000 per ton of SO₂ removed, which is patently *not* cost-effective.²⁷

EPA’s cost estimate *failed to include over \$495 million* that Entergy will be required to incur to install dry FGD on the White Bluff units.²⁸ EPA rejected certain costs in the analysis prepared for Entergy by Sargent & Lundy because Entergy did not provide to EPA the underlying 2009 and 2013 Alstom quotes on which Sargent & Lundy’s cost analysis relied.²⁹ Because Entergy had no notice that EPA would require submission of these quotes, which contain non-public, highly confidential and proprietary information, to validate Entergy’s cost analysis, Entergy is providing redacted versions of these quotes now.³⁰ The Alstom quotes

²³ *Id.* at 4 (“Entergy is prepared to offer meaningful interim emission reductions to complement its proposed commitment to cease coal-fired operations at White Bluff and assure that Arkansas remains on a path that is below the URP for the long term.”).

²⁴ 81 Fed. Reg. at 66,356.

²⁵ EAI Comments at 5.

²⁶ 81 Fed. Reg. at 66,386.

²⁷ Memorandum from Sargent & Lundy (Nov. 18, 2016) (hereinafter “Sargent & Lundy Memo”) (attached as Exhibit C).

²⁸ *See* Sargent & Lundy Memo at 2.

²⁹ 81 Fed. Reg. at 66,383.

³⁰ 2009 Alstom Report (attached as Exhibit D) and 2013 Alstom Report (attached as Exhibit E). These reports contain confidential business information. Non-pertinent information has been redacted.

demonstrate that EPA improperly excluded extensive costs associated with “Balance of Plant” items, which are items not included in the FGD supplier’s scope, but which are necessary to integrate the FGD system into the plant.³¹ The quotes also demonstrate that EPA underestimated escalation by using the Chemical Engineering Plant Cost Indices (“CEPCI”) instead of relying on more accurate information from the vendor.

The more detailed and accurate cost analysis prepared by Sargent & Lundy, which includes costs improperly excluded by EPA and correctly predicts tons removed, estimates that dry FGD cost-effectiveness will range from approximately \$7,100 to \$8,000 per ton if the units cease combusting coal in 2027-2028.³² Even if certain costs rejected by EPA were excluded in Sargent & Lundy’s cost estimate (i.e., allowance for funds used during construction (“AFUDC”), escalation, and owner’s costs), the cost-effectiveness of dry FGD at White Bluff would range from approximately \$5,400 to \$6,100 per ton.³³ Regardless of which estimate is used, these costs exceed those that EPA has previously rejected in other BART analyses and thus are too high to represent BART for the White Bluff units.³⁴ As a result, dry FGD cannot constitute SO₂ BART for White Bluff Units 1 and 2. Accordingly, EPA should reconsider the White Bluff SO₂ BART.

4. EPA must reconsider SO₂ BART for White Bluff even in the absence of a DSI analysis.

In the Final FIP, EPA argues, for the first time, that it would be necessary to assess dry sorbent injection (“DSI”) as an interim control if the White Bluff units cease to combust coal, and indicates that this lack of DSI analysis somehow negates EPA’s obligation to conduct a reasonable BART analysis of dry FGD at the White Bluff units. Entergy did not have notice of or an opportunity to comment on this assertion, which is of central relevance to the Final FIP. The lack of a DSI analysis, which EPA had not previously requested, does not absolve EPA of its obligation to properly assess the cost-effectiveness of dry FGD.

EPA explains in the Final FIP that “[b]ecause Entergy has provided no analysis to demonstrate that there is no more effective interim SO₂ control that would constitute BART, the company’s proposed strategy is not adequate to ensure that the BART requirements for White Bluff Units 1 and 2 will be met.”³⁵ EPA ties the lack of a DSI analysis to its determination that it

³¹ Upon further review, Sargent & Lundy determined that costs associated with ductwork downstream of the booster fans were included in the Alstom quote. The updated cost estimates in this Petition remove these costs. Sargent & Lundy Memo at 2.

³² *Id.* at 3.

³³ *Id.*

³⁴ EPA declined to impose dry FGD as BART in Arizona, where the average cost effectiveness was estimated to be \$5,090/ton. Proposed Arizona Regional Haze FIP, 79 Fed. Reg. 9,317, 9,331-33 (Feb. 18, 2014); Final Arizona Regional Haze FIP, 79 Fed. Reg. 52,420, 52,436 (Sept. 3, 2014). In North Dakota, EPA approved the state’s determination that a cost effectiveness of \$6,525 per ton was excessive for NO_x controls and did not constitute BART. Proposed North Dakota FIP, 76 Fed. Reg. 58,570, 58,630 (Sept. 21, 2011); Final North Dakota Regional Haze FIP, 77 Fed. Reg. 20,894, 20,896 (Apr. 6, 2012). And, in Montana, EPA concluded that certain SO₂ controls with a cost effectiveness of \$5,442/ton and \$6,365/ton were not cost effective. Proposed Montana Regional Haze FIP, 77 Fed. Reg. 23,988, 24,047 (Apr. 20, 2012); Final Montana Regional Haze FIP, 77 Fed. Reg. 57,864, 57,866 (Sept. 18, 2012).

³⁵ 81 Fed. Reg. at 66,356.

need not even consider Entergy's finding that FGD is not cost-effective in light of its proposal for White Bluff. This is a false premise; the appropriateness of DSI as an interim control measure is irrelevant to the assessment of whether dry FGD is cost-effective. As outlined above, EPA failed to account for the proposed remaining useful life of Units 1 and 2 when assessing dry FGD as a control technology, as well as certain costs associated with such controls, and must do so now on reconsideration. To the extent that EPA *also* believes that an assessment of DSI as a potential control technology is warranted, such assessment is wholly independent of the FGD assessment.

Despite the fact that EPA's request for a DSI analysis arose for the first time in the Final FIP, Entergy is willing to develop and provide the analysis if EPA grants reconsideration on SO₂ BART for White Bluff. Additionally, Entergy understands that the Arkansas Department of Environmental Quality ("ADEQ") will develop a state implementation plan ("SIP") to replace portions of the Final FIP, including the BART controls for White Bluff, and Entergy will submit a DSI analysis to ADEQ, if required, as part of the SIP development process.

D. EPA's LNB/SOFA Assumptions Are Unsupported and Unreasonable, and Must Be Revised.

EPA should reconsider whether NO_x controls should be required for either White Bluff or Independence. As addressed in Section III.A above, NO_x controls on Independence to address reasonable progress are unnecessary for this first planning period. Further, EPA should reconsider its imposition of source-specific NO_x BART controls in the Final FIP and instead determine that compliance with CSAPR is acceptable for compliance with the NO_x BART requirements in Arkansas, including for White Bluff, as addressed more fully in ADEQ's Petition for Reconsideration and Request for Administrative Stay.³⁶

However, if EPA denies reconsideration on these threshold issues, EPA must grant reconsideration on the compliance deadline and NO_x emission limits applicable to both White Bluff and Independence. The compliance deadline and NO_x limits are not logical outgrowths of the Proposed FIP, are not reasonable and fraught with errors, and are of central relevance to EPA's determination of NO_x BART in the rulemaking.

1. EPA must extend the 18-month timeline for the installation of LNB/SOFA to Three Years.

a. The 18-month deadline is not a logical outgrowth of the proposed rule and was promulgated in error.

The Final FIP unlawfully shortens the compliance deadline for the NO_x emission limits for White Bluff and Independence from three years to 18 months.³⁷ EPA proposed a three-year NO_x compliance deadline for these plants and did not indicate in the Proposed FIP that it was considering a shorter deadline. The 18-month deadline is not a logical outgrowth of the proposed compliance deadline. While Entergy stated in its comments that it was prepared to

³⁶ ADEQ Petition at 5-8.

³⁷ 81 Fed. Reg. at 66,338, 66,354.

meet the proposed three-year deadline,³⁸ it lacked notice and had no opportunity to comment on its ability to comply with a shortened compliance deadline.

EPA erred in relying on comments from environmental organizations when contracting the compliance timeline.³⁹ First, the environmental organizations requested a shorter compliance deadline only for White Bluff, not for Independence.⁴⁰ Indeed, while the organizations asserted that LNB/SOFA could be installed on Independence in under a year, the comment concluded that “three years is more than reasonable.”⁴¹ Even if the environmental organizations had requested a shortened compliance deadline for both plants, it is well-established that EPA “cannot bootstrap notice from a comment.” *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 549 (D.C. Cir. 1983); *Am. Fed’n of Labor v. Donovan*, 757 F.2d 330, 340 (D.C. Cir. 1985).

Further, the environmental organizations’ comments on installation of LNB/SOFA fail to provide a reasonable justification for the shorter compliance timeline. The comments were based on an expert report, which, in turn, relied on a 10-year-old vendor association report that did not consider permitting considerations, a company’s internal project development and approval process, site-specific factors, or reliability concerns.⁴² The vendor association report explicitly recognized that “[v]ariations in the schedule may occur due to site specific conditions that may increase or decrease the typical deployment time.”⁴³ The vendor report also does not appear to allow sufficient time for testing and optimization of equipment, providing only one week for commissioning and startup.⁴⁴ Because the environmental organization comments relied on outdated, generic information about timing, they do not provide a proper basis for the shortened deadline for these specific units. Notably, EPA has not even attempted to provide any explanation of how this shorter deadline is reasonable for White Bluff and Independence in light of site-specific and company-specific considerations. Nor does EPA appear to have required such a short timeframe for the installation of controls in other regional haze plans. Even for AEP’s Flint Creek plant, where SO₂ control equipment *is installed and functioning already*, EPA granted the company 18 months to make any modifications necessary to ensure the controls can meet the BART limit.⁴⁵

b. The 18-month deadline is unreasonable.

The 18-month deadline to install LNB/SOFA at White Bluff and Independence is infeasible, as it does not guarantee sufficient time to develop, plan, permit, install, tune, and test the equipment. Specifically, a project of this scope requires Entergy to develop a prevention of significant deterioration (“PSD”) permit application, obtain a PSD permit, comply with the

³⁸ EAI Comments at 13-14.

³⁹ 81 Fed. Reg. at 66,378.

⁴⁰ Comments of Earthjustice, National Parks Conservation Association, and Sierra Club at 25 (Aug. 7, 2015) (Docket ID No. EPA-R06-OAR-2015-0189-0153) (hereinafter “Sierra Club Comments”).

⁴¹ *Id.* at 39.

⁴² *Id.* at 25; Technical Support Document to Comments of Conservation Organizations, Prepared by Victoria R. Stamper, at 46 (Aug. 5, 2015) (Docket ID No. EPA-R06-OAR-2015-0189-0171) (hereinafter “Stamper Report”).

⁴³ Typical Installation Timelines for NO_x Emission Control Technologies on Industrial Sources, Institute of Clean Air Companies, at 4 (Dec. 4, 2006), available at https://c.ymcdn.com/sites/icac.site-ym.com/resource/resmgr/ICAC_NOx_Control_Installatio.pdf.

⁴⁴ *Id.*

⁴⁵ 81 Fed. Reg. at 66,338.

company's internal planning and prudence review procedures, complete a request for proposal ("RFP") process, select a vendor, procure equipment, schedule outages, install equipment, and then tune and test the equipment. Completion of all of these steps will require more than 18 months, even though Entergy already has obtained the necessary PSD permit for White Bluff, and is in the process of developing the PSD permit application for Independence.⁴⁶ Entergy would only be able to complete installation and tuning of LNB/SOFA on all four units by the final deadline if it circumvented its internal planning and prudence review procedures and completed the tuning and testing process *after* the compliance deadline.

The internal process that must be completed before the performance of any equipment work is robust, with preparation for this work just getting underway with respect to Independence. First, projects over \$20 million, like the installation of LNB/SOFA, are subject to an internal company approval process that includes risk review and investment procedures. This process takes approximately two months and requires approval from several levels of Entergy management. Once the review process has been completed, Entergy can undertake project-specific planning. An engineer will draft project specifications based on the Final FIP requirements and design characteristics, a process that takes approximately two months. These specifications will be included in an RFP, which will be put out for a four- to six-week bidding process. Once a vendor is selected, negotiation of the final contract will take an additional four to six weeks.

Simultaneous to this internal process, Entergy must prepare a PSD permit application for the installation of LNB/SOFA at Independence.⁴⁷ Despite the fact that work already is proceeding, the earliest the application will be ready for submittal to ADEQ will be mid-December. ADEQ approval is expected to take, at a minimum, between six and eight months, resulting in permit issuance between mid-June and mid-August 2017, but this process could take longer for a variety of reasons outside of Entergy's control. For example, the permitting process could be extended if significant public comments are received on the draft permit that must be addressed by the ADEQ before a final permit can be issued, due to agency resource constraints, or due to an appeal of the final permit to the Arkansas Pollution Control and Ecology Commission, which, absent additional regulatory proceedings, would result in an automatic stay of the permit pending final resolution of the appeal.

Once the permit is issued and the final contract has been signed, the selected vendor must design and fabricate the equipment, which takes approximately eight months. Outages must be scheduled for all four units, each lasting between six and seven weeks. Once installation is complete, each unit will need to undergo four weeks of boiler tuning and two weeks of performance verification testing to demonstrate that the controls are achieving the anticipated NOx reductions. After this, Entergy will have to perform a final phase of fine-tuning and training. During the final phase, which lasts approximately five months, each unit will undergo a three-month procedure review during which the system description is re-written to include the new equipment and components, and the operating procedures are updated. This process cannot

⁴⁶ Although Entergy already has acquired control equipment for one unit at White Bluff, equipment still must be obtained for the second White Bluff unit and both Independence units to comply with the requirements in the Final FIP.

⁴⁷ As noted above, Entergy already has obtained a permit to install LNB/SOFA on White Bluff but does not yet have all the equipment needed to do so.

be truncated as it requires the operators to observe performance during all operating scenarios, including startup, shutdown, and periods of load transition. The staff must then be trained on both the system description and the operating procedures, which typically takes a month. An additional month is needed to validate operating configurations to determine which combinations result in the best load profile. It would be imprudent not to complete the entire training and fine-tuning process prior to the compliance deadline.

Even with a truncated schedule, Entergy cannot reasonably expect to meet the 18-month deadline. At best, Entergy could take the following steps, which increase risk and cost without any guarantee of compliance. It could circumvent its normal internal procedures, including its risk and prudence reviews and its process for obtaining competitive bids from multiple vendors. Entergy would be required to perform a more limited risk and prudence review, would have to forgo a complete bidding process in favor of using a pre-selected vendor that can fabricate and install the equipment as quickly as possible, and may even need to engage this vendor prior to having all regulatory approvals in hand. These internal procedures are in place to attempt to ensure cost recovery, and failure to comply with them puts the company at risk of making investments that the APSC later determines are not in the public interest and therefore not eligible for cost recovery. The schedule also does not allow for any delays associated with the PSD permitting process.

Finally, even with these truncated procedures, and assuming final PSD permit issuance in mid-June to mid-August 2017, the timeframe allowed in the Final FIP is insufficient for Entergy to conduct thorough testing and tuning of the NOx control equipment, where unforeseen issues frequently arise and must be addressed to ensure compliance. For example, it is common during the installation process to discover previously unknown equipment issues that complicate installation or hinder the expected performance of the installed equipment. Installation of controls involves many variables and each unit has unique characteristics, resulting in unpredictable challenges. As an example, small, unforeseen differences in mill performance or coal pulverization could result in problems that must be addressed to ensure the LNB/SOFA equipment performs as expected.

In light of these site-specific considerations, including the mandatory regulatory approval process, EPA should grant reconsideration and revise the 18-month deadline to provide the full three years provided in the Proposed FIP for installation of LNB/SOFA at White Bluff and Independence. This will allow time for Entergy to comply with its internal planning and prudence review procedures, to obtain all required approvals, and ensure that the controls are properly tuned prior to the compliance deadline. At a minimum, EPA should grant reconsideration and provide at least 30 months for the installation of LNB/SOFA at White Bluff and Independence as this is the minimum amount of time Entergy anticipates that the NOx compliance deadline could be met even by truncating its internal procedures and barring any unforeseen issues.

2. EPA must revise the NOx limit and averaging period that apply during periods of low load.

In the Final FIP, EPA unlawfully introduced, for the first time, a NOx emission limit of 671 lb/hr on a rolling 3-hour average that applies when the White Bluff and Independence units are operating at less than 50 percent of their maximum heat input capacity.⁴⁸ In contrast, EPA had proposed an emission limit of 0.15 lb/MMBtu on a 30 boiler-operating-day rolling average that would apply regardless of the capacity at which the units were operating.⁴⁹ Entergy did not have notice of or an opportunity to comment on the significant change in the Final FIP to the limit and averaging period that apply when the units are operating at low loads. Entergy explained in its comments on the Proposed FIP that a higher limit is necessary during periods of low load operation because the LNB/SOFA system is designed to operate primarily in the range of 50-100 percent of unit load, and the vendor would not guarantee that LNB/SOFA could meet a limit of 0.15 lb/MMBtu for operating loads below 50 percent.⁵⁰ While Entergy appreciates EPA's apparent attempt to account for periods of low load in the Final FIP, EPA must reconsider the emission rate and averaging period that apply when the units are operating at less than 50 percent of the maximum heat input capacity.

First, Entergy did not have an opportunity to comment on the new emission limit and averaging period that apply during low load operation. EPA has not explained why either the limit that it established or the shorter averaging period are appropriate for either White Bluff or Independence, given that they were not raised or considered in the Proposed FIP or in Entergy's comments. The final limit and averaging period are not logical outgrowths of the Proposed FIP and they are plainly unlawful, arbitrary and capricious. EPA must grant reconsideration of these elements of the Final FIP.

Second, the new averaging period is unworkable for low load operation and will result in exceedances of the limit. During periods of load transition and, in particular, periods of reduced load, NOx is very sensitive to changing conditions such as air flow, fuel flow, and burner tilt position. When load is being ramped up or down, and mills are put in or out of service, NOx can spike to levels well above typical levels for short periods of time. Within minutes of the excursion, NOx typically will return to and stabilize at the steady state level. With the short 3-hour averaging period, a single 15-minute spike in NOx could result in NOx exceeding the low-load NOx emission limit for a 3-hour period, even if the remaining 165 minutes were below compliance levels.⁵¹ A 30-boiler-operating-day period is necessary to moderate the variations in NOx due to load transition and low load.

Finally, the low-load NOx emission limit, which EPA set at one half the limit proposed by Entergy, also is problematic. It offers no compliance margin, which is necessary to account for increased NOx levels that occur as a function of low load operation, and the unavailability of SOFA when the unit is operated at less than 30 percent of capacity. When load falls below 50 percent, NOx levels increase as a percentage of heat input, trending upwards as load is reduced. This phenomenon is due to the increased levels of excess air that are used to ensure safe boiler

⁴⁸ 81 Fed. Reg. at 66,344, 66,354.

⁴⁹ 80 Fed. Reg. at 18,974, 18,997.

⁵⁰ EAI Comments at 50.

⁵¹ See Memorandum from Foster Wheeler (hereinafter "Foster Wheeler Memo") (attached as Exhibit F).

operation during low loads. During load swings, control systems lead load increases with increases in air flow and follow load decreases with reductions in air flow. This excess air leads to NOx formation from nitrogen-laden air. Not only are NOx emissions generated at a higher rate at low load, but NOx control options are limited during these periods. SOFA is unavailable when the boiler operates below 30 percent capacity, including during startup, because there is insufficient air to support both good combustion and maintain overfire air flow to the boiler. As a result, the SOFA system cannot provide any NOx reduction during these operational periods.

Accordingly, EPA should reconsider the NOx limit and averaging time that applies to periods of low load operation and adopt the limit requested by Entergy in its comments: a rolling 30-boiler operating day average emission rate of 1,342.5 lb NOx/hr at each coal-fired unit at White Bluff and Independence.⁵² At the least, EPA should revise the NOx averaging time to a 30-boiler-operating day period, and the limit to 895 lb/hr.⁵³ This will allow the inevitable NOx variations to be smoothed out over the averaging period, resulting in a limit that is possible to achieve.

IV. REQUEST FOR STAY

A. EPA Should Grant a Stay Pursuant to the CAA and the APA.

Section 307(d)(7)(B) of the CAA authorizes EPA to stay the effectiveness of a rule for up to three months during reconsideration,⁵⁴ which can be extended for additional three-month periods. Additionally, the Administrative Procedure Act (“APA”) authorizes EPA to stay the effectiveness of a rule indefinitely. Under the APA, “[w]hen an agency finds that justice so requires, it may postpone the effective date of action taken by it, pending judicial review.”⁵⁵ EPA has applied this standard to CAA actions.⁵⁶

Unlike a judicial stay, an administrative stay does not require a demonstration of irreparable harm. The APA states:

When an agency finds that justice so requires, it may postpone the effective date of action taken by it, pending judicial review. On such conditions as may be required and to the extent necessary to prevent irreparable injury, the reviewing court . . . may issue all necessary and appropriate process to postpone the effective date of an agency action or to preserve status or rights pending conclusion of the review proceedings.⁵⁷

The APA deliberately contrasts what is required for an administrative stay—“justice so requires”—and a judicial stay—“conditions as may be required” and “irreparable harm.” Similarly, CAA Section 307(d)(7)(B) authorizes an administrative stay, but does not premise that

⁵² EAI Comments at 49.

⁵³ Foster Wheeler Memo at 4.

⁵⁴ See 42 U.S.C. § 7607(d)(7)(B).

⁵⁵ 5 U.S.C. § 705.

⁵⁶ See, e.g., Prevention of Significant Deterioration (“PSD”) and Nonattainment New Source Review (“NSR”): Aggregation, 75 Fed. Reg. 27,643 (May 18, 2010).

⁵⁷ 5 U.S.C. § 705. EPA has stayed a rule pursuant to Section 705 even after the rule’s effective date has passed. See *Stay of Federal Water Quality Criteria for Metals*, 60 Fed. Reg. 22,228 (May 4, 1995).

stay on a finding of irreparable injury, noting simply that “[t]he effectiveness of the rule may be stayed during such reconsideration...for a period not to exceed three months.”⁵⁸

EPA should administratively stay the Final FIP’s emission limitations for White Bluff and Independence while it addresses the issues identified above in Entergy’s Petition, and while the Eighth Circuit considers Entergy’s petition for review of the Final FIP. Specifically, Entergy requests that EPA stay 40 C.F.R. §§ 52.173(c)(6)-(8) with respect to White Bluff and §§ 52.173(c)(24)-(26) with respect to Independence. As explained below, a delay in implementation of the FIP would prevent harms to Entergy, with negligible visibility impact, while the Final FIP is reviewed. An administrative stay also would allow ADEQ time to develop its replacement SIP.

B. Justice Requires that EPA Grant a Stay.

1. Compliance with the SO₂ limits would immediately and irreparably harm Entergy, its co-owners, employees, customers, and communities.

To meet the Final FIP’s SO₂ emission limits at White Bluff and Independence, Entergy must make plans for compliance now. Implementation of the Final FIP requires Entergy to make a Hobson’s choice as soon as possible to either (1) permit, design, gain regulatory approval for, construct, install, and tune dry scrubbers on all four units by October 27, 2021, or (2) deactivate the units by that date, eliminate 230 Entergy jobs in rural Arkansas,⁵⁹ dramatically reduce the local tax revenues, and commit to new resources to replace a significant portion of its generating capacity. Either path for compliance with the SO₂ emission limits at White Bluff and Independence is a complex undertaking that must be pursued independently for each unit, and will result in immediate and irreparable harm to Entergy, its co-owners,⁶⁰ and local economies.

To ensure compliance, either path would require Entergy to begin making commitments and significant financial investments in the immediate future and without state agency review of the proposed path. Entergy must pursue both potential paths for as long as there is regulatory uncertainty.⁶¹ Entergy would suffer irreparable harm if it is forced to proceed before EPA acts

⁵⁸ 42 U.S.C. § 7607(d)(7)(B).

⁵⁹ Entergy also directly employs several hundred contractors over the course of the year, for both seasonal outage work and ongoing plant support.

⁶⁰ As described in petitions for reconsideration of the Final FIP filed by co-owners of the White Bluff and Independence plants, the harms to these co-owners would be significant. For example, deactivation of both plants in October of 2021 would create the immediate need to add an estimated 500 megawatts (“MW”) of firm generation capacity to the Midcontinent Independent System Operator (“MISO”) side of the Arkansas Electric Cooperative Corporation (“AECC”) system. This replacement capacity is estimated to require the investment of \$490,000,000. The levelized investment recovery cost of this generation capacity to AECC’s member cooperatives would be approximately \$34,000,000 annually. Jonesboro City Water and Light estimates that replacement of its share of ownership of the generation capacity of the White Bluff and Independence units in 2021 would result in increased costs between \$16.3 million and \$25 million, *in 2021 alone*, which translates to a 17-27 percent increase in customer rates. See Petition for Reconsideration and Request for Administrative Stay of AECC and Petition for Reconsideration and Request for Administrative Stay of Energy & Environmental Alliance of Arkansas (“EEAA”).

⁶¹ Either choice would cause irreparable harm in so far as significant financial investments would need to be made that could not be reversed if the Final FIP were later revised or vacated. Additionally, due to the lead time needed to install FGD technology or to prepare for permanent retirement, more time is needed to select one of these two options than the Final FIP allows. As described in this section, regulatory reviews are required for both paths, so the

on the Petition and before the Eighth Circuit determines the merits of Entergy's petition for review of the Final FIP. And yet, to meet the compliance deadline, it will be compelled to do so or risk noncompliance with the Final FIP. The first path, installing dry scrubbers on all four units, would be a massive undertaking costing approximately \$2 billion. The first phase of this multi-phase project would have to begin as soon as the decision to proceed was made, as the process would require the entirety of the five years allotted in the Final FIP, as explained in further detail below, including spending over \$150 million in the first 18 months alone. The second path, deactivating the units, is complicated and costly in different ways, as explained below. Both paths cause Entergy irreparable harm.

Given the lead times for either path, Entergy must start immediately to conduct analyses and reviews to support its internal decision-making process, which will take several months. Entergy's internal review process would assess both approaches, particularly analyzing and comparing the economics of each approach, and would be coordinated with the co-owners of White Bluff and Independence. Assessing the costs of the two approaches is extremely complicated. For example, for EAI to retire an existing generating unit, EAI must provide at least six months' notice to MISO, the regional transmission operator that dispatches White Bluff and Independence, of its intent to retire the unit. Because of the interconnected nature of the electric grid, a decision to retire a unit can have implications for the remainder of the grid, some of which may require upgrades to the transmission system to ensure that the grid can be operated reliably after the generating unit is retired. Accordingly, owners/operators of a generating unit typically would request that MISO perform an "Attachment Y-2 study," which would determine, on a non-binding basis, whether the retirement of the generating unit (i.e., White Bluff or Independence) would impact transmission system reliability, or whether the plant would need to continue to operate until transmission upgrades or other system changes to maintain reliability can be completed. In Entergy's experience, an Attachment Y-2 study takes approximately three to four months for a standard request. However, this situation is far from standard; assessing the retirement of four units totaling nearly 3400 MW of capacity may take much longer. Entergy would incorporate the Attachment Y-2 results into its internal economic analysis. Depending on the time needed to perform the economic analysis, coordinate with co-owners, and obtain the results of MISO's Attachment Y-2 study, this decision-making process would take between six and nine months.

Compliance with the FIP also requires EAI, the operator of all four units, along with the other co-owners of White Bluff and Independence to adhere to other regulatory processes, each unique to each co-owner.⁶² In similar cases involving significant capital investments at existing generating units, EAI has sought a declaratory order from the APSC confirming that the selected path is in the public interest.⁶³ Because EAI is a rate-regulated entity, costs prudently incurred in the provision of electrical service typically are recoverable from customers, but cost recovery can occur only after the costs are reviewed by the APSC and a regulatory rate adjustment is made. In

compressed timeline mandated by the Final FIP requires Entergy to simultaneously prepare for both paths in the event that the selected path does not earn regulatory approval.

⁶² For example, EMI also has regulatory reviews and approvals before the Mississippi Public Service Commission that it must pursue. *See also* Petition for Reconsideration and Request for Stay of Energy and Environmental Alliance of Arkansas.

⁶³ *See, e.g.*, APSC Docket No. 09-024-U (Seeking public interest finding for installation of environmental controls at White Bluff Units 1 and 2).

other words, a public interest finding addresses the prudence of the investment; it does not address the prudence of the management of the incurrence of the costs nor does it modify base rates or effect other charges to include those costs (which would be the result of a separate review by the APSC in a later proceeding). If cost recovery is not approved or if recovery is significantly delayed, EAI could be deprived of a reasonable opportunity to receive adequate recovery of costs incurred.⁶⁴ In either case, the preparation of the application and supporting testimony could take up to six months. Additionally, completion of discovery, an APSC-determined procedural schedule with multiple rounds of testimony from the APSC General Staff, Attorney General, and other intervenors, a public hearing, and the issuance of a final order, could take an additional 14 months to complete. Accordingly, the state regulatory process may take as long as 20 months, and that is prior to any potential challenge by EAI to the APSC's final order, which could include a petition for rehearing and subsequent appeal.

Should Entergy choose to install dry scrubbers on all four units, Entergy would be forced to make considerable expenditures within the next few years, effectively prohibiting any alternative approach. Of the approximately \$2 billion that Entergy estimates it would spend for scrubbers on White Bluff and Independence, Entergy would need to spend well in excess of \$38 million within the first year, \$150 million within 18 months, and \$305 million within 24 months.⁶⁵

The work to install the dry scrubbers also would need to begin immediately to comply with the FIP's five-year deadline. During the preliminary engineering phase of the project, which is expected to take between six and 12 months, an engineer would need to develop detailed specification requirements for the engineering, procurement, and construction of the FGD systems. Contractors would need at least three months to develop proposals, and then several weeks would be required to evaluate the proposals and award the contract. Because White Bluff and Independence have different co-owners, two separate FGD contracts would need to be developed. Afterward, the FGD contractor at each plant would proceed with the detailed engineering phase, during which every component required for a complete and operable FGD system would be designed and fabricated. Next, the engineered components would be delivered to the sites and the FGD contractor at each site would erect them and integrate them into the existing plants. A tie-in outage must be taken for each unit so that physical connections to existing systems can be made. Because Entergy would not take simultaneous outages at all four units for reliability reasons, and because there would be two FGD contracts awarded at different times, the construction phase likely would be staggered by approximately one year across all four units. Once constructed, equipment startup and commissioning would occur, followed by operational tuning and performance optimization. Performance testing would then

⁶⁴ EAI has elected to be regulated pursuant to Ark. Code Ann. § 23-4-1201 et seq., which provides that a public utility may choose to be regulated under a formula rate review mechanism that provides for an annual streamlined review of a public utility's rates and designation of a test period based on a projected test year. EAI's APSC-approved Rate Schedule No. 44, Formula Rate Plan Rider ("Rider FRP") provides for annual adjustment of customers' rates based on a comparison of EAI's earned return on common equity and its target return rate approved by the APSC. However, pursuant to Ark. Code Ann. § 23-4-1207 and Rider FRP, the annual Rider FRP revenue increase or decrease for each rate class shall not exceed four percent of each rate class' revenue. Accordingly, in complying with the FIP, EAI may pursue cost recovery for those costs pursuant to Rider FRP or other potential cost recovery mechanisms.

⁶⁵ These estimates were developed by Sargent & Lundy but do not include the significant costs for AFUDC, escalation and owner's costs that Entergy also will incur. Sargent & Lundy Memo at 5.

be conducted to confirm compliance with emission limits. The FGD contractor would need approximately three years to complete engineering and construction of one unit, followed by up to six months of commissioning, startup, performance optimization, and performance testing.

Alternatively, were Entergy to choose deactivation, the company would have to secure additional regulatory approvals as quickly as possible to provide for a smooth transition to replacement power by the 2021 deadline. The company must provide six months' notice to MISO before a generator can be retired (the "Attachment Y" process described above).

Entergy next would need to procure and build replacement power because White Bluff and Independence currently are needed for Entergy to provide reliable electricity generation to its customers and meet its obligations to MISO. Entergy's resource planning process would consist of designing, gaining regulatory approval for, constructing, and making operational a new alternative generating unit. Entergy anticipates that the replacement generation would be a combined cycle gas turbine ("CCGT"),⁶⁶ which may require construction of a new gas pipeline to the selected site. Depending on the site that is selected for the CCGT, rights-of-way may need to be obtained. Transmission would need to be planned and built to connect the new CCGT with the grid. To construct replacement generation as quickly as possible, Entergy must prepare an environmental permit application, prepare RFPs for the construction, select a vendor, and submit a permit application. The time required for this process means that replacement power would not be available for five years at the earliest, thus exposing customers to market capacity prices in the interim. Accordingly, planning must begin immediately to limit, as much as possible, the duration of customer exposure to market prices. In the meantime, even maintaining reliability through the purchase of power would require Entergy to accelerate planned transmission projects. A project that currently is planned to be completed in 2024 would have to be accelerated to be completed in 2020, at an additional cost of \$8 million and with a start date in 2017.

Ceasing operations at White Bluff and/or Independence would cause irreparable harm to Entergy employees and the communities in which they work. The total number of jobs created and supported by the White Bluff plant alone is estimated to be 1,237.⁶⁷ Entergy itself employs 105 full-time employees at White Bluff, along with 10 Entergy Service Company employees that support White Bluff full time. White Bluff also employs approximately 300 contractors for at least six weeks in the spring and fall each year for planned outage support. Additionally, there are about 20 contractors that work full time in security, coal dust management, janitorial, lawn maintenance, ash management and scaffolding support. At Independence, Entergy employs 108

⁶⁶ White Bluff cannot be replaced by renewable energy. White Bluff provides approximately 1,600 MW of reliable capacity to the MISO system and there are no practical or reasonable renewable generation options to meet the MISO resource adequacy requirements currently satisfied by White Bluff. Replacement of White Bluff would require 3,200 MW of solar power (necessitating 22,000 acres of panels), or 10,000 MW of wind generation (necessitating 7,000 windmills that would have to be located in the plains states hundreds of miles away from Entergy's load). Additionally, there is insufficient biomass fuel available to supply a 1,600 MW replacement biomass plant, and even if sufficient fuel were available, it would take an impracticable amount of trucks to deliver the necessary fuel. None of these options is feasible.

⁶⁷ Willie Lee Brooks, Jr., Senior Analyst, Economic & Financial Risk, *What is the Economic Impact of the White Bluff Electric Power Plant?*, at 2, Arkansas Electric Cooperative Corporation (May 30, 2014), available at <http://www.arkleg.state.ar.us/assembly/2015/Meeting%20Attachments/890/112666/HANDOUT%20%20-%20HIGHLEY%20%20Economic%20Impact%20of%20White%20Bluff%20Electric%20Pwr%20Plant.pdf>.

full-time employees, along with seven Entergy Service Company employees that support Independence full time. Independence also employs 83 contractors, who provide janitorial services, maintenance support, ash disposal services, and work on insulation and scaffolding during outages. If White Bluff and Independence were to cease operations, the company would have to lay off or reassign its employees, and the contractors would be out of work. These shutdowns would have significant impacts on the rural Arkansas communities where the plants are located. For example, the estimated the value of White Bluff to the local economy is \$173 million.⁶⁸

2. Compliance with the NOx limits would immediately and irreparably harm Entergy, its co-owners, employees, customers, and communities.

As explained above in Section III.D, the 18-month deadline to install LNB/SOFA at White Bluff and Independence is infeasible, as it does not provide sufficient time to develop, plan, permit, install, and appropriately tune the equipment. Entergy could complete installation of LNB/SOFA at all four units by the final deadline only by circumventing its normal internal procedures and the tuning and training process. Entergy would be forced to perform a more limited risk and prudence review, would have to forgo a competitive bidding process in favor of using a pre-selected vendor for fabrication and installation, and may even need to engage this vendor prior to having all regulatory approvals in hand. These procedures are in place to attempt to ensure cost recovery, and failure to comply with them puts the company at risk of making investments that the APSC later determines are not in the public interest and therefore ineligible for cost recovery. Additionally, Entergy would be forced to comply with the emission limits prior to the conclusion of its tuning and training procedures. Even with these truncated procedures, the schedule does not allow for any unforeseen issues in the installation and tuning process, which frequently arise and complicate installation or hinder the expected performance of the installed equipment.

Implementation of the Final FIP forces Entergy to choose between two untenable options – each resulting in irreparable harm and unnecessary risk: (1) increasing costs and risk through rushed work and non-compliance with company prudence procedures, with no guarantee of FIP compliance once the work is completed, and (2) taking more time than the Final FIP permits, resulting in cessation of operation of the White Bluff and Independence units until LNB/SOFA can be installed. Beyond the fact that cessation of operations would necessitate Entergy to obtain costly replacement power on the open market, critically, it also could cause reliability issues, as generation from White Bluff and Independence is necessary for Entergy to provide reliable electricity generation to its customers and meet its obligations to MISO. In light of this, EPA must issue a stay of the deadline for compliance with the NOx limits until a more appropriate deadline can be set.

⁶⁸ *Id.*

3. A stay would prevent harm to Entergy and its co-owners, customers, and communities but would still allow Arkansas to meet its regional haze goals.

Arkansas already is below the URP and EPA's RPGs, and thus a delay in the implementation of the FIP would not contribute to unacceptable visibility impairment. As discussed previously, the IMPROVE data for January 2014 through December 2015 show that visibility continues to improve at a greater rate than the URP in Caney Creek and Upper Buffalo.⁶⁹ The recent IMPROVE data also confirm that visibility in the two Arkansas Class I areas already is better than EPA's final RPGs for the areas.⁷⁰ Accordingly, a stay would not interfere with attainment of the URP or the RPGs.

D. Entergy Also Meets the Four Factors that Courts Consider When Assessing Judicial Stay Requests.

Although the judicial test for analyzing a request for a stay does not apply here, Entergy's request for stay nonetheless satisfies this test. First, as described above, Entergy has made a strong showing of likelihood of success on the merits. For the reasons explained in this Petition, the Final FIP contains significant errors and unreasonable requirements upon which Entergy was unable to comment during the period for public review, and that are not logical outgrowths of the Proposed FIP. The CAA *requires* that EPA reconsider these elements of the Final FIP. Second, Entergy would be irreparably harmed if the Final FIP is not stayed. As explained above, implementation of the FIP would force Entergy to make expensive choices about the installation of controls and possible deactivation of units in very short order. Entergy would be forced to spend significant amounts of money once these choices are made. Third, a stay of the rule would not cause harm. Visibility in Arkansas' Class I areas already is improving at a rate greater than the URP for each area, and the areas already have surpassed EPA's final RPGs for the first planning period. Implementation of SO₂ and NO_x controls at White Bluff and Independence is not needed to achieve either the URP or the RPGs. Fourth, the balance of harms and the public interest favor a stay. A stay would prevent significant, irreparable harm to Entergy with little visibility impact, as Arkansas already has met the goals that the installation of FGD and LNB/SOFA are designed to achieve. It also would prevent the harm to employees and local communities that would ensue from the deactivation of any of the units. In light of this, a stay is appropriate and just, and should be granted.

V. CONCLUSION

For the reasons discussed above, Entergy urges EPA, by February 1, 2017, to reconsider and stay certain provisions of the Final FIP to avoid the harms to Entergy, its employees, co-owners, customers and local communities, as described herein.

⁶⁹ Trinity Report at 3.

⁷⁰ See *supra* at 4.

Exhibit C



Entergy Services, Inc., on behalf of Entergy Arkansas, Inc.



Effects of Coal-Fired Power Plant Closures
in First Planning Period on Visibility in Arkansas Class I Areas

Submitted to:

Arkansas Department of Environmental Quality (ADEQ)

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February 2, 2018

Trinity Project 183702.0022



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1. EXECUTIVE SUMMARY

This report presents the emissions reductions and visibility improvements attributed to the closures of coal-fired power plants located in the states of Texas and Tennessee. The impacts of these planned closures on the short term (i.e., first planning period) and the long-term visibility improvement at the Arkansas Class I areas is important for the Arkansas Department of Environmental Quality (ADEQ) to consider in its development of a Regional Haze State Implementation Plan (SIP) to address emissions of sulfur dioxide (SO₂) for the first planning period.

The completed and/or planned shutdown of five (5) coal-fired power plants¹: will result in emissions reductions of greater than 206,000 tons per year (tpy) of SO₂ and more than 39,000 tpy of nitrogen oxides (NO_x). These massive emissions reductions are predicted to improve visibility conditions in Arkansas Class I areas, which, as documented in Trinity reports submitted under separate cover, are already substantially better than the reasonable progress goals set for the first planning period.

Based on the emissions reductions and anticipated visibility improvements from these coal-fired power plant closures, it is clear that no additional reductions are *necessary* at this time to achieve reasonable progress towards the goals of the Regional Haze Program. ADEQ should consider these reductions and the resulting visibility improvements at the Arkansas Class I areas in their first planning period SIP development as well as the long-term strategy development.

¹ These plants are Luminants' Big Brown, Sandow, and Monticello plants; CPS Energy's Deely plant; and Tennessee Valley Authority's Allen plant.

2. EMISSIONS REDUCTIONS DUE TO PLANT CLOSURES

Luminant Energy recently announced that it will be closing three (3) coal-fired power plants in 2018: The Big Brown Plant southeast of Corsicana, Texas, the Sandow Plant northeast of Austin, Texas, and the Monticello Plant near Mount Pleasant, Texas.² One other Texas coal-fired power plant – CPS Energy’s Deely plant located in east Texas – is also scheduled to close in 2018.³ In addition, Tennessee Valley Authority (TVA) has announced that it will be retiring the Allen coal-fired plant in 2018.⁴

Table 2-1 summarizes the maximum annual SO₂ and NO_x emissions for each of these plants. The emissions for the Texas plants were obtained from a review of the Technical Support Document⁵ (baseline modeling scenario) for EPA’s 2014 Texas Regional Haze Reasonable Progress Federal Implementation Plan (2014 TX RP FIP), and, according to the FIP, represent the maximum annual emissions from 2008-2012. The emissions for TVA’s Allen Plant were obtained from the Clean Air Markets Database (CAMD); the maximum annual emissions for 2008-2012 are used for consistency.

Table 2-1. Summary of Maximum Annual Emissions for To-Be-Closed Plants

Facility Name	SO₂ (tpy)	NO_x (tpy)
Big Brown	66,227.29	6,752.83
Sandow 5	2,152.60	1,397.57
Sandow Steam	25,594.22	1,500.37
Monticello	73,212.41	11,433.76
Deely	26,588.75	9,933.45
Allen	12,495.02	8,056.72
TOTAL	206,270.29	39,074.70

As presented in Table 2-1, more than 206,000 tpy of SO₂ and 39,000 tpy of NO_x reductions will take place within the first planning period, which ends on December 31, 2018. These total reductions of SO₂ and NO_x are significantly higher than the emissions reductions anticipated by the final Arkansas Federal Implementation Plan (FIP)⁶ or the proposed Arkansas SIPs (including both the final and approved NO_x-related SIP revision and

² Dallas News, <https://www.dallasnews.com/business/energy/2017/10/13/texas-largest-power-generator-speeds-coals-decline-closure-two-plants>, Accessed January 2018; Power Engineering, <http://www.power-eng.com/articles/2017/10/luminant-to-close-1-800-mw-coal-fired-monticello-power-plant.htm>, Accessed January 2018; and Luminant, <https://www.luminant.com/luminant-close-two-texas-power-plants/>, Accessed January 2018.

³ Power Engineering, <http://www.power-eng.com/articles/2017/10/cps-deely-coal-to-still-close-even-with-clean-power-plan-reversal.html>, Accessed January 2018.

⁴ <https://www.epa.gov/sites/production/files/documents/tvacoal-fired-cd.pdf>, Accessed January 2018.

⁵ Modeled emission rates for the Texas plants were obtained from the following files in EPA Docket No. EPA-R06-OAR-2014-0754 (Folder: TX166.010-00 ENVIRON Modeling Data and Reports”):

X166-010-03 EPA_txbart3612k_Vis_2002_2018_PSAT_Projected_072913

TX166-010-08 Memo_TXHAZE_2002CAMx_ENV_29July2013

TX166-010-09 Memo_TXHAZE_2018CAMx 16Sept13

The modeled emission rates are similar to, but do not exactly match in every case, the information available from CAMD for 2008 to 2012, Accessed January 2018.

⁶ 81 Fed. Reg. 66,332 (September 27, 2016).

the proposed SO₂-related SIP revision). They are also greater than the maximum emissions for Entergy Arkansas, Inc.'s (EAI) White Bluff and Independence facilities combined. Moreover, the emissions reductions from the plant closures are taking place within the first planning period, as compared to the SO₂ reductions stipulated by the Arkansas FIP or proposed Arkansas SIP.⁷

In addition to the emissions reductions, the relative distances for the plants (especially Monticello, Big Brown, and Allen) to the Arkansas Class I areas are comparable to the EAI plants; therefore, predicted visibility improvements at the Arkansas Class I areas would also be comparable. Section 3 provides a discussion of potential visibility improvements due to the plant closures.

⁷ Under the FIP, the deadline for White Bluff and Independence to comply with the SO₂ limitations is October 27, 2021. ADEQ's proposed SIP would require compliance with the SO₂ limitations by approximately the end of 2021 - three years after EPA's final action on the SIP, which is projected to be the end of 2018. *See* Memorandum of Understanding between EPA and ADEQ (Dec. 14, 2017).

3. VISIBILITY IMPROVEMENTS DUE TO PLANT CLOSURES

Figure 3-1 shows the locations of the to-be-closed plants relative to the two (2) Arkansas Class I areas: Caney Creek Wilderness Area (CACR) and Upper Buffalo Wilderness Area (UPBU). Table 3-1 provides the distances to CACR and UPBU from each plant.

Figure 3-1. Locations of To-Be-Closed Plants with respect to the Arkansas Class I Areas

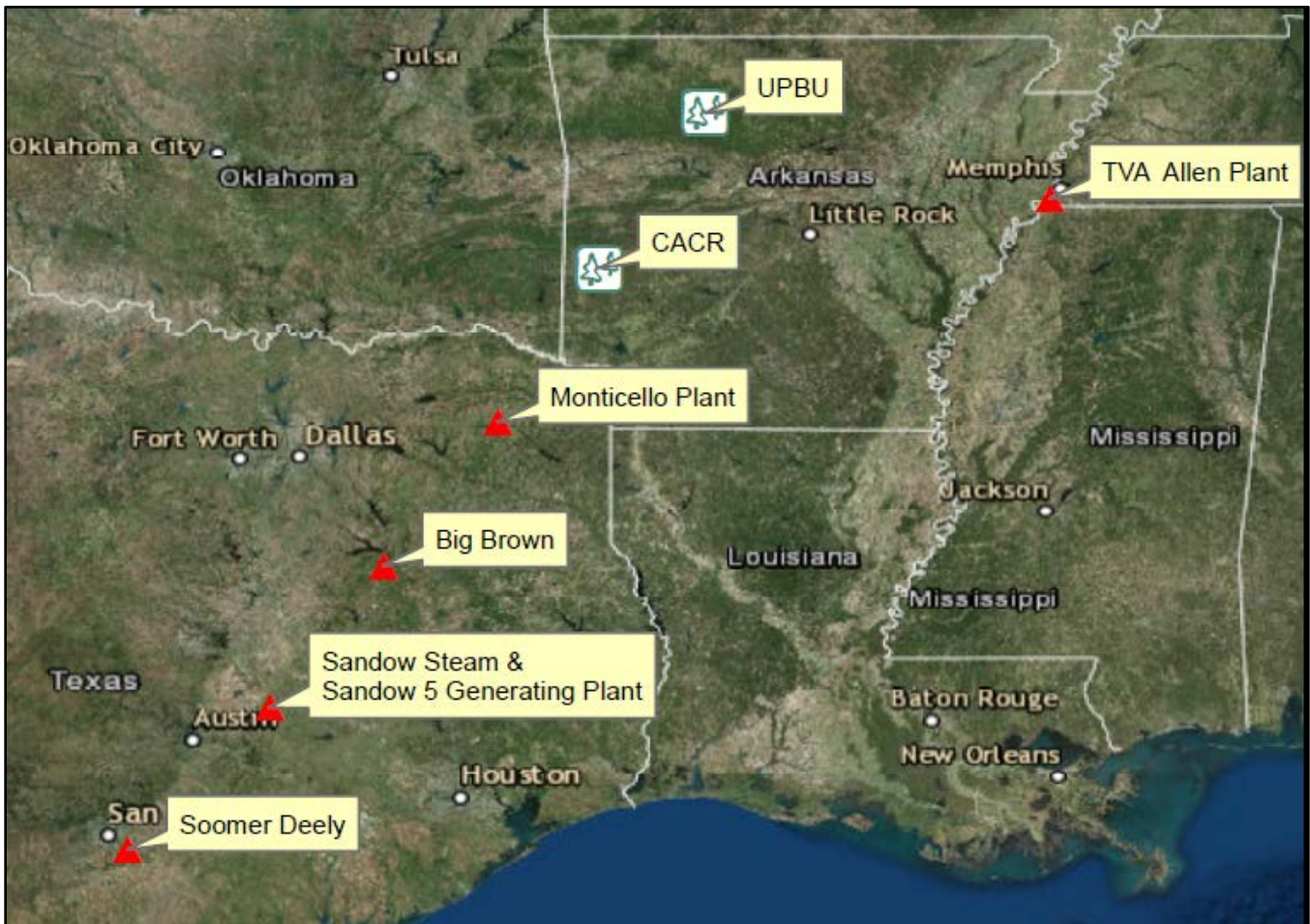


Table 3-1. Distance from To-Be-Closed Plants to Class I Areas

Facility Name	Distance to CACR (km)	Distance to UPBU (km)
Big Brown	343	517
Sandow 5 Generating Plant	512	686
Sandow Steam Plant	512	686
Monticello	172	347
Deely	697	870
Allen	370	288

The four coal-fired power plants in Texas that will be closed are among the 38 power plants included in EPA’s regional haze modeling for the 2014 TX RP FIP,⁸ and the visibility impacts attributable to these plants can be determined from that modeling. Table 3-2 presents the worst 20 percent days average visibility impact, in delta deciview (Δdv), and the individual contribution to total visibility extinction, in percent, at CACR and UPBU attributable to each of the plants.

Table 3-2. Worst 20% Visibility Impact (Δdv) and Contribution to Total Extinction for the To-Be-Closed Texas Plants

Facility Name	Worst 20% Days Average (Δdv)		Contribution to Total Extinction (%)	
	CACR	UPBU	CACR	UPBU
Big Brown	0.0564	0.0225	0.63%	0.25%
Sandow 5 Generating Plant	0.0011	0.0010	0.01%	0.01%
Sandow Steam Plant	0.0042	0.0041	0.05%	0.05%
Monticello	0.1594	0.0401	1.76%	0.45%
Deely	0.0021	0.0031	0.02%	0.03%

As shown in Table 3-2, the planned shutdown of the Texas plants (not accounting for TVA’s Allen plant) in the first planning period is predicted by EPA’s modeling to result in a total reduction of approximately 2.5 percent in visibility extinction at CACR and about 0.8 percent at UPBU.

The reduction at CACR is nearly equivalent to the total contribution to visibility extinction from all point sources in Arkansas, and is equivalent to one-fifth of the total impact at CACR from all sources in Arkansas.⁹ In other words, the improvement at CACR predicted by the shutdown of the Texas plants would be equivalent to closing one-fifth of all emissions sources (including stationary and mobile) in the entire state of Arkansas.

The predicted significance of the Texas plant closures is illustrated in Figure 3-2 and Figure 3-3, which present the glidepaths for CACR and UPBU along with observed IMPROVE haze indices for 2002 through 2016 and predicted 2018 values calculated by subtracting the cumulative contribution to total extinction from the four Texas plants from the 2016 observed haze index. These are conservative estimates of 2018 predicted visibility impairments as they do not take into account any other reductions taking place, e.g., at TVA’s Allen plant and others.

⁸ EPA’s 2014 modeling was completed using the Comprehensive Air Quality Model with Extensions (CAMx), the Modeled Attainment Test Software (MATS) post-processor, which tethers the model-predicted values to actual monitoring data via Relative Response Factors (RRFs), and the Particulate Source Apportionment Tool (PSAT), which was developed to determine source-specific contributions based on the data provided by CAMx. The modeling was completed by a contractor: Ramboll (formerly ENVIRON).

⁹ Based on EPA’s modeling, the contribution to predicted extinction at CACR from point sources in Arkansas is 2.87 percent, and the total contribution from the entire state of Arkansas (all sources including stationary and mobile) is 13.10 percent.

Figure 3-2. CACR Glidepath with Observed and 2018 Predicted Haze Index

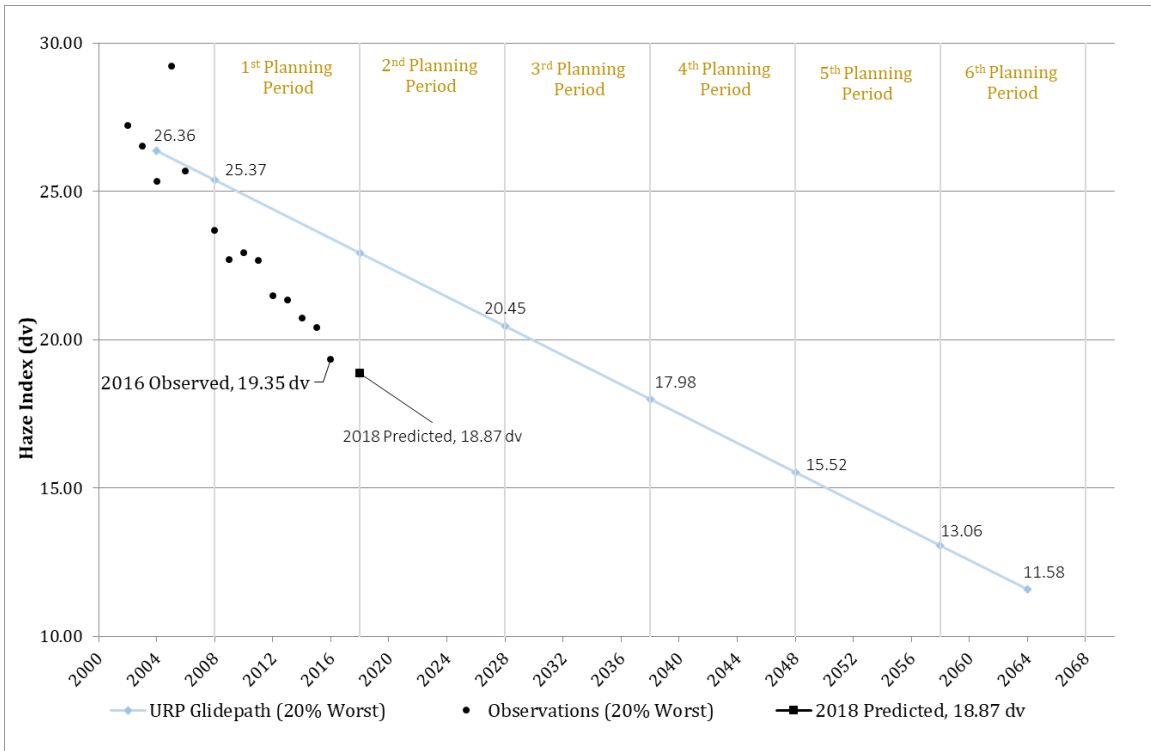
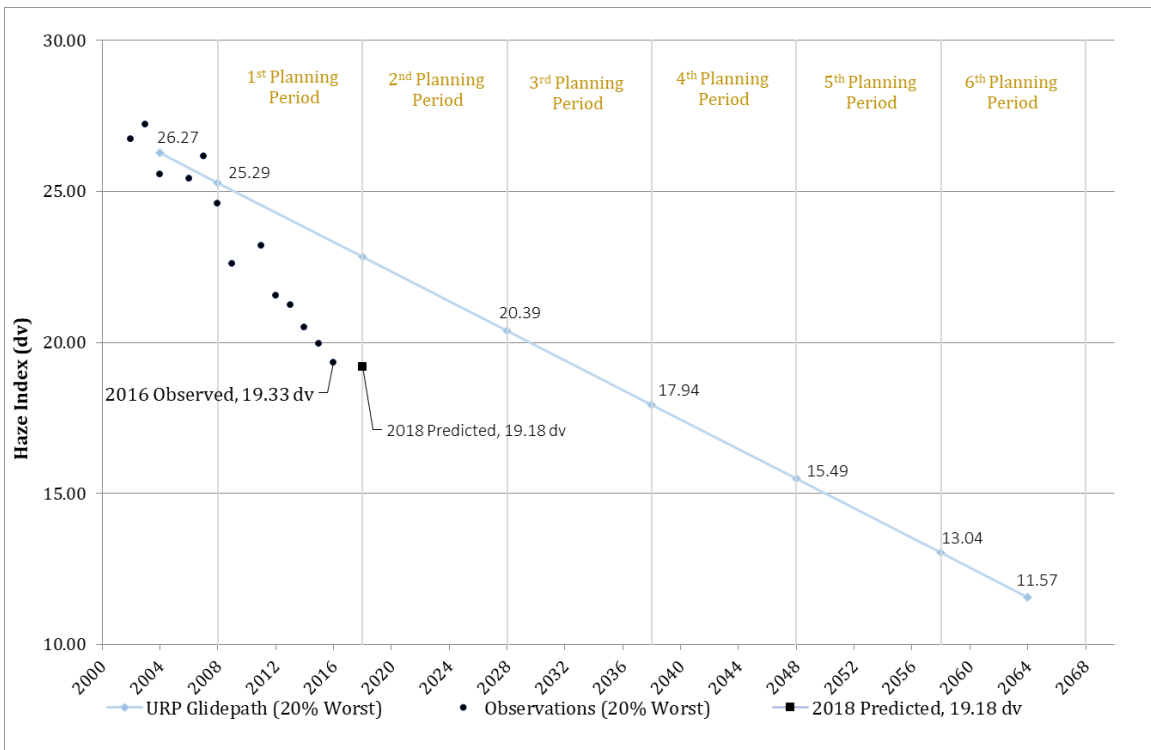


Figure 3-3. UPBU Glidepath with Observed and 2018 Predicted Haze Index



The visibility improvements due to the Texas plant shutdowns are predicted to further reduce visibility impairment in CACR and UPBU, increasing the already significant gap between the observed haze indices and the glidepaths. Furthermore, because the shutdowns will occur before the end of 2018, the visibility improvement will take place before the end of the first planning period. Table 3-3 provides a comparison of 2016 observed haze indices, 2018 predicted haze indices, and the FIP's 2018 Reasonable Progress Goals.

Table 3-3. Comparison of Observed 2016 and Predicted 2018 Haze Index with 2018 and 2028 RPG

Class I Area	Observed 20% Worst Days Average for 2016	Predicted 20% Worst Days Average for 2018	RPG for 2018
CACR	19.35	18.87	22.47
UPBU	19.33	19.18	22.51

Exhibit D



ENTERGY ARKANSAS, INC.

**REVIEW OF EPA'S COST ANALYSIS FOR ARKANSAS REGIONAL HAZE
PROPOSED FEDERAL IMPLEMENTATION PLAN**

SL-012913

Final

July 14, 2015

Project No: 13027-002

PREPARED BY

The logo for Sargent & Lundy, featuring a stylized grey shape that resembles a drop or a flame on the left, and the text "Sargent & Lundy" in a blue serif font on the right, with "LLC" in a smaller font to the right.

Sargent & Lundy^{LLC}

**55 East Monroe Street
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ATTACHMENTS

Attachment A – Cost-Effectiveness Calculation

EXECUTIVE SUMMARY

On April 8, 2015, the U.S. Environmental Protection Agency (EPA) published in the *Federal Register* a proposed rule that would partially approve and partially disapprove specific portions of the Arkansas State Implementation Plan (AR SIP) and issue a Federal Implementation Plan (FIP) that would regulate a group of Arkansas electric generating units (EGUs).¹ In this rule, EPA proposes to require additional SO₂ emission reductions that would require retrofitting new FGD systems on Entergy's White Bluff Station Units 1 and 2 and Entergy's Independence Station Units 1 and 2.

Sargent & Lundy (S&L) was contracted by Entergy to review EPA's proposed cost modifications as described in its Technical Support Document entitled, "Technical Support Document for EPA's Proposed Action on the Arkansas Regional Haze Federal Implementation Plan," hereinafter referred to as "FIP TSD," including one of its appendices, entitled "Appendix A. Technical Support Document for the SDA Control Cost Analysis for the Entergy White Bluff and Independence Facilities Arkansas Regional Haze Federal Implementation Plan (SO₂ Cost TSD)," hereinafter referred to as "Cost TSD."

Cost-effectiveness is influenced by two variables: the total annualized cost to retrofit dry FGD systems (\$/yr) and the corresponding reduction in annual SO₂ emissions (tons per year "tpy"). EPA's approach does not accurately calculate either variable.

Based on our review, the following items in EPA's analysis were identified to result in overstating the tons of SO₂ removed:

- After defining a baseline SO₂ emission period of between 2009 and 2013, EPA arbitrarily excluded the years with the maximum and minimum annual averages;
- When calculating SO₂ emission reductions due to FGD retrofits, EPA incorrectly used maximum monthly averages for baseline SO₂ emissions; and
- A controlled SO₂ limit of 0.06 lb/MMBtu is not a realistic or sustainable value to maintain on a long-term basis when considering the normal variation in operation that occurs at all coal-fueled facilities.

In addition, the following items in EPA's analysis were identified to result in understating the annualized cost of the dry FGD retrofit:

- EPA subtracted over \$23 million in BOP costs for both units because they mistakenly believed the equipment to be included in Alstom's scope;
- Because EPA mistakenly removed BOP cost items that should be included in the estimate, they over-estimated and misapplied percent reductions to other cost items, resulting in cost subtractions of over \$7 million for both units;

¹ See 80 Fed. Reg. 18,944 (April 8, 2015).

- EPA removed over \$41 million per unit in Owner's Costs despite the fact that these are real costs that the Entergy will incur;
- EPA under-estimated cost escalation, and in some cases de-escalated costs, by relying on cost indices rather than using vendor pricing information, all of which resulted in under-estimating costs by more than \$42 million per unit;
- EPA incorrectly utilized the IPM model, which is not designed to evaluate site-specific costs, to verify O&M costs at White Bluff;
- EPA scaled capital costs to a design fuel of 0.68 lb/MMBtu, which when compared to operating data, is completely insufficient to ensure compliance with the proposed emission limits for nearly half of the time;
- While we agree that O&M costs should be based on 0.68 lb/MMBtu, EPA's methodology to scale direct O&M costs based on fuel sulfur levels is incorrect and resulted in under-estimating these costs by over \$5 million per unit;
- EPA incorrectly scaled indirect O&M costs using fuel sulfur levels, despite these costs being estimated as percentages of capital cost, which resulted in under-estimating these costs by over \$4 million; and
- EPA used a remaining useful life of 30 years, when Entergy is proposing to cease coal-fired operations on these units in 2027 and 2028, resulting in a remaining useful life of 6 or 7 years.

As discussed above, S&L's analysis reveals that EPA overstates the cost-effectiveness (\$/ton of SO₂ removed) to retrofit dry FGD systems at White Bluff Units 1 and 2, which EPA proposes to require in its FIP. In its approach, EPA understated the annualized cost of the control systems and overstated the tons of SO₂ that would be removed by its FIP-imposed FGD retrofits. To better address EPA's questions on scope and cost items which it did not understand, S&L has prepared an updated cost report to clarify and provide further detail around scope items and cost items included in the estimate.² The corrected and updated cost-effectiveness for both White Bluff units is greater than \$7500/ton, which is clearly not cost effective.

With respect to EPA's Reasonable Progress Goal (RPG) analysis for SO₂ controls, EPA did not follow its own guidance document when conducting its four factor analysis of Independence. EPA failed to consider lower cost options that could reduce SO₂ emissions at Independence and instead concluded that BART-level controls were required to meet RPG. EPA did not prepare cost estimates based on design parameters for FGD systems retrofit at Independence, as required by their RPG guidance document. EPA did not conduct a dollar-per-deciview analysis, as recommended in its RPG document for these analyses to demonstrate the benefit of retrofitting dry FGD at Independence accounting for visibility benefits. When applying annualized costs to projected visibility improvements the result is over \$1.3 billion/ Δ dv for Caney Creek and over \$1.5 billion/ Δ dv for Upper Buffalo, which is clearly not cost effective.

² See S&L Report #012831 ("White Bluff Dry FGD Cost Estimate and Technical Basis") (July 2015).

1. INTRODUCTION

On April 8, 2015, the U.S. Environmental Protection Agency (EPA) published in the *Federal Register* a proposed rule that would partially approve and partially disapprove specific portions of the Arkansas State Implementation Plan (AR SIP) and issue a Federal Implementation Plan (FIP) that would regulate a group of Arkansas electric generating units (EGUs).³ In this rule, EPA proposes to require additional SO₂ emission reductions that would require retrofitting new FGD systems on Entergy's White Bluff Station Units 1 and 2 and Entergy's Independence Station Units 1 and 2.

Sargent & Lundy (S&L) was contracted by Entergy to review EPA's proposed cost modifications as described in its Technical Support Document entitled, "Technical Support Document for EPA's Proposed Action on the Arkansas Regional Haze Federal Implementation Plan," hereinafter referred to as "FIP TSD," including one if its appendices, entitled "Appendix A. Technical Support Document for the SDA Control Cost Analysis for the Entergy White Bluff and Independence Facilities Arkansas Regional Haze Federal Implementation Plant (SO₂ Cost TSD)," hereinafter referred to as "Cost TSD."

S&L's experience in the electric power industry, as well as our experience with the Entergy facilities makes us uniquely qualified to perform this review. S&L has considerable experience with the federal and state environmental regulations affecting power plant operations, as well as the specification, evaluation, selection, and implementation of emission control technologies for both gas- and coal-fueled utility power facilities, including extensive experience with various FGD technologies. For example, since 2000, S&L has provided, or is currently providing, engineering services for the implementation of over 40 wet FGD projects, 30 dry FGD projects, and 25 dry sorbent injection (DSI) projects, all of which are technologies that are used to control SO₂ emissions. Our first-hand experience with these technologies provides us with a thorough understanding of both capital and operating and maintenance (O&M) costs associated with these technologies, as well as providing us with a comprehensive understanding of the achievable emission rates and limitations of these technologies.

S&L's analysis reveals that EPA overstates the cost-effectiveness (\$/ton of SO₂ removed) to retrofit dry FGD systems at White Bluff Units 1 and 2, which EPA proposes to require in its FIP. Cost-effectiveness is influenced by two variables: the total annualized cost of retrofit dry FGD systems (\$/yr) and the corresponding reduction in annual SO₂ emissions (tons per year "tpy"). EPA's approach does not accurately calculate either variable. In its approach, EPA understated the annualized cost of the control systems and overstated the tons of SO₂ that would be removed by its FIP-imposed FGD retrofits.

³ See 80 Fed. Reg. 18,944 (April 8, 2015).

2. Comments to the FIP TSD – SO₂ Emission Reduction Errors

The majority of S&L's comments are relative to EPA's Cost TSD; however, we note that in its FIP TSD, EPA incorrectly estimates both baseline emissions and SO₂ emission reductions that would result from the retrofit of dry FGD systems at White Bluff station. In addition, in proposing emission rates for White Bluff station, EPA proposed SO₂ emission limits that are consistent with performance guarantees offered by dry FGD suppliers during initial performance testing, not emission rates that are achievable over the 30-year life EPA assumed in its analysis. The following sections describe EPA's flawed analysis contained in the FIP TSD.

2.1 Baseline Emission Rates

Although baseline emission rates identified in Entergy's original BART analysis⁴ were calculated based on the average annual emission rates from 2001 to 2003, in the FIP TSD, EPA redefines baseline emission by using a 3-year average of annual average SO₂ emissions from the years 2009 to 2013, excluding the years with the maximum and minimum annual averages.⁵

We can find no reason to reject EPA's selection of 2009 to 2013 as the baseline period as it represents more recent operation. However, the approach used by EPA to exclude the maximum and minimum values is entirely arbitrary and EPA does not explain how this approach represents a more realistic depiction of anticipated emissions from the existing sources.

The BART Guidelines state that baseline emissions from existing sources "should represent a realistic depiction of anticipated annual emissions for the source."⁶ In general, for the existing sources, facilities should estimate the anticipated annual emissions based upon actual emissions from a baseline period.⁷ However, EPA provides no explanation or analysis to demonstrate that the approach taken results in a realistic depiction of anticipated annual emissions from White Bluff and Independence. In addition, there is no basis for concluding that EPA's approach of excluding actual emissions data more accurately represents the actual operation of the units. Finally, to our knowledge, with the exception of EPA's proposed Texas FIP, this approach has not been used previously by EPA as a methodology for evaluating baseline emissions in other evaluations (and even if EPA had done so, it is not justified here).

The following table shows a comparison between the baseline emissions as established using EPA's approach and baseline emissions calculated as a straight average for various timeframes within the 2009-2013 period.

⁴ Revised Bart Five Factor Analysis, White Bluff Steam Electric Station, Redfield, Arkansas, October 2013, Trinity Consultants.

⁵ See EPA-R06-OAR-2015-0189-0093-White Bluff_R6 cost revisions2.xlsx, under Annual Emissions.

⁶ 40 CFR Part 51 Appendix Y.

⁷ *Id.*

Table 1: Comparison of Baseline SO₂ Emissions for White Bluff and Independence

Unit	EPA Approach 3 Year Average* (tons)	3 Year Average 2009-2011 (tons)	3 Year Average 2010-2012 (tons)	3 Year Average 2011-2013 (tons)	5 Year Average 2009-2013 (tons)
White Bluff 1	15,816	15,745	15,395	15,826	15,939
White Bluff 2	16,697	15,582	15,217	16,697	16,034
Independence 1	14,269	14,160	15,486	14,707	14,258
Independence 2	15,511	14,673	15,196	16,035	15,407

*EPA's approach includes 2009-2013 3-year average, excluding maximum and minimum years.

With the exception of White Bluff 1, EPA's approach of eliminating the maximum and minimum values results in higher baseline SO₂ emissions compared to averaging the entire 5-year period. In all cases, there is at least one other approach that would result in lower baseline SO₂ emissions compared to EPA's approach. By overestimating the baseline SO₂ emissions, EPA overstates the amount of SO₂ that would be removed and, thus, overstates the cost-effectiveness of the FGD retrofit projects.

2.2 SO₂ Emission Reduction

SO₂ emission reductions were estimated incorrectly by EPA for White Bluff and Independence. For each unit, EPA identified the maximum monthly SO₂ emission rate in the baseline period of 2009 to 2013 and then calculated the percent reduction that would be required to achieve a controlled emission rate of 0.06 lb/MMBtu. The percent reduction calculated was then multiplied by the baseline emission tons to determine the tons of SO₂ reduced. This methodology is incorrect because it assumes the baseline emissions calculated in the previous section are based on maximum monthly averages, which are significantly higher than the annual averages actually used to calculate baseline emissions.

The correct way to project the SO₂ emission reduction is to multiply the outlet emission rate of 0.06 lb/MMBtu by the average heat input to the boiler (MMBtu/year) from the baseline period. For example, the average heat input to White Bluff 1 over the baseline period of 2009 to 2013 was 55,829,551 MMBtu/year. Multiplying by 0.06 lb/MMBtu and then converting from pounds to tons results in estimated SO₂ emission reductions of 14,264 tons per year, as compared to EPA's 14,363. This method has been utilized by S&L on previous BART analyses, and has been accepted previously by EPA.

Table 2: SO₂ Emission Reductions for White Bluff and Independence

Unit	EPA Approach Using Maximum Monthly SO ₂ emission and 3-Year Baseline (tons)	Using 5-Year Average Heat Input and Baseline (tons)
White Bluff 1	14,363	14,264
White Bluff 2	15,221	14,353
Independence 1	12,912	12,607
Independence 2	13,990	13,655

Table 2 compares EPA’s incorrect methodology to estimate SO₂ emission reductions at the Entergy Units to the more accurate methodology described above of using the 5-year average heat input from the baseline period. EPA’s methodology overestimated the SO₂ emission reduction in all cases and therefore overstates the cost-effectiveness of the FGD retrofits at each unit.

2.3 SO₂ Emission Rate

EPA proposed SO₂ emission rates based on the assumption that a retrofit dry FGD will achieve a controlled SO₂ emission rate of 0.06 lb/MMBtu. In our experience, this assumption is unrealistic and cannot be sustained on a continuous, long-term basis. In several places, EPA cites the IPM dry FGD cost development document, which states: the “[r]ecommended SO₂ emission floor = 0.08 lb/MMBtu.”⁸

EPA’s proposal is too stringent to be achievable with the retrofit of an existing unit. A controlled SO₂ limit of 0.06 lb/MMBtu is not a realistic or sustainable value to maintain on a long-term basis when considering the normal variation in operation that occurs at all coal-fueled facilities. As noted in the IPM dry FGD document, the 0.06 lb/MMBtu emission rate corresponds to the lowest available SO₂ emission guarantees from dry FGD suppliers. Compliance with a vendor’s guarantee value is typically demonstrated during very short term testing conducted at ideal operating conditions. Vendor guarantees do not reflect controlled emission rates that may be achievable on a consistent long-term basis as the unit operation varies from design conditions.

Dry FGD control systems, like all large air pollution control systems, are not steady state control systems, and controlled SO₂ emissions will continually fluctuate in response to changing operating parameters. Operating parameters that may affect SO₂ emissions include the fuel sulfur content, boiler load, load changes, flue gas flow rate, and flue gas temperatures, all of which continually change during normal operation of the boiler.

⁸ Sargent & Lundy LLC, *IPM Model – Updates to Cost and Performance for APC Technologies, SDA FGD Cost Development Methodology*, March 2013.

Furthermore, as shown in Table 3, S&L investigated permit limits for dry FGD projects for Spray Dryer Absorber (SDA) projects similar to the dry FGD technology proposed for the White Bluff units, and Circulating Dry Scrubber (CDS) technology, which are more efficient dry scrubber systems because of increased flue gas and reagent contact through the use of a fluidized bed. As indicated, the lowest permit value for all units retrofitting dry FGD systems with averaging periods of 30 days was 0.09 lb/MMBtu, and that includes the more efficient CDS dry FGD systems. The last unit shown in the table includes the lowest permit limit of any of the dry FGD systems listed, but this value still contains the necessary margin because the averaging period is much longer (i.e. 12 months), and because the dry FGD system was installed as part of a new boiler project, so it was incorporated into the new unit design which inherently minimizes some of the design challenges associated with retrofitting, where non-ideal layouts can lead to non-ideal flow distribution inside the absorbers.

Projecting future emissions using the anticipated control system vendor guarantee (i.e., 0.06 lb/MMBtu) as EPA did is overly aggressive and provides no margin for normal operating conditions or long-term operation. A reasonable margin between the vendor guarantee value or design target, and the projected actual long-term achievable emission rate is needed to allow for normal fluctuations in the controlled emissions. In S&L’s opinion, an operating margin of at least 0.02 lb/MMBtu between the vendor guarantee and projected long-term emission rate is reasonable. As indicated in Table, using a limit of 0.08 lb/MMBtu to provide the recommended margin would still be an aggressive permit limit compared to other dry FGD projects.

Table 3: SO₂ Permit Limits for Dry FGD Projects

Reference Plant	Permit SO ₂ Limit	Permit Averaging Period
Plant 1 (SDA)	0.09 lb/MMBtu	30 day rolling
Plant 2 (SDA)	0.10 lb/MMBtu	30 day rolling
Plant 3 (SDA)	0.10 lb/MMBtu	30 day rolling
Plant 4 (SDA)	0.10 lb/MMBtu	30 day rolling
Plant 5 (SDA)	0.10 lb/MMBtu	30 day rolling
Plant 6 (SDA)	0.10 lb/MMBtu	30 day rolling
Plant 7 (CDS)	0.09 lb/MMBtu	30 day rolling
Plant 8 (CDS)	0.10 lb/MMBtu	30 day rolling
Plant 9 (CDS)*	0.07 lb/MMBtu	12-month rolling average

*This unit was a new unit, not a retrofit

EPA’s approach to estimating controlled SO₂ emission rates is incorrect and based on a misunderstanding of the actual performance and operation of dry FGD technology. By using this approach, EPA is overestimating the tons of SO₂ removed and thus overstating the cost-effectiveness of the retrofit FGD control systems.

3. Comments to the Cost TSD – Annualized Cost Errors

S&L's remaining comments are focused on EPA's Cost TSD. Our comments follow the same organization of EPA's Cost TSD document and are contained in the following sections.

3.1 Cost TSD, Section 2 – SDA Cost Analysis Methodology

EPA states that the “Control Cost Manual uses the overnight method of cost estimating, widely used in the utility industry.”⁹ To support this conclusion, EPA references its own characterization of the CCM methodology published in the preamble to the Oklahoma Regional Haze FIP.¹⁰ Using the overnight methodology, EPA removed certain costs from the SDA cost estimate, including Owner's costs and interest incurred during the construction period. We disagree that the CCM describes an overnight approach to calculating capital costs. The CCM does not once define or even mention the overnight methodology as being the basis for estimating costs. Rather, the CCM describes a constant dollar approach that annualizes all capital costs and O&M costs (on a constant-dollar basis) over the useful life of the project.

In the Oklahoma rule EPA cited to an Energy Information Administration (EIA) document as support for using the overnight cost estimating concept. In fact, EPA stated that “EIA presents all of its projected plant costs in terms of overnight costs.”¹¹ However, this is a mischaracterization of the methodology the EIA uses to develop capital costs for new power generation. The EIA document upon which EPA relied includes a clarifying footnote that states: “Starting from overnight cost estimates, EIA's electricity modeling explicitly takes account of the time required to bring each generating technology online and the costs of financing construction in the period before a plant becomes operational.”¹² Therefore, EIA cost evaluations take into account financing costs, including AFUDC, one of the line items EPA insisted that Entergy remove¹³ from the SDA capital cost estimate

Finally, EPA states that the overnight method is appropriate for BART determinations “because it allows different pollution controls equipment to be compared in a meaningful manner.”¹⁴ However, excluding financing costs will bias the cost-effectiveness comparison toward the high-capital options with extended construction periods. Project financing costs such as AFUDC may be minimal on projects that do not require significant capital and with short construction periods, but can be very significant on projects with large capital costs and extended construction periods. Excluding financing costs from the capital cost estimate results in the high-capital cost option appearing more cost-effective. Including financing costs allows the analyst to compare projects with varying capital requirements and varying construction periods.

⁹ Cost TSD, page 1.

¹⁰ *Id.*

¹¹ *Id.*

¹² EIA, *Updated Capital Cost Estimates for Electricity Generation Plants*, November 2010, pg. 2.

¹³ See August 21, 2013 email from Dayana Medina of EPA Region 6 to Mary Pettyjohn of the Arkansas DEQ.

¹⁴ *Cost TSD*, page 1.

3.2 Cost TSD Section 2.3 – Use of the 2009 Alstom Cost Analysis

EPA invited Entergy to clarify certain issues associated with Alstom's 2010 quotation, including a misunderstanding regarding the scope of the dry FGD vendor's contract. In S&L Report #012831 of our comments, we have included a report that explicitly describes the scope of supply for the dry FGD vendor as compared to the balance of plant (BOP) scope of work. EPA made several incorrect assumptions regarding Alstom's scope that led to incorrect adjustments to the BOP cost estimate, as described in Section 3.3 of our comments. Furthermore, EPA's approach to escalating the Alstom quotation was incorrect as described in Section 3.5 of our comments.

3.3 Cost TSD Section 2.4 – Use of the S&L Balance of Plant Costs

EPA mistakenly subtracted BOP costs because they mistakenly believed the equipment to be included in Alstom's scope. As described in S&L Report #012831, the reagent handling system, which feeds the dry FGD supplier's reagent preparation system were not included in Alstom's scope. The "Dry FGD Island" supplied by the dry FGD vendor includes lime day bins, slakers, slurry transfer tanks, slurry transfer pumps, slurry storage tanks, and slurry feed pumps. The BOP system includes the cost associated with the "Reagent Handling System," which includes a rail delivery and unloading system for the lime, new rail spur, renovation of existing rail spur, delivery shed building, long-term storage silos, and a pneumatic conveying system to transfer the lime reagent from the long-term storage silos to the day bins, which are within the dry FGD vendor's scope.

We agree with EPA's comment that including the NO_x control equipment for Units 1 and 2 was an oversight and should not be incorporated into the Dry FGD estimates.

EPA mistakenly subtracted a total of \$1,754,000 from the BOP quote because they mistakenly believed that all of the ductwork to be in Alstom's scope. The Dry FGD supplier's scope only includes ductwork between the dry FGD, the baghouse, and the booster fans. The ductwork to supply the flue gas to the SDA and the ductwork from booster fans to the existing chimney are within the BOP scope.

EPA mistakenly deleted a total of \$255,000 to paint the Chimney because it did not understand this line item. Due to lower temperatures and higher moisture of the flue gas, downwash from the gas is more likely to occur and can lead to acid attack of concrete on the chimney shell; therefore, the costs to apply an acid resistant coating to the top 50 feet of the existing chimney shell was included in the estimate.

EPA mistakenly removed a total of \$390,000 for costs associating with replacing and recalibrating the Continuous Emission Monitoring Systems (CEMS). The CEMS equipment reflected in Entergy's BART analysis was required because the existing CEMS was not capable of measuring SO₂ concentrations in the controlled range with Dry FGD technology. The costs included in the original estimate to cover replacement of the existing equipment with new equipment rated for the lower SO₂ concentrations as well as the cost to calibrate and certify these

monitors including conducting a Relative Accuracy Test Audit (RATA) test.

Based on these comments, we have corrected EPA's cost subtractions in Table 4.

Table 4: Excluded BOP Costs (Corrected, Total for Both Units)

	Equipment	Material	Labor	Total
Total BOP Cost	\$45,561,000	\$35,120,000	\$80,863,000	\$161,544,000
Eliminate U1 NO_x Equipment	\$3,622,000	\$1,600,000	\$3,073,000	\$8,295,000
Eliminate U2 NO_x Equipment	\$3,622,000	\$1,600,000	\$3,073,000	\$8,295,000
Total Eliminated Cost	\$7,244,000	\$3,200,000	\$6,146,000	\$16,590,000
% BOP Items Reduced	15.90	9.11	7.60	N/A

EPA then adjusted additional cost items in the BOP estimate that were either percentages of the equipment, material, and labor costs or were related to equipment, material, and labor costs. EPA adjusted these items by applying the % reduction in cost of equipment, material and labor. Since EPA mistakenly removed cost items that should be included in the estimate, they over-estimated and misapplied percent reduction to the other items. In Table 4, we correct EPA's adjustments to remaining Entergy BOP costs by employing EPA's methodology but reducing the percentage factors to the values indicated in Table 5.

EPA excluded a total of \$51,733,667 from the estimate, but Tables 4 and 5 show that only \$20,724,543 was justified because NO_x control equipment had been included. Because of EPA's misconception as to the scope of work included in the BOP and Alstom estimates, they mistakenly concluded that costs were double-counted and removed \$31,009,123 (total for both units) in costs that should be included. This resulted in EPA overstating the cost-effectiveness to retrofit dry FGD systems at White Bluff.

Table 5: Adjustment to Remaining Entergy BOP Costs (Total for Both Units)

DESCRIPTION	EPA Cost TSD Reductions				Corrected Reductions*			
	Equipment	Material	Labor	Total	Equipment	Material	Labor	Total
MOBILIZE/DEMOBILIZE @ 1% OF LABOR	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MOBILIZE/DEMOBILIZE @ 1% OF LABOR	\$0	\$0	\$546,061	\$546,061	\$0	\$0	\$656,036	\$656,036
MOBILIZE/DEMOBILIZE @ 1% OF LABOR	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
COST DUE TO OVERTIME - 5-10'S	\$0	\$0	\$7,970,183	\$7,970,183	\$0	\$0	\$9,575,359	\$9,575,359
COST DUE TO OVERTIME - 5-10'S	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
PER DIEM - @ \$10 PER HOUR	\$0	\$0	\$7,888,659	\$7,888,659	\$0	\$0	\$9,477,416	\$9,477,416
PER DIEM - @ \$10 PER HOUR	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
SPARE PARTS @ 1% OF EQUIPMENT	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
SPARE PARTS @ 1% OF EQUIPMENT	\$327,060	\$0	\$0	\$327,060	\$400,318	\$0	\$0	\$400,318
FREIGHT @ 5% OF MATERIAL	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
FREIGHT @ 5% OF MATERIAL	\$0	\$1,413,404	\$0	\$1,413,404	\$0	\$1,596,000	\$0	\$1,596,000
GENERAL & ADMINISTRATIVE (G&A) @ 5% OF MATERIAL AND LABOR	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
GENERAL & ADMINISTRATIVE (G&A) @ 5% OF MATERIAL AND LABOR	\$0	\$1,413,404	\$2,417,281	\$3,830,686	\$0	\$1,596,000	\$2,904,116	\$4,500,116
GENERAL & ADMINISTRATIVE (G&A) @ 5% OF MATERIAL AND LABOR	\$0	\$0	\$1,119,810	\$1,119,810	\$0	\$0	\$1,345,337	\$1,345,337
PROFIT @ 10% OF MATERIAL AND LABOR	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
PROFIT @ 10% OF MATERIAL AND LABOR	\$0	\$2,826,809	\$4,833,794	\$7,660,602	\$0	\$3,192,000	\$5,807,308	\$8,999,308
PROFIT @ 10% OF MATERIAL AND LABOR	\$0	\$0	\$2,240,388	\$2,240,388	\$0	\$0	\$2,691,597	\$2,691,597
NON CONTRACTOR INDIRECTS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
ENGINEERING - BOP	\$0	\$0	\$7,579,481	\$7,579,481	\$0	\$0	\$9,105,970	\$9,105,970
Totals				\$40,576,333				\$48,347,457
Reduction in Remaining BOP Costs				\$11,905,667				\$4,134,543
Excluded BOP Costs from Table 4								\$16,590,000
TOTAL BOP Reduction								\$20,724,543

*Same methodology used as EPA but percentages applied are from Table 4

3.4 Cost TSD Section 2.5 – Undocumented or Disallowed Cost Items

Owner's Costs include a variety of costs incurred by the owner to support the air pollution control project. Owner's Costs are project-specific, but generally include costs incurred by the Owner to manage the project, hire and retain staff to support the project, and costs associated with third party assistance associated with project development and financing. Owner's Costs typically include, but may not necessarily be limited to:

- Site investigations (geotechnical, hydrology, etc.) for project design
- Environmental permitting/approvals
- Insurance during construction
- Site security during construction
- Transmission interconnection (if applicable)
- Fuel interconnection (if applicable)
- Owner's mobilization costs
- Owner's project management and support staff
- Insurance advisor
- Labor relations consultant
- Tax consultant
- Financial advisor
- Legal advisor
- Market consultant
- Community relations/community outreach program.

Owner's Costs are real costs that the owner will incur during the project and are typically included in cost estimates prepared for large air pollution control retrofit projects. In fact, U.S. EPA's Coal Quality Environmental Cost (CUECost) model includes Owner's Costs (or "Home Office" costs) in its air pollution control system cost estimating workbook and interrelated set of spreadsheets.¹⁵ CUECost uses a factor of 10% of the total installed cost to estimate Owner's Costs and Engineering Costs for limestone forced oxidation and lime spray dryer control systems.

To address the items in this section, we included a section in S&L Report #012831 that describes Entergy's Owner's costs and how they were developed. We believe EPA deleted these Owner's costs because EPA did not understand how they were defined and therefore, incorrectly assumed that they did not reflect real costs to Entergy. In total, EPA removed \$41,741,743 per unit from the original estimate which should be included. Removing these costs resulted in EPA overstating the cost-effectiveness to retrofit dry FGD systems at White Bluff and Independence. Detailed explanations of these costs are included in S&L Report #012831 to help EPA understand

¹⁵ See, Coal Utility Environmental Cost (CUECost) Workbook Development Documentation Version 5.0, prepared by U.S. EPA, September 2009, pages 17 and 34. Appendix B, pages B-3 and B-6.

these costs.

3.5 Cost TSD Section 2.6 – Escalation

We agree with EPA’s assertion that the application of escalation is allowed by the CCM.¹⁶ However, EPA’s method of using Chemical Engineering Plant Cost Indices (CEPCI) to escalate costs to the year 2013 resulted in severely underestimating the costs associated with escalation. CEPCI are sometimes used to estimate escalation by multiplying base costs by the ratio of the index for the year costs are to be escalated to the index for the year in which the costs were originally generated. For example, EPA used CEPCI from 2009 (521.9) and 2013 (550.8) to escalate the FGD costs from a 2009 basis to a 2013 basis. Thus, EPA applied the following formula, $550.8/521.9 * \$247,856,184$ to obtain an estimated 2013 FGD cost of \$261,581,119 for both units.

Rather than estimating escalation of Alstom’s pricing from 2010, S&L (on behalf of Entergy) requested updated FGD pricing from Alstom in 2013¹⁷. We agree with a reference cited in the CCM and authored by EPA which states, “At best [cost indices] provide a cloudy mirror...there is no substitute for current price information obtained from suppliers of those goods and services.”¹⁸ Nothing illustrates EPA’s conclusion that cost indices are not to be substituted for supplier information better than comparing EPA’s escalation rate to the actual escalation rate indicated in Alstom’s budgetary quotations as shown in Table 6.

Table 6: Alstom Quotation Comparison (Total for Both Units)

Parameter	EPA	Vendor Quotation
FGD Cost 2009	\$247,856,184	\$247,856,184
FGD Cost 2013	\$261,581,119	\$297,904,000
Average Escalation	1.36%	4.7% per year

As shown in Table 6, EPA underestimated escalation significantly, resulting in underestimating the 2013 dry FGD costs by \$36,322,881 (total for both units). In fact, EPA applied CEPCI indices in several instances from 2008 that *de-escalated* costs, resulting in lower costs in 2013 as compared to 2008. We note specifically that EPA’s cost calculations ignored the updated 2012 direct annual costs provided by Entergy, and instead included the 2008 costs.¹⁹ Table 7 summarizes how EPA incorrectly estimated escalation in its analysis for White Bluff Unit 1 and corrects that by applying an average escalation rate of 4.7% to match the Alstom quotation. We note that information from Alstom showed their pricing escalated nearly equivalently for

¹⁶ See Cost TSD, Section 2.6, page 8

¹⁷ Updated FGD pricing from Alstom is used as the basis of the 2015 cost estimate documented in S&L Report #012831.

¹⁸ Escalation Indexes for Air Pollution Control Costs, United States Environmental Protection Agency, October 1995, pp. 3-4.

¹⁹ See, EPA-R06-OAR-2015-0189-0093-White Bluff_R6 cost revisions2.xlsx, tab “Entergy Costs”

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equipment/material (~4.8%) and for installation (~4.6%). Since the difference was negligible we applied the average 4.7% in the revised costs shown in Table 7. EPA's underestimation of cost escalation carried through their analysis and resulted in an incorrect reduction in the cost estimate of over \$42 million per unit.

Table 7: Summary of EPA's Escalation Errors (Per Unit)²⁰

Item	Entergy	EPA (2013)	Corrected Costs Including Escalation (2013)	Escalation Costs Omitted by EPA
Total Contractor Costs* (2010)	\$156,974,274	\$161,676,662	\$180,164,213	\$18,487,550
Contingency (2010)	\$20,875,711	\$21,501,073	\$23,959,697	\$2,458,624
Balance of Plant (2008)**	\$102,085,500	\$75,145,724	\$115,401,842	\$13,316,342
Balance of Plant Indirect Costs (2012) ***	\$9,768,175	\$0	\$10,227,279	\$1,494,175
Misc Contract Labor (2012)	\$4,583,719	\$0	\$4,799,154	\$215,435
Entergy Internal Costs (2012)	\$20,076,644	\$0	\$21,020,246	\$943,602
Capital suspense (2012)	\$8,348,276	\$0	\$8,740,645	\$392,369
Total Capital Investment (TCI)		\$258,323,459	\$319,525,752	
Direct Annual Costs (2008)	\$7,901,369	\$7,790,140	\$9,941,130	\$2,150,990
Indirect Annual Costs				
Overhead (2008)	\$2,572,707	\$2,536,491	\$3,236,859	\$700,368
Administrative Charges @ 2% of TCI		\$5,166,469	\$6,390,515	\$1,224,046
Property Tax @ 1% of TCI		\$2,583,235	\$3,195,258	\$612,023
Insurance @ 1% of TCI		\$2,583,235	\$3,195,258	\$612,023
Total Indirect Annual Costs		\$12,869,429	\$16,017,889	
Total Escalation Costs Underestimated by EPA				\$42,607,547

* This item reflects the updated dry FGD pricing received in 2013

** As EPA did, this item subtracts the excluded BOP costs discussed in Section 3.3 before applying the escalation

*** In the Cost TSD, EPA incorrectly used the 2008 BOP Indirect Costs from the Revised Bart Five Factor Analysis, SDA Cost analysis rather than the 2012 BOP Indirect Costs as identified. The differential between the 2008 and 2012 BOP Indirect Costs (\$1,035,071) was included in the column for Escalation Costs Omitted by EPA.

²⁰ See Cost TSD, Table 5 on page 10

3.6 Cost TSD Section 2.7 – Operating and Maintenance (O&M) Costs

Although EPA claims in its proposal that it relied on the methods and principals contained within the Control Cost Manual in developing its individual control technology cost estimates, in the supporting Cost TSD EPA stated that “we can compare Entergy’s O&M costs to those obtained through the use of our IPM SDA cost model.”²¹

The IPM model and the Control Cost Manual provide two entirely different approaches to calculating control system capital and O&M costs. IPM is described by EPA as a multi-regional, dynamic, deterministic linear programming model used by EPA to analyze system-wide impacts of air emissions policies on the U.S. electric power sector in the 48 contiguous states and the District of Columbia.²² The model has been used by EPA to analyze impacts associated with proposed regulatory programs such as the Clean Air Interstate Rule (CAIR) and Mercury and Air Toxics Standard (MATS). The primary purpose of the model is to provide forecasts of least-cost capacity expansion, electricity dispatch and emission control strategies for meeting energy demand and environmental, transmission, dispatch and reliability constraints. The model includes cost modules for various air quality control technologies, and S&L developed the cost algorithms used in the IPM model to estimate costs associated with DSI, SDA, and wet FGD control systems.²³ The IPM model is not referred to in either the Control Cost Manual or the BART Guidelines as an acceptable tool to develop site specific capital or O&M cost estimates.

Cost algorithms in the IPM model were developed based on a statistical evaluation of cost data available from various industry publications, and do not take into consideration site-specific cost issues.²⁴ The primary purpose of the IPM cost modules is to provide generic order-of-magnitude costs for various air quality control technologies that can be applied to the electric power generating industry on a system-wide basis, not on an individual unit basis. By necessity, the cost algorithms were designed to require minimal site-specific information available from publicly available sources. Because of the limited number of site-specific inputs, the IPM cost algorithms provide order-of-magnitude control system cost estimates, but they do not provide case-by-case project-specific cost estimates meeting the requirements of the BART Guidelines, nor do the IPM equations incorporate the cost estimating methodology described in the Control Cost Manual.

Regarding O&M costs for SDA FGD systems, the IPM model includes the following assumptions that are not consistent with a site-specific O&M cost estimates:

- A fixed quantity of additional personnel to operate the equipment is included, not accounting for site-specific project and staffing needs;

²¹ See Cost TSD, Section 2.7, page 9.

²² See, EPA website: www.epa.gov/airmarkt/progsregs/epa-ipm/.

²³ See, e.g., IPM Model- Updates to Cost and Performance for APC Technologies Wet FGD Cost Development Methodology, Sargent & Lundy LLC, March 2013.

²⁴ *Id.*, at page 1.

- While we agree with the general practice of estimating maintenance material and labor costs as percentage of capital costs, the IPM model does not estimate site-specific capital costs sufficiently upon which to apply this percentage, and the assumed percentage cannot be modified to accommodate project specific requirements;
- The assumptions incorporated in the maintenance material and labor costs are propagated into the administrative labor item, and is therefore limited by the same items as the previous item;
- Reagent consumption assumes a stoichiometry that cannot be modified to match vendor-supplied guarantees for a specific application;
- Reagent consumption also depends upon a flue gas temperature into the SDA of 300°F and cannot be modified to apply site-specific temperatures;
- Reagent consumption also depends upon lime purity, which the IPM model assumes to be 90% and cannot be modified to match actual reagent supply information;
- The IPM model estimates water consumption based on gas flow and fuel sulfur levels instead of performing site-specific calculations using actual fuel properties and operating conditions;
- Waste generation is a function of the assumed lime stoichiometry discussed above as well as an assumed moisture content of 10% that cannot be modified to match vendor-supplied mass balances for specific applications; and
- The SDA flue gas pressure drop estimate included in the IPM model is an average value based on flue gas flow rate and sulfur levels instead of performing site-specific calculations that consider the actual fuel properties, operating conditions, and actual equipment sizing and arrangement.

EPA's use of IPM to benchmark O&M costs is thus not an appropriate choice for a unit-specific analysis consistent with BART guidelines. By relying on the IPM cost modules to verify dry FGD O&M costs, EPA did not adequately evaluate and account for potential project-specific site constraints that Entergy would incur to operate the FGD control systems EPA is proposing. In addition, using the IPM cost algorithms to calculate FGD control system capital or O&M costs is inconsistent with the case-by-case BART cost analysis described in the BART Guidelines for at least two reasons. First, the IPM model does not account for unit-specific design and operating parameters that can affect control system design and costs, including operating costs. Second, the IPM cost equations do not take into consideration site-specific conditions that could affect the O&M costs to operate the control system.

Please see additional comments in the next section of our comments (3.7), addressing EPA's adjustment of the O&M cost estimates to account for lower coal sulfur.

3.7 Cost TSD Section 3.1 – Entergy's Coal Sulfur Assumption

EPA states that an uncontrolled SO₂ emission rate of 2.0 lb/MMBtu at White Bluff is “far in excess of sulfur level of the coals it has historically burned,” and concludes, “[t]hus Entergy has costed SO₂ scrubber systems for the White Bluff facility that are oversized compared to its historical needs.” Based on this conclusion, EPA adjusts the capital and O&M costs using a

design sulfur level selected by EPA. While we agree with EPA that direct O&M costs be revised to 0.68 lb/MMBtu, this sulfur level is completely inadequate for the Dry FGD equipment design basis.

EPA correctly assumes that the 2.0 lb/MMBtu design basis was to preserve fuel flexibility, but their conclusions that, "either (1) this higher cost be balanced against its greater SO₂ reduction potential, or (2) that the scrubber system's capability and cost be adjusted down to match the facility's historical emissions," are without basis and inconsistent with BART guidelines.

The SO₂ emission reduction calculation depends upon the baseline emissions, baseline heat input, and the required outlet emission rate (see Section 2.2 of our comments). SO₂ emission reduction does not depend on the fuel sulfur levels selected for FGD system design, neither the BART guidelines nor the CCM address evaluating potential future SO₂ reduction based on design fuels as part of the BART analysis or cost estimating methodology. Therefore, EPA's first conclusion that the higher costs be balanced against greater SO₂ reduction potential is inconsistent with BART requirements and has no basis.

Although the BART guidelines and the CCM both account for the development of a design basis, there are no specific requirements that air pollution control design be tied to historical operating trends. Therefore, EPA's second conclusion that capital costs must be adjusted to match historical emissions is arbitrary and without basis.

Based on its erroneous conclusions, EPA selected a maximum monthly fuel sulfur level of 0.68 lb/MMBtu as the design basis used to estimate the capital costs. Figure 1 illustrates why the use of White Bluff's maximum monthly fuel sulfur level is completely insufficient. The ability to reduce SO₂ emissions depends critically upon the amount of reagent, or lime that can be added to the FGD system. With a 0.68 lb/MMBtu design basis, the reagent preparation and delivery equipment would be inadequately sized to add lime when sulfur levels increase beyond that level. As shown in Figure 1, EPA's design basis would result in emissions above the proposed emission rate for almost half of the operating time. This design approach would require limiting fuel sulfur levels to below 0.68 lb/MMBtu to ensure continuous compliance. If this is the approach EPA is intending, then the cost analysis would need to be revised to incorporate significant additional costs associated with fuel purchasing limitations. We did not include any additional O&M costs associated with fuel limitations because we believe EPA selected the design basis due to a lack of experience rather than intending to place enforceable limits on fuel purchasing at White Bluff station.

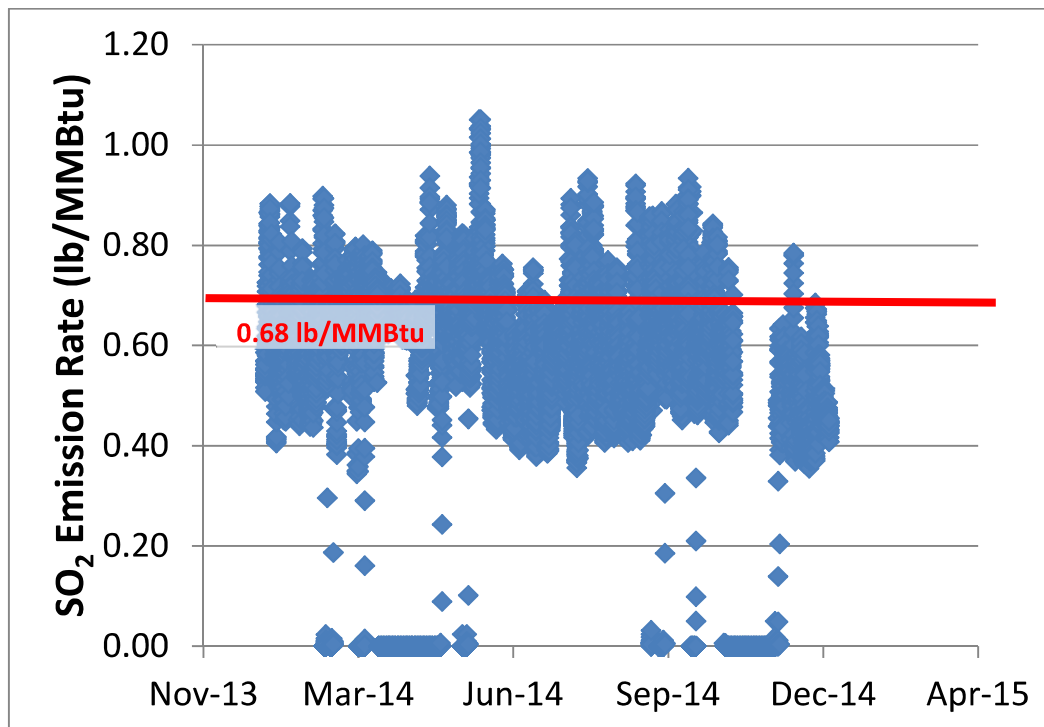


Figure 1: 2014 SO₂ Emissions for White Bluff 1²⁵

While we believe that the 2008 design basis of 2.0 lb/MMBtu was appropriate at that time based on the potential to fire fuels with higher sulfur levels, based on more recent information, Entergy now believes that they will not purchase fuels with sulfur levels higher than 1.2 lb/MMBtu. The operating data shown in Figure 1 confirms that 1.2 lb/MMBtu would result in a design basis that would ensure continued compliance with EPA's proposed FIP emission rates. Therefore, we have provided a revised cost estimate based on 1.2 lb/MMBtu. To illustrate the small difference in capital costs associated with the revised design basis (1.2 lb/MMBtu versus 0.68 lb/MMBtu), S&L has included a sensitivity analysis in S&L Report #012831.

As discussed previously, we agree that it is appropriate to base direct O&M cost estimates on 0.68 lb/MMBtu fuel sulfur levels to represent average operational costs. However, EPA's adjustment factor of 0.5823 applied to direct O&M costs severely underestimated these costs. In agreement with EPA's sulfur basis, S&L developed O&M costs for the 0.68 lb/MMBtu operating case in S&L Report #012831 based on site specific consumption rate estimates and unit costs. Our report estimated O&M costs including direct variable and fixed O&M costs to be a total of \$10,166,000 per unit in the first year. By comparison, EPA's calculation scales direct O&M costs of \$7,790,140 by 0.5823, resulting in direct O&M costs of \$4,536,199 per unit being

²⁵ Downloaded from EPA's Clean Air Market Database.

included in its cost-effectiveness calculation.²⁶ This methodology underestimated direct O&M costs by \$5,629,801 per unit.

In addition, EPA applied the same O&M factor of 0.5823 to the indirect annual costs, including overhead, administrative charges, property tax and insurance, all of which depend on capital cost.²⁷ Therefore, assuming EPA's capital cost scaling methodology for capital cost is correct (which we do not believe is the case), then EPA should have applied the 0.9584 factor used to correct capital costs to the indirect annual costs. EPA's methodology underestimated indirect O&M costs by \$4,840,192 per unit.

3.8 Cost TSD Section 4.1 – EPA's Conservatism in Cost Estimating

EPA lists two assumptions it believes are conservative in its Cost TSD. In one assumption, EPA noted that amortization from the 2008 S&L cost analysis was 40 years, but they lowered the remaining useful life to 30 years, which increases the cost-effectiveness. EPA's estimate is not conservative with regard to equipment life because, as EPA states, they, "typically assume a 30 year equipment life for scrubbers,"²⁸ and the 2008 amortization value from S&L was not intended to be used to conduct the BART analysis. Furthermore, as discussed in Section 3.9, the actual remaining life of these units is far below what EPA assumed.

In the second assumption, EPA concludes that two absorber vessels are not required and, thus, a 7% cost savings that could have been realized was not applied. We do not believe EPA is qualified to design dry FGD systems, and therefore not qualified to evaluate the number of vessels that are suitable for White Bluff. Dry FGD systems of this type have not been applied to units of this size, and the dry FGD supplier quoted three absorber vessels for this application based on their expertise. EPA cites no reference where fewer absorber vessels have been installed for a unit with an identical design basis, and therefore its assertion that two absorber vessels is adequate is arbitrary and without basis.

3.9 Remaining Useful Life

EPA states, "With regard to consideration of the remaining useful life of the units, we are not aware of any enforceable shutdown date for the Entergy White Bluff Plant, nor did Entergy's evaluation indicate any future planned shutdown."²⁹ Therefore, EPA utilized 30-years as the remaining useful life in its cost-effectiveness calculations. As stated in Entergy's comments to the proposed rule, Entergy proposes to cease coal-firing at the White Bluff units between 2027 and 2028. The proposed rule requires that the FGD controls and White Bluff be operational 5 years after the effective date of the rule. Assuming the effective date of the final rule is one year after the comment period closes, then the White Bluff FGD's will need to be operating by July of

²⁶ See, EPA-R06-OAR-2015-0189-0093-White Bluff_R6 cost revisions2.xlsx, tab "Cost-Effectiveness" Cell D4.

²⁷ *Id.*

²⁸ Cost TSD, Section 4.1 page 16.

²⁹ AR FIP TSD, p. 80.



ENERGY ARKANSAS, INC.

**REVIEW OF EPA'S COST ANALYSIS FOR
ARKANSAS REGIONAL HAZE PROPOSED FIP**

SL-012913

Final

18.

2021. Based on the coal-cessation dates of White Bluff Units 1 and 2, the remaining useful life of these FGD systems is therefore between 6 and 7 years, instead of 30 years used in EPA's analysis.



4. Cost TSD Section 5 – Inclusion of Independence under Reasonable Progress Goals (RPGs)

EPA included Entergy's Independence Plant in its RPG analysis based on annual emissions from the facility.³⁰ It is beyond the scope of S&L's comments to address the basis upon which EPA decided to include Independence in its RPG analysis for Caney Creek and Upper Buffalo. Instead, our comments focus on the inconsistencies and errors included in EPA's RPG analysis for the Independence station.

In EPA's RPG analysis for SO₂ Controls, EPA concluded that the units at White Bluff and Independence Stations are similar enough to apply "the total annualized dry FGD and wet FGD costs [they] developed for the White Bluff units to the Independence units."³¹ EPA then calculates the cost-effectiveness to retrofit FGD systems at Independence by adjusting the White Bluff cost effectiveness calculations to account for the differences in SO₂ emissions at Independence. This approach is flawed for several reasons. First, this approach includes all of the errors in EPA's cost-effectiveness analysis for White Bluff as described in the preceding sections, including errors in calculating baseline emissions, errors in calculating emission reductions, and errors associated with estimating annualized costs. Second, applying the White Bluff annualized costs to Independence is inconsistent with EPA's RPG guidance which requires cost estimates based on design parameters be developed for air pollution control systems.

To determine whether air pollution controls would be required at Independence Units 1 & 2 to meet the Reasonable Progress Goals at Caney Creek and Upper Buffalo, EPA conducted an RPG four factor analysis. The four factor analysis is described in EPA's RPG Guidance Document, and includes an evaluation of: (a) costs of compliance; (b) time necessary for compliance; (c) energy and non-air impacts; and (d) the remaining useful life of the source.³² Regarding the first factor listed, costs of compliance, EPA suggests that, for stationary sources, the following steps be performed:

- a) Identify the emissions units to be controlled;
- b) Identify the design parameters for emission controls; and
- c) Develop cost estimates based upon those design parameters³³

EPA did not perform steps b and c of the RPG compliance cost evaluation. Rather, EPA relied upon an EIA database comparison as well as an aerial photo comparison of the two units to justify applying the White Bluff FGD costs to Independence. The EIA information does not contain any information that would be used to set the design basis for either FGD system;

³⁰ See 80 Fed. Reg. 18,991 (April 8, 2015).

³¹ *Id.*, at page 18,992.

³² See "Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program," U.S. EPA June 1, 2007, pg 1-3.

³³ *Id.*, at page 5-1.

therefore it cannot be used to conclude the FGD system design at Independence would be identical to White Bluff. Furthermore, EPA's use of aerial photos to indicate visual similarities between White Bluff and Independence ignores many site-specific factors that cannot be captured in a Google Earth image downloaded from the internet. Some of the site-specific factors that EPA did not account for by using this approach and which could result in different costs to retrofit FGD technology at Independence as compared to White Bluff include:

- EPA proposes the same timeline for compliance for White Bluff and Independence which will add significant labor costs due to the amount of skilled labor that would be required to construct four FGD systems in the same time period;
- EPA did not review plant operating data, such as flue gas temperatures, which affect flue gas volume, potentially requiring different equipment sizing for Independence;
- EPA did not review operating and maintenance practices at Independence, which could result in different O&M costs;
- EPA did not assess differences in underground utility interferences that could potentially change the equipment arrangement at Independence;
- EPA did not conduct subsurface geotechnical investigations to determine differences in soil conditions or distances to reach bedrock that would impact foundation design or seismic design requirements;
- EPA did not assess other seismic design requirements such as seismic risk or magnitude of potential earthquakes to determine steel design differences that may be required; and
- EPA did not assess differences in wind loads which could impact foundation and structural steel design.

In its guidance document, EPA states, “[f]or additional guidance on applying the cost of compliance factor to stationary sources, you may wish to consult the BART guidelines.”³⁴ We note that, for EPA's RPG analysis for Independence, EPA did not revisit any of the steps required as part of a BART analysis; therefore, EPA ignored other lower cost technologies or methodologies to reduce SO₂ emissions at Independence station. EPA's inherent assumption is that BART-level SO₂ reductions are required at Independence to meet the RPGs, but it does not adequately support that assumption. EPA modeled visibility impacts of SO₂ reductions assuming FGD systems would be retrofitted at Independence, but they failed to conduct modeling using any other technology or methodology that could provide more cost-effective SO₂ reductions.

Finally, EPA also states in its RPG guidance document that for, “individual, large scale sources, simple cost effectiveness estimates based on a dollar-per-ton calculation may not be as meaningful as a dollar-per-deciview calculation.”³⁵ EPA's CENRAP modeling showed that the cumulative benefit of installing all of the controls proposed in the FIP would result in visibility benefits at Caney Creek of only 0.21 dv and at Upper Buffalo of only 0.19 dv.³⁶ Considering that

³⁴ *Id.*, at page 5-1.

³⁵ *Id.*, at page 5-2.

³⁶ See 80 Fed. Reg. 18,998, Table 67.

Independence represents only approximately 36% of the SO₂ point source emissions and 29% of the point source NO_x emissions in Arkansas, Entergy estimated the visibility improvement due to retrofitting FGD systems at Independence would be approximately 0.08 dv at Caney Creek and 0.07 dv at Upper Buffalo. Although we do not support EPA’s use of the White Bluff cost estimates for Independence, we applied the White Bluff costs to retrofit dry FGD and the estimated visibility improvement due to retrofitting dry FGD systems at Independence to estimate dollar-per-deciview as suggested in EPA’s RPG guidance document. Table 8 shows that retrofitting dry FGD systems at Independence is clearly not cost effective when considering the insignificant visibility improvements.

Table 8: Dollar-Per-Deciview Reduction for Dry FGD at Independence

Class I Area	Caney Creek	Upper Buffalo
Estimated Visibility Improvement³⁷	0.08	0.07
Revised Annualized Costs³⁸	\$106,765,022	\$106,765,022
\$/Adv	\$1,334,562,775	\$1,525,214,600

³⁷ The CENRAP modeling includes SO₂ and NO_x impacts; therefore, the numbers shown likely overestimate the visibility improvement based solely on SO₂ reductions.

³⁸ Annualized costs for Retrofitting Dry FGD at White Bluff 1 and 2 from S&L Report #012831 were used assuming a 30-year remaining useful life.

5. CONCLUSION

S&L reviewed the approach EPA takes in its proposed FIP for Arkansas, including EPA’s determination of costs for retrofit dry FGD scrubbers, and EPA’s evaluation of annual SO₂ emission reductions. Our analysis identifies several areas where EPA overstates the cost-effectiveness (\$/ton of SO₂ removed) of the dry FGD retrofits that EPA would require in its FIP. As discussed in this analysis, cost-effectiveness is influenced by two variables: the total annualized cost to retrofit FGD controls (\$/yr) and the corresponding reduction in annual SO₂ emissions (tons per year “tpy”). EPA’s approach does not accurately calculate either variable. Table 9 shows how the approach EPA took understated the annualized cost of the control systems and the adjustments S&L made to correct EPA’s errors.

Table 9: Adjustments to EPA’s Annualized Cost for a Single Unit at White Bluff

Item	Total Capital Investment (\$)	Annualized Cost (\$/year)
EPA FIP	\$247,537,295	\$31,981,230
Corrected BOP Cost Exclusions	\$263,041,857	\$33,230,898
Corrected Owner’s Cost Exclusions	\$304,783,600	\$36,595,282
Corrected Escalation	\$347,391,147	\$40,029,450
Corrected Operating Costs	\$347,391,147	\$50,499,444
Remaining Useful Lifetime Adjustment*	\$347,391,147	\$86,975,068 to \$95,381,830
2015 Estimate (S&L Report #012831) *	\$536,185,000	\$109,681,936 to \$122,657,613
Differential from EPA FIP*	+ \$99,853,852	+ \$54,993,838 to \$63,400,600

* Entergy proposes to cease to use coal at White Bluff 1 and 2 between 2027 and 2028; therefore, the annualized costs are shown as a range based on a remaining useful life of 6 or 7 years.

In addition, Table 10 shows how EPA’s approach overstated the tons of SO₂ that would be removed by its FIP-imposed dry FGD and the adjustments S&L made to correct EPA’s mistakes.

Table 10: Adjustments to EPA’s SO₂ Emission Reductions

Item	White Bluff 1 (tons)	White Bluff 2 (tons)
EPA FIP	14,363	15,221
Corrected Baseline Emission Calculation	14,474	14,617
Corrected SO ₂ Emission Reduction Calculation	14,264	14,353
Differential from EPA FIP	-99	-868

EPA’s errors resulted in severely overstating the cost-effectiveness to retrofit dry FGD systems at White Bluff 1 and 2 (and then by extension in its reasonable progress analysis for Independence 1 and 2). Table 11 summarizes how EPA’s errors systematically underestimated cost and overstated the cost-effectiveness to install these dry FGD systems. As Table 11 indicates when the errors are corrected and updated costs incorporated, retrofitting dry FGD systems at these units is clearly not cost-effective.

Table 11: Summary Cost-Effectiveness Impacts

Item	White Bluff 1 (\$/ton)	White Bluff 2 (\$/ton)
EPA’s Cost Effectiveness	\$2,227	\$2,101
Corrected Baseline Emission Calculation	\$2,210	\$2,188
Corrected SO ₂ Emission Reduction Calculation	\$2,242	\$2,228
Corrected BOP Cost Exclusions	\$2,330	\$2,315
Corrected Owner’s Cost Exclusions	\$2,566	\$2,550
Corrected Escalation	\$2,806	\$2,789
Corrected Operating Cost	\$3,540	\$3,518
Corrected Remaining Useful Life *	\$6,097 to \$6,687	\$6,060 to \$6,646
2015 Estimate (S&L Report #012831) *	\$7,689 to \$8,599	\$7,642 to \$8,546
Differential from EPA FIP¹	+ \$5,462 to \$6,372	+ \$5,541 to \$6,445

* Entergy proposes to cease to use coal at White Bluff Units 1 and 2 between 2027 and 2028; therefore, the cost effectiveness values are shown as a range based on a remaining useful life of 6 or 7 years.

With respect to EPA’s RPG analysis for SO₂ controls, EPA did not follow its own guidance document when conducting its four factor analysis of Independence. EPA failed to consider lower cost options that could reduce SO₂ emissions at Independence and instead concluded that BART-level controls were required to meet RPG. EPA did not prepare cost estimates based on design parameters for FGD systems retrofit at Independence, as required by their RPG guidance document. EPA did not conduct a dollar-per-deciview analysis, as recommended in its RPG document for these analyses, to demonstrate the benefit of retrofitting dry FGD at Independence accounting for visibility benefits. When applying annualized costs to projected visibility improvements the result is **over \$1.3 billion/Adv** for Caney Creek and **over \$1.5 billion/Adv** for Upper Buffalo, which is clearly not cost effective.

	EPA FIP	Corrected Baseline Emissions	Corrected Heat Input and Emission Reduction	Section 2.4, Excluded BOP Costs	Section 2.5, Excluded Owner's Costs	Section 2.6, Incorrect Escalation	Section 2.7, Corrected Operating Cost	Remaining Useful Lifetime Adjustment (7 Year Life)	Remaining Useful Lifetime Adjustment (6 Year Life)	2015 Capital Cost Estimate (S&L Report # 012831 - 7 Year Life)	2015 Capital Cost Estimate (S&L Report # 012831 - 6 Year Life)
White Bluff 1											
Total Annualized Cost	\$31,981,230	\$31,981,230	\$31,981,230	\$33,230,898	\$36,595,282	\$40,029,450	\$50,499,444	\$86,975,068	\$95,381,830	\$109,681,936	\$122,657,613
Interest Rate (%)	7	7	7	7	7	7	7	7	7	7	7
Equipment Lifetime (years)	30	30	30	30	30	30	30	7	6	7	6
Capital Recovery Factor (CRF)	0.0806	0.0806	0.0806	0.0806	0.0806	0.0806	0.0806	0.1856	0.2098	0.1856	0.2098
SO2 Emission Rate (lbs/MMBtu) ²	0.65	0.65	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
Baseline Heat Input (MMBtu/yr) ¹	Not Used	Not Used	55,829,551	55,829,551	55,829,551	55,829,551	55,829,551	55,829,551	55,829,551	55,829,551	55,829,551
Controlled SO2 Emission Rate (%)	90.81	90.81	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
Controlled SO2 Emission Rate (lb/MMBtu) ³	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
SO2 Emission Baseline (tons)	15,816	15,939	15,939	15,939	15,939	15,939	15,939	15,939	15,939	15,939	15,939
SO2 Emission Reduction (tons)	14,363	14,474	14,264	14,264	14,264	14,264	14,264	14,264	14,264	14,264	14,264
Cost Effectiveness (\$/ton)	\$2,227	\$2,210	\$2,242	\$2,330	\$2,566	\$2,806	\$3,540	\$6,097	\$6,687	\$7,689	\$8,599
White Bluff 2											
Total Annualized Cost	\$31,981,230	\$31,981,230	\$31,981,230	\$33,230,898	\$36,595,282	\$40,029,450	\$50,499,444	\$86,975,068	\$95,381,830	\$109,681,936	\$122,657,613
Interest Rate (%)	7	7	7	7	7	7	7	7	7	7	7
Equipment Lifetime (years)	30	30	30	30	30	30	30	7	6	7	6
Capital Recovery Factor (CRF)	0.0806	0.0806	0.0806	0.0806	0.0806	0.0806	0.0806	0.1856	0.2098	0.1856	0.2098
SO2 Emission Rate (lbs/MMBtu)	0.68	0.68	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
Baseline Heat Input (MMBtu/yr) ¹	49,108,824	47,158,824	56,042,262	56,042,262	56,042,262	56,042,262	56,042,262	56,042,262	56,042,262	56,042,262	56,042,262
Controlled SO2 Emission Rate (%)	91.16	91.16	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
Controlled SO2 Emission Rate (lb/MMBtu) ³	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
SO2 Emission Baseline (tons)	16,697	16,034	16,034	16,034	16,034	16,034	16,034	16,034	16,034	16,034	16,034
SO2 Emission Reduction (tons)	15,221	14,617	14,353	14,353	14,353	14,353	14,353	14,353	14,353	14,353	14,353
Cost Effectiveness (\$/ton)	\$2,101	\$2,188	\$2,228	\$2,315	\$2,550	\$2,789	\$3,518	\$6,060	\$6,646	\$7,642	\$8,546

1 - EPA did not list the heat input. EPA's analysis incorrectly assumes the annual average heat input as being the baseline SO2 emissions (tpy) divided by the monthly maximum emission rate (lb/MMBtu)

2 - EPA incorrectly applied the maximum monthly SO2 emission rate to determine the % reduction in SO2 to achieve 0.06

3 - EPA did not include this item. SO2 emission reduction is corrected to calculate it as [baseline annual average heat input (MMBtu/Yr)] * [the controlled SO2 emission rate (lb/MMBtu)] * [2000 lb/ton]

Exhibit E



Entergy Services, Inc., on behalf of Entergy Arkansas, Inc.
White Bluff Steam Electric Station
Redfield, Arkansas (AFIN 35-00110)



Updated BART Five-Factor Analysis for SO₂ for Units 1 and 2

Submitted to:

Arkansas Department of Environmental Quality (ADEQ)
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August 18, 2017

Trinity Project 173702.0014



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This report provides an update to the Best Available Retrofit Technology (BART) Five Factor Analysis for sulfur dioxide (SO₂) for Unit 1 (SN-01) and Unit 2 (SN-02) at Entergy Arkansas, Inc.'s (EAI's) White Bluff Steam Electric Station (White Bluff) as well as revising the SO₂ BART conclusion. EAI submitted the original BART Five Factor Analysis to the Arkansas Department of Environmental Quality (ADEQ) on February 21, 2013, with revisions on June 10, 2013 and October 15, 2013.

- Unit 1 (SN-01) is a primary boiler with a maximum net power rating of 850 megawatts (MW) and a nominal heat input capacity of 8,950 million British thermal units per hour (MMBtu/hr). The boiler burns sub-bituminous or bituminous coal¹ as the primary fuel and No. 2 fuel oil or biofuel as a start-up fuel, and it is currently equipped with an electrostatic precipitator (ESP) for particulate matter (PM) control.
- Unit 2 (SN-02) is identical in design to Unit 1. It is a primary boiler with a maximum net power rating of 850 MW and a nominal heat input capacity of 8,950 MMBtu/hr. The boiler burns sub-bituminous or bituminous coal² as the primary fuel and No. 2 fuel oil or biofuel as a start-up fuel, and it is currently equipped with an ESP for PM control.

Specific updates incorporated in this version of the report are outlined below.

1.1 REPORT UPDATES

This report includes the following updates to the previous SO₂ Five Factor Analysis for White Bluff Units 1 and 2:

1. Updating the baseline period to 2009-2013.
2. Incorporating new information regarding the remaining useful life (RUL) of the units.
3. Incorporating a new control scenario representing combustion of only low-sulfur coal (LSC).
4. Incorporating additional information (i.e., cost information and modeling results) related to control options involving Dry Sorbent Injection (DSI).
5. Updating all modeling to reflect the newest methodologies for dividing (“speciating”) particulate matter (PM or PM₁₀)³ emissions into its constituents.
6. Updating the SO₂ BART conclusion in consideration of the new information and updates listed above.

¹ The coal-fired units at White Bluff primarily burn sub-bituminous coal, but are permitted to burn bituminous or sub-bituminous coal. Only sub-bituminous coals were burned during the baseline periods evaluated in this analysis.

² Ibid.

³ All PM represented in this report is assumed to have a mass mean diameter smaller than ten microns.

1.2 SUMMARY OF UPDATED BART FIVE FACTOR ANALYSIS

Trinity conducted the below five-step analysis based on EPA's BART Guidelines⁴ in 40 CFR Part 51 and other EPA guidance⁵ to evaluate SO₂ BART for Units 1 and 2:

1. Identifying all available retrofit control technologies;
2. Eliminating technically infeasible control technologies;
3. Evaluating the control effectiveness of remaining control technologies;
4. Evaluating impacts and documenting the results; and
5. Evaluating visibility impacts.

The updated BART Five Factor Analysis concludes that combustion of LSC constitutes BART for Unit 1 and Unit 2 in light of the updated RUL. The proposed BART emission rate for SO₂ is 0.6 pounds per MMBtu (lb/MMBtu) on a rolling 30-day average.

⁴ The BART guidelines were published as amendments to EPA's Regional Haze Rule (RHR) at 40 CFR 51.308 on July 6, 2005.

⁵ April 26, 2012, letter from Mr. Guy Donaldson, EPA Region VI, to Mr. Anthony Davis, ADEQ.

2 INTRODUCTION AND BACKGROUND

In the 1977 amendments to the Clean Air Act (CAA), Congress set a national goal to restore national parks and wilderness areas to pristine conditions by preventing any future, and remedying any existing, man-made visibility impairment. On July 1, 1999, the U.S. EPA published the final Regional Haze Rule (RHR). The objective of the RHR is to restore visibility to pristine conditions in 156 specific areas across the United States known as Class I areas. The CAA defines Class I areas as certain national parks (larger than 6,000 acres), wilderness areas (larger than 5,000 acres), national memorial parks (larger than 5,000 acres), and international parks that were in existence on August 7, 1977.

The RHR requires States to set goals that provide for reasonable progress towards achieving natural visibility conditions for each Class I area in their state. On July 6, 2005, the EPA published amendments to its 1999 RHR, often called the Best Available Retrofit Technology (BART) rule, which included guidance for making source-specific BART determinations. The BART rule defines BART-eligible sources as sources that meet the following criteria:

- (1) Have potential emissions of at least 250 tons per year of a visibility-impairing pollutant,
- (2) Began operation between August 7, 1962, and August 7, 1977, and
- (3) Are included as one of the 26 listed source categories in the guidance.

A BART-eligible source is subject to BART if the source is “reasonably anticipated to cause or contribute to visibility impairment in any federal mandatory Class I area.” For the purpose of determining which sources are subject to BART, a 1.0 Δ dv change or more from an individual source is considered to “cause” visibility impairment, and a change of 0.5 Δ dv is considered to “contribute” to impairment, which therefore establishes 0.5 Δ dv as a numerical screening threshold for subject-to-BART determinations.⁶ According to the BART guidelines, the CALPUFF modeling system (CALPUFF) or any other appropriate dispersion model can be used to predict the visibility impacts.⁷ The model-predicted visibility impact, specifically when using CALPUFF the 98th percentile impact measured against natural background (and not the maximum impact), is compared to the 0.5 Δ dv threshold to determine if the source is anticipated to cause or contribute to the visibility impairment.⁸

Once it is determined that a source is subject to BART, a BART determination must address air pollution control measures for the source. The visibility regulations define BART as follows:

...an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by...[a BART-eligible source]. The emission limitation must be established on a case-by-case basis, taking into consideration the technology available, the cost of compliance, the energy and non-air quality

⁶ “Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations; Final Rule,” 70 Fed. Reg. 39,116-18 (July 6, 2005).

⁷ Trinity and EAI assert that CALPUFF is not the most appropriate model for estimating visibility impacts. Due to its numerous inherent limitations (e.g., limited chemistry mechanism, distance limitations, blanket background ammonia values, etc.), CALPUFF does not yield reliable results. Furthermore, CALPUFF is no longer an EPA-preferred model, which further indicates CALPUFF’s unreliability. More advanced models like the Comprehensive Air Quality Model with Extensions (CAMx)—if processed appropriately—can yield more reliable characterizations of visibility impairment. Nevertheless (without waiver), CALPUFF modeling will continue to be presented in this report for consistency with past submittals.

⁸ Id. at 39,163.

environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.

The BART Guidelines state that a BART determination should address the following five statutory factors:

1. Existing controls;
2. Cost of controls;
3. Energy and non-air quality environmental impacts;
4. Remaining useful life of the source; and
5. Degree of visibility improvement as a result of controls.

Further, the BART Guidelines indicate that the five basic steps in a BART analysis can be summarized as follows:

1. Identify all available retrofit control technologies;
2. Eliminate technically infeasible control technologies;
3. Evaluate the control effectiveness of remaining control technologies;
4. Evaluate impacts and document the results; and
5. Evaluate visibility impacts.

As described in the above-referenced, previous submittals, the boilers at White Bluff meet the three BART-eligibility criteria, and the existing visibility impairment is modeled at greater than 0.5 Δ dv in at least one Class I area. Thus, the White Bluff units are subject to BART.

3 EXISTING EMISSIONS AND BASELINE VISIBILITY IMPAIRMENT

Five Factor Analyses require the determination of unit-specific baseline visibility impairment values to which any post-control scenarios can be compared. The unit-specific baseline modeling analyses are built upon, but are distinguished from, the baseline (a.k.a., “screening”) modeling for the collection of BART eligible units at each source that is completed to determine if a BART eligible source is subject to BART. EAI is not updating the subject-to-BART determination at this time.

This section summarizes the baseline visibility impairment attributable to each of White Bluff’s units based on CALPUFF air quality modeling conducted by Trinity.⁹ Trinity conducted the modeling using the same protocol, methodologies, and inputs (except where specifically updated as described in this report) as presented in the October 15, 2013 submittal. The protocol and details method descriptions are not included with this report because nothing has changed and the CALMET dataset developed per the protocol has been used – and approved by EPA – numerous times since its development.

While this report updates the BART Five Factor Analysis for SO₂ emissions specifically, BART modeling must consider emissions of all visibility-affecting pollutants (VAP), including SO₂, oxides of nitrogen (NO_x), and speciated particulate matter, including filterable coarse particulate matter (PM_c), filterable fine particulate matter (PM_f), elemental carbon (EC), inorganic condensable particulate matter (IOR CPM) as sulfates (SO₄), and organic condensable particulate matter (OR CPM), also referred to as secondary organic aerosols (SOA).

3.1 BASELINE EMISSION RATES

The updated modeled NO_x and SO₂ emission rates for Unit 1 and Unit 2 are the highest actual 24-hour emission rates based on Clean Air Markets Database (CAMD) data from 2009-2013.¹⁰ The updated modeled PM₁₀ emission rates for Unit 1 and Unit 2 are based on emission factors from AP-42 for filterable PM₁₀ and condensable PM (with a 99.5 percent control efficiency for ESP applied to the PM₁₀ filterable fraction) used in conjunction with the average 2009-2013 coal heating value and ash content (as a percentage of mass).¹¹ Emission rates for specific PM₁₀ species were calculated using the monitored filterable PM rate and the National Park Service (NPS) “speciation spreadsheet” for *Dry Bottom Boiler Burning Pulverized Coal using only ESP*¹² except for SO₄, which was calculated using an Electric Power Research Institute (EPRI) methodology that considers the SO₂ to SO₄ conversion rate and SO₄ reduction factors for various downstream equipment.¹³ Table 3-1 summarizes the emission rates that were modeled for SO₂, NO_x, and PM₁₀, including the speciated PM₁₀ emissions.

⁹ See footnote 7, above.

¹⁰ The use of this baseline is a conservative approach. EAI would be justified in using a more recent baseline with lower emissions that would result in higher cost effectiveness values.

¹¹ AP-42, Chapter 1 External Combustion Sources, Section 1.1 Bituminous and Subbituminous Coal Combustion, Table 1.1-5, page 1.1-24 (September 1998).

¹² The baseline speciation is based on the NPS Workbook for a Dry Bottom Boiler burning Pulverized Coal using an ESP. Based on average 2009-2013 values, the following input values were used: heating value of 8,587 Btu/lb, 0.27% sulfur, 4.96% ash, 8,950 MMBtu/hr heat input, and a baseline total PM₁₀ emission rate of 119.2 lb/hr at both White Bluff Unit 1 and Unit 2. NPS: <http://www.nature.nps.gov/air/Permits/ect/index.cfm>.

¹³ Electric Power Research Institute (EPRI) Estimating Total Sulfuric Acid Emissions from Stationary Power Plants: EPRI, Technical Update, Palo Alto, CA: March 2012. 1023790.

Table 3-1. Baseline Maximum 24-hour Emission Rates (As Hourly Equivalents)

Unit	SO ₂ (lb/hr)	NO _x (lb/hr)	Total PM ₁₀ (lb/hr)	SO ₄ (lb/hr)	PM _c (lb/hr)	PM _f (lb/hr)	SOA (lb/hr)	EC (lb/hr)
SN-01	6,771.9	3,355.4	119.2	5.1	40.4	31.1	9.3	1.2
SN-02	6,622.3	3,590.5	119.2	5.0	40.4	31.1	9.3	1.2

3.2 BASELINE VISIBILITY IMPAIRMENT

Trinity conducted modeling to estimate the current visibility impairment attributable to Unit 1 and Unit 2 in four Class I Areas: Caney Creek Wilderness (CACR), Upper Buffalo Wilderness (UPBU), Hercules Glades Wilderness (HERC), and Mingo Wilderness (MING) using the CALPUFF dispersion model.¹⁴ Table 3-2 provides a summary of the modeled visibility impairment attributable to Unit 1 and Unit 2 based on the emission rates shown in Table 3-1. This table shows the 98th percentile impacts in Δdv and the number of days with impacts greater than 0.5 Δdv .

Table 3-2. Baseline Visibility Impairment

Unit	Year ^A	CACR		UPBU		HERC		MING	
		98 th Percentile (Δdv)	No. of Days with $\Delta dv \geq 0.5$	98 th Percentile (Δdv)	No. of Days with $\Delta dv \geq 0.5$	98 th Percentile (Δdv)	No. of Days with $\Delta dv \geq 0.5$	98 th Percentile (Δdv)	No. of Days with $\Delta dv \geq 0.5$
SN-01	2001	1.505	38	1.051	30	0.925	24	0.802	16
	2002	1.306	29	0.742	15	0.567	10	0.708	21
	2003	1.053	32	1.033	24	0.704	15	0.666	14
SN-02	2001	1.533	39	1.059	30	0.912	25	0.819	15
	2002	1.322	29	0.739	16	0.568	11	0.719	20
	2003	1.059	32	1.03	25	0.72	16	0.678	14

^A Meteorological data year modeled.

¹⁴ Due to an EPA-requested change in meteorological data (to a refined, or "NO OBS = 0", dataset), which excluded the Sipsey Class 1 Area from the modeling domain, Sipsey was not included in this analysis. See also footnote 7 above.

4.1 IDENTIFICATION OF AVAILABLE RETROFIT SO₂ CONTROL TECHNOLOGIES FOR UNIT 1 AND UNIT 2

The boilers burn primarily coal. Sulfur oxides, SO_x, are generated during coal combustion from the oxidation of sulfur contained in the fuel. SO_x emissions are almost entirely dependent on the sulfur content of the fuel and are generally not affected by boiler size or burner design. SO_x emissions from conventional combustion systems are predominantly in the form of SO₂. Since SO₂ is the predominant sulfur compound emitted from Unit 1 and Unit 2, the BART analysis is specific to emissions of SO₂. Reductions in emissions of SO₂ are expected to reduce visibility impairment by reducing sulfate (SO₄) formation.

Step 1 of the top-down control review is to identify available retrofit control options for SO₂. The available SO₂ retrofit control technologies for Unit 1 and Unit 2 are summarized in Table 4-1.

Table 4-1. Available SO₂ Control Technologies for Unit 1 and Unit 2

SO₂ Control Technologies
Fuel Switching – Low-Sulfur Coal (LSC)
Dry Sorbent Injection (DSI)
Dry / Semi-Dry Flue Gas Desulfurization (DFGD), e.g., Spray Dryer Absorber (SDA)
Wet Scrubbing, i.e., Wet Flue Gas Desulfurization (WFGD)

4.2 ELIMINATE TECHNICALLY INFEASIBLE SO₂ CONTROL TECHNOLOGIES FOR UNIT 1 AND UNIT 2

Step 2 of the BART determination is to eliminate technically infeasible SO₂ control technologies that were identified in Step 1.

4.2.1 Fuel Switching - Low-Sulfur Coal

With an achievable emission level of 0.6 lb/MMBtu, switching to LSC can reduce SO₂ emissions by approximately 8.75 percent compared to baseline levels.¹⁵

4.2.2 Dry Sorbent Injection

DSI involves the injection of a sorbent (e.g., Trona) into the exhaust gas stream where acid gases such as hydrogen chloride (HCl) and SO₂ react with and become entrained in the sorbent. The stream then passes through a particulate control device to remove the sorbent along with the entrained SO₂. The process was developed as a lower cost FGD option because the mixing of the SO₂ and sorbent occurs directly in the exhaust gas stream rather than in a separate vessel. Sorbent injection control efficiency depends on residence time, gas stream temperature, and limitations of the particulate control device.

¹⁵ Calculated based on a comparison of the maximum 30 boiler operating day SO₂ emission rate during the baseline period to the proposed limit for low-sulfur coal of 0.6 lb/MMBtu.

DSI is a technically feasible yet seldom used technology for moderate to high removal of SO₂ from coal-fired power plants, with limited full-scale installations for SO₂ control. A significant amount of testing of DSI for SO₂ control has been performed in recent years. This testing has shown that a wide range of performance is achievable (up to 80 or 90 percent SO₂ reduction in some cases). However, this testing has also shown that there are many factors that can impact the performance of these reagents, including particle size (milling), residence time, temperature, and the particulate collection equipment. The primary lesson learned through this testing is that each unit is unique, with various factors that can impact the achievable performance or required reagent feed rate. Different performance has even been seen on sister units. Therefore, it is critical to perform a demonstration or Proof of Concept test at each facility.

A demonstration has not to-date been performed on the White Bluff units to show the achievable SO₂ control and associated reagent feed rates. The cost reports developed by S&L, included in Appendix A, show predicted performance and required reagent rates based on Sargent & Lundy's (S&L's) extensive experience with DSI testing and previous work with the White Bluff units. Two DSI technologies are considered for White Bluff: "DSI", which would utilize the existing ESP, and "enhanced DSI", which would include installation of a fabric filter or baghouse. Enhanced DSI should achieve greater SO₂ reductions because the installation of a fabric filter increases residence time and improves collection efficiency to allow more sorbent to be injected. The S&L reports present predicted performance levels (SO₂ emission rates) for DSI and enhanced DSI of 0.35 lb/MMBtu and 0.15 lb/MMBtu, respectively. Because the actual performance and required reagent rates may vary from the predicted values due to unforeseen site-specific conditions, it is possible that the capital and annual costs represented in the S&L reports, and in Section 4.4.2 of this report, could also vary. If a significantly higher injection rate were actually required to achieve the same performance level (SO₂ emission rate) then the capital and annual costs, and corresponding cost-effectiveness of the DSI technologies, could dramatically increase.

Furthermore, DSI has yet to be demonstrated on similarly sized units to those at White Bluff. An important consideration for DSI technology is the design throughput of the system, beyond just the size and achievable performance (SO₂ emission rate). The largest DSI system installed and operating has a design feed rate of 12 tons/hour, while most of the installed systems inject approximately five to six tons/hour. The predicted injection rate for the White Bluff enhanced DSI case is approximately 15 tons/hour. The greater the injection rates, the more issues associated with supply and delivery logistics that arise. At 15 tons/hour (per unit) White Bluff would consume one railcar (100-ton capacity) of Trona every 3.3 hours if both units are operating at full load.

Prior to moving forward with DSI technology as a compliance strategy, a demonstration test would need to be performed to confirm the feasibility, achievable performance and balance of plant impacts (brown plume formation, ash handling modifications, landfill/leachate considerations and impact to mercury control). The balance of plant impacts have been addressed as part of the S&L cost reports based on typical assumptions, but would also be impacted should the design injection rate vary. Any compliance strategy which were to rely on DSI technology would need to be contingent on successful completion of a demonstration test.

4.2.3 Dry / Semi-Dry Flue Gas Desulfurization

Of the various designs for dry or semi-dry FGD systems, the most popular is the Spray Dryer Absorber (SDA) design. In the SDA design, a fine mist of lime slurry is sprayed into an absorption tower where the SO₂ is absorbed by the slurry droplets. The absorption of the SO₂ leads to the formation of calcium sulfite and calcium sulfate within the droplets. The heat from the exhaust gas causes the water to evaporate before the droplets reach the bottom of the tower, resulting in the formation of a dry powder that is carried out with the gas and collected with a fabric filter.

SDA systems can achieve control efficiencies ranging from 60 to 95 percent.¹⁶ SDA is a technically feasible option for control of SO₂ from Unit 1 and Unit 2. Based on a site-specific study completed by S&L, SDA could technically achieve an SO₂ emission rate of 0.06 lb/MMBtu at Unit 1 and Unit 2.

4.2.4 Wet Flue Gas Desulfurization

While WFGD is technically feasible, it is not expected to achieve significant reductions beyond DFGD/SDA and was eliminated in the previous analyses and in EPA’s final regulations (SIP approval and FIP). Accordingly, WFGD is not considered further in this analysis.

4.3 RANK OF TECHNICALLY FEASIBLE SO₂ CONTROL OPTIONS BY EFFECTIVENESS FOR UNIT 1 AND UNIT 2

The third step in the BART analysis is to rank the technically feasible options according to their effectiveness in reducing SO₂.

Table 4-2 provides a ranking of the control levels for the controls listed in the previous section.

Table 4-2. Control Effectiveness of Technically Feasible SO₂ Control Technologies

Control Technology	Achievable Emission Rate (lb/MMBtu) ^A
Semi-Dry Scrubber (SDA)	0.06
Enhanced DSI	0.15
DSI	0.35
Low Sulfur Coal	0.6

4.4 EVALUATION OF IMPACTS FOR FEASIBLE SO₂ CONTROLS FOR UNIT 1 AND UNIT 2

The fourth step in the BART analysis is the impact analysis, which evaluates the impacts for the control options deemed feasible in Step 2. This analysis typically is conducted to demonstrate that the most effective control technology does not necessarily constitute BART. The BART guidelines list the four factors to be considered in the impact analysis:

- Cost of compliance
- Energy impacts
- Non-air quality impacts; and
- The RUL of the source

Because the RUL of the source directly affects the cost of compliance, RUL is considered first.

¹⁶ EPA Basic Concepts in Environmental Sciences, Module 6: Air Pollutants and Control Techniques <http://www.epa.gov/eogapti1/module6/sulfur/control/control.htm>

4.4.1 Remaining Useful Life

EAI anticipates Unit 1 and Unit 2 will cease to use coal by end of year 2028, and, upon acceptance of the BART determinations contained herein in an approved SIP, is prepared to take an enforceable restriction to this effect.

4.4.2 Cost of Compliance

The capital costs and annual operating and maintenance costs for the considered control options, except for the LSC option, were developed by S&L and are included in Appendix A. The annual cost increase due to burning only LSC is based on a cost premium of \$0.50 per ton, which was the premium provided to EAI's fuel purchasing department by its coal suppliers. For the S&L-developed costs, two sets of values are presented. The first, in Table 4-3, is the actual cost estimated for each unit and control option. The second, in Table 4-4, is the estimated cost after excluding cost items that EPA has historically claimed should not be accounted for in BART cost effectiveness calculations. An example of an excluded cost is Allowance for Funds Used During Construction (AFUDC). AFUDC represents the interest expense incurred on the investment in a large capital project, such as a FGD installation, which can take several years to complete (≥ 5 years). Although interest expenses will certainly be incurred on such a project, and AFUDC is typically considered as part of the capital cost of such a project for standard accounting and rate-making purposes, EPA Region 6 has expressed concern with the inclusion of AFUDC and certain other costs. EAI disagrees and believes that determining the cost effectiveness of the control options must realistically reflect the actual cost of compliance. *See* EAI's comments on the proposed FIP.¹⁷ Nonetheless, for completeness, this analysis shows a range of cost effectiveness both including AFUDC and other costs and excluding those costs.

Trinity annualized the capital costs based on capital recovery periods reflecting the total amount of time that the control option could be employed until the unit ceases to use coal at the end of 2028. For the purpose of this report, the start of operation for the SDA option is assumed to be the end of 2021.¹⁸ Therefore, the capital recovery period for SDA is set at seven (7) years (2028 - 2021 = 7 years). The LSC and DSI options can be employed two (2) years earlier than SDA which, for purposes of this report, is assumed to be the end of 2019. Therefore, the capital recovery period for these control options is set at nine (9) years (2028 - 2019 = 9 years).

Trinity determined the values for annual tons of SO₂ reduced by subtracting the estimated controlled annual emission rate from the baseline annual emission rate. The baseline annual emission rate was based on the average rate for the 2009-2013 baseline period.¹⁹ The controlled annual emission rates were based on the lb/MMBtu levels listed in Table 4-2 multiplied by the future annual heat input, which was based on the average actual heat input from CAMD for the 2009-2013 baseline period. For the LSC scenario, "controlled" annual emission rates were based on an 8.75 percent decrease compared to baseline annual emission rates, which is estimated by comparing the maximum 30-boiler operating day rolling average to the controlled emission rate of 0.6 lb/MMBtu.

The cost effectiveness in dollars per ton of SO₂ reduced was determined by dividing the annualized cost of control by the annual tons reduced. Table 4-3 presents a summary of the cost effectiveness for each control

¹⁷ Entergy Arkansas Inc. "Comments On the Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas" (EPA Docket ID No. EPA-R06-OAR-2015-0189), August 7, 2015, pp. 10-11.

¹⁸ October 27, 2021 per 81 Fed. Reg. Vol. 81, p. 66416. However, given that actual installation would take at least five years, SDA likely could not be installed until 2023 or later.

¹⁹ As noted above, this is a conservative baseline, and EAI would have been justified in using a more recent baseline with lower emissions that would have resulted in generally higher cost effectiveness values.

option. The cost of switching to low sulfur coal is less than \$1,200/ton of SO₂ reduced. The actual cost effectiveness of the add-on controls is economically infeasible at more than \$7,000/ton of SO₂ reduced. It's noted (without waiver) that the cost effectiveness of add-on controls even when excluding certain costs for which EPA has expressed concern (e.g., AFUDC), but that will be incurred as explained above, also results in economic infeasibility, at more than approximately \$5,400/ton.²⁰

Table 4-3. Summary of SO₂ Controls Cost Effectiveness for Unit 1 and Unit 2 Based on Actual Costs

Unit & Control Option	Baseline Emission Rate (tpy)	Controlled Emission Rate (tpy)	Capital Cost (\$MM)	Annualized Capital Cost (\$MM/yr)	Annual O&M Cost (\$MM/yr)	Average Cost Effectiveness (\$/ton)	Incremental Cost Effectiveness v. LSC (\$/ton)
SN-01 – LSC	15,939	14,544	0	0	1.60	1,150	
SN-02 – LSC	16,034	14,631	0	0	1.61	1,148	
SN-01 – DSI	15,939	9,770	190.11	29.18	14.91	7,148	8,900
SN-02 – DSI	16,034	9,807	190.11	29.18	14.91	7,081	8,807
SN-01 – Enhanced DSI	15,939	4,187	393.74	60.44	26.19	7,372	8,209
SN-02 – Enhanced DSI	16,034	4,203	393.74	60.44	26.19	7,322	8,153
SN-01 – SDA	15,939	1,675	495.74	92.01	9.60	7,124	7,771
SN-02 – SDA	16,034	1,681	495.74	92.01	9.60	7,080	7,722

Table 4-4. Summary of SO₂ Controls Cost Effectiveness for Unit 1 and Unit 2 Based on Costs Adjusted for EPA-Exclusions for Illustration Purposes

Unit & Control Option	Baseline Emission Rate (tpy)	Controlled Emission Rate (tpy)	Capital Cost (\$MM)	Annualized Capital Cost (\$MM/yr)	Annual O&M Cost (\$MM/yr)	Average Cost Effectiveness (\$/ton)	Incremental Cost Effectiveness v. LSC (\$/ton)
SN-01 – LSC	15,939	14,544	0	0	1.60	1,150	
SN-02 – LSC	16,034	14,631	0	0	1.61	1,148	
SN-01 – DSI	15,939	9,770	154.79	23.76	14.91	6,269	7,764
SN-02 – DSI	16,034	9,807	154.79	23.76	14.91	6,211	7,683
SN-01 – Enhanced DSI	15,939	4,187	321.42	49.34	26.19	6,427	7,137
SN-02 – Enhanced DSI	16,034	4,203	321.42	49.34	26.19	6,384	7,088
SN-01 – SDA	15,939	1,675	364.83	67.71	9.60	5,420	5,883
SN-02 – SDA	16,034	1,681	364.83	67.71	9.60	5,387	5,846

²⁰ Issues raised on appeal of the federal plan include EPA's use of undervalued cost of controls. However, without waiver of any claims or arguments, EPA's estimates also support the conclusion that SDA is not cost effective. Using EPA's estimates of capital cost (\$247,709,875), total O&M cost (\$16,877,127), and emissions reductions (14,363 tpy for Unit 1 and 15,221 tpy for Unit 2), adjusted only to consider the shortened remaining useful life value discussed above, the average cost effectiveness values for SDA are \$4,376/ton for Unit 1 and \$4,129 for Unit 2.

4.4.3 Energy Impacts and Non-Air Quality Impacts

There are numerous energy impacts and adverse non-air quality environmental impacts associated with the add-on controls under consideration. Some examples related to the use of DSI include (a) the need for substantial storage and transportation – both delivery via rail and conveyance on site – of Trona, (b) the forced abandonment of the beneficial re-use of fly ash, and (c) potential negative impacts on the PM control device.²¹ These impacts are more fully addressed for all the considered control options in the S&L reports included in Appendix A.

4.5 EVALUATION OF VISIBILITY IMPACT OF FEASIBLE SO₂ CONTROLS FOR UNIT 1 AND UNIT 2

Trinity conducted an impact analysis to assess the visibility improvement achieved. The impact analysis compared the impacts associated with the baseline emission rates to the impacts associated with the maximum emission rates representative of each control option.

Table 4-5 summarizes the lb/hr emission rates that were modeled to reflect each control option. The NO_x and total PM₁₀ emission rates were modeled at the revised 2009-2013 baseline rates. The applicable NPS speciation spreadsheets were relied upon to determine emission rates for PM species.^{22,23,24} SO₄ emission rates were independently calculated using an EPRI methodology that considers the SO₂ to SO₄ conversion rate and SO₄ reduction factors for various downstream equipment.²⁵

²¹ Sargent & Lundy, *Entergy Arkansas, Inc. White Bluff DSI Cost Estimate Basis Document*, SL-014000 Final, Rev. 0, August 3, 2017, pp. 6-10. See Appendix A of this report.

²² Low sulfur coal PM speciation is based on the NPS Workbook for a Dry Bottom Boiler burning Pulverized Coal using an ESP. The following values were input: heating value of 8,587 Btu/lb, 0.27% sulfur, 4.96% ash, 8,950 MMBtu/hr heat input, and a baseline total PM₁₀ emission rate of 119.2 lb/hr at White Bluff Unit 1 and Unit 2. NPS: <http://www.nature.nps.gov/air/Permits/ect/index.cfm>.

²³ DSI and Enhanced DSI PM speciations are based on the NPS workbooks for a Dry Bottom Boiler burning Pulverized Coal using an FGD system with an ESP or Fabric Filter. The following values were input: heating value of 8,587 Btu/lb, 0.27% sulfur, 4.96% ash, 8,950 MMBtu/hr heat input, and a baseline total PM₁₀ emission rate of 119.2 lb/hr at White Bluff Unit 1 and Unit 2. NPS: Ibid.

²⁴ DFGD speciation is based on the NPS workbook for a Dry Bottom Boiler burning Pulverized Coal using an FGD system with a Fabric Filter. The following values were input: heating value of 8,587 Btu/lb, 0.27% sulfur, 4.96% ash, 8,950 MMBtu/hr, and a baseline total PM₁₀ emission rate of 119.2 lb/hr at White Bluff Unit 1 and Unit 2. NPS: Ibid.

²⁵ Electric Power Research Institute (EPRI) *Estimating Total Sulfuric Acid Emissions from Stationary Power Plants*: EPRI, Technical Update, Palo Alto, CA: March 2012. 1023790.

Table 4-5. Emission Rates Modeled to Reflect SO₂ Controls for Unit 1 and Unit 2

Unit & Control Option	SO₂ (lb/hr)	SO₄^A (lb/hr)	NO_x (lb/hr)	PM_c (lb/hr)	PM_f (lb/hr)	EC (lb/hr)	SOA (lb/hr)	Total PM₁₀ (lb/hr)
SN-01 – LSC	5,370.0	4.0	3,355.4	40.4	31.1	1.2	9.3	119.2
SN-02 – LSC	5,370.0	4.0	3,590.5	40.4	31.1	1.2	9.3	119.2
SN-01 – DSI	3,132.5	0.5	3,355.4	29.0	22.4	0.9	13.4	119.2
SN-02 – DSI	3,132.5	0.5	3,590.5	29.0	22.4	0.9	13.4	119.2
SN-01 – Enhanced DSI	1,342.5	0.02	3,355.4	13.4	12.9	0.5	18.5	119.2
SN-02 – Enhanced DSI	1,342.5	0.02	3,590.5	13.4	12.9	0.5	18.5	119.2
SN-01 – SDA	537.0	0.01	3,355.4	13.4	12.9	0.5	18.5	119.2
SN-02 – SDA	537.0	0.01	3,590.5	13.4	12.9	0.5	18.5	119.2

^A SO₄ as it is displayed in this table represents ammonium sulfate.

Comparisons of the existing/baseline visibility impacts and the post-control visibility impacts are provided in Table 4-6 and Table 4-7.

Table 4-6. Summary of CALPUFF-Modeled Visibility Impacts from SO₂ Controls for Unit 1 (Across All Modeled Years, 2001-2003)

Scenario	CACR		UBPU		HERC		MING	
	98% Impact (Δdv)	# Days > 0.5 Δdv	98% Impact (Δdv)	# Days > 0.5 Δdv	98% Impact (Δdv)	# Days > 0.5 Δdv	98% Impact (Δdv)	# Days > 0.5 Δdv
Baseline	1.505	99	1.051	69	0.925	49	0.802	51
LSC	1.376	89	0.908	54	0.758	34	0.687	40
<i>Improvement over baseline</i>	<i>0.129</i>	<i>10</i>	<i>0.143</i>	<i>15</i>	<i>0.167</i>	<i>15</i>	<i>0.115</i>	<i>11</i>
DSI	1.197	64	0.676	30	0.584	19	0.469	17
<i>Improvement over baseline</i>	<i>0.308</i>	<i>35</i>	<i>0.375</i>	<i>39</i>	<i>0.341</i>	<i>30</i>	<i>0.333</i>	<i>34</i>
<i>Improvement over LSC</i>	<i>0.179</i>	<i>25</i>	<i>0.232</i>	<i>24</i>	<i>0.174</i>	<i>15</i>	<i>0.218</i>	<i>23</i>
Enhanced DSI	1.013	41	0.496	14	0.458	11	0.366	6
<i>Improvement over baseline</i>	<i>0.492</i>	<i>58</i>	<i>0.555</i>	<i>55</i>	<i>0.467</i>	<i>38</i>	<i>0.436</i>	<i>45</i>
<i>Improvement over LSC</i>	<i>0.363</i>	<i>48</i>	<i>0.412</i>	<i>40</i>	<i>0.300</i>	<i>23</i>	<i>0.321</i>	<i>34</i>
<i>Improvement over DSI</i>	<i>0.184</i>	<i>23</i>	<i>0.180</i>	<i>16</i>	<i>0.126</i>	<i>8</i>	<i>0.103</i>	<i>11</i>
SDA	0.902	35	0.409	7	0.400	6	0.298	2
<i>Improvement over baseline</i>	<i>0.603</i>	<i>64</i>	<i>0.642</i>	<i>62</i>	<i>0.525</i>	<i>43</i>	<i>0.504</i>	<i>49</i>
<i>Improvement over LSC</i>	<i>0.474</i>	<i>54</i>	<i>0.499</i>	<i>47</i>	<i>0.358</i>	<i>28</i>	<i>0.389</i>	<i>38</i>
<i>Improvement over DSI</i>	<i>0.295</i>	<i>29</i>	<i>0.267</i>	<i>23</i>	<i>0.184</i>	<i>13</i>	<i>0.171</i>	<i>15</i>
<i>Improvement over Enhanced DSI</i>	<i>0.111</i>	<i>6</i>	<i>0.087</i>	<i>7</i>	<i>0.058</i>	<i>5</i>	<i>0.068</i>	<i>4</i>

Table 4-7. Summary of CALPUFF-Modeled Visibility Impacts from SO₂ Controls for Unit 2 (Across All Modeled Years, 2001-2003)

Scenario	CACR		UBPU		HERC		MING	
	98% Impact (Δdv)	# Days > 0.5 Δdv	98% Impact (Δdv)	# Days > 0.5 Δdv	98% Impact (Δdv)	# Days > 0.5 Δdv	98% Impact (Δdv)	# Days > 0.5 Δdv
Baseline	1.533	100	1.059	71	0.912	52	0.819	49
LSC	1.436	89	0.932	55	0.775	35	0.697	41
<i>Improvement over baseline</i>	<i>0.097</i>	<i>11</i>	<i>0.127</i>	<i>16</i>	<i>0.137</i>	<i>17</i>	<i>0.122</i>	<i>8</i>
DSI	1.259	66	0.700	31	0.609	19	0.486	18
<i>Improvement over baseline</i>	<i>0.274</i>	<i>34</i>	<i>0.359</i>	<i>40</i>	<i>0.303</i>	<i>33</i>	<i>0.333</i>	<i>31</i>
<i>Improvement over LSC</i>	<i>0.177</i>	<i>23</i>	<i>0.232</i>	<i>24</i>	<i>0.166</i>	<i>16</i>	<i>0.211</i>	<i>23</i>
Enhanced DSI	1.073	42	0.528	17	0.483	12	0.384	7
<i>Improvement over baseline</i>	<i>0.460</i>	<i>58</i>	<i>0.531</i>	<i>54</i>	<i>0.429</i>	<i>40</i>	<i>0.435</i>	<i>42</i>
<i>Improvement over LSC</i>	<i>0.363</i>	<i>47</i>	<i>0.404</i>	<i>38</i>	<i>0.292</i>	<i>23</i>	<i>0.313</i>	<i>34</i>
<i>Improvement over DSI</i>	<i>0.186</i>	<i>24</i>	<i>0.172</i>	<i>14</i>	<i>0.126</i>	<i>7</i>	<i>0.102</i>	<i>11</i>
SDA	0.959	37	0.427	12	0.426	8	0.318	3
<i>Improvement over baseline</i>	<i>0.574</i>	<i>63</i>	<i>0.632</i>	<i>59</i>	<i>0.486</i>	<i>44</i>	<i>0.501</i>	<i>46</i>
<i>Improvement over LSC</i>	<i>0.477</i>	<i>52</i>	<i>0.505</i>	<i>43</i>	<i>0.349</i>	<i>27</i>	<i>0.379</i>	<i>38</i>
<i>Improvement over DSI</i>	<i>0.300</i>	<i>29</i>	<i>0.273</i>	<i>19</i>	<i>0.183</i>	<i>11</i>	<i>0.168</i>	<i>15</i>
<i>Improvement over Enhanced DSI</i>	<i>0.114</i>	<i>5</i>	<i>0.101</i>	<i>5</i>	<i>0.057</i>	<i>4</i>	<i>0.066</i>	<i>4</i>

4.6 BART FOR SO₂ FOR UNIT 1 AND UNIT 2

Based on the costs of the control options listed above, BART for Unit 1 and Unit 2, when considering the updated RUL, would be an emission level of 0.6 lb/MMBtu based on the use of low-sulfur coal.

APPENDIX A. CONTROL COST INFORMATION

SO₂ CONTROL COST INFORMATION – LAST UPDATED AUGUST 2017

APPENDIX B. BASELINE VISIBILITY IMPAIRMENT BY POLLUTANT

Table B-8. Baseline Visibility Impairment Attributable to Unit 1 by Pollutant

Year	Maximum (Δv)	98th Percentile (Δv)	No. of Days with Δv ≥ 0.5	98th Percentile % SO₄	98th Percentile % NO₃	98th Percentile % PM₁₀	98th Percentile % NO₂
Caney Creek							
2001	2.912	1.505	38	74.33	25.34	0.17	0.15
2002	2.048	1.306	29	61.53	34.59	0.83	3.04
2003	4.020	1.053	32	47.92	50.35	0.35	1.39
Upper Buffalo							
2001	2.089	1.051	30	68.58	31.17	0.26	0.00
2002	1.438	0.742	15	79.11	20.19	0.37	0.32
2003	1.773	1.033	24	79.79	19.92	0.28	0.00
Hercules Glades							
2001	1.643	0.925	24	90.21	9.56	0.23	0.00
2002	1.184	0.567	10	74.20	25.45	0.25	0.10
2003	1.977	0.704	15	86.02	13.73	0.25	0.00
Mingo							
2001	1.538	0.802	16	51.46	48.03	0.39	0.12
2002	0.898	0.708	21	54.87	44.82	0.31	0.01
2003	1.003	0.666	14	57.31	41.18	0.41	1.11

Table B-9. Baseline Visibility Impairment Attributable to Unit 2 by Pollutant

Year	Maximum (Δv)	98th Percentile (Δv)	No. of Days with Δv ≥ 0.5	98th Percentile % SO₄	98th Percentile % NO₃	98th Percentile % PM₁₀	98th Percentile % NO₂
Caney Creek							
2001	2.994	1.533	39	36.23	60.75	0.74	2.28
2002	2.098	1.322	29	59.43	36.53	0.82	3.22
2003	4.084	1.059	32	96.37	3.38	0.24	0.01
Upper Buffalo							
2001	2.066	1.059	30	66.54	33.21	0.26	0.00
2002	1.447	0.739	16	77.57	21.71	0.37	0.35
2003	1.791	1.030	25	78.24	21.46	0.28	0.00
Hercules Glades							
2001	1.665	0.912	25	89.39	10.38	0.23	0.00
2002	1.185	0.568	11	72.38	27.26	0.25	0.11
2003	1.947	0.720	16	40.35	58.44	0.40	0.82
Mingo							
2001	1.580	0.819	15	81.62	17.93	0.33	0.12
2002	0.886	0.719	20	58.93	40.66	0.19	0.22
2003	0.999	0.678	14	55.08	43.36	0.40	1.17

APPENDIX C. REFINED PM SPECIATION CALCULATIONS

Exhibit F

**BEFORE THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY**

In re:)	EPA Docket No.
)	
Protection of Visibility: Amendments)	EPA-HQ-OAR-2015-0531
to Requirements for State Plans)	
)	

**Petition for Reconsideration of the Revisions to the Regional Haze Rule by Southwestern
Public Service Company, Entergy Services, Inc., and Cleco Power LLC**

Southwestern Public Service Company (“SPS”); Entergy Services, Inc., on behalf of Entergy Corporation and its subsidiaries (collectively, “Entergy”); and Cleco Power LLC (“Cleco”) (collectively, “Petitioners”) respectfully petition the U.S. Environmental Protection Agency (“EPA” or “Agency”) for reconsideration of the final rule entitled “*Protection of Visibility: Amendments to Requirements for State Plans*,” Docket No. EPA-HQ-OAR-2015-0531.¹ Specifically, Petitioners request that EPA eliminate (1) provisions codifying an interpretation of the relationship between reasonable progress goals and long-term strategies; and (2) provisions pertaining to the reasonably attributable visibility impairment (“RAVI”) program. These provisions contradict the Clean Air Act (“CAA” or “Act”) and EPA’s previous regulations and impose unnecessary and potentially staggering costs without achieving any corresponding visibility benefits. The Final Rule also improperly interferes with state authority to implement the Regional Haze Program, in direct violation of the cooperative federalism structure of the CAA. As was recently explained in a letter to Administrator Pruitt from the Attorneys General for 19 states, “the primary regulators of the environment are the States and local governments.”² EPA should reconsider and eliminate these provisions of the Final Rule to restore the proper balance of state and federal authority, as well as to make the Rule consistent with the CAA and prior EPA regulations and effectuate recent Executive Orders.

¹ 82 Fed. Reg. 3,078 (Jan. 10, 2017) (“Final Rule”).

² Letter to Hon. Scott Pruitt, Administrator, U.S. EPA, re: Request to reexamine delegation of certain environmental regulation authority to the States in accordance with the express terms of the Clean Air and Water Acts (Mar. 7, 2017).

I. INTRODUCTION

A. Description of Petitioners

The Petitioners are electric generating companies that own and/or operate power plants subject to the Regional Haze Program and are directly affected by the Final Rule.

SPS is a wholly owned subsidiary of Xcel Energy Inc., a utility holding company headquartered in Minneapolis, Minnesota. Xcel Energy Inc.'s operating companies own 75 generating facilities with approximately 16,744 megawatts of electric generating capacity and 20,053 miles of transmission lines, with SPS owning nine generating plants with approximately 4,446 megawatts of electric generating capacity and 6,839 miles of transmission lines. Xcel Energy Inc.'s operating companies, including SPS, serve approximately 3.5 million electricity customers across Colorado, Michigan, Minnesota, New Mexico, North Dakota, South Dakota, Texas and Wisconsin, with SPS serving approximately 388,000 electric customers in a 52,000 square mile area of the Texas Panhandle and eastern and southern New Mexico. Xcel Energy Inc. has approximately 12,000 employees.

Entergy is an integrated energy company engaged primarily in electric power production and retail distribution operations. Entergy owns and operates power plants with approximately 30,000 megawatts of electric generating capacity. Entergy delivers electricity to 2.8 million utility customers in Arkansas, Louisiana, Mississippi, and Texas and owns and operates wholesale electricity generating units in Massachusetts, Michigan, and New York. Entergy has more than 13,000 employees.

Cleco is a regulated utility company headquartered in Pineville, Louisiana. Cleco owns nine generating units with a total nameplate capacity of 3,310 megawatts, 11,931 miles of distribution lines and 1,305 miles of transmission lines. Cleco delivers electricity to approximately 287,000 customers in Louisiana through its retail business, and supplies wholesale power in Louisiana and Mississippi. Cleco is a wholly owned subsidiary of Cleco Corporate Holdings LLC, a utility holding company headquartered in Pineville, Louisiana. Cleco Corporate Holdings LLC has approximately 1,200 employees.

B. Background

Section 169A of the CAA establishes a national goal of preventing future visibility impairment (*i.e.*, “regional haze”) and remedying existing visibility impairment caused by manmade air pollution in certain national parks, wilderness areas, and monuments (collectively defined as “Class I areas”).³ To implement this goal, states must adopt State Implementation Plans (“SIPs”) for phased 10-year planning periods that (1) require certain major stationary sources to meet emission limits based on the installation of “best available retrofit technology”

³ 42 U.S.C. § 7491(a)(1).

“BART”),⁴ and (2) include a long-term strategy for the state to make “reasonable progress” towards the national goal of attaining natural visibility conditions by 2064.⁵ The long-term strategy consists of “such emission limits, schedules of compliance and other measures as may be necessary” for meeting reasonable progress goals.⁶

In setting a reasonable progress goal, the CAA requires states to consider four factors: “the costs of compliance, the time necessary for compliance, and the energy and nonair quality environmental impacts of compliance, and the remaining useful life of any existing source subject to such requirements.”⁷ EPA further specifies that the reasonable progress goal “must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.”⁸ EPA has explained that reasonable progress goals are “interim goals that represent incremental visibility improvement over time toward the goal of natural background conditions.”⁹

EPA took a two-phased approach in establishing the Regional Haze Program to satisfy the mandate of CAA Section 169A. In the first phase, EPA addressed impairment of visibility in Class I areas that was “reasonably attributable” to a specific source or smaller group of sources.¹⁰ This “reasonably attributable visibility impairment” (“RAVI”) program also addressed potential visibility impacts from new and modified major sources already subject to New Source Review permitting requirements.¹¹ In the second phase, beginning with EPA’s 1999 Regional Haze Rule,¹² EPA addressed regional haze in Class I areas through a regional planning approach. This second phase targets visibility impairment that is not reasonably attributable to a single source or small, defined group of sources, but instead is produced by emissions from a wide array of sources over a broad geographic area.

⁴ BART is defined as “an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction.” 40 C.F.R. § 51.301.

⁵ 42 U.S.C. § 7491(b)(2).

⁶ *Id.*

⁷ 42 U.S.C. § 7491(g)(1).

⁸ 40 C.F.R. § 51.308(d)(1).

⁹ U.S. EPA, Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program, at 1–2 (June 1, 2007) (“Reasonable Progress Guidance”), available at https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/20070601_wehrum_reasonable_progress_goals_reghaze.pdf.

¹⁰ *See* Visibility Protection for Federal Class I Areas (“RAVI Regulation”), 45 Fed. Reg. 80,084, 80,085–86 (Dec. 2, 1980); 40 C.F.R. § 51.300–307.

¹¹ *Id.*

¹² 64 Fed. Reg. 35,714, 35,731 (July 1, 1999). EPA revised the Regional Haze Rule in 2005. 70 Fed. Reg. 39,104 (July 6, 2005).

The Final Rule revises provisions of both the RAVI and Regional Haze Programs.¹³ According to EPA, the revisions remove older provisions that have been superseded by subsequent developments and clarify certain provisions to ensure consistent understanding of requirements as states prepare their Regional Haze SIPs for the second implementation period. Most notably, the Final Rule (1) “clarifies” the relationship between reasonable progress goals and long-term strategies; and (2) modifies and expands the RAVI program.

II. REQUEST FOR RECONSIDERATION

EPA should grant reconsideration because certain provisions of the Final Rule contradict the CAA and EPA’s previous regulations, undermine the principles of cooperative federalism, and impose excessive costs with no corresponding visibility benefits. Federal agencies have inherent authority to reconsider their past decisions and to revise, replace or repeal a decision to the extent permitted by law and supported by a reasoned explanation. *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009); *Motor Vehicle Mfrs. Ass’n of U.S. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 42 (1983).

Reconsideration of a rulemaking is “well within an agency’s discretion” when it is based “on a reevaluation of which policy would be better in light of the facts.” *Nat’l Ass’n of Home Builders v. EPA*, 682 F.3d 1032, 1038, 1042 (D.C. Cir. 2012) (citing *Fox*, 556 U.S. at 514-15). The agency need not demonstrate that the reasons for the new policy are better than the reasons for the old one; rather, “it suffices that the new policy is permissible under the statute, that there are good reasons for it, and that the agency believes it to be better.” *Fox*, 556 U.S. at 515 (emphasis omitted). A new Presidential Administration is a valid reason for conducting such a reevaluation of the best policy approach. *Motor Vehicle Mfrs. Ass’n*, 463 U.S. at 59 (1983) (Rehnquist, J., concurring in part and dissenting in part) (“A change in administration brought about by the people casting their votes is a perfectly reasonable basis for an executive agency’s reappraisal of the costs and benefits of its programs and regulations.”). EPA recently exercised this authority when announcing its intent to reconsider the Clean Water Rule.¹⁴

A. EPA Should Eliminate Provisions “Clarifying” the Relationship Between Long-Term Strategies and Reasonable Progress Goals.

The Final Rule revises certain regulatory provisions to “clarify the relationship between long-term strategies and reasonable progress goals.”¹⁵ These revisions include adding provisions (1) requiring states to select emission control measures for long-term strategies *before* calculating reasonable progress goals;¹⁶ and (2) providing that a state, when developing its long-term strategy and considering the time necessary for compliance, “may not reject a control measure because it cannot be installed or become operational until after the end of the

¹³ 40 C.F.R. Pts. 51-52.

¹⁴ 82 Fed. Reg. 12,532 (Mar. 6, 2017).

¹⁵ 82 Fed. Reg. at 3,078.

¹⁶ See 40 C.F.R. § 51.308(f)(2)(i).

implementation period.”¹⁷ These modifications should be eliminated because they undermine the CAA’s intent to achieve gradual and steady improvement in visibility in Class I areas over a 60-year period, as well as limit state authority and increase costs for affected sources without any corresponding visibility benefit.

1. The “Clarifications” Improperly Require Assessment of Reasonable Progress Controls *Before* States Set Reasonable Progress Goals.

EPA’s “clarification” turns the statutory scheme on its head by requiring states to identify reasonable progress controls to be included in long-term strategies before they establish their reasonable progress goals, contradicting both the CAA and the Agency’s own regulations. The CAA requires states to set reasonable progress goals by considering four factors: (1) the costs of compliance; (2) the time necessary for compliance; (3) the energy and nonair quality environmental impacts of compliance; and (4) the remaining useful life of any existing source subject to such requirements.¹⁸ The Act then permits states to impose emission reduction requirements in their long term strategies *only* to the extent *necessary* to achieve reasonable progress.¹⁹ Accordingly, Congress directed that states *first* set reasonable progress goals (considering the four statutory factors) and *second*, develop long-term strategies to achieve the reasonable progress goals. As EPA itself has explained, a state’s long-term strategy is inextricably linked to the reasonable progress goals because the long-term strategy “must include enforceable emission limitations, compliance schedules, and other measures *as necessary to achieve the reasonable progress goals....*”²⁰

The Final Rule effectively reverses this process, violating the statutory mandate that reasonable progress controls be imposed *as necessary* to meet reasonable progress goals. First, when developing long-term strategies, the Final Rule requires states to “evaluate and determine the emission reduction measures that are necessary to make reasonable progress by considering the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected anthropogenic source of visibility impairment.”²¹ Second, the Final Rule requires states to establish reasonable progress goals that reflect the visibility conditions projected to be achieved by the end of the applicable implementation period as a result of the emission reductions measures identified in the first step.²² Taken together, these new provisions require states to identify reasonable progress controls to include in their long-term strategies *before* establishing their reasonable progress goals.

¹⁷ 82 Fed. Reg. at 3,089; *see also* 40 C.F.R. § 51.308(f)(2)(i).

¹⁸ 42 U.S.C. § 7491(g)(1).

¹⁹ *See* 42 U.S.C. § 7491(b)(2) (long term strategies must “contain such emission limits ... *as may be necessary* to make reasonable progress”) (emphasis added).

²⁰ *See* 82 Fed. Reg. at 3,084 (quoting 40 C.F.R. § 51.308(d)(3)) (emphasis added).

²¹ 40 C.F.R. § 51.308(f)(2)(i).

²² *Id.* § 51.308(f)(3)(i).

Not only does this change in sequencing violate the CAA, EPA's new approach leads to the absurd result that states may be required to impose emission control requirements that *are not necessary* to make reasonable progress toward the national visibility goal. In other words, states may be forced to require controls where actual visibility in the Class I area already is better than the reasonable progress goals that would be established based on an evaluation of the four statutory factors. This is the case in Arkansas and Texas, where EPA applied this new sequencing in Federal Implementation Plans ("FIPs") for those states. In both cases, EPA imposed burdensome and expensive emission control requirements in long-term strategies even though visibility in both states already has surpassed EPA's final reasonable progress goals for the first planning period.²³ The outcome in Arkansas is particularly arbitrary, as the Class I areas in that state already have surpassed the uniform rate of progress ("URP"), or glidepath, for the planning period.²⁴

This is a plainly arbitrary outcome that far exceeds what the CAA envisions. Under the Act, a state may impose emission reduction requirements only to the extent *necessary* to achieve reasonable progress towards natural visibility levels.²⁵ But EPA's new approach requires individual source controls without assessing whether those controls are necessary to address visibility impairment. If an evaluation of the four statutory factors identifies control measures, the Final Rule *requires* that states establish reasonable progress goals based on the imposition of such control measures, regardless of whether the controls result in reasonable visibility improvements in a Class I area. As a result, because the reasonable progress goal assumes the installation of these control measures, states are effectively required to mandate that individual sources impose these controls.

The practical effect of this approach will give undue weight to the cost of compliance factor. In recent Regional Haze FIPs, which applied EPA's new interpretation even before EPA codified it in the Final Rule, EPA deemed a control to be "reasonable" for a state's long-term strategy if it is cost-effective. For example, in the Arkansas Regional Haze FIP, EPA required controls on Entergy's Independence Plant in part because EPA concluded that imposing controls on the plant would be cost-effective.²⁶ EPA gave no consideration to whether the controls and resulting emissions reductions would improve visibility in any Class I area and, in fact, recognized that controls would not be necessary for Arkansas Class I areas to meet their URPs.²⁷ This is problematic because it does not consider the costs in relation to visibility improvement,

²³ See Brief of Entergy, et al. at 34-35, *Arkansas v. EPA*, No. 16-4270 (8th Cir. Feb. 17, 2017); Brief of State of Arkansas at 34-38, *Arkansas v. EPA*, No. 16-4270 (8th Cir. Feb. 17, 2017); *Texas v. EPA*, 829 F.3d 405, 427 (5th Cir. 2016).

²⁴ See Brief of Entergy, et al. at 34-35, *Arkansas v. EPA*, No. 16-4270 (8th Cir. Feb. 17, 2017); Brief of State of Arkansas at 34-38, *Arkansas v. EPA*, No. 16-4270 (8th Cir. Feb. 17, 2017).

²⁵ See 42 U.S.C. § 7491(b)(2) (implementation plans must "contain such emission limits . . . as may be *necessary* to make reasonable progress") (emphasis added).

²⁶ See 80 Fed. Reg. 18,944, 18,991-92 (Apr. 8, 2015).

²⁷ See 80 Fed. Reg. at 18,992.

or lack thereof. Controls, regardless of their cost-effectiveness, should be required only when they are *necessary* for a state to achieve reasonable progress toward the national visibility goal.

Implementation of the new approach also will illegally proscribe states' authority in setting their reasonable progress goals and developing their long-term strategies. In effect, the Final Rule requires EPA to reject SIPs if the state determines that controls are unnecessary because they would achieve only minute visibility improvements. It also requires EPA to reject SIPs if the state decides not to evaluate any sources for reasonable progress controls because its Class I areas already are meeting or exceeding the URP; instead, states will be forced to select specific sources for evaluation of emission controls. Because such determinations are within the states' purview pursuant to the CAA, the Final Rule unlawfully takes authority away from the states and gives it to EPA. Such arrogation of authority violates the cooperative federalism principles underlying the CAA.²⁸ The Act limits EPA to a deferential role, under which the Agency must defer to states' determination of their reasonable progress goals so long as they comply with the Act.²⁹

2. The “Clarifications” Improperly Sever the Link Between Reasonable Progress Controls and Planning Periods.

The Final Rule severs the link between reasonable progress controls in a state's long-term strategy and the 10-year planning periods on which the Regional Haze Program is based. States' authority to consider planning periods when developing long-term strategies under the Final Rule is explicitly constrained. Specifically, the Final Rule modifies the Regional Haze regulations to explicitly provide that if a state, in selecting control measures for a long-term strategy, “concludes that a control measure cannot reasonably be installed and become operational until after the end of the implementation period, the State may not consider this fact in determining whether the measure is necessary to make reasonable progress.”³⁰ This revision means that states are required to impose reasonable progress controls without any nexus to an implementation period—that is, regardless of whether or not the control will help meet reasonable progress goals during the relevant 10-year planning period.

This directly conflicts with both the statute and the regulatory requirements in § 51.308. First, the Regional Haze regulations still require states to consider the relevant planning period when setting reasonable progress goals: when setting goals, states must consider “the [URP] and

²⁸ See 42 U.S.C. § 7401(a)(3); § 7407(a).

²⁹ *Texas v. EPA*, 829 F.3d 405, 428 (5th Cir. 2016) (citing 42 U.S.C. § 7410(k)(3) (EPA “shall approve” a state implementation plan that satisfies the requirements of the Act)); *Luminant Generation Co. v. EPA*, 675 F.3d 917, 921 (5th Cir. 2012) (“With regard to implementation, the Act confines the EPA to the ministerial function of reviewing SIPs for consistency with the Act’s requirements”); *Michigan v. EPA*, 268 F.3d 1075, 1083 (D.C. Cir. 2001) (“[T]he Act intended to create an overarching federal role in air pollution control policy, . . . but that overarching role is in setting standards, not in implementation.”).

³⁰ 40 C.F.R. § 51.308(f)(2)(i); see also 82 Fed. Reg. at 3,089 (a state “may not reject a control measure because it cannot be installed or become operational *until after the end of the implementation period.*”) (emphasis added).

the emission reduction measures needed to achieve it *for the period covered by the implementation plan.*”³¹ Second, § 51.308(d)(3) mandates that long-term strategies include measures “as necessary to achieve the reasonable progress goals.”³² The regulatory text further specifies that reasonable progress goals must consider the emission reduction measures needed to achieve the uniform rate of progress “for the period covered by the implementation plan.”³³ Even in the Final Rule, EPA itself emphasized that the reasonable progress goals do not include emission reductions that would occur only *after* the end of the relevant planning period.³⁴ It is simply illogical, then, that a control measure that could not be implemented until after the planning period would nonetheless be deemed necessary to achieve reasonable progress for that same period.

EPA should not require states to evaluate and impose control measures that are completely divorced from the planning period at issue. This undermines the purpose of the 10-year planning period. Planning periods are mandated by the statute,³⁵ and indicate Congress’s intent to establish a program that takes a gradual approach toward the national goal of eliminating visibility impairment. EPA itself observed this when first promulgating the Regional Haze Rule, providing the states with 60 years to reach natural visibility conditions at Class I areas because, in the long term, facilities built in the latter part of the 20th century will retire and/or be replaced by more fuel-efficient facilities, and innovations in emissions control technologies and renewable energy will allow new plants to meet lower emissions rates.³⁶ EPA also has explained that states “should take into account the fact that the long-term goal of no manmade impairment encompasses several planning periods. It is reasonable for [the state] to defer reductions to later planning periods in order to maintain a consistent glidepath toward the long-term goal.”³⁷

EPA’s approach in the Final Rule contradicts this statutory and regulatory scheme and will force states to mandate emissions controls even if it would be reasonable to defer them to later planning periods.. It also imposes unnecessary costs on regulated sources, which may be required to install costly new control measures without any corresponding benefit in visibility improvement that would help achieve reasonable progress during the relevant planning period.

³¹ 40 C.F.R. § 51.308(d)(1)(i)(B) (emphasis added). This requirement existed in the prior version of the regulation. *See* 40 C.F.R. § 51.308(d)(1)(i)(B) (2012). The Final Rule did not modify this requirement. *See* 40 C.F.R. § 51.308(d)(1)(i)(B) (2017); *see also* 82 Fed. Reg. at 3,089.

³² 40 C.F.R. § 51.308(d)(3).

³³ 40 C.F.R. § 51.308(d)(1)(i)(B).

³⁴ 82 Fed. Reg. at 3,089 (“Of course, any emission reductions that will not occur until after the end of the implementation period should not be reflected in the [reasonable progress goals].”).

³⁵ 42 U.S.C. § 7491(b)(2)(B).

³⁶ 64 Fed. Reg. at 35,732.

³⁷ Reasonable Progress Guidance at 1-4.

B. EPA Should Eliminate the RAVI Program, Which Is Unnecessary and Impedes State Authority.

EPA should eliminate the outdated RAVI program from the Regional Haze regulations because it serves no purpose in light of the subsequent implementation of the Regional Haze Program and because it unlawfully intrudes upon states' authority under the CAA. In the Final Rule, EPA not only retained the RAVI program but expanded the program's scope to (1) include all states for the first time;³⁸ (2) allow federal land managers ("FLMs") to certify RAVI in states where the source or sources are located, even if that state does not contain the Class I area where the visibility impairment occurred;³⁹ and (3) cover both BART-eligible and non-BART-eligible sources.⁴⁰ The Final Rule also alters the federal-state relationship by (1) giving FLMs authority to identify (as opposed to suggest) the source or small group of sources responsible for RAVI, thereby triggering mandatory requirements for the state, including the requirement to submit a SIP revision,⁴¹ and (2) revising the definition of "reasonably attributable" to "make clear that a state does not have complete discretion to determine what techniques are appropriate for attributing visibility impairment to specific sources."⁴²

As noted above, EPA took a two-phased approach in establishing the Regional Haze Program. In the first phase, EPA established the RAVI program to address impairment of visibility in Class I areas that was "reasonably attributable" to a specific source or smaller group of sources.⁴³ The RAVI regulations sought to address "plume blight," which is "smoke, dust, colored gas plumes, or layered haze emitted from stacks which obscure the sky or horizon and are relatable to a single source or a small group of sources."⁴⁴ EPA "explicitly deferred action on regional haze," defined as "visibility-impairing pollution that is caused by the emission of air pollutants *from numerous sources located over a wide geographic area.*"⁴⁵ In the second phase, EPA addressed regional haze in Class I areas through a regional planning approach with the promulgation of the Regional Haze Rule. This second phase targets visibility impairment that is not reasonably attributable to a single source or small, defined group of sources, but instead is

³⁸ 82 Fed. Reg. at 3,112; 40 C.F.R. § 51.300.

³⁹ See 40 C.F.R. § 51.302.

⁴⁰ See 82 Fed. Reg. at 3,112-13; see also 40 C.F.R. § 51.302(a)-(c). Under the revised RAVI program, a state must revise its Regional Haze SIP to include a reasonable progress control determination for a particular source or small group of sources upon receipt of a RAVI certification of impairment, regardless of whether or not the source is BART-eligible. See 40 C.F.R. § 51.302(b).

⁴¹ See 40 C.F.R. § 51.302(a)-(c).

⁴² 82 Fed. Reg. at 3,112; 40 C.F.R. § 51.301.

⁴³ See RAVI Regulation, 45 Fed. Reg. 80,084, 80,085-86 (Dec. 2, 1980); 40 C.F.R. § 51.300-307.

⁴⁴ RAVI Regulation, 45 Fed. Reg. at 80,085.

⁴⁵ U.S. EPA, 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, at 5-6 (July 2016) (emphasis added) Docket No. EPA-HQ-OAR-2016-0289-0020.

produced by emissions from a wide array of sources over a broad geographic area. This expanded the scope of visibility improvement requirements to many more sources.

The Regional Haze Program has, by design, subsumed the RAVI program and rendered it unnecessary. RAVI was designed as a placeholder until techniques for assessing regional haze, particularly from multiple sources, improved sufficiently for EPA to establish a comprehensive program. EPA established this comprehensive program in the 1999 Regional Haze Rule which “fulfill[ed] EPA’s responsibility under section 169A, pending since 1980, to put in place a national regulatory program that addresses *both* reasonably attributable *and* regional haze visibility impairment.”⁴⁶ Specifically, the evaluation of sources for reasonable progress controls under the Regional Haze Program will capture sources that otherwise might be targeted by RAVI.

Instead of eliminating the RAVI program in recognition of the fact that it is unnecessary in light of the Regional Haze Program, the Final Rule expands the RAVI program beyond its original intent, thereby increasing its redundancy with the Regional Haze Program. *First*, EPA’s assertion that RAVI is applicable to any source, even if it is not BART-eligible,⁴⁷ goes against EPA’s own regulations and guidance, which state that RAVI is focused on BART-eligible sources.⁴⁸ The Final Rule also suggests that an FLM certification of RAVI would reopen the BART determination process for sources that already were eliminated from BART requirements because their emissions were not determined to be causing or contributing to visibility impairment in any Class I area. This makes no sense. If a source was deemed not subject to BART because it is not causing or contributing to visibility impairment, the FLM certification would necessarily be for *imperceptible* visibility impairment and not the visibility impairment intended to be addressed by the RAVI program. Further, the reasonable progress analysis under the Regional Haze Program already provides an avenue to address non-BART sources. The new RAVI provisions simply provide a mechanism by which the federal government can supplant state determinations on how to address these sources.

Second, the Final Rule’s requirement for FLMs to issue RAVI certifications to states *outside* of the state with the affected Class I area⁴⁹ effectively alters the RAVI program from one that addresses *intrastate* haze from a source or small group of sources to one addressing *interstate* haze from regional sources. Rather than streamlining the RAVI and Regional Haze programs, this change increases the overlap between the two programs. It also is unnecessary

⁴⁶ 64 Fed. Reg. at 35,717 (emphasis added).

⁴⁷ 82 Fed. Reg. at 3,115.

⁴⁸ See U.S. EPA, Additional Regional Haze Questions, at 16-17 (Sept. 27, 2006) Docket No. EPA-HQ-OAR-2016-0289-0014; U.S. EPA, Guidelines for Determining Best Available Retrofit Technology for Coal-Fired Power Plants and Other Existing Stationary Facilities, at 3-6, 6 (Nov. 1980) EPA-450/3-80-009b (“Once the impact of the existing stationary facility on visibility is identified as being reasonably attributable to that source, the State must conduct an analysis to determine BART for that particular existing stationary facility.”).

⁴⁹ See 40 C.F.R. § 51.302.

because the Regional Haze Program already establishes a comprehensive program for addressing haze from sources outside of a state in which an affected Class I area is located.

Third, EPA suggests that RAVI certifications could be based on modeling alone.⁵⁰ Modeled visibility impairment is not what the RAVI program was designed to address and makes the RAVI program even more duplicative of the Regional Haze Program. Modeling that simulates an event that might occur is far from the “visual observation” called for in the original definition of “reasonably attributable.”⁵¹ It also strays far from the original intent of RAVI to address plume blight. Modeling would not demonstrate any “smoke,” “dust,” “colored gas plumes,” or “layered haze,” or whether such events “obscure the sky or horizon.”⁵² Instead, the use of modeling would make RAVI indistinguishable from how states are directed to determine whether sources are causing or contributing to regional haze.

Finally, the revised RAVI program improperly alters the federal-state relationship. In developing a “cooperative federalism” framework under the CAA, Congress purposely limited the federal government’s authority by creating a statute in which “air pollution prevention . . . and air pollution control . . . is the primary responsibility of States and local governments.”⁵³ The Final Rule undermines this intent. For instance, the revisions giving FLMs the authority to identify (as opposed to merely suggest, as under the prior regulation) the source or small group of sources responsible for RAVI shifts discretion and authority from states to FLMs.⁵⁴ While FLMs may be able to identify RAVI, they have no particular expertise in identifying which sources are causing RAVI. States are more appropriate authorities for this identification.

EPA should eliminate the RAVI provisions from its regulations. There are no sources evading the Regional Haze Program that warrant retaining the RAVI program as a backstop. It makes no sense to continue to impose RAVI when reasonable progress planning addresses emissions from sources that would have been subject to RAVI and imposes controls for visibility impairment far below what would warrant controls under RAVI. It also is not necessary to preserve the RAVI program to provide FLMs the ability to work with states or EPA to address visibility concerns given that the Regional Haze Program has existing mechanisms for engaging with FLMs in developing implementation plans. In light of this redundancy, the RAVI

⁵⁰ 82 Fed. Reg. at 3,113 (explaining changes to definition of “reasonably attributable” in 40 C.F.R. § 51.301). In the RAVI regulations, EPA made it clear that RAVI certifications were to be based on *observed* visibility impairment (in evaluating FLM certification, the state needs to review the specific documentation of visibility conditions contained in the certification, which “should include information regarding the type of impairment (*i.e.*, coherent plume or layered haze)[,] the location of both the observer and the observed impairment, the meteorological conditions when the impairment was observed, and the time(s) of day or year of occurrence.”). 52 Fed. Reg. 7802, 7804 (Mar. 12, 1987).

⁵¹ See 40 C.F.R. § 51.301.

⁵² See RAVI Regulation, 45 Fed. Reg. at 80,085.

⁵³ 42 U.S.C. § 7401(a)(3); see also 42 U.S.C. § 7407(a) (“Each State shall have the primary responsibility for assuring air quality within the entire geographic area comprising such State”); see also *Texas v. EPA*, 829 F.3d at 411 (EPA’s role in reviewing SIPs is “ministerial”).

⁵⁴ See 40 C.F.R. § 51.302(a)-(c).

program's costs cannot justify its benefits. Further, the obligation for states to develop SIP revisions in response to a RAVI certification could strain states' limited resources.

C. Reconsideration Is Appropriate in Light of Recent Executive Orders.

EPA should grant reconsideration of the Final Rule in light of recent executive orders directing federal agencies to reduce regulatory costs and/or eliminate or modify regulations that impose unnecessary costs or burdens. Specifically, President Trump issued an executive order on January 30, 2017, entitled "*Reducing Regulation and Controlling Costs*,"⁵⁵ which sets a "zero sum" cost requirement for new regulations, under which the total incremental cost of all new regulations to be finalized in fiscal year 2017 shall be "no greater than zero," unless otherwise required by law or directed by the White House Office of Management and Budget.⁵⁶ The Order requires agencies to offset "any new incremental costs associated with new regulations . . . by the elimination of existing costs associated with at least two prior regulations."⁵⁷ President Trump issued another executive order on February 24, 2017, entitled "*Enforcing the Regulatory Reform Agenda*,"⁵⁸ that directs agencies to establish Regulatory Reform Task Forces to evaluate existing regulations and recommend any which should be repealed, replaced, or modified, including those that (i) eliminate jobs or inhibit job creation; (ii) are outdated, unnecessary, or ineffective, or (iii) impose costs that exceed benefits.⁵⁹

As discussed in this Petition, certain provisions of the Final Rule impose unnecessary costs and burdens. Specifically, EPA's new interpretation of "reasonable progress" requires states to impose controls on sources, even when such controls are unnecessary to achieve reasonable progress during the planning period covered by the SIP. In states where the URP or reasonable progress goals already have been attained without reasonable progress controls, no additional "benefit" in light of the purposes of the Regional Haze Program can be gained through the imposition of such controls. Additionally, the RAVI program adds redundant and potentially costly requirements to the already comprehensive Regional Haze Program. EPA should eliminate those portions of the Final Rule that impose costs with no benefits and all of the RAVI program provisions to further the Agency's efforts to effectuate these Executive Orders. Repealing these provisions also would assist EPA in complying with the One In, Two Out Order, because eliminating program costs will help the Agency offset new mandatory environmental regulations.

⁵⁵ Exec. Order No. 13,771, 82 Fed. Reg. 9,339 (Jan 30, 2017) ("One In, Two Out Order").

⁵⁶ *Id.* at § (2)(b).

⁵⁷ *Id.* at § (2)(c).

⁵⁸ Exec. Order No. 13,777, 82 Fed. Reg. 12,285 (Feb. 24, 2017) ("Regulatory Reform Task Force Order").

⁵⁹ *Id.* at § (3)(d).

III. CONCLUSION

For the reasons discussed above, Petitioners urge EPA to reconsider certain provisions of the Final Rule.

Dated: March 13, 2017

Respectfully submitted,



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(202) 639-7700

*Counsel for Southwestern Public
Service Company, Entergy Services,
Inc., and Cleco Power LLC*

Exhibit G



E. SCOTT PRUITT
ADMINISTRATOR

January 17, 2018

Ms. Debra J. Jezouit
Ms. Allison Watkins Mallick
Counsel for Southwestern Public Service Company,
Entergy Services Inc. and Cleco Power LLC
Baker Botts L.L.P.
1299 Pennsylvania Avenue, NW
Washington, D.C. 20004

Re: Petition for Reconsideration by Southwestern Public Service Company, Entergy Services Inc. and Cleco Power LLC of the final rule titled *Protection of Visibility: Amendments to Requirements for State Plans*, 82 FR 3078, published on January 10, 2017

Dear Ms. Jezouit and Ms. Mallick:

The U.S. Environmental Protection Agency has reviewed the petitions for reconsideration of the final rule titled *Protection of Visibility: Amendments to Requirements for State Plans* published at 82 FR 3078 (January 10, 2017), including the petition submitted by Southwestern Public Service Company, Entergy Services Inc. and Cleco Power LLC. The EPA is not at this time acting on the petitions for reconsideration. We have, however, considered the issues therein and decided to revisit aspects of the 2017 Regional Haze Rule under our inherent rulemaking authority.¹ We intend to commence a notice-and-comment rulemaking in which we will address portions of the rule, including but not limited to the Reasonably Attributable Visibility Impairment provisions, the provisions regarding Federal Land Manager consultation and any other elements of the rule we may identify for additional consideration. Furthermore, we plan to finalize one or more EPA guidance documents for regional haze State Implementation Plan revisions due in 2021. Such guidance may also address some or all of the issues raised in the petitions for reconsideration.

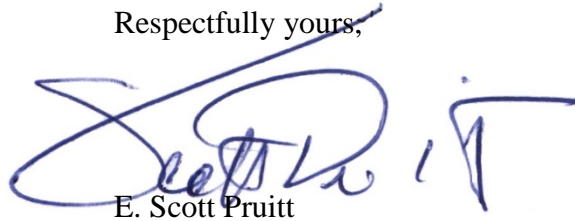
We intend to prepare a notice of proposed rulemaking that will provide Southwestern Public Service Company, Entergy Services Inc., Cleco Power LLC and the public an opportunity to comment on the issues identified above, as well as any other aspects of the rule we believe will

¹ *Trujillo v. Gen. Elec. Co.*, 621 F.2d 1084, 1086 (10th Cir. 1980) (“Administrative Agencies have an inherent authority to reconsider their own decisions, since the power to decide in the first instance carries with it the power to reconsider.”); see also *United Gas Improvement Co. v. Callery Properties Inc.*, 382 U.S. 223, 229 (1965); *Mazaleski v. Treusdell*, 562 F.2d 701, 720 (D.C. Cir. 1977).

benefit from further public input. We appreciate your input and your interest in this matter. The decision to revisit the rule is not a determination on the merits of the issues raised in the above-captioned petition for reconsideration.

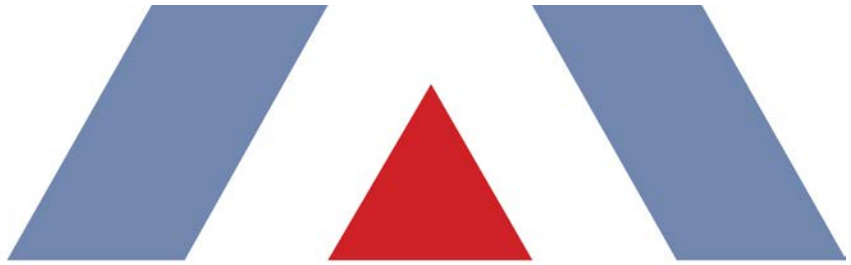
If you have any questions regarding this action, please contact Amanda M. Gunasekara in the Office of Air and Radiation at (202) 564-7404 or gunasekara.mandy@epa.gov.

Respectfully yours,

A handwritten signature in blue ink, appearing to read "Scott Pruitt", is written over the typed name. The signature is stylized with large loops and a long horizontal stroke at the end.

E. Scott Pruitt

Exhibit H



Entergy Services, Inc., on behalf of Entergy Arkansas, Inc.
Independence Steam Electric Station
Newark, Arkansas (AFIN 32-00042)



CALPUFF Modeling for Low-Sulfur Coal Scenario

Submitted to:

Arkansas Department of Environmental Quality (ADEQ)
Office of Air Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Prepared By:

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January 3, 2018

Trinity Project 173702.0014



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1. EXECUTIVE SUMMARY

This report is provided to address information related to visibility impacts attributable to the use of low-sulfur coal at the Independence Steam Electric Station (Independence) that is missing from the Arkansas Department of Environmental Quality's October 2017 SIP proposal. It is important for the ADEQ to consider visibility modeling results for all "control" scenarios, including the use of low sulfur coal. Entergy Arkansas, Inc. (EAI) and Trinity Consultants (Trinity) want to ensure that the use of low sulfur coal as a "control" scenario is not viewed as resulting in no visibility improvement.

This brief report presents the modeling inputs, methodologies, and results related to the Independence low-sulfur coal scenario. As documented in this report, using low-sulfur coal at Independence Units 1 and 2 is predicted to achieve five (5) to 15 percent improvement in visibility at the two Class I areas in Arkansas and the two Class I areas in Missouri.

2. BACKGROUND

Information regarding modeled visibility improvement due to the use of low-sulfur coal (LSC) at the Entergy Arkansas, Inc. (EAI) Independence Steam Electric Station (Independence) is missing from the October 2017 State of Arkansas *Revisions to the Arkansas State Implementation Plan – Regional Haze SIP Revision for 2008-2018 Planning Period* (the proposed SIP).¹ The SIP, at paragraph V.C.6, states: “Because Entergy Independence frequently achieves less than or equal to the 0.6 lb/MMBtu emission rate associated with LSC, **ADEQ has not modeled visibility impacts for the LSC scenario**” (emphasis added). As described in comments filed by EAI on the proposed SIP, the premise of ADEQ’s statement – that low-sulfur coal is currently being used at Independence that would allow the units to meet an emission rate of 0.6 lb/MMBtu – is flawed. Therefore, EAI and Trinity Consultants (Trinity) are providing this report, which shows the modeled visibility improvement for the LSC scenario, for ADEQ’s consideration.

¹ State of Arkansas Revisions to the Arkansas State Implementation Plan – Regional Haze SIP Revision for 2008-2018 Planning Period, Arkansas Department of Environmental Quality, Office of Air Quality, Policy and Planning Branch, October 2017. (<https://www.adeq.state.ar.us/air/planning/sip/pdfs/regional-haze/public-review-package.pdf>, accessed on December 20, 2017)

3. MODELING INPUTS AND METHODOLOGY

3.1. MODELING METHODOLOGY

Except where specifically updated as described in this report, Trinity conducted the CALPUFF² modeling for Independence using the same protocol, methodologies, and inputs used for EAI's White Bluff Five Factor Analyses submitted on October 15, 2013, and revised on August 18, 2017. This CALPUFF modeling differs from the modeling conducted by EPA in support of the Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas (the "proposed FIP")³ in several ways, as summarized below:

- EAI and Trinity determined that EPA's modeled location of Independence was incorrect – off by approximately 110 kilometers (km) in the CALPUFF/CALMET-required Lambert Conformal Conic (LCC) map projection. The modeling presented in this report accurately represents the location of the Independence units.
- Because of the location error, EPA's modeling also used incorrect base elevations. The modeling presented in this report corrects this error.
- The modeling presented in this report followed the Arkansas Best Available Retrofit Technology ("BART")⁴ Modeling Protocol for the following parameters instead of the CALPUFF-default values:
 - Wet deposition liquid precipitation scavenging coefficient for SO₂: The ADEQ BART Modeling Protocol Table G-12 lists 3.21E-05 s⁻¹ as both the default and the selected value.⁵ The default in the CALPUFF manual is 3.0E-05 s⁻¹, which is the value utilized by EPA.⁶
 - Monthly ozone values used to fill in missing data: ADEQ BART Modeling Protocol Table G-13 lists 80 ppb as the default and 40 ppb as the selected value. The default in the CALPUFF manual is 80 ppb, which is the value utilized by EPA.

3.2. MODELED SCENARIOS AND EMISSION RATES

To determine the visibility impact, in delta deciviews (Δdv), of a control device using CALPUFF modeling, two modeling scenarios are needed: a baseline scenario and a control scenario. In this case, the control scenario will represent the use of low-sulfur coal (LSC).

² Trinity and EAI assert that CALPUFF is not the most appropriate model for estimating visibility impacts. Due to its numerous inherent limitations (e.g., limited chemistry mechanism, distance limitations, blanket background ammonia values, etc.), CALPUFF does not yield reliable results. Furthermore, CALPUFF is no longer an EPA-preferred model, which further indicates CALPUFF's unreliability. More advanced models like the Comprehensive Air Quality Model with Extensions (CAMx)—if processed appropriately—can yield more reliable characterizations of visibility impairment. Nevertheless (without waiver), CALPUFF modeling is used for the purpose of this report. CAMx modeling could not be completed within the comment period for the proposed SIP.

³ 80 FR 18,944, Proposed Federal Implementation Plan to address certain regional haze and visibility transport requirements for the State of Arkansas (April 8, 2015).

⁴ Independence is not subject to BART requirements or BART-related modeling guidance. Rather, this guidance was used for consistency with the contemporaneous BART modeling (e.g., for White Bluff).

⁵ Draft Best Available Retrofit Technology (BART) Modeling Protocol, ADEQ. June 7, 2006. Prepared by: Mary Pettyjohn, Senior Epidemiologist.

⁶ A User's Guide for the CALPUFF Dispersion Model (Version 5). January 2000. Prepared by: Earth Tech, Inc.

The modeled baseline emission rates for each unit are based on the maximum daily average emission rates during 2011-2013. The modeled nitrogen oxides (NO_x) and sulfur dioxide (SO₂) emission rates for Unit 1 and Unit 2 are from the data available in the Clean Air Markets Database (CAMD). The modeled particulate matter⁷ (PM₁₀) emission rates for Unit 1 and Unit 2 are based on emission factors from AP-42 for filterable PM₁₀ and condensable PM (with a 99.5 percent control efficiency for ESP applied to the PM₁₀ filterable fraction) used in conjunction with the average 2011-2013 coal heating value and ash content (as a percentage of mass).⁸ The PM₁₀ emission estimate was broken down into specific PM₁₀ species – filterable coarse particulate matter (PM_c), filterable fine particulate matter (PM_f), elemental carbon (EC), inorganic condensable particulate matter (IOR CPM) as sulfates (SO₄), and organic condensable particulate matter (OR CPM), also referred to as secondary organic aerosols (SOA) – using the National Park Service (NPS) “speciation spreadsheet” for *Dry Bottom Boiler Burning Pulverized Coal using only ESP*.⁹ The emission rates for Unit 5 are estimates based on maximum daily heat input from 2011-2013 and emission factors from AP-42 for Fuel Oil Combustion.¹⁰ The PM₁₀ emission estimate was broken down into specific PM₁₀ species using the NPS “speciation spreadsheet” for *Uncontrolled Utility Residual Oil Boilers*¹¹. Table 3-1 summarizes the baseline scenario emission rates that were modeled for SO₂, NO_x, and the speciated PM₁₀ emissions.

Table 3-1. Baseline Maximum 24-hour Emission Rates (As Hourly Equivalents)

Unit	SO₂ (lb/hr)	NO_x (lb/hr)	SO₄ (lb/hr)	PM_c (lb/hr)	PM_f (lb/hr)	SOA (lb/hr)	EC (lb/hr)
1	6,095.2	3,164.7	35.8	40.2	30.9	8.9	1.2
2	6,669.4	2,478.8	35.8	40.2	30.9	8.9	1.2
5	2.4	28.5	1.3	0.6	1.6	0.2	0.1

⁷ For modeling purposes, particulate matter is the portion of total PM that has an aerodynamic diameter of 10 microns or less, i.e., PM₁₀.

⁸ AP-42, Chapter 1 External Combustion Sources, Section 1.1 Bituminous and Subbituminous Coal Combustion, Table 1.1-5, page 1.1-24 (September 1998).

⁹ The baseline speciation is based on the NPS Workbook for a Dry Bottom Boiler burning Pulverized Coal using an ESP. Based on average 2011-2013 values, the following input values were used: heating value of 8,498.33 Btu/lb, 0.26% sulfur, 5.09% ash, 8,700 MMBtu/hr heat input, and a baseline total PM₁₀ emission rate of 117.0 lb/hr for both ISES Unit 1 and Unit 2. NPS: <http://www.nature.nps.gov/air/Permits/ect/index.cfm>.

¹⁰ AP-42, Chapter 1 External Combustion Sources, Section 1.3 Fuel Oil Combustion, Table 1.3-1 and Table 1.3-2, pages 1.3-12 and 1.3-13, respectively (May 2010).

¹¹ The baseline speciation is based on the NPS Workbook for an Uncontrolled Utility Residual Oil Boiler. Based on average 2009-2011 values, the following input values were used: No 2. Fuel oil with a sulfur content of 0.01%, a heating value of 138,136 Btu/gal, a heat input of 183 MMBtu/hr, and a baseline total PM₁₀ emission rate of 3.9 lb/hr for ISES Unit 5. NPS: <http://www.nature.nps.gov/air/Permits/ect/index.cfm>.

Emission rates for the LSC scenario are the same as the baseline scenario except for the SO₂ emission rates for Units 1 and 2, which are calculated as the nominal maximum heat input capacity for each unit times the emission factor representing LSC, i.e., 8,700 million British thermal units per hour (MMBtu/hr) * 0.60 pounds of SO₂ per MMBtu (lb/MMBtu).

Table 3-2. LSC-Scenario Maximum 24-hour Emission Rates (As Hourly Equivalent)

Unit	SO₂ (lb/hr)	NO_x (lb/hr)	SO₄ (lb/hr)	PM_c (lb/hr)	PM_f (lb/hr)	SOA (lb/hr)	EC (lb/hr)
1	5,220	3,164.7	35.8	40.2	30.9	8.9	1.2
2	5,220	2,478.8	35.8	40.2	30.9	8.9	1.2
5	2.4	28.5	1.3	0.6	1.6	0.2	0.1

4. MODELING RESULTS

Trinity conducted modeling to estimate the predicted visibility impairment attributable to Independence in four Class I Areas: Caney Creek Wilderness (CACR), Upper Buffalo Wilderness (UPBU), Hercules Glades Wilderness (HEGL), and Mingo Wilderness (MING) using the CALPUFF dispersion model. Table 4-1 provides a summary of the modeled baseline scenario visibility impairment, using the 98th percentile metric, attributable to Independence based on the emission rates shown in Table 3-1.

Table 4-1. Baseline Visibility Impairment

Year ^A	CACR	UPBU	HEGL	MING
	98 th Percentile (Δ dv)	98 th Percentile (Δ dv)	98 th Percentile (Δ dv)	98 th Percentile (Δ dv)
2001	2.151	1.698	1.803	1.906
2002	1.542	2.089	1.624	1.295
2003	1.864	2.071	1.889	1.354
Max.	2.151	2.089	1.889	1.906

^A Meteorological data year modeled

Table 4-2 provides a summary of the modeled LSC scenario visibility impairment, using the 98th percentile metric, attributable to Independence based on the emission rates shown in Table 3-2.

Table 4-2. LSC Scenario Visibility Impairment

Year ^A	CACR	UPBU	HEGL	MING
	98 th Percentile (Δ dv)	98 th Percentile (Δ dv)	98 th Percentile (Δ dv)	98 th Percentile (Δ dv)
2001	2.039	1.427	1.551	1.635
2002	1.357	1.787	1.433	1.113
2003	1.690	1.782	1.653	1.193
Max.	2.039	1.787	1.653	1.635

^A Meteorological data year modeled

Table 4-3 presents the differences between the maximum results of the two scenarios, which are the amounts of visibility improvement attributable to using LSC at Independence Units 1 and 2. These values reflect five (5) to 15 percent improvement over the baseline results.

Table 4-3. Visibility Improvement Attributable to LSC Scenario

Difference Between Baseline and LSC Scenario of Maximum 98th Percentile Δv Values			
CACR	UPBU	HEGL	MING
0.112	0.302	0.236	0.271

Exhibit I



Entergy Services, Inc., on behalf of Entergy Arkansas, Inc.



Supplemental Information
Analysis of Reasonable Progress
Arkansas Regional Haze Program
First Planning Period

Submitted to:

Arkansas Department of Environmental Quality (ADEQ)
Office of Air Quality
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February 2, 2018

Trinity Project 183702.0022



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1. INTRODUCTION

This report provides an update to the monitoring information originally provided by Entergy Arkansas, Inc. (EAI) and Trinity Consultants (Trinity) on August 7, 2015,¹ which was updated on November 15, 2016,² and September 27, 2017³. As of the September 27, 2017 update, only data for the first half of 2016 was available. Raw monitoring (“observed”) data for all months of 2016 are now available and are summarized herein. This report provide supplemental information only. The previous reports should be reviewed for explanations of how the raw data was summarized, how the deciview metric is calculated, and other background information.

Additionally, this report provides site-specific control cost estimates developed by Sargent & Lundy (S&L) for the Independence Steam Electric Station (Independence). These costs can be compared to the cost values developed by EPA for the FIP, the costs used by ADEQ for the SIP, and the costs that were presented – revised to reflect a 9-year equipment life – in the September 27, 2017 report.

¹ Trinity Consultants, *Regional Haze Modeling Assessment Report – Entergy Arkansas, Inc. – Independence Plant* (August 7, 2015) (Trinity Project No. 154401.0074), submitted as an Exhibit C to Entergy Arkansas, Inc.’s *Comments On the Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas*.

² Trinity Consultants, *Assessment of Recent Class I Area IMPROVE Monitoring Data* (November 15, 2016) (Trinity Project No. 163701.0059).

³ Trinity Consultants, *Analysis of Reasonable Progress - Arkansas Regional Haze Program - First Planning Period* (September 27, 2017) (Trinity Project No. 173702.0014).

2. UPDATED IMPROVE MONITORING DATA

The most recent summary of annual monitoring data available from IMPROVE for CACR and UPBU has been completed through the year 2015. As of the date of this report, non-summarized data through December 31, 2016, is available and can be used to calculate the light extinction coefficients and haze indices for 2016. Trinity obtained the non-summarized data and compiled an independent summary for 2016. The species-specific and total light extinction and haze index values for the averages of the 20 percent worst days⁴ and the 20 percent best days for 2016 are shown in Table 2-1.

Table 2-1. Independent Summary of Monitoring Data for 2016

Light Extinction Value (Mm ⁻¹)	20 Percent Worst Days Average		20 Percent Best Days Average	
	CACR	UPBU	CACR	UPBU
Sulfate	31.32	31.42	5.64	5.99
Nitrate	14.15	17.25	0.98	1.21
Organics	17.18	16.74	2.59	2.64
Carbon	3.11	3.38	0.41	0.44
Soil	2.64	2.34	0.11	0.11
Coarse PM	6.17	6.41	1.31	1.39
Sea Salt	1.07	0.76	0.08	0.07
Total Light Extinction (Mm ⁻¹)	70.08	70.12	25.31	26.32
Haze Index (dv)	19.35	19.33	9.07	9.56

Table 2-2 presents a summary of the annual-average haze index values for each year from 2002 to 2016.

⁴ The revised Regional Haze Rule published on January 10, 2017, changed the definition of the “most impaired days” but is only applicable to the second and subsequent planning periods. Accordingly, this report uses the definition of the most impaired days that is applicable to the first planning period.

Table 2-2. Summary of Annual Average Haze Index Values from 2002 through 2016

Year	20 Percent Worst Days Average		20 Percent Best Days Average	
	CACR	UPBU	CACR	UPBU
2002	27.21	26.74	11.88	12.83
2003	26.54	27.22	10.74	10.62
2004	25.34	25.58	11.11	10.74
2005	29.21	30.47	12.93	13.34
2006	25.68	25.42	12.51	13.00
2007	-- ^A	26.17	-- ^A	12.45
2008	23.70	24.60	9.24	10.49
2009	22.68	22.62	8.09	9.40
2010	22.94	-- ^A	10.76	-- ^A
2011	22.67	23.21	11.71	11.51
2012	21.49	21.56	9.54	10.31
2013	21.35	21.25	8.61	8.60
2014	20.72	20.49	8.52	8.13
2015	20.41	19.96	7.03	7.50
2016	19.35	19.33	9.07	9.56

^A Summarized data are not available for CACR for 2007 and UPBU for 2010.

Figure 2-1 and Figure 2-2 present, for CACR and UPBU, respectively, comparisons of the observed haze index values for each year of IMPROVE data, including independently summarized values from 2016, to the Uniform Rate of Progress (URP) line established for each area. The same comparisons are shown for the two Missouri Class I areas in Appendix A.

Figure 2-1. CACR Monitored Observations Compared to Uniform Rate of Progress

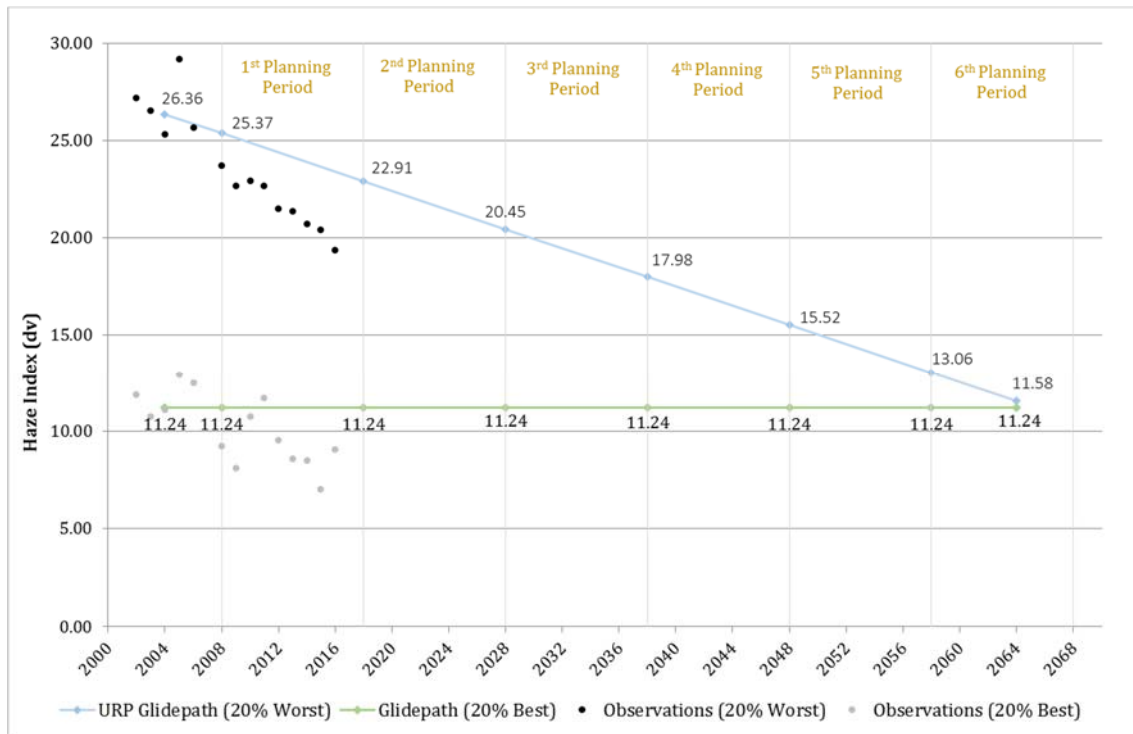
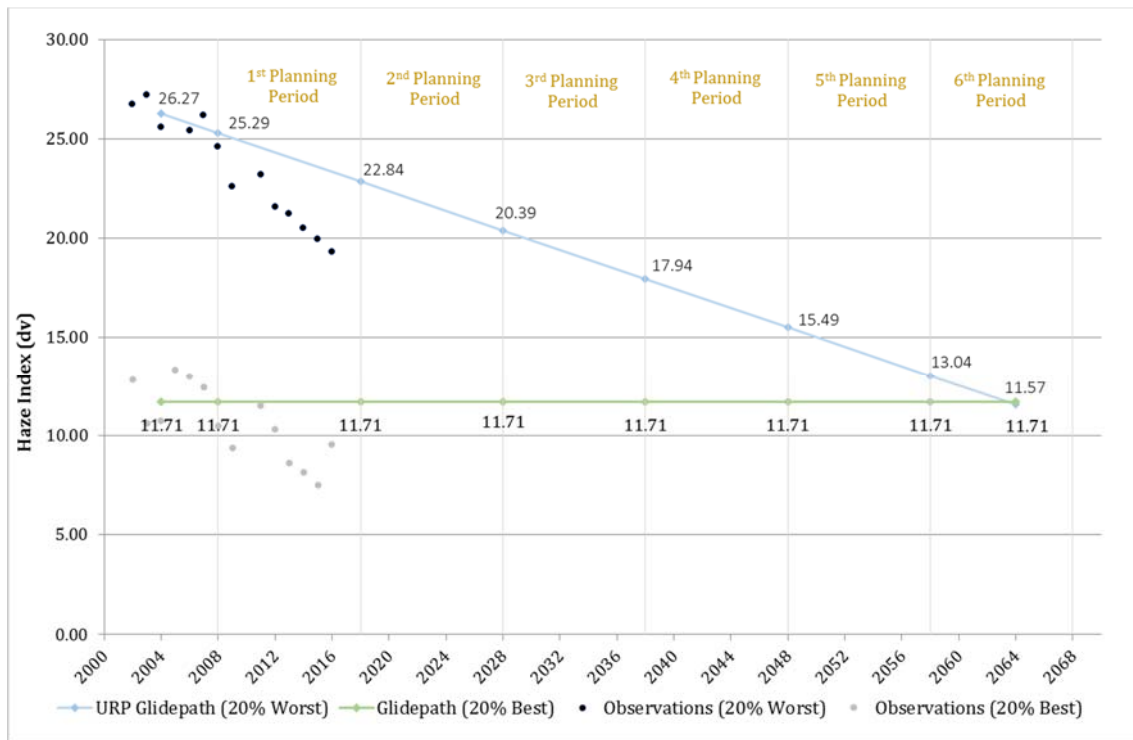


Figure 2-2. UPBU Monitored Observations Compared to Uniform Rate of Progress



As seen in the figures above, the actual observed visibility impairment at these Class I areas has declined sharply from 2002 through 2016 (the most recent available data). According to the monitor data, the current observed 20 percent worst days average haze index values are below the URP values for 2018 as well as the 2018 Reasonable Progress Goals (RPGs) that EPA set in the Arkansas Regional Haze Federal Implementation Plan,⁵ meaning that Arkansas has achieved more than is necessary to demonstrate reasonable progress for the first planning period. Table 2-3 presents a comparison of the 2016 observed values and the 2018 RPG values.

Table 2-3. 2016 Observed Haze Index Values Compared to 2018 URPs and RPGs

Class I Area	Observed 20 Percent Worst Days Average for 2016 (first half year)	RPG for 2018	Observed Value as % of RPG
CACR	19.35	22.47	86.1 %
UPBU	19.33	22.51	85.9 %

⁵ 81 Fed. Reg. 66,332 (September 27, 2016).

3. SITE-SPECIFIC COST INFORMATION FOR INDEPENDENCE

Site-specific control cost estimates were recently developed by Sargent & Lundy (S&L) for Dry Flue Gas Desulfurization (DFGD) at Independence. Based on these estimates, the cost of compliance is more than \$6,600/ton for Unit 1 and more than \$6,100/ton for Unit 2. S&L’s detailed report is included in Appendix B of this report, and a summary is provided in Table 3-1, below. Two sets of values are presented: “Actual” costs as estimated by S&L and “Adjusted” values based on S&L’s estimates after excluding cost items that EPA has historically claimed should not be accounted for in cost effectiveness calculations.⁶ Even using these adjusted costs, the cost of compliance would be more than \$5,000/ton for Unit 1 and more than \$4,600/ton for Unit 2.

Table 3-1. Summary of Site-Specific Control Cost Estimates – Actual and Adjusted Values

Actual Costs	Unit 1	Unit 2
Capital (\$)	491,893,500	491,893,500
Capital Recovery Factor ^A	0.1535	0.1535
Annualized Capital (\$/yr)	75,505,652	75,505,652
Annual O&M (\$/yr)	8,809,000	8,809,000
Total Annual Cost (\$/yr)	84,314,652	84,314,652
SO ₂ Emissions Reduction (ton/yr) ^B	12,608	13,655
Cost Effectiveness (\$/ton)	6,688	6,175
Adjusted Costs	Unit 1	Unit 2
Capital (\$)	355,391,500	355,391,500
Capital Recovery Factor ^A	0.1535	0.1535
Annualized Capital (\$/yr)	54,552,595	54,552,595
Annual O&M (\$/yr)	8,809,000	8,809,000
Total Annual Cost (\$/yr)	63,361,595	63,361,595
SO ₂ Emissions Reduction (ton/yr) ^B	12,608	13,655
Cost Effectiveness (\$/ton)	5,026	4,640

^A Based on a nine-year amortization period and 7 % interest.

^B EAI’s emissions reduction value differs from EPA’s value because of a difference in how the average baseline emissions were calculated. EAI simply averaged the five annual values for 2009-2013. EPA took a three-year average over the same time period after excluding the minimum and maximum values.

⁶ An example of an excluded cost is Allowance for Funds Used During Construction (AFUDC). AFUDC represents the interest expense incurred on the investment in a large capital project, such as a FGD installation, which can take several years to complete (≥ 5 years). Although interest expenses will certainly be incurred on such a project, and AFUDC is typically considered as part of the capital cost of such a project for standard accounting and rate-making purposes, EPA Region 6 has expressed concern with the inclusion of AFUDC and certain other costs. EAI disagrees and believes that determining the cost effectiveness of the control options must realistically reflect the actual cost of compliance. See EAI’s comments on the proposed FIP. Nonetheless, for completeness, this report shows a range of cost effectiveness both including AFUDC and other costs and excluding those costs.

APPENDIX A: OBSERVATIONS COMPARED TO UNIFORM RATES OF PROGRESS FOR MISSOURI'S CLASS I AREAS

Figure A-1. MING Monitored Observations Compared to Uniform Rate of Progress

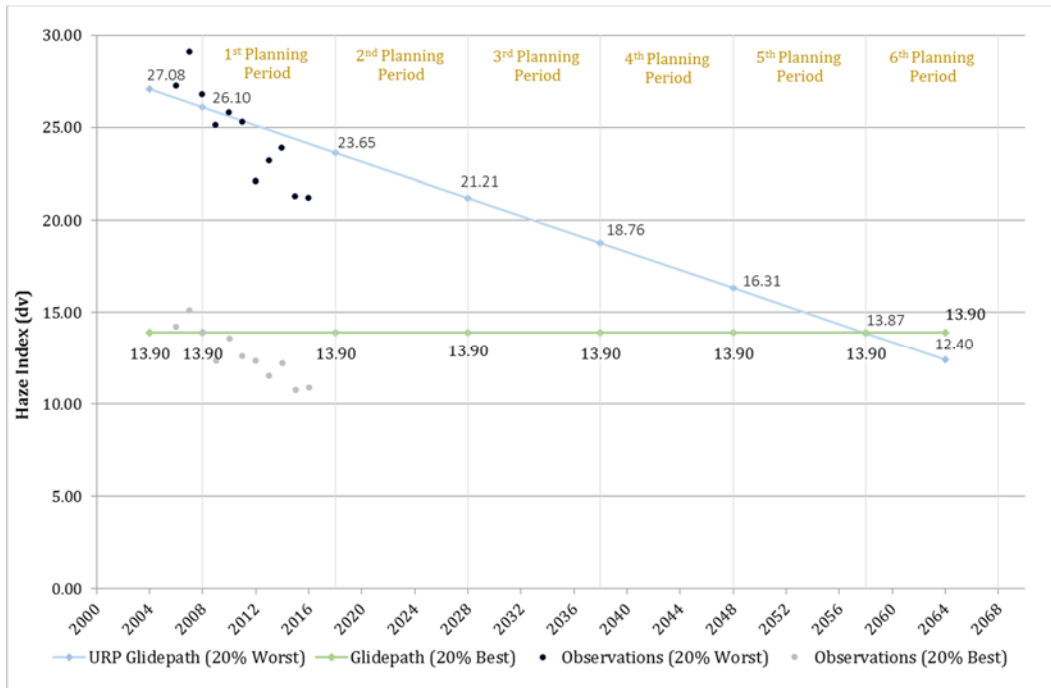
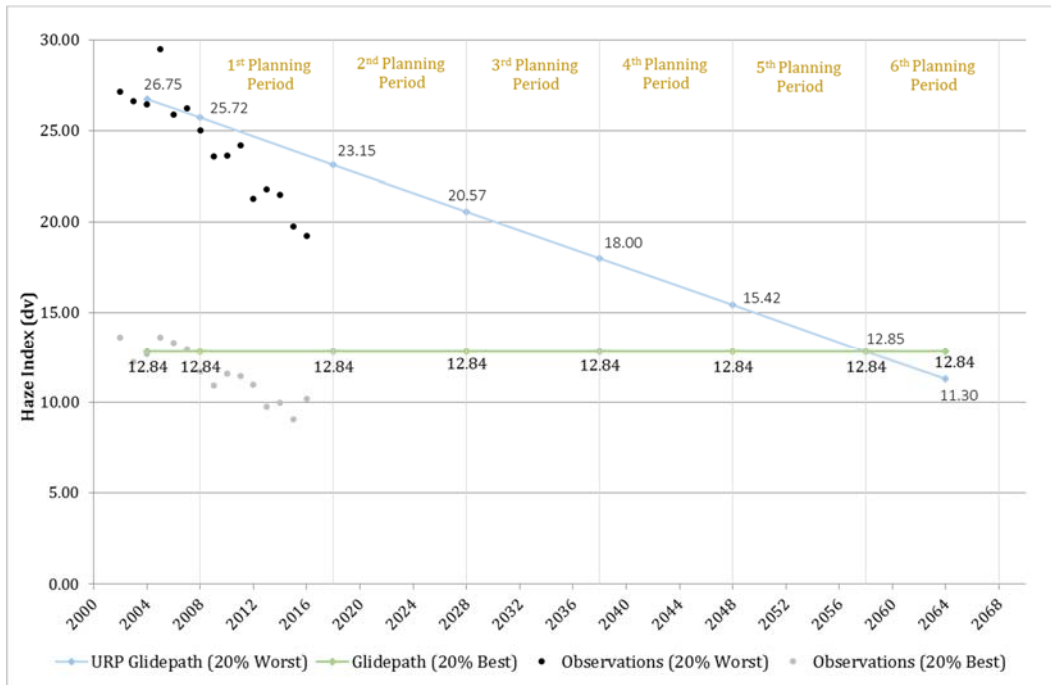


Figure A-2. HEGL Monitored Observations Compared to Uniform Rate of Progress



APPENDIX B: CONTROL COST INFORMATION



ENERGY ARKANSAS, INC.

**INDEPENDENCE DRY FGD
COST ESTIMATE AND TECHNICAL BASIS**

SL-014308
Final, Rev. 0
January 31, 2018
Project 13027-004

Prepared by



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1. PURPOSE

The purpose of this study is to estimate the total capital investment and operating and maintenance costs associated with installing dry flue gas desulfurization (FGD) technology on Independence Units 1&2.

This report documents the conceptual design and technical basis for the dry FGD cost estimate.

2. TECHNOLOGY DESCRIPTION

2.1.1. Reagent Preparation System

Lime will be supplied to the lime day bins from the long-term storage silo located in the Reagent Handling Area and supplied by the EPC Contractor. The lime day bins, located in the Reagent Preparation Area and provided by the Dry FGD System Supplier, will each have a storage capacity to supply the plant with lime reagent for 24 hours when firing 1.2 lb SO₂/mmBtu coal.

Lime from the day bin will be gravity-fed through feeders to a lime slaker, where the lime will be slaked (mixed with low pressure service water and converted from calcium oxide to calcium hydroxide slurry). The plant will have a total of two lime slaking trains (2 x 100%), each sized to process enough lime slurry to supply the entire plant. Each lime slaker will discharge to a lime slurry transfer tank, which is equipped with two lime slurry transfer pumps which will feed into the lime slurry storage tanks. The common lime slurry storage tanks will each be sized for 12 hours of storage for the entire plant when burning a 1.2 lb SO₂/mmBtu coal. The lime day bin, slaking trains, and lime slurry tanks are sized to provide the necessary reagent slurry to both units simultaneously. The lime slurry tanks are built with cross-ties such that either slurry tank can feed either the Unit 1 or Unit 2 FGD systems.

A total of four lime slurry feed pumps (two per unit), each sized for 100% flow to one unit, will pump the lime slurry from the storage tanks to the SDAs through one of 2 x 100% piping loops, and return unused slurry back to the lime slurry storage tank. The closed-loop reagent supply line requires a flow velocity between 4-10 fps to avoid any solids buildup in the piping. Because of this, the pumping requirement is higher than the actual SDA requirement and must be sufficiently greater than the slurry flow that is pumped into the absorbers to allow the returning flow to remain above 4 fps.

2.1.2. Absorbers

Three absorbers, each treating 33⅓% of the flue gas are provided for each unit. Depending on the supplier and the type of atomizer normally used, there may be one rotary atomizer per absorber with a shared spare (B&W), three rotary atomizers per absorber with one or more shared spares (Alstom, basis of the estimate), or multiple dual-fluid atomizers with 15% shared spares (Siemens). The cost estimate includes contingency to capture the possibility of any of these designs.

2.1.3. Baghouse

Each SDA will be paired with a pulse-jet baghouse with a gross air-to-cloth ratio of approximately 3.2-3.4 ft/min. The filter bags in each baghouse are cleaned by pulses of compressed air. The air compressors will be 4 x 33% for the station and are included in the scope of the baghouse supplier.

2.1.4. Byproduct Recycle System

The reaction byproducts from the absorbers will be collected in the baghouses and a portion of the collected material will be recycled. The baghouse hoppers will be emptied through air lock feeders and pneumatically conveyed to two recycle day bins located in the Byproduct Recycle Area and supplied by the Dry FGD System Supplier, which are common for both units. The air-lock feeders are installed without a spare. One recycle day bin is located in the recycle train for each unit. The common byproduct recycle day bins (one per unit) provide 8-hours of storage when burning 1.2 lb SO₂/mmBtu coal.

Each byproduct recycle day bin is equipped with two recycle slurry preparation systems. The byproduct in each recycle day bin is gravimetrically conveyed to one of two systems where the byproduct is slurried with water (cooling tower blowdown). The byproduct recycle slurry is stored in one of four plant wide recycle slurry tanks, two per unit (combined 4-hour storage capacity).

Two recycle water make-up tanks are located in the recycle area. The recycled by-product slurry will be combined with fresh lime slurry for feed to the SDA atomizers. Recycle feed slurry pumps (4 x 100%, two installed per unit) will be used to transfer the recycle slurry from the recycle slurry tanks to the atomizers. In addition, all recycle feed lines are provided in a loop configuration as with the reagent

system, with a complete redundant loop to allow unhindered operation due to any pluggage of pumps or feed piping.

2.1.5. Reagent Handling System

The basis of the estimate is delivery of lime via hopper-bottom railcars with truck unloading as a backup. In order to accommodate rail delivery to the site, a new rail spur will be constructed from the existing track on the plant site for unloading. A trackmobile car positioner will position railcars, two at a time, in the enclosed delivery shed for unloading. A vacuum pneumatic system will unload the railcars into either of the two (2) lime storage silos. The lime storage silos will be sized for supply of reagent for 14 days of storage at full load when firing 1.2 lb SO₂/mmBtu coal. Lime from the long-term storage silos will be pneumatically transferred to two lime day bins located in the Reagent Preparation Area and supplied by the Dry FGD System Supplier.

2.1.6. Byproduct Handling System

Excess FGD byproduct from the recycle system will be pneumatically conveyed to either of the two common long-term FGD byproduct storage silos. The two long-term FGD byproduct storage silos are each sized to handle the byproduct for a total of 7 days of storage when firing the 1.2 lb SO₂/mmBtu coal. The byproduct will be mixed with a small amount of fly ash and water to form a final product which contains approximately 65% FGD byproduct, 5% fly ash, and 30% water. In order to achieve this mixture, a common fly ash blending bin (7-day storage) will be located near the new byproduct silos. The wetted byproduct/fly ash mixture is then loading into dump trucks, which will deposit the FGD byproduct in a final storage location in the landfill. It is assumed that the existing landfill will have sufficient capacity to accommodate the addition of FGD byproduct. Therefore no costs were included in the capital estimate for the (existing) landfill.

2.1.7. Flue Gas Handling System

The flue gas from the existing ID fans will be ducted to the absorbers. The gases from the absorbers will be ducted to the baghouses to collect the reaction by-products and residual fly ash. Two axial booster fans (2 x 50% for each unit) will be located downstream of the absorbers and baghouse; the booster ID

fans can be provided by the Dry FGD System Supplier or the EPC Contractor. Due to the dry condition of the scrubbed flue gas, the existing stack and liners will be used for the retrofit case.

2.1.8. Electrical BOP System

In order to feed the new dry FGD and other BOP equipment, significant modifications and additions to the existing power system would be required. These include, at a minimum, installation of new auxiliary transformers, medium- and low-voltage switchgear buses, motor control centers (MCCs) and upgrades to the isolated phase tap-off buses. As a detailed conceptual design was not developed an allowance was included for the Electrical BOP Scope.

2.1.9. I&C BOP System

The dry FGD system will be integrated into the existing DCS system. The baghouse will be controlled through a PLC and the ID booster fans will be integrated into the existing DCS system. As a detailed conceptual design was not developed an allowance was included for the I&C BOP Scope.

3. APPROACH

The project capital and O&M cost estimates are based on project-specific information, including:

- An engineer-procure-construct (EPC) contracting strategy with the Dry FGD technology supplier providing the main process equipment as a complete FGD Island.
- On-site disposal of Dry FGD byproduct using new ash handling equipment. The byproduct will be collected in the new fabric filter and blended with fly ash prior to disposal.
- Reagent injection rates based on achieving an outlet SO₂ emission rate of 0.06 lb SO₂/MMBtu from a design inlet concentration of 1.20 lb SO₂/MMBtu, based on the sulfur limit in the fuel supply contracts.
 - Annual operating costs will be based on an uncontrolled SO₂ rate of 0.49 lb SO₂/MMBtu, based on the annual heat input weighted average emission from 2009 through 2013.
 - The system will be designed to control emissions to meet a permit limit of 0.06 SO₂/MMBtu, based on the required permit limits in the EPA Arkansas FIP.

- A high level conceptual system design was used as input to the Dry FGD cost estimate. The following were estimated based on previous projects and scaled for the predicted dry sorbent injection rate for Independence:
 - Auxiliary power consumption
 - Annual reagent consumption
 - Equipment Sparing and Quantities
 - BOP Allowances (Mechanical, Electrical and I&C)

The total plant capital cost estimate includes the following:

- Equipment and material
- Installation labor
- Demolition and Relocation work
- Indirect field costs and BOP engineering
- Freight on Materials
- General and Administration
- Erection contractor profit
- Engineering, Procurement and Project Services
- Spare parts/initial fills (other than reagent)
- EPC Fee

As part of this project, S&L estimated the costs for Owner's services and costs outside of the EPC contract including the following:

- Owner's Costs
- Owner's Engineer
- Construction Management Support
- Startup and Commissioning Support
- Performance Testing
- Contingency
- Escalation
- Interest During Construction

Cost Estimate 34261 provided in Attachment 1 represents the total cost to Entergy to install Dry FGD technology on both units at Independence (Unit 1 and 2) including the EPC Contract price and all additional Owner's costs and third party services.

The total unit O&M cost estimate includes the following:

- Waste disposal (Dry FGD waste)
- Reagent consumption
- Auxiliary power consumption
- Water consumption for reagent and byproduct handling
- Operating labor
- Maintenance material
- Maintenance labor

The O&M Cost Estimate and Capital Cost Estimate were developed using the assumptions and scope provided in this document. The project definition and accuracy corresponds to a study level estimate as defined in U.S.EPA's Office of Air Quality Planning and Standards (OAQPS) Control Cost Manual. The costs provided in this report are in 2017 dollars.

4. CAPITAL AND O&M COST ESTIMATE TECHNICAL BASIS

4.1. DESIGN INPUTS AND ASSUMPTIONS

The following summarizes the design inputs used as the basis for the Independence dry FGD Systems:

- Design SO₂ inlet concentration of 1.2 lb SO₂/MMBtu for equipment design, based on the current coal contract sulfur limit.
- SO₂ inlet concentration of 0.49 lb SO₂/MMBtu for annual operating costs, based on the annual heat input weighted average emission from 2009 through 2013.
- Design SO₂ outlet concentration of 0.06 lb SO₂/MMBtu.
- Annual capacity factor of 75.0% (annual average capacity factor for Independence Units 1 and 2 based on historical heat input from 2009 through 2013).
- Project duration of five years.

4.2. TOTAL INSTALLED CAPITAL INVESTMENT

The Dry FGD System Supplier will provide all of the equipment within the FGD Island. The FGD Island will include the Reagent Preparation Equipment, Absorber Area Equipment, Baghouse Area Equipment and the Byproduct Recycle Equipment. The booster ID fans could be provided by either the Dry FGD System Supplier or the EPC Contractor; the basis of this estimate is supply of the booster fans by the Dry FGD System Supplier. The EPC Contractor will provide the remaining BOP scope in order to provide a complete and operable FGD system. In addition, the EPC Contractor will install/construct the entire system including the equipment provided by the DFGD supplier. The scope of work for the cost estimate is broken out by the following areas:

4.2.1. Dry FGD Island

- a. Reagent Preparation System, common to both units:
 - Two lime day bins, 24-hours storage each
 - Two detention lime slakers at 100% capacity, each with a grit screen, gravimetric feeder
 - Two lime slurry transfer tanks
 - Four slurry transfer centrifugal pumps
 - Two lime slurry storage tanks
 - Four slurry feed centrifugal pumps
 - Cost estimate based on budgetary proposal from Alstom; the budgetary proposal is based on a design sulfur of 2.0 lb/MMBtu, cost adjustments were included in the estimate for a lower design sulfur of 1.2 lb/MMBtu. These cost adjustments were developed by estimating the differential equipment cost for the reagent preparation and waste handling equipment. The impacted equipment is identified in Section 4.5 which discusses the sulfur design basis sensitivity.
- b. Absorber Area, per unit
 - Three absorber vessels per unit, with access doors
 - Rotary atomizers, two spare atomizers included
 - Vessel material carbon steel, 1/4 in. – 5/8 in. carbon steel
 - Heating and ventilation
 - Vacuum piping
 - SDA Superstructure
 - Cost estimate based on budgetary proposal from Alstom

- c. Baghouse Area, per unit
 - New baghouse, including pulse jet cleaning system and all appurtenances
 - Cost estimate based on budgetary proposal from Alstom
- d. Byproduct Recycle System, per unit (located remotely in common location for both units)
 - One recycle silo with bin vent filter per unit, 8-hour total capacity
 - Two recycle mix tanks per unit
 - Two recycle slurry tanks per unit, with two recycle slurry centrifugal pumps per unit
 - Agitators for each tank
 - Baghouse ash handling system common to both units
 - Rotary air-lock valves from baghouse hopper outlets to pressure pneumatic conveying system (60-degree typical)
 - Pneumatic pressure blowers (8 x 33 $\frac{1}{3}$ %)
 - Cost estimate based on budgetary proposal from Alstom
- e. ID Booster Fans, per unit
 - Two approximately 5,200 hp axial booster fans per unit sized to overcome pressure drop associated with FGD and baghouse
 - Includes motors - no spare motor included
 - Cost estimate based on budgetary proposal from Alstom
 - Dampers from ID fan to booster fans (cost estimated separately, not included in Alstom budgetary proposal)
- f. Interconnecting Ductwork, per unit
 - ID fan outlet to absorber inlet ductwork and supports; carbon steel, $\frac{1}{4}$ in, design velocity, 3,600 fpm
 - Absorber outlet to baghouse inlet ductwork and supports; carbon steel, $\frac{1}{4}$ in, design velocity, 3,600 fpm
 - Baghouse outlet to new booster fans and fan outlet to the stack inlet ductwork and supports; carbon steel, $\frac{1}{4}$ in, design velocity, 3,600 fpm

4.2.2. FGD Island BOP

- a. Absorber tower foundations including caissons
- b. Baghouse area foundations including 18" auger cast piles 60' long
- c. Booster fan area foundations
- d. Concrete foundations for all flue gas ductwork

- e. 6” insulation with lagging for Absorbers, Baghouses and Ductwork
- f. Penthouse enclosure for Absorbers located in FGD Island
- g. Two elevators (one for each unit) to provide maintenance access to Absorber and Baghouse Areas
- h. Enclosure around hoppers for Baghouses located in FGD Island
- i. Lime preparation building for Reagent Preparation Area in FGD Island, including substructure and superstructure
- j. Byproduct recycle building for Byproduct Recycle Area in FGD Island, including substructure and superstructure

4.2.3. Reagent Storage and Handling, common to both units:

- a. Lime rail car unloader:
 - Lime delivery via 25-car unit train
 - System consists of mobile receiving pan and associated vacuum pneumatic equipment to unload railcar through railcar bottom hoppers
 - Enclosed railcar unloading building
 - One vacuum pneumatic system operating to unload a car
 - Pneumatic vacuum exhausters (2 x 100%)
 - Filter separator with vacuum-to-pressure transfer hopper and valves
 - Cost estimate based on vendor quote for a similar unit
- b. Lime storage silos:
 - Two lime storage silos, (14-day capacity each, common to both units) with bin vent filter, including substructure and superstructure
 - 1,000-tons storage, each
 - Continuous level detection systems
 - Live bottom hopper outlets
 - Rotary airlock assemblies
 - Lime transfer systems:
 - Pressure pneumatic conveying system from lime storage silos to lime day bins
 - Pneumatic pressure blowers
 - One lot of pneumatic conveying piping located on an elevated pipe rack
- c. Concrete foundations including caissons for all material silos
- d. Concrete foundations for pneumatic conveying blowers and exhausters

4.2.4. Byproduct Handling System, common to both units

- a. Two FGD by-product storage silos (7-day capacity each, common to both units) with bin vent filter, fluidizing system, and two unloading conditioners (one operating, one spare per silo), including substructure and superstructure
- b. One common fly ash blending, 7-day storage bin with bin vent filter, fluidizing system, and four pneumatic airslide conveyors
- c. Water pumps and associated piping for unloading conditioners (pin mixers) at both silos
- d. Continuous level detection system
- e. Two truck scales and substructure
- f. Concrete foundations including caissons for all material silos
- g. Concrete foundations for pneumatic conveying blowers and exhausters
- h. Allowance for existing road improvements for truck haulage to existing landfill

4.2.5. Civil BOP

- a. Site grading
- b. Soil removal earthwork
- c. Excavation, backfill, and compaction for all foundations
- d. Development of a new laydown area, approximately 10 acres, including site preparation, fencing, and temporary power. It was assumed that this area would be located on existing plant property, and does not require land to be purchased.

4.2.6. Mechanical BOP System

- a. Interconnecting piping, above-ground and buried
- b. Valves for interconnecting piping, above-ground and buried
- c. Lime slaking water storage tank, 175,000-gallon capacity
- d. Recycle make-up water tanks, 2 x 200,000-gallon capacity
- e. Pipe Racks, common to both units
 - Between lime railcar unloading enclosure and lime silos
 - Between lime silos and lime day bins
 - From baghouse hoppers to recycle silos and FGD by-product silo
 - From lime slurry storage tanks to absorber
 - From recycle slurry storage tank to absorber
 - Concrete foundations including caissons for all pipe racks
 - Shallow concrete foundations for other miscellaneous structures

- f. BOP Pumps
- Three by-product recycle water forwarding pumps to recycle slurry
 - Four reagent prep/recycle sump pumps
 - Two lime silo and unloading area sump pumps
 - Two by-product ash silo area sump pumps
 - Two by-product recycle make-up water tank supply pumps
 - Two lime slaking water pumps
- g. Instrument Air System, common to both units
- Air compressors; 2 x 100%,
 - IA dryers w/filters; 2 x 100%,
 - Air receivers; 2 x 100%
 - Instrument air piping to every silo or day bin, bin vent and reagent preparation/recycle area
 - Heat-traced piping
- h. Service Air System, common to both units
- Air compressors; 2 x 100%
 - Air receivers; 2 x 100%
- i. Field painting
- Multiple coat system used for exposed ductwork only
 - Inorganic zinc primer and polyurethane system used for steel
 - Allowance for underground piping shop coatings built into piping cost

4.2.7. Demolition and Relocation

- a. Allowance of \$1,800,000, plus labor costs, is included for demolition and relocation of existing equipment and infrastructure which may interfere with the new Dry FGD system. This allowance is based on recent in-house cost estimates for similar projects.

4.2.8. Electrical BOP System

- a. Allowances of \$13,900,000, \$8,500,000 and \$1,400,000, plus labor costs, are included for electrical equipment upgrades and modifications, cables and conduits/raceway, respectively. These allowances are based on recent in-house cost estimates for similar projects.

4.2.9. Instrumentation and Controls BOP System

- a. Allowance of \$1,585,000, plus labor costs, is include for DCS upgrades and added instrumentation. This allowance is based on recent in-house cost estimates for similar projects.

4.2.10. Labor Costs

Installation/labor costs were included in the base estimate under the direct costs. Manhours are estimated for each item in the base estimate and are based on the type of work and typical estimates for similar work. The labor costs are based on the labor wage rates and labor crews developed by S&L.

a. Labor Wage Rates

Crew labor rates were developed using prevailing craft rates, fringe benefits and state specific worker's compensation rates as published in the 2017 edition of R.S. Means Labor Rates for Pine Bluff, Arkansas area. Costs were added to cover FICA, workers compensation, all applicable taxes, small tools, incidentals, construction equipment, and contractor's overhead. A 1.15 geographic labor productivity multiplier is included based on the Compass International Construction Yearbook for Arkansas. The crew rates do not include an allowance for weather related delays.

b. Labor crews

Construction/erection labor cost is based on the use of applicable construction crews typically required for projects of this type. The construction crew costs were specifically developed for utility industry and are proprietary to S&L. The prevailing craft rates are incorporated into work crews appropriate for the activities, and include costs for small tools, construction equipment, insurance, and site overheads.

4.2.11. Other Direct and Construction Indirect Costs

In addition to the base labor costs, other construction indirect costs for the project were broken out in the estimate as well as other contractor direct costs. The following items were included as other direct and construction indirect costs.

- a. Scaffolding and Consumables
- b. Premiums and per diems (\$10 per hour)
- c. Overtime is included based on five 10-hour shifts per week work schedule
- d. Freight on construction materials
- e. Contractor's General & Administration Fees (included at 10% of total direct and construction indirect costs)
- f. Contractor's Profit (included at 5% of total direct and construction indirect costs)

4.2.12. EPC Indirect Costs

The final contribution to the overall EPC project price are the EPC Contractor's indirect costs; these include the EPC engineering services, startup spare parts and initial fills, technical field advisors, and the EPC risk fee.

a. EPC Engineering Services

The EPC engineering services was estimated based on recent projects with similar scopes and schedules. The total cost of the EPC engineering services was estimated to be \$23,000,000.

b. Startup Spare Parts and Initial Fills

An allowance has been included for initial fills for equipment, including first fills for lubrication of any motorized equipment. The initial fill of pebble lime was not included in the EPC Contractor's scope, as this is considered to be an operating cost rather than a capital expense. The initial fill of pebble lime is included in the Owner's costs. The total cost of the initial fills was estimated to be \$300,000.

c. Technical Field Advisors (Vendors)

Allowances were included for equipment supplier's technical field advisory services based on an estimated 600 man-days. The estimate includes technical field advisors for the FGD system supplier (including FGD system subcontractors) and the DCS supplier. The total cost of the technical field advisors was estimated to be \$600,000.

d. EPC Risk Fee

An EPC approach provides an alternative which is expected to reduce risk for Entergy by placing the responsibility for the project on a single entity, the EPC Contractor. The EPC risk fee is a premium charged by the contractor which accounts for the additional coordination and management of the project as well as the additional risk assumed by the contractor. Based on S&L's experience with recent EPC projects, an EPC risk fee was included at 10% of the total EPC project costs.

4.2.13. Owner's Costs and Services

Outside of the EPC Contractor's total cost, Entergy will incur other costs associated with the project, such as services procured from third parties (including Owner's engineer, construction management support, startup and commissioning support and performance testing), and other project related costs.

a. Owner's Costs

Owner's Costs are direct costs that the Owner incurs over the life of the project. The following items are real costs Entergy will incur to install DSI at Independence based on the scope and schedule of this project:

- Internal Labor
- Internal Indirects

- Travel Expenses
- Legal Services
- Builders Risk Insurance
- Initial Fills (Reagent)

Owner's costs were included in the estimate at 8% of the total project cost.

b. Construction Management Support

The construction management support was estimated based on similar project scopes. It was assumed that Entergy will not have the internal support personnel required to perform the tasks, and therefore it will be outsourced. The cost of labor is based on present day cost. The total cost of the construction management support was estimated to be \$4,969,000.

c. Startup and Commissioning Support

The startup and commissioning support was estimated based on similar project scopes. It was assumed that Entergy will not have the internal support personnel required to perform the tasks, and therefore it will be outsourced. The total cost of the startup and commissioning support was estimated to be \$550,000.

d. Owner's Engineer

The Owner's Engineer cost was developed as a high level estimate based on a typical scope for Owner's Engineer work for this type of project; including the following tasks:

- Conceptual Study Support
- EPC Specification Supporting Documents
- Project Schedule Development
- EPC Specification Development
- EPC Bid Evaluation and Contract Conformance
- General Project Support
 - Monthly Project Status Meetings
 - Weekly Teleconferences
 - Overall Coordination
 - Project Administration
 - Site Visits and Travel
- Permitting Support
- Design Review of Drawing Submittals
- Technical support during design, fabrication, construction, commissioning, and testing

- Equipment vendor QA/QC audits

The total cost of the Owner's Engineer was estimated to be \$6,500,000.

e. Performance testing

The cost for performance testing was developed as a factored estimate using costs from projects of similar scope. This cost includes the testing, performed by a third-party contractor hired by the Owner, and also includes the cost for S&L's assistance in the following tasks:

- Development of the test protocol
- Procuring the services of the testing contractor
- Overseeing the performance test campaign
- Evaluating the results of the testing with respect to guarantee compliance

The estimate for the third party testing contractor is based on the assumption that the contractor would be onsite for up to 5 days. The total cost of the Performance Testing was estimated to be \$275,000.

f. Contingency

Contingency is included in the estimate to cover the uncertainty associated with the project costs. The cost estimate includes a recommended contingency of 15% (due to a greater extent of project definition), which is consistent with cost estimating guidelines for a conceptual design and the current level of project definition. Contingency was applied to the total project costs before escalation.

g. Escalation

Escalation was included in the estimate based on a typical schedule for implementation of a Dry FGD system at an escalation rate of 2.15% on equipment and materials and 3.35% on labor and indirects. These escalation rates were developed by S&L based on recent pricing and in-house escalation projections.

h. Interest During Construction

Interest during construction (IDC) accounts for the time value of money associated with the distribution of construction cash flows over the construction period. IDC was applied to the total EPC project costs including contingency. The IDC was calculated based on a typical schedule for implementation of a DSI system and a typical interest rate of 7.8% per year which was assumed based on a low interest market environment.

4.3. VARIABLE OPERATING AND MAINTENANCE COSTS

The following unit costs were used to develop the variable Operating and Maintenance (O&M) costs. All of these values, with the exception of the reagent costs, were provided by Entergy or are typical industry values confirmed by Entergy. The reagent costs are based on recent supplier quotes for the area.

Table 4-1: Unit Pricing for Utilities (Provided by Entergy)

Unit Cost	Units	Value
Pebble Lime	\$/ton	\$130.0
High Quality Water	\$/1000 gal	\$2.00
Low Quality Water	\$/1000 gal	\$0.50
Byproduct Disposal	\$/ton	\$7.50
Aux Power Cost ¹	\$/MWh	\$43.35

Note 1: Entergy provided auxiliary power costs for the first year of operation.

Table 4-2 below summarizes the consumption rates estimated as well as the first year variable O&M costs for the Dry FGD system.

Table 4-2: Variable O&M Rates and First Year Costs, per Unit

	Units	Value
Dry FGD System Parameters		
Reagent Consumption	lb/hr	4,800
Byproduct Waste Production	lb/hr	10,600
Aux Power Consumption	kW	10,000
High Quality Water Consumption	gpm	50
Low Quality Water Consumption	gpm	880
First Year¹ Variable O&M Costs (@CF²)		
Reagent Cost	\$/year	\$2,050,000
Byproduct Waste Disposal Cost	\$/year	\$261,000
Aux Power Cost	\$/year	\$2,628,000
Water Cost	\$/year	\$213,000
Bag and Cage Replacement Cost	\$/year	\$372,000
Total First Year Variable O&M Cost	\$/year	\$5,524,000

Note 1: First year costs are provided in \$2017.

Note 2: The first year costs are calculated using an annual capacity factor of 75.0%.

4.4. FIXED OPERATING AND MAINTENANCE COSTS

The fixed O&M costs for the systems consist of operating personnel as well as maintenance costs (including material and labor). Based on the conceptual design for the dry FGD system, the estimated staffing additions are 28 personnel for two systems on adjacent units.

The annual maintenance costs are estimated as a percentage of the total capital equipment cost, based on the amount of operating equipment which will require routine maintenance. For this evaluation, the maintenance costs (maintenance and labor) were estimated to be approximately 1.3% of the project capital. This is a lower value than typical because items such as track work and civil work are high capital cost items with little to no maintenance.

Table 4-3 below summarizes the first year fixed O&M costs for the design and typical cases.

Table 4-1: First Year Fixed O&M Costs for Dry FGD, per Unit

First Year¹ Fixed O&M Costs	Units	Value
Operating Labor ²	\$/year	\$1,660,000
Maintenance Material	\$/year	\$975,000
Maintenance Labor	\$/year	\$650,000
Total First Year Fixed O&M Cost	\$/year	\$3,285,000

Note 1: First year costs are provided in \$2017.

Note 2: Operating labor costs are based on a labor rate of \$56.95, which was provided by Entergy.

Note 3: Installation of systems on both units would require 28 operators total. For accounting purposes, this is considered 14 operators per unit.

5. SUMMARY

The cost estimate for the Independence Units 1&2 Dry FGD systems is based on the addition of two SDA FGD systems for SO₂ removal. The attached capital estimate for the Independence Dry FGD system is based on this technical basis and is presented in 2017 dollars.

6. ATTACHMENTS

1. Independence DFGD Project Units 1 and 2 Conceptual Capital Cost Estimate, Sargent & Lundy
Estimate No. 34261

**ENTERGY ARKANSAS
INDEPENDENCE STATION DRY (SDA) FGD
CONCEPTUAL COST ESTIMATE**

Estimator	A. KOCI
Labor rate table	17ARPBL
Project No.	13027-004
Estimate Date	10/04/2017
Reviewed By	GA
Approved By	BA
Estimate No.	34261A
Cost index	ARPBL

ENTERGY ARKANSAS
 INDEPENDENCE STATION DRY (SDA) FGD
 CONCEPTUAL COST ESTIMATE



Area	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Total Cost
101	FGD ISLAND	147,908,000	150,000,000	16,508,216	343,779	26,553,044	340,969,260
102	REAGENT HANDLING SYSTEM	5,830,400	2,591,000	1,325,175	39,706	3,315,997	13,062,572
105	BYPRODUCT HANDLING SYSTEM	6,120,000	6,810,000	792,075	103,041	8,417,500	22,139,575
121	CIVIL BOP	350,000		3,731,841	63,706	8,336,292	12,418,133
151	MECHANICAL BOP	720,000	1,647,000	5,962,113	88,963	8,343,711	16,672,824
190	DEMOLITION / RELOCATION			1,800,000	33,333	3,276,667	5,076,667
201	ELECTRICAL BOP SYSTEM		12,300,000	11,500,000	284,184	22,691,518	46,491,518
211	INSTRUMENTATION AND CONTROLS BOP SYSTEM		1,500,000	1,085,000	10,920	789,374	3,374,374
	TOTAL DIRECT	160,928,400	174,848,000	42,704,420	967,632	81,724,103	460,204,922

**ENTERGY ARKANSAS
 INDEPENDENCE STATION DRY (SDA) FGD
 CONCEPTUAL COST ESTIMATE**



Estimate Totals

Description	Amount	Totals	Hours
Direct Costs:			
Labor	81,724,103		967,632
Material	42,704,420		
Subcontract	160,928,400		
Process Equipment	174,848,000		
	460,204,923	460,204,923	
Other Direct & Construction			
Indirect Costs:			
91-1 Scaffolding	5,721,000		
91-2 Cost Due To OT 5-10's	11,337,000		
91-4 Per Diem	9,676,000		
91-5 Consumables	817,077		
91-6 Freight on Material	2,135,000		
91-8 Sales Tax	7,566,000		
91-9 Contractors G&A	15,776,000		
91-10 Contractors Profit	7,888,000		
	60,916,077	521,121,000	
Indirect Costs:			
93-1 Engineering Services	23,000,000		
93-4 SU/S Parts/ Initial Fills	300,000		
93-5 Technical Field Advisors	600,000		
93-8 EPC Fee	54,502,000		
	78,402,000	599,523,000	
Escalation:			
96-1 Escalation on Material	5,731,000		
96-2 Escalation on Labor	20,520,000		
96-3 Escalation on Subcontract	26,919,000		
96-4 Escalation on Process Eq	17,974,000		
96-5 Escalation on Indirects	12,802,000		
	83,946,000	683,469,000	
Total EPC Cost		683,469,000	
Owner's Costs:			
99-1 Owner's Costs	47,962,000		
	47,962,000	731,431,000	
Third Party Services:			
100 CM Oversight	4,969,000		
102 Start-up Oversight	550,000		
103 Owner's Engineer	6,500,000		
104 Performance Testing	275,000		
	12,294,000	743,725,000	
Project Contingency :			
110 Project Contingency	98,966,000		
	98,966,000	842,691,000	
Escalation Addition:			
120 Escalation on Lines 99-110	8,897,000		
	8,897,000	851,588,000	
Interest During Construction:			
130 Interest During Constr.	132,199,000		
	132,199,000	983,787,000	
Total		983,787,000	

ENTERGY ARKANSAS
 INDEPENDENCE STATION DRY (SDA) FGD
 CONCEPTUAL COST ESTIMATE



Area	Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Crew Rate	Labor Cost	Total Cost
101			FGD ISLAND									
	21.00.00		CIVIL WORK									
		21.53.00	PILING									
			PILE - MOB/DEMOB		1.00	LS	-	-		115.48	/MH	100,000
			PILE - 18" AUGER CAST X 60' LONG	UNIT 1 DUCTWORK (NOT INCLUDED IN FGD ISLAND SCOPE)	138.00	EA	-	496,800		115.48	/MH	496,800
			PILE - 18" AUGER CAST X 60' LONG	UNIT 2 DUCTWORK (NOT INCLUDED IN FGD ISLAND SCOPE)	138.00	EA	-	496,800		115.48	/MH	496,800
			PILE - 18" AUGER CAST X 60' LONG	UNIT 1 BAGHOUSE FDN	252.00	EA	-	907,200		115.48	/MH	907,200
			PILE - 18" AUGER CAST X 60' LONG	UNIT 2 BAGHOUSE FDN	252.00	EA	-	907,200		115.48	/MH	907,200
			PILING									2,908,000
		21.54.00	CAISSON									
			2.5 FT DIA X 30 FT DEEP CAISSON	ABSORBER TOWERS FOUNDATIONS	180.00	EA	-	334,260	4,552	115.48	/MH	859,893
			2.5 FT DIA X 30 FT DEEP CAISSON	ABSORBER TOWERS FOUNDATIONS	180.00	EA	-	334,260	4,552	115.48	/MH	859,893
			2.5 FT DIA X 30 FT DEEP CAISSON	REAGENT PREP ENCLOSURE 50'X50' SUBSTRUCTURE	50.00	EA	-	92,850	1,264	115.48	/MH	238,859
			2.5 FT DIA X 30 FT DEEP CAISSON	BYPRODUCTS RECYCLE EQUIPMENT BLDG 60' X 60' SUBSTRUCTURE	72.00	EA	-	133,704	1,821	115.48	/MH	343,957
			2.5 FT DIA X 30 FT DEEP CAISSON	UNIT 1 BOOSTER FAN FOUNDATION	40.00	EA	-	74,280	1,011	115.48	/MH	191,087
			2.5 FT DIA X 30 FT DEEP CAISSON	UNIT 2 BOOSTER FAN FOUNDATION	40.00	EA	-	74,280	1,011	115.48	/MH	191,087
			CAISSON					1,043,634	14,211		1,641,143	2,684,777
			CIVIL WORK					1,043,634	14,211		1,641,143	5,592,777
	22.00.00		CONCRETE									
		22.13.00	CONCRETE									
			MAT FOUNDATION LESS THAN 5FT THICK, 4500 PSI - COMPOSITE RATE	REAGENT PREP ENCLOSURE 50'X50' SUBSTRUCTURE	300.00	CY	-	69,000	2,414	68.52	/MH	234,393
			MAT FOUNDATION LESS THAN 5FT THICK, 4500 PSI - COMPOSITE RATE	BYPRODUCTS RECYCLE EQUIPMENT BLDG 60' X 60' SUBSTRUCTURE	432.00	CY	-	99,360	3,476	68.52	/MH	337,526
			MAT FOUNDATION LESS THAN 5FT THICK, 4500 PSI - COMPOSITE RATE	UNIT 1 BOOSTER FAN FOUNDATION	600.00	CY	-	138,000	4,828	68.52	/MH	468,786
			MAT FOUNDATION LESS THAN 5FT THICK, 4500 PSI - COMPOSITE RATE	UNIT 2 BOOSTER FAN FOUNDATION	600.00	CY	-	138,000	4,828	68.52	/MH	468,786
			SLAB FOUNDATION LESS THAN 2 FT THICK, 4500 PSI, - COMPOSITE RATE	UNIT 1 DUCTWORK (NOT INCLUDED IN FGD ISLAND SCOPE)	966.00	CY	-	222,180	7,772	68.52	/MH	754,746
			SLAB FOUNDATION LESS THAN 2 FT THICK, 4500 PSI, - COMPOSITE RATE	UNIT 2 DUCTWORK (NOT INCLUDED IN FGD ISLAND SCOPE)	966.00	CY	-	222,180	7,772	68.52	/MH	754,746
			CONCRETE FOUNDATIONS - COMPOSITE RATE	ABSORBER TOWER FOUNDATION	1,300.00	CY	-	299,000	10,460	68.52	/MH	1,015,703
			CONCRETE FOUNDATIONS - COMPOSITE RATE	ABSORBER TOWERS FOUNDATIONS	1,300.00	CY	-	299,000	10,460	68.52	/MH	1,015,703
			CONCRETE FOUNDATIONS - COMPOSITE RATE	LIME SLURRY FEED TANKS	400.00	CY	-	92,000	3,218	68.52	/MH	312,524
			CONCRETE FOUNDATIONS - COMPOSITE RATE	UNIT 1 BAGHOUSE FDN 3 FDNS 83'X63'X3'	1,743.00	CY	-	400,890	14,024	68.52	/MH	1,361,824
			CONCRETE FOUNDATIONS - COMPOSITE RATE	8' X 10' UNIT 1 BAGHOUSE AREA, COMPRESSOR BLDG	6.00	CY	-	1,380	48	68.52	/MH	4,688
			CONCRETE FOUNDATIONS - COMPOSITE RATE	UNIT 2 BAGHOUSE FDN 3 FDNS 83'X63'X3'	1,743.00	CY	-	400,890	14,024	68.52	/MH	1,361,824
			CONCRETE FOUNDATIONS - COMPOSITE RATE	8' X 10' UNIT 2 BAGHOUSE AREA, TRUCK SCALE HOUSE	6.00	CY	-	1,380	48	68.52	/MH	4,688
			CONCRETE					2,383,260	83,372		5,712,678	8,095,938
			CONCRETE					2,383,260	83,372		5,712,678	8,095,938
	23.00.00		STEEL									
		23.17.00	GALLERY									
			GALVANIZED GRATING, 1 1/4" DEEP x 3/16" BEARING BAR WITH HOLD DOWN CLIPS	REAGENT PREP ENCLOSURE 50'X50' SUPERSTRUCTURE	4,000.00	SF	-	60,000	460	72.48	/MH	93,324
			GALVANIZED GRATING, 1 1/4" DEEP x 3/16" BEARING BAR WITH HOLD DOWN CLIPS	BYPRODUCTS RECYCLE EQUIPMENT BLDG	5,760.00	SF	-	86,400	662	72.48	/MH	134,387
			3" HEAVY DUTY GRATING	WASTE MANAGEMENT FACILITY (REPLACES HAZMAT BLDG)	200.00	SF	-	11,200	39	72.48	/MH	14,033
			DOUBLE PIPE HANDRAIL WITH POSTS AND GUARD PLATES, PAINTED	REAGENT PREP ENCLOSURE 50'X50' SUPERSTRUCTURE	3,000.00	LF	-	159,000	621	72.48	/MH	203,988
			DOUBLE PIPE HANDRAIL WITH POSTS AND GUARD PLATES, PAINTED	BYPRODUCTS RECYCLE EQUIPMENT BLDG	4,320.00	LF	-	228,960	894	72.48	/MH	293,742
			SELF CLOSING SWING GATE - USER DEFINED	REAGENT PREP ENCLOSURE 50'X50' SUPERSTRUCTURE	40.00	EA	-	11,200	184	72.48	/MH	24,530
			SELF CLOSING SWING GATE - USER DEFINED	BYPRODUCTS RECYCLE EQUIPMENT BLDG	58.00	EA	-	16,240	267	72.48	/MH	35,568
			LADDER	REAGENT PREP ENCLOSURE 50'X50' SUPERSTRUCTURE	800.00	LF	-	40,000	368	72.48	/MH	66,659
			LADDER	BYPRODUCTS RECYCLE EQUIPMENT BLDG	1,100.00	LF	-	55,000	506	72.48	/MH	91,657
			STAIR SYSTEM	REAGENT PREP ENCLOSURE 50'X50' SUPERSTRUCTURE	2,400.00	SF	-	218,400	3,172	72.48	/MH	448,337

ENTERGY ARKANSAS
 INDEPENDENCE STATION DRY (SDA) FGD
 CONCEPTUAL COST ESTIMATE



Area	Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Crew Rate	Labor Cost	Total Cost
		23.17.00	GALLERY STAIR SYSTEM GALLERY	BYPRODUCTS RECYCLE EQUIPMENT BLDG	3,500.00 SF	-	-	318,500	4,626	72.48 /MH	335,324	653,824
								1,204,900	11,798		855,147	2,060,047
		23.25.00	ROLLED SHAPE LIGHT WEIGHT MEMBERS, LESS THAN 20 LB/LF, TWO COAT PAINT	REAGENT PREP ENCLOSURE 50'X50' GALLERY SUPPORT	200.00 TN	-	-	716,000	5,057	98.30 /MH	497,149	1,213,149
			LIGHT WEIGHT MEMBERS, LESS THAN 20 LB/LF, TWO COAT PAINT	BYPRODUCTS RECYCLE EQUIPMENT BLDG	288.00 TN	-	-	1,031,040	7,283	98.30 /MH	715,895	1,746,935
			LIGHT WEIGHT MEMBERS, LESS THAN 20 LB/LF, GALVANIZED	U1 BAGHOUSE SKIRTS STEEL GIRTS	36.00 TN	-	-	138,240	910	98.30 /MH	89,487	227,727
			LIGHT WEIGHT MEMBERS, LESS THAN 20 LB/LF, GALVANIZED	U2 BAGHOUSE SKIRTS STEEL GIRTS	36.00 TN	-	-	138,240	910	98.30 /MH	89,487	227,727
			BUILDING MIX, TWO COAT PAINTED		50.00 TN	-	-	128,000	920	98.30 /MH	90,391	218,391
			BUILDING MIX, TWO COAT PAINTED		50.00 TN	-	-	128,000	920	98.30 /MH	90,391	218,391
			BUILDING MIX, TWO COAT PAINTED	REAGENT PREP ENCLOSURE SUPERSTRUCTURE	500.00 TN	-	-	1,280,000	9,195	98.30 /MH	903,908	2,183,908
			BUILDING MIX, TWO COAT PAINTED	BYPRODUCTS RECYCLE EQUIPMENT BLDG	720.00 TN	-	-	1,843,200	13,241	98.30 /MH	1,301,628	3,144,828
			ROLLED SHAPE					5,402,720	38,437		3,778,336	9,181,056
			STEEL					6,607,620	50,235		4,633,483	11,241,103
	24.00.00		ARCHITECTURAL									
		24.17.00	ELEVATOR PASSENGER, TRACTION, 4 STOPS, 3500LB, 350 FT/MIN ELEVATOR	SCHINDLER ELEVATOR BUDGET	2.00 LS	-	-	318,700	1,885	114.46 /MH	215,764	534,464
								318,700	1,885		215,764	534,464
		24.35.00	PRE-ENGINEERED BUILDING PRE-ENGINEERED BUILDING	8' X 10' UNIT 1 BAGHOUSE AREA, COMPRESSOR BLDG	1.00 LT	-	-	20,000	115	98.30 /MH	11,299	31,299
			PRE-ENGINEERED BUILDING	8' X 10' UNIT 2 BAGHOUSE AREA, TRUCK SCALE HOUSE	1.00 LT	-	-	10,000	115	98.30 /MH	11,299	21,299
			PRE-ENGINEERED BUILDING					30,000	230		22,598	52,598
		24.37.00	ROOFING METAL, INSULATED, 2 IN GALVANIZED, PAINTED, 22 GA	U1 SDA TOP ENCLOSURE ROOF	3,318.00 SF	-	-	54,946	339	60.10 /MH	20,400	75,346
			METAL, INSULATED, 2 IN GALVANIZED, PAINTED, 22 GA	U2 SDA TOP ENCLOSURE ROOF	3,318.00 SF	-	-	54,946	339	60.10 /MH	20,400	75,346
			METAL, INSULATED- USER DEFINED	REAGENT PREP ENCLOSURE SUPERSTRUCTURE	2,500.00 SF	-	-	19,425	862	60.10 /MH	51,810	71,235
			METAL, INSULATED- USER DEFINED	BYPRODUCTS RECYCLE EQUIPMENT BLDG	3,600.00 SF	-	-	27,972	1,241	60.10 /MH	74,607	102,579
			ROOFING					157,289	2,782		167,216	324,506
		24.41.00	SIDING METAL, INSULATED, 2 IN THICK FIBERGLASS, 22 GA, GALVANIZED PAINTED	U1 SDA TOP ENCLOSURE SIDING	2,450.00 SF	-	-	40,572	251	87.92 /MH	22,036	62,608
			METAL, INSULATED, 2 IN THICK FIBERGLASS, 22 GA, GALVANIZED PAINTED	U2 SDA TOP ENCLOSURE SIDING	2,450.00 SF	-	-	40,572	251	87.92 /MH	22,036	62,608
			METAL, INSULATED, 2 IN THICK FIBERGLASS, 22 GA, GALVANIZED PAINTED	REAGENT PREP ENCLOSURE	10,000.00 SF	-	-	165,600	1,023	87.92 /MH	89,941	255,541
			METAL, INSULATED, 2 IN THICK FIBERGLASS, 22 GA, GALVANIZED PAINTED	BYPRODUCTS RECYCLE EQUIPMENT BLDG	14,400.00 SF	-	-	238,464	1,473	87.92 /MH	129,515	367,979
			METAL, UNINSULATED, 24 GA, GALVANIZED CORRUGATED	U1 BAGHOUSE SKIRTS 6x(83'+63) x30' tall'	26,260.00 SF	-	-	85,345	1,238	87.92 /MH	108,805	194,150
			METAL, UNINSULATED, 24 GA, GALVANIZED CORRUGATED	U2 BAGHOUSE SKIRTS 6x(83'+63) x30' tall'	26,280.00 SF	-	-	85,410	1,238	87.92 /MH	108,887	194,297
			SIDING					655,963	5,473		481,220	1,137,183
		24.99.00	ARCHITECTURAL, MISCELLANEOUS PENTHOUSE HEATING	U1 SDA SUPERSTRUCTURE	6,400.00 SF	-	-	64,000	74	73.32 /MH	5,394	69,394
			PENTHOUSE LIGHTING	U1 SDA SUPERSTRUCTURE	6,400.00 SF	-	-	64,000	74	84.60 /MH	6,223	70,223
			PENTHOUSE FIRE PROTECTION	U1 SDA SUPERSTRUCTURE	6,400.00 SF	-	-	32,000	37	84.60 /MH	3,112	35,112
			PENTHOUSE HEATING	U2 SDA SUPERSTRUCTURE	6,400.00 SF	-	-	64,000	74	73.32 /MH	5,394	69,394
			PENTHOUSE LIGHTING	U2 SDA SUPERSTRUCTURE	6,400.00 SF	-	-	64,000	74	84.60 /MH	6,223	70,223
			PENTHOUSE FIRE PROTECTION	U2 SDA SUPERSTRUCTURE	6,400.00 SF	-	-	32,000	37	84.60 /MH	3,112	35,112
			ARCHITECTURAL, MISCELLANEOUS - USER DEFINED	U1 BAGHOUSE SKIRTS MANDOORS	3.00 EA	-	-	1,500	28	58.15 /MH	1,604	3,104
			ARCHITECTURAL, MISCELLANEOUS - USER DEFINED	U2 BAGHOUSE SKIRTS MANDOORS	3.00 EA	-	-	1,500	28	58.15 /MH	1,604	3,104
			ARCHITECTURAL, MISCELLANEOUS					323,000	423		32,666	355,666
			ARCHITECTURAL					1,484,952	10,794		919,463	2,404,415
	31.00.00		MECHANICAL EQUIPMENT									
		31.41.00	FIRE PROTECTION EQUIPMENT & SYSTEM									

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		31.41.00	FIRE PROTECTION EQUIPMENT & SYSTEM									
			FIRE PROTECTION EQUIPMENT & SYSTEM - USER DEFINED	REAGENT PREP ENCLOSURE 50'X50' FIRE PROTECTION ALLOWANCE	5,000.00 SF	-	-	27,500	385	75.53 /MH	29,083	56,583
			FIRE PROTECTION EQUIPMENT & SYSTEM - USER DEFINED	BYPRODUCTS RECYCLE EQUIPMENT BLDG' FIRE PROTECTION ALLOWANCE	10,800.00 SF	-	-	59,400	832	75.53 /MH	62,820	122,220
			FIRE PROTECTION EQUIPMENT & SYSTEM					86,900	1,217		91,904	178,804
		31.45.00	FGD EQUIPMENT									
			DRY FGD ISLAND -UNITS 1 & 2 FGD SYSTEMS	INCLUDES ABSORBERS, BAGHOUSES, REAGENT PREP, BYPRODUCT RECYCLE, ID BOOSTER FANS, CONTROLS, PIPING, DUCTWORK, AND WIRING WITHIN FGD ISLAND (BASED ON RECENT BUDGETARY QUOTE FROM SIMILARLY SIZED PROJECT)	1.00 LS		150,000,000	-		100.38 /MH		150,000,000
			DRY FGD ISLAND -UNITS 1 & 2 FGD SYSTEMS	INSTALLATION COST FOR DRY FGD ISLAND INCLUDING ITEMS LISTED ABOVE	1.00 LS	145,000,000		-		100.38 /MH		145,000,000
			FGD EQUIPMENT			145,000,000	150,000,000					295,000,000
			MECHANICAL EQUIPMENT			145,000,000	150,000,000	86,900	1,217		91,904	295,178,804
		34.00.00	HVAC									
		34.99.00	HVAC, MISCELLANEOUS									
			HVAC, MISCELLANEOUS - HVAC ALLOWANCE	REAGENT PREP ENCLOSURE 50'X50' LIGHTING ALLOWANCE	5,000.00 SF	-	-	55,000	57	73.32 /MH	4,214	59,214
			HVAC, MISCELLANEOUS - HVAC ALLOWANCE	BYPRODUCTS RECYCLE EQUIPMENT BLDG LIGHTING ALLOWANCE	10,800.00 SF	-	-	118,800	124	73.32 /MH	9,102	127,902
			HVAC, MISCELLANEOUS					173,800	182		13,316	187,116
			HVAC					173,800	182		13,316	187,116
		36.00.00	INSULATION									
		36.13.00	DUCT									
			MINERAL WOOL INSULATION, 4 IN THICK, 8 LB/CF DENSITY, ALUMINUM LAGGING, INSTALLED IN PLACE	U1 BAGHOUSE INSULATION TOP, SIDES AND HOPPERS	141,831.00 SF	-	-	850,986	35,050	73.69 /MH	2,582,848	3,433,834
			MINERAL WOOL INSULATION, 4 IN THICK, 8 LB/CF DENSITY, ALUMINUM LAGGING, INSTALLED IN PLACE	U2 BAGHOUSE INSULATION - TOPS, SIDES AND HOPPERS	141,831.00 SF	-	-	850,986	35,050	73.69 /MH	2,582,848	3,433,834
			MINERAL WOOL INSULATION, 6 IN THICK, 8 LB/CF DENSITY, ALUMINUM LAGGING, INSTALLED IN PLACE	SDA SHELL INSULATION	40,167.00 SF	-	-	261,086	10,388	73.69 /MH	765,493	1,026,578
			MINERAL WOOL INSULATION, 6 IN THICK, 8 LB/CF DENSITY, ALUMINUM LAGGING, INSTALLED IN PLACE	SDA ROOF INSULATION	11,019.00 SF	-	-	71,624	2,850	73.69 /MH	209,997	281,621
			MINERAL WOOL INSULATION, 6 IN THICK, 8 LB/CF DENSITY, ALUMINUM LAGGING, INSTALLED IN PLACE	SDA SHELL INSULATION	40,167.00 SF	-	-	261,086	10,388	73.69 /MH	765,493	1,026,578
			MINERAL WOOL INSULATION, 6 IN THICK, 8 LB/CF DENSITY, ALUMINUM LAGGING, INSTALLED IN PLACE	SDA ROOF INSULATION	11,019.00 SF	-	-	71,624	2,850	73.69 /MH	209,997	281,621
			MINERAL WOOL INSULATION, 6 IN THICK, 8 LB/CF DENSITY, ALUMINUM LAGGING, INSTALLED IN PLACE	UNIT 1 DUCTWORK (NOT INCLUDED IN FGD ISLAND SCOPE)	168,220.00 SF	-	-	1,093,430	43,505	73.69 /MH	3,205,896	4,299,326
			MINERAL WOOL INSULATION, 6 IN THICK, 8 LB/CF DENSITY, ALUMINUM LAGGING, INSTALLED IN PLACE	UNIT 2 DUCTWORK (NOT INCLUDED IN FGD ISLAND SCOPE)	168,220.00 SF	-	-	1,093,430	43,505	73.69 /MH	3,205,896	4,299,326
			DUCT					4,554,250	183,586		13,528,470	18,082,720
			INSULATION					4,554,250	183,586		13,528,470	18,082,720
		41.00.00	ELECTRICAL EQUIPMENT									
		41.37.00	LIGHTING ACCESSORY (FIXTURE)									
			LIGHTING ACCESSORY (FIXTURE) - ALLOWANCE	REAGENT PREP ENCLOSURE 50'X50' LIGHTING ALLOWANCE	5,000.00 SF	-	-	55,000	57	69.31 /MH	3,983	58,983
			LIGHTING ACCESSORY (FIXTURE) - ALLOWANCE	BYPRODUCTS RECYCLE EQUIPMENT BLDG LIGHTING ALLOWANCE	10,800.00 SF	-	-	118,800	124	69.31 /MH	8,604	127,404
			LIGHTING ACCESSORY (FIXTURE)					173,800	182		12,587	186,387
			ELECTRICAL EQUIPMENT					173,800	182		12,587	186,387
			101 FGD ISLAND			147,908,000	150,000,000	16,508,216	343,779		26,553,044	340,969,260
102		21.00.00	REAGENT HANDLING SYSTEM									
			CIVIL WORK									
		21.14.00	STRIP & STOCKPILE TOPSOIL									
			STRIP & STOCKPILE TOPSOIL - 12' STRIP & STOCKPILE TOPSOIL	EXTEND REAGENT RAIL TRACK	22,500.00 SF	-	-		52	185.95 /MH	9,618	9,618
									52		9,618	9,618
		21.41.00	EROSION AND SEDIMENTATION CONTROL									
			CRUSHED ROCK SURFACING, 12" DEEP WHITE ROCK	EXTEND REAGENT RAIL TRACK	2,500.00 SY	-	-	26,625	86	103.37 /MH	8,911	35,536

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			EROSION AND SEDIMENTATION CONTROL						26,625	86		8,911	35,536
	21.53.00		PILING PILE - 18" AUGER CAST X 60' LONG PILING	UNLOADING SHED 200' X 75 WIDE	64.00 EA	230,400	-			115.48 /MH		230,400	
						230,400						230,400	
	21.54.00		CAISSON 2.5 FT DIA X 30 FT DEEP CAISSON	SUBSTRUCTURE 2200 TON LIME STORAGE SILOS	100.00 EA	-	-	185,700	2,529	115.48 /MH	292,018	477,718	
			CAISSON					185,700	2,529		292,018	477,718	
	21.71.00		TRACKWORK LIME RAILCAR UNLOADING SPUR TRACKWORK	ALLOWANCE	1,000.00 LF	-	-	170,000	1,724	87.32 /MH	150,552	320,552	
			CIVIL WORK			230,400		170,000	1,724		150,552	320,552	
								382,325	4,391		461,099	1,073,824	
	22.00.00		CONCRETE										
	22.13.00		CONCRETE MAT FOUNDATION LESS THAN 5FT THICK, 4500 PSI - COMPOSITE RATE	SUBSTRUCTURE 2-2,000 TON LIME STORAGE SILOS	600.00 CY	-	-	138,000	4,828	68.52 /MH	330,786	468,786	
			FOUNDATION, 4500 PSI - COMPOSITE RATE	UNLOADING SHED 200' X 75 WIDE	925.00 CY	-	-	212,750	7,443	68.52 /MH	509,962	722,712	
			CONCRETE					350,750	12,270		840,748	1,191,498	
			CONCRETE					350,750	12,270		840,748	1,191,498	
	24.00.00		ARCHITECTURAL										
	24.35.00		PRE-ENGINEERED BUILDING SHELL ONLY, STEEL UNINSULATED 22 GA, PRE-ENGINEERED BUILDING	UNLOADING SHED 200' X 75 WIDE x15' TALL	15,000.00 SF	-	-	525,000	4,828	98.30 /MH	474,552	999,552	
			ARCHITECTURAL					525,000	4,828		474,552	999,552	
								525,000	4,828		474,552	999,552	
	26.00.00		MISCELLANEOUS STRUCTURAL ITEM										
	26.13.00		CONCRETE SILO CONCRETE SILO - 2,000 TON LIME STORAGE SILO	SUBCONTRACT - ERRECTED	2.00 LS	5,600,000	-	-		68.52 /MH		5,600,000	
			CONCRETE SILO - BIN VENT FILTERS	INCLUDED W/ SILO	1.00 LS	-	-	-	0	/MH			
			CONCRETE SILO - LEVEL INDICATOR	INCLUDED W/ SILO	1.00 LS	-	-	-	0	/MH			
			CONCRETE SILO - VACUUM PRESSURE RELIEF VALVE	INCLUDED W/ SILO	1.00 LS	-	-	-	0	/MH			
			CONCRETE SILO - MANHOLE	INCLUDED W/ SILO	1.00 LS	-	-	-	0	/MH			
			CONCRETE SILO			5,600,000		-	0			5,600,000	
			MISCELLANEOUS STRUCTURAL ITEM			5,600,000			0			5,600,000	
	31.00.00		MECHANICAL EQUIPMENT										
	31.25.00		CRANES & HOISTS CRANES & HOISTS & TROLLEYS	REAGENT HANDLING SYSTEM ALLOWANCE	1.00 LT	-	-	275,000		75.53 /MH		275,000	
			CRANES & HOISTS					275,000				275,000	
			MECHANICAL EQUIPMENT					275,000				275,000	
	33.00.00		MATERIAL HANDLING EQUIPMENT										
	33.14.00		MATERIAL HANDLING EQUIPMENT LIME HANDLING SYSTEM - 25 TPH PNEUMATIC TRAIN UNLOADING SYSTEM		1.00 LS	-	500,000	-	3,306	75.53 /MH	249,683	749,683	
			LIME HANDLING SYSTEM - VACUUM EXHAUSTER WITH SOUND ENCLOSURES	INCLUDED WITH 25 TPH PNEUMATIC TRAIN UNLOADING SYSTEM	2.00 LS	-	-	-		/MH			
			LIME HANDLING SYSTEM - RECEIVING PANS UNDER RAIL CARS	INCLUDED WITH 25 TPH PNEUMATIC TRAIN UNLOADING SYSTEM	1.00 LS	-	-	-		/MH			
			LIME HANDLING SYSTEM - FILTER SEPARATORS ON TOP OF SILO	INCLUDED WITH 25 TPH PNEUMATIC TRAIN UNLOADING SYSTEM	1.00 LS	-	-	-		/MH			
			LIME HANDLING SYSTEM - 25 TPH PNEUMATIC TRANSPORT SYSTEM		2.00 LS	-	1,000,000	-	6,611	75.53 /MH	499,366	1,499,366	
			LIME HANDLING SYSTEM - PRESSURE BLOWERS WITH SOUND ENCLOSURES	INCLUDED WITH 25 TPH PNEUMATIC TRANSPORT SYSTEM	3.00 LS	-	-	-		/MH			
			LIME HANDLING SYSTEM - PRESSURE FEEDERS	INCLUDED WITH 25 TPH PNEUMATIC TRANSPORT SYSTEM	1.00 LS	-	-	-		/MH			
			LIME HANDLING SYSTEM - SPARE PARTS FOR STARTUP AND SPECIAL TOOLS		1.00 LS	-	8,000	-		75.53 /MH		8,000	
			LIME HANDLING SYSTEM - FREIGHT		1.00 LS	-	50,000	-		75.53 /MH		50,000	
			MATERIAL HANDLING EQUIPMENT				1,558,000		9,917		749,049	2,307,049	
	33.41.00		MOBILE YARD EQUIPMENT										

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		33.41.00	MOBILE YARD EQUIPMENT MOBILE YARD EQUIPMENT - TRACKMOBILE MOBILE YARD EQUIPMENT	REAGENT HANDLING SYSTEM	1.00 EA	-	225,000	-		75.53 /MH		225,000
							225,000					225,000
		33.51.00	RAIL CAR UNLOADER RAIL CAR UNLOADER - RAIL CAR UNLOADER	IN UNLOADING SHED 200'X75' WIDE	2.00 LT	-	270,000	-	3,724	98.30 /MH	366,083	636,083
							270,000		3,724		366,083	636,083
			MATERIAL HANDLING EQUIPMENT				2,053,000		13,641		1,115,132	3,168,132
	34.00.00		HVAC									
		34.99.00	HVAC, MISCELLANEOUS HVAC, MISCELLANEOUS - HVAC ALLOWANCE HVAC, MISCELLANEOUS	2-2000 TON LIME STORAGE SILOS	3,600.00 SF	-	-	39,600	41	73.32 /MH	3,034	42,634
								39,600	41		3,034	42,634
			HVAC					39,600	41		3,034	42,634
	35.00.00		PIPING									
		35.14.10	CARBON STEEL, STRAIGHT RUN 8 IN DIA, SCH 40, 8" VACUUM CONVEY PIPING WITH 4 ELBOWS	TO SUPPORT 25 TPH PNEUMATIC TRAIN UNLOADING SYSTEM	500.00 LF	-	38,000	-	540	93.09 /MH	50,290	88,290
					2,500.00 LF	-	225,000	-	3,966	93.09 /MH	369,150	594,150
			CARBON STEEL, STRAIGHT RUN					263,000	4,506		419,440	682,440
			PIPING					263,000	4,506		419,440	682,440
	41.00.00		ELECTRICAL EQUIPMENT									
		41.37.00	LIGHTING ACCESSORY (FIXTURE) LIGHTING ACCESSORY (FIXTURE) - ALLOWANCE LIGHTING ACCESSORY (FIXTURE)	2-2000 TON LIME STORAGE SILO	2,500.00 SF	-	-	27,500	29	69.31 /MH	1,992	29,492
								27,500	29		1,992	29,492
			ELECTRICAL EQUIPMENT					27,500	29		1,992	29,492
			102 REAGENT HANDLING SYSTEM				5,830,400	2,591,000	1,325,175	39,706	3,315,997	13,062,572
105			BYPRODUCT HANDLING SYSTEM									
	21.00.00		CIVIL WORK									
		21.54.00	CAISSON 2.5 FT DIA X 30 FT DEEP CAISSON	ASH SILO AND FGD BYPRODUCT SILOS	125.00 EA	-	-	232,125	3,161	115.48 /MH	365,023	597,148
								232,125	3,161		365,023	597,148
			CIVIL WORK					232,125	3,161		365,023	597,148
	22.00.00		CONCRETE									
		22.13.00	CONCRETE MAT FOUNDATION LESS THAN 5FT THICK, 4500 PSI - COMPOSITE RATE	FGD BYPRODUCT SILOS	614.00 CY	-	-	141,220	4,940	68.52 /MH	338,505	479,725
					67.00 CY	-	-	15,410	539	68.52 /MH	36,938	52,348
					144.00 CY	-	-	33,120	1,159	68.52 /MH	79,389	112,509
					100.00 CY	-	-	23,000	805	68.52 /MH	55,131	78,131
			CONCRETE					212,750	7,443		509,962	722,712
			CONCRETE					212,750	7,443		509,962	722,712
	23.00.00		STEEL									
		23.13.75	SILO NEW 250 TON FLYASH BLENDING BIN SILO - 24FT DIA X 72 FT HIGH - ERECTION AND FREIGHT INCLUDED	SILO	1.00 EA	-	275,000	-	2,839	80.89 /MH	229,653	504,653
								275,000	2,839		229,653	504,653
			STEEL					275,000	2,839		229,653	504,653
	26.00.00		MISCELLANEOUS STRUCTURAL ITEM									
		26.13.00	CONCRETE SILO CONCRETE SILO - 2-2,200 TON FGD BYPRODUCT SILO CONCRETE SILO - BIN VENT FILTERS CONCRETE SILO - LEVEL INDICATOR CONCRETE SILO - VACUUM PRESSURE RELIEF VALVE CONCRETE SILO - MANHOLE	SUBCONTRACTED - ERECTED INCLUDED W/ SILO INCLUDED W/ SILO INCLUDED W/ SILO INCLUDED W/ SILO	2.00 LS 1.00 LS 1.00 LS 1.00 LS 1.00 LS	6,000,000 - - - -	- - - - -	- - - - -	68.52 /MH 0 /MH 0 /MH 0 /MH 0 /MH	- - - - -	6,000,000 - - - -	6,000,000 - - - -

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			CONCRETE SILO			6,000,000				0		6,000,000
			MISCELLANEOUS STRUCTURAL ITEM			6,000,000				0		6,000,000
33.00.00			MATERIAL HANDLING EQUIPMENT									
	33.13.00		BYPRODUCT HANDLING EQUIPMENT									
			PNEUMATIC ASH CONVEYORS	EQUIPMENT INCLUDES FREIGHT	1.00 LS	-	5,655,000	-		80.89 /MH		5,655,000
			PNEUMATIC ASH CONVEYORS	INSTALLATION COST	1.00 LT	-	-	-	79,293	80.89 /MH	6,414,019	6,414,019
			BLOWERS, PRESSURE FEEDERS, TRANSPORT PIPING AND VACUUM / PRESSURE RELIEF VALVES	INCLUDED ABOVE	1.00 LT	-	-	-		80.89 /MH		
			-FOUR PIN MIXERS BELOW CONCRETE SILOS INCL ALL VALVES AND ACCESSORIES		1.00 LT	-	540,000	-	3,347	80.89 /MH	270,749	810,749
			-DRY UNLOADING SPOUT BELOW THE PRODUCT SILO		2.00 EA	-	60,000	-	258	80.89 /MH	20,883	80,883
			AIRSLIDE CONVEYORS FROM BLENDING BIN MIXER/PIPE CONVEYOR, INCL ALL VALVES AND ACCESSORIES		4.00 EA	-	80,000	-	688	80.89 /MH	55,675	135,675
			BYPRODUCT HANDLING EQUIPMENT				6,335,000		83,587		6,761,325	13,096,325
	33.57.00		SCALE									
			SCALE - NEW TRUCK SCALES	BYPRODUCT HANDLING SYSTEM	2.00 EA	-	200,000	-	460	75.53 /MH	34,726	234,726
			SCALE				200,000		460		34,726	234,726
			MATERIAL HANDLING EQUIPMENT				6,535,000		84,046		6,796,052	13,331,052
34.00.00			HVAC									
	34.37.00		DUST COLLECTOR									
			DUST COLLECTOR - INSTALLED COST		1.00 LS	120,000	-	-		73.32 /MH		120,000
			DUST COLLECTOR			120,000						120,000
			HVAC			120,000						120,000
35.00.00			PIPING									
	35.14.10		CARBON STEEL, STRAIGHT RUN									
			12 IN DIA, 3/8 IN STD	CONVEYOR PIPING	2,000.00 LF	-	-	198,400	3,172	93.09 /MH	295,320	493,720
			12 IN DIA, 3/8 IN STD	12" TIE IN PIPING TO BYPRODUCT SILO FROM THE EXISTING 50 TPH FLY ASH PRESSURE SYSTEM	1,500.00 LF	-	-	148,800	2,379	93.09 /MH	221,490	370,290
			CARBON STEEL, STRAIGHT RUN					347,200	5,552		516,810	864,010
			PIPING					347,200	5,552		516,810	864,010
			105 BYPRODUCT HANDLING SYSTEM			6,120,000	6,810,000	792,075	103,041		8,417,500	22,139,575
121			CIVIL BOP									
	21.00.00		CIVIL WORK									
		21.14.00	STRIP & STOCKPILE TOPSOIL									
			STRIP & STOCKPILE TOPSOIL - 12"		300,000.00 SF	-	-	-	690	185.95 /MH	128,241	128,241
			STRIP & STOCKPILE TOPSOIL - ONSITE		40,000.00 CY	-	-	-	5,287	185.95 /MH	983,184	983,184
			STRIP & STOCKPILE TOPSOIL - 12"	SITE GRADING	600,000.00 SF	-	-	-	1,379	185.95 /MH	256,483	256,483
			STRIP & STOCKPILE TOPSOIL - ONSITE	SITE GRADING	160,000.00 CY	-	-	-	21,149	185.95 /MH	3,932,736	3,932,736
			STRIP & STOCKPILE TOPSOIL						28,506		5,300,644	5,300,644
		21.17.00	EXCAVATION									
			EXCAVATION - EXCAVATION , BACKFILL & COMPACT EXCAVATION	ALL FOUNDATIONS	12,600.00 CY	-	-	-	4,345	84.40 /MH	366,703	366,703
			EXCAVATION						4,345		366,703	366,703
		21.39.00	STORM DRAINAGE UTILITIES									
			STORM SEWER WORK	SITE GRADING	1.00 LT	-	-	110,000	2,299	86.33 /MH	198,460	308,460
			STORM DRAINAGE UTILITIES					110,000	2,299		198,460	308,460
		21.41.00	EROSION AND SEDIMENTATION CONTROL									
			CRUSHED ROCK SURFACING, 12" DEEP WHITE ROCK		33,334.00 SY	-	-	355,007	1,149	103.37 /MH	118,818	473,826
			CRUSHED ROCK SURFACING, 12" DEEP WHITE ROCK	SITE GRADING	66,667.00 SY	-	-	710,004	2,299	103.37 /MH	237,633	947,637
			EROSION AND SEDIMENTATION CONTROL					1,065,011	3,448		356,452	1,421,462
		21.57.00	ROAD, PARKING AREA, & SURFACED AREA									
			ONSITE ROAD UPGRADES	ALLOWANCE	1.00 LS	-	-	700,000	3,483	86.08 /MH	299,796	999,796
			ROAD, PARKING AREA, & SURFACED AREA					700,000	3,483		299,796	999,796
		21.99.00	CIVIL WORK, MISCELLANEOUS									
			CIVIL WORK - CONSTRUCTION LAYDOWN AREAS	FENCING, POWER ETC...	10.00 AC	-	-	842,400	9,195	84.40 /MH	776,092	1,618,492

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Area	Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Crew Rate	Labor Cost	Total Cost
			CIVIL WORK, MISCELLANEOUS					842,400	9,195		776,092	1,618,492
			CIVIL WORK					2,717,411	51,276		7,298,147	10,015,557
22.00.00			CONCRETE									
	22.13.00		CONCRETE									
			SLAB FOUNDATION LESS THAN 2 FT THICK, 4500 PSI, - COMPOSITE RATE	NEW WAREHOUSE BUILDING 200'X75'X15' TALL	555.00 CY	-	-	127,650	4,466	68.52 /MH	305,977	433,627
			CONCRETE FOUNDATIONS - COMPOSITE RATE	8' X 10' BYPRODUCT AREA, TRUCK SCALE HOUSE	6.00 CY	-	-	1,380	48	68.52 /MH	3,308	4,688
			CONCRETE					129,030	4,514		309,285	438,315
			CONCRETE					129,030	4,514		309,285	438,315
24.00.00			ARCHITECTURAL									
	24.35.00		PRE-ENGINEERED BUILDING									
			SHELL ONLY, STEEL UNINSULATED 22 GA, 200 FT X 75 FT x 15' TALL	NEW WAREHOUSE BUILDING 200'X75'X15' TALL	15,000.00 SF	-	-	420,000	5,862	98.30 /MH	576,241	996,241
			PRE-ENGINEERED BUILDING	8' X 10' BYPRODUCT AREA, TRUCK SCALE HOUSE	1.00 LT	-	-	10,000	115	98.30 /MH	11,299	21,299
			PRE-ENGINEERED BUILDING					430,000	5,977		587,540	1,017,540
	24.41.00		SIDING									
			INSULATION, 2 IN THICK FIBERGLASS,	NEW WAREHOUSE BUILDING 200'X75'X15' TALL	8,250.00 SF	-	-	9,900	95	87.92 /MH	8,337	18,237
			SIDING					9,900	95		8,337	18,237
			ARCHITECTURAL					439,900	6,072		595,877	1,035,777
27.00.00			PAINTING & COATING									
	27.17.00		PAINTING									
			PAINTING - ALLOWANCE	NEW WAREHOUSE BUILDING 200'X75'X15' TALL	15,000.00 SF	-	-	15,000	172	64.47 /MH	11,116	26,116
			PAINTING					15,000	172		11,116	26,116
			PAINTING & COATING					15,000	172		11,116	26,116
31.00.00			MECHANICAL EQUIPMENT									
	31.41.00		FIRE PROTECTION EQUIPMENT & SYSTEM									
			FIRE PROTECTION EQUIPMENT & SYSTEM	NEW WAREHOUSE BUILDING 200'X75'X15' TALL, FIRE PROTECTION ALLOWANCE	15,000.00 SF	-	-	82,500	1,155	75.53 /MH	87,250	169,750
			FIRE PROTECTION EQUIPMENT & SYSTEM					82,500	1,155		87,250	169,750
			MECHANICAL EQUIPMENT					82,500	1,155		87,250	169,750
34.00.00			HVAC									
	34.99.00		HVAC, MISCELLANEOUS									
			HVAC, MISCELLANEOUS - HVAC ALLOWANCE	NEW WAREHOUSE BUILDING 200'X75'X15' TALL	15,000.00 SF	-	-	165,000	172	73.32 /MH	12,641	177,641
			HVAC, MISCELLANEOUS					165,000	172		12,641	177,641
			HVAC					165,000	172		12,641	177,641
36.00.00			INSULATION									
	36.99.00		INSULATION, MISCELLANEOUS									
			INSULATION - ROOF INSULATION	NEW WAREHOUSE BUILDING 200'X75'X15' TALL	15,000.00 SF	-	-	18,000	172	58.15 /MH	10,026	28,026
			INSULATION, MISCELLANEOUS					18,000	172		10,026	28,026
			INSULATION					18,000	172		10,026	28,026
41.00.00			ELECTRICAL EQUIPMENT									
	41.37.00		LIGHTING ACCESSORY (FIXTURE)									
			LIGHTING ACCESSORY (FIXTURE) - ALLOWANCE	NEW WAREHOUSE BUILDING 200'X75'X15' TALL, LIGHTING ALLOWANCE	15,000.00 SF	-	-	165,000	172	69.31 /MH	11,950	176,950
			LIGHTING ACCESSORY (FIXTURE)					165,000	172		11,950	176,950
			ELECTRICAL EQUIPMENT					165,000	172		11,950	176,950
71.00.00			PROJECT INDIRECT									
	71.25.00		CONSULTANT, THIRD PARTY									
			CONSULTANT - SUBSURFACE INVESTIGATION		1.00 LS	200,000	-			/MH		200,000
			CONSULTANT - GEOTECHNICAL		1.00 LS	150,000	-			/MH		150,000

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Area	Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Crew Rate	Labor Cost	Total Cost
			CONSULTANT, THIRD PARTY				350,000					350,000
			PROJECT INDIRECT				350,000					350,000
151			121 CIVIL BOP				350,000	3,731,841	63,706		8,336,292	12,418,133
	21.00.00		MECHANICAL BOP									
		21.54.00	CIVIL WORK									
			CAISSON									
			2.5 FT DIA X 30 FT DEEP CAISSON	TANK FOUNDATIONS	76.00 EA	-	-	141,132	1,922	115.48 /MH	221,934	363,066
			2.5 FT DIA X 30 FT DEEP CAISSON	COMMON PIPE RACK FOUNDATIONS	223.00 EA	-	-	414,111	5,639	115.48 /MH	651,201	1,065,312
			2.5 FT DIA X 30 FT DEEP CAISSON	BYPRODUCT PIPE RACK FOUNDATIONS	57.00 EA	-	-	105,849	1,441	115.48 /MH	166,450	272,299
			2.5 FT DIA X 30 FT DEEP CAISSON	REAGENT UNLOADING PIPE RACK FOUNDATIONS	32.00 EA	-	-	59,424	809	115.48 /MH	93,446	152,870
			CAISSON					720,516	9,811		1,133,031	1,853,547
			CIVIL WORK					720,516	9,811		1,133,031	1,853,547
	22.00.00		CONCRETE									
		22.13.00	CONCRETE									
			SPREAD FOOTING FOUNDATION, 4500 PSI - COMPOSITE RATE	3X 35' DIA TANK FDN	81.00 CY	-	-	18,630	652	68.52 /MH	44,656	63,286
			CONCRETE FOUNDATIONS - COMPOSITE RATE	COMMON PIPE RACK FOUNDATIONS	250.00 CY	-	-	57,500	2,011	68.52 /MH	137,828	195,328
			CONCRETE FOUNDATIONS - COMPOSITE RATE	BYPRODUCT PIPE RACK FOUNDATIONS	65.00 CY	-	-	14,950	523	68.52 /MH	35,835	50,785
			CONCRETE FOUNDATIONS - COMPOSITE RATE	REAGENT UNLOADING PIPE RACK FOUNDATIONS	36.00 CY	-	-	8,280	290	68.52 /MH	19,847	28,127
			CONCRETE					99,360	3,476		238,166	337,526
			CONCRETE					99,360	3,476		238,166	337,526
	23.00.00		STEEL									
		23.21.00	GIRDER									
			ROLLED SHAPE GIRDER - MEDIUM WEIGHT MEMBER 20# TO 40# / LF, 2 COAT PAINTED	COMMON 750'X20'W, 550'X15'W, ALL 20' HIGH	235.00 TN	-	-	636,850	4,592	98.30 /MH	451,389	1,088,239
			ROLLED SHAPE GIRDER - MEDIUM WEIGHT MEMBER 20# TO 40# / LF, 2 COAT PAINTED	BYPRODUCT PIPE RACK, 200'X12'W X 20' HIGH	24.00 TN	-	-	65,040	469	98.30 /MH	46,099	111,139
			ROLLED SHAPE GIRDER - MEDIUM WEIGHT MEMBER 20# TO 40# / LF, 2 COAT PAINTED	REAGENT UNLOADING PIPE RACK, 200'X6' WIDE X 20' HIGH	12.00 TN	-	-	32,520	234	98.30 /MH	23,050	55,570
			GIRDER					734,410	5,295		520,538	1,254,948
			STEEL					734,410	5,295		520,538	1,254,948
	31.00.00		MECHANICAL EQUIPMENT									
		31.17.00	COMPRESSOR & ACCESSORIES									
			AIR COMPRESSOR, CENTRIFUGAL - 250 SCFM EA @ 200 PSIG	SERVICE AIR	2.00 EA	-	310,000	-	92	75.53 /MH	6,945	316,945
			AIR COMPRESSOR, CENTRIFUGAL - 250 SCFM EA @ 200 PSIG	INSTRUMENT AIR	2.00 EA	-	310,000	-	92	75.53 /MH	6,945	316,945
			AIR DRYER - W/FILTERS, 250 NET SCFM EA	SERVICE AIR	2.00 EA	-	33,400	-	74	75.53 /MH	5,556	38,956
			AIR DRYER - W/FILTERS, 250 NET SCFM EA	INSTRUMENT AIR	2.00 EA	-	33,400	-	74	75.53 /MH	5,556	38,956
			AIR RECEIVER - 1,000 GALLON EA	SERVICE AIR	2.00 EA	-	11,200	-	37	75.53 /MH	2,778	13,978
			AIR RECEIVER - 1,000 GALLON EA	INSTRUMENT AIR	2.00 EA	-	11,200	-	37	75.53 /MH	2,778	13,978
			COMPRESSOR & ACCESSORIES					709,200	405		30,559	739,759
		31.41.00	FIRE PROTECTION EQUIPMENT & SYSTEM									
			DELUGE - POWER TRANSFORMERS		3.00 EA	-	-	127,500	1,959	93.09 /MH	182,328	309,828
			FIRE PROTECTION EQUIPMENT & SYSTEM					127,500	1,959		182,328	309,828
		31.65.00	HEAT EXCHANGER									
			HEAT EXCHANGER - SLAKER WATER HEATER 3" IN-LINE, 475 KW		4.00 EA	-	220,000	-	368	69.31 /MH	25,493	245,493
			HEAT EXCHANGER					220,000	368		25,493	245,493
		31.75.00	PUMP									
			CENTRIFUGAL, HORIZONTAL, SINGLE STAGE - MAKEUP WATER PUMPS, 2600 GPM, 200 TDH		2.00 EA	-	96,000	-	577	75.53 /MH	43,582	139,582
			CENTRIFUGAL, HORIZONTAL, SINGLE STAGE - RECYCLE ASH WATER PUMP, 50 HP		3.00 EA	-	72,000	-	221	75.53 /MH	16,669	88,669
			CENTRIFUGAL, HORIZONTAL, SINGLE STAGE - LIME SLAKING WATER PIUMPS, 50 HP		2.00 EA	-	48,000	-	147	75.53 /MH	11,112	59,112
			SUMP, CENTRIFUGAL, WET BEARING - REGENT PREP/RECYCLE SUMP, 120GPM, 150 TDH		4.00 EA	-	220,000	-	276	75.53 /MH	20,836	240,836
			SUMP, CENTRIFUGAL, WET BEARING - LIME SILO & UNLOADING AREA SUMP 120 GPM @ 150 TDH		2.00 EA	-	88,000	-	138	75.53 /MH	10,418	98,418

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Area	Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Crew Rate	Labor Cost	Total Cost
		31.75.00	PUMP									
			SUMP, CENTRIFUGAL, WET BEARING - WASTE ASH SILO AREA SUMP 120GPM @150 TDH		2.00 EA	-	88,000	-	138	75.53 /MH	10,418	98,418
			SUMP, CENTRIFUGAL, WET BEARING - WASTEWATER FORWARDING PUMP TO RECYCLED SLURRY, 100 GPM@150 TDH		4.00 EA	-	28,800	-	294	75.53 /MH	22,225	51,025
			SUMP, SUBMERSIBLE - RECYCLE ASH WATER TANK SUPPLY PUMP, 100 HP		2.00 EA	-	77,000	-	690	75.53 /MH	52,090	129,090
			PUMP				<u>717,800</u>		<u>2,480</u>		<u>187,349</u>	<u>905,149</u>
		31.83.00	TANK									
			ATMOSPHERIC, FIELD FABRICATED - LIME SLAKING WATER TANK, 175,000 GALLON	35' DIA X 24' HIGH	1.00 EA	220,000	-	-		94.32 /MH		220,000
			ATMOSPHERIC, FIELD FABRICATED - RECYCLE ASH WATER TANK, 200,000 GALLON	35' DIA X 30' HIGH	2.00 EA	500,000	-	-		94.32 /MH		500,000
			TANK			<u>720,000</u>						<u>720,000</u>
			MECHANICAL EQUIPMENT			<u>720,000</u>	<u>1,647,000</u>	<u>127,500</u>	<u>5,211</u>		<u>425,730</u>	<u>2,920,230</u>
	35.00.00		PIPING									
		35.13.01	SS 304, ABOVE GROUND, PROCESS AREA									
			1 IN DIA, SCH 40S		1,520.00 LF	-	-	32,832	1,974	93.09 /MH	183,783	216,615
			1.5 IN DIA, SCH 40S		1,380.00 LF	-	-	52,302	2,094	93.09 /MH	194,911	247,213
			2 IN DIA, SCH 40S		2,070.00 LF	-	-	113,022	3,426	93.09 /MH	318,946	431,968
			SS 304, ABOVE GROUND, PROCESS AREA					<u>198,156</u>	<u>7,494</u>		<u>697,640</u>	<u>895,796</u>
		35.13.10	CARBON STEEL, ABOVE GROUND, PROCESS AREA									
			1 IN DIA, SCH 80		260.00 LF	-	-	2,314	305	93.09 /MH	28,376	30,690
			2 IN DIA, SCH 80		2,260.00 LF	-	-	48,138	3,273	93.09 /MH	304,693	352,831
			2.5 IN DIA, SCH 40		1,000.00 LF	-	-	15,400	1,437	93.09 /MH	133,750	149,150
			3 IN DIA, SCH 40		7,160.00 LF	-	-	125,300	11,028	93.09 /MH	1,026,601	1,151,901
			3 IN DIA, SCH 80		1,760.00 LF	-	-	38,720	3,055	93.09 /MH	284,363	323,083
			4 IN DIA, SCH 40		1,000.00 LF	-	-	22,600	1,701	93.09 /MH	158,360	180,960
			6 IN DIA, SCH 40		880.00 LF	-	-	28,248	1,629	93.09 /MH	151,598	179,846
			6 IN DIA, SCH 40 VACUUM PIPE		2,260.00 LF	-	-	72,546	4,182	93.09 /MH	389,330	461,876
			8 IN DIA, SCH 80		3,520.00 LF	-	-	256,608	9,832	93.09 /MH	915,235	1,171,843
			CARBON STEEL, ABOVE GROUND, PROCESS AREA					<u>609,874</u>	<u>36,441</u>		<u>3,392,307</u>	<u>4,002,181</u>
		35.14.10	CARBON STEEL, STRAIGHT RUN									
			6 IN DIA, SCH 40, LIME SLAKING TANK MAKEUP	LIME SLAKING TANK MAKEUP	1,200.00 LF	-	-	27,480	1,214	93.09 /MH	112,992	140,472
			8 IN DIA, SCH 40, LIME SLAKING TANK MAKEUP	LIME SLAKING TANK MAKEUP	450.00 LF	-	-	13,905	486	93.09 /MH	45,261	59,166
			8 IN DIA, SCH 40, RECYCLE ASH WATER PIPING	RECYCLE ASH WATER PIPING	2,000.00 LF	-	-	61,800	2,161	93.09 /MH	201,160	262,960
			10 IN DIA, SCH 40, RECYCLE ASH TANK MAKEUP	RECYCLE ASH TANK MAKEUP	450.00 LF	-	-	24,660	610	93.09 /MH	56,817	81,477
			CARBON STEEL, STRAIGHT RUN					<u>127,845</u>	<u>4,471</u>		<u>416,230</u>	<u>544,075</u>
		35.15.10	CARBON STEEL, BURIED									
			3 IN DIA, SCH 40, WRAPPED		3,000.00 LF	-	-	51,000	2,241	93.09 /MH	208,650	259,650
			6 IN DIA, SCH 40, WRAPPED		750.00 LF	-	-	23,925	776	93.09 /MH	72,225	96,150
			10 IN DIA, SCH 40, WRAPPED, RECYCLE ASH WATER PIPE DISCHARGE BURIED	RECYCLE ASH WATER PIPE DISCHARGE BURIED	1,800.00 LF	-	-	119,700	2,441	93.09 /MH	227,268	346,968
			CARBON STEEL, BURIED					<u>194,625</u>	<u>5,459</u>		<u>508,143</u>	<u>702,768</u>
		35.15.25	FRP, BURIED									
			3 IN DIA, TAPER		1,000.00 LF	-	-	14,800	460	93.09 /MH	42,800	57,600
			3 IN DIA, TAPER FRP/HDPE PIPE		2,380.00 LF	-	-	35,224	1,094	93.09 /MH	101,864	137,088
			FRP, BURIED					<u>50,024</u>	<u>1,554</u>		<u>144,664</u>	<u>194,688</u>
		35.15.30	HDPE, BURIED									
			6 IN DIA, DR 9		1,430.00 LF	-	-	12,870	1,134	93.09 /MH	105,577	118,447
			8 IN DIA, DR 9		1,340.00 LF	-	-	20,770	1,278	93.09 /MH	119,005	139,775
			HDPE, BURIED					<u>33,640</u>	<u>2,413</u>		<u>224,582</u>	<u>258,222</u>
		35.36.00	PIPE SUPPORTS, RACK									
			SUPPORT SLEEPERS	BYPRODUCT PIPE, 1750LF	125.00 EA	-	-	43,750	575	93.09 /MH	53,500	97,250
			SUPPORT SLEEPERS	REAGENT UNLOADING PIPE, 1500LF	108.00 EA	-	-	37,800	497	93.09 /MH	46,224	84,024
			PIPE SUPPORTS, RACK					<u>81,550</u>	<u>1,071</u>		<u>99,724</u>	<u>181,274</u>
		35.45.00	VALVES									

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Area	Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Crew Rate	Labor Cost	Total Cost
		35.45.00	VALVES									
			VALVE - 36" 150 LB CS BUTTERFLY, FLANGED		2.00 EA	-	-	79,920	96	93.09 /MH	8,902	88,822
			VALVE - 12" 150 LB CS KNIFE GATE, FLANGED		6.00 EA	-	-	20,160	195	93.09 /MH	18,169	38,329
			VALVE - 12" 150 LB CS GATE VALVE, FLANGED		2.00 EA	-	-	8,920	65	93.09 /MH	6,056	14,976
			VALVE - 10" 150 LB CS SWING CHECK, FLANGED		2.00 EA	-	-	9,200	55	93.09 /MH	5,136	14,336
			VALVE - 10" 150 LB CS BUTTERFLY, FLANGED		5.00 EA	-	-	22,200	138	93.09 /MH	12,840	35,040
			VALVE - 8" 150 LB CS GATE, FLANGED		20.00 EA	-	-	100,000	425	93.09 /MH	39,590	139,590
			VALVE - 6" 150 LB CS GATE, FLANGED		6.00 EA	-	-	19,800	110	93.09 /MH	10,272	30,072
			VALVE - 6" 150 LB CS AIR OPERATED GATE, FLANGED		4.00 EA	-	-	20,400	74	93.09 /MH	6,848	27,248
			VALVE - 6" 150 LB CS AIR OPERATED GLOBE, FLANGED		4.00 EA	-	-	20,400	74	93.09 /MH	6,848	27,248
			VALVE - 6" 150 LB CS SWING CHECK, FLANGED		2.00 EA	-	-	3,400	37	93.09 /MH	3,424	6,824
			VALVE - 4" 150 LB CS GATE, FLANGED		3.00 EA	-	-	3,825	25	93.09 /MH	2,311	6,136
			VALVE - 3" AND BELOW CS FOR SERVICE WATER ISOLATION		120.00 EA	-	-	1,224,000	1,076	93.09 /MH	100,152	1,324,152
			VALVE - 3" AND BELOW CS FOR SERVICE AIR ISOLATION		120.00 EA	-	-	1,224,000	1,076	93.09 /MH	100,152	1,324,152
			VALVE - 3" 150 LB CS GATE, FLANGED		20.00 EA	-	-	15,000	179	93.09 /MH	16,692	31,692
			VALVE - 3" CS PST IND FOR FP 250 LB		6.00 EA	-	-	6,600	54	93.09 /MH	5,008	11,608
			VALVE - 2" AND ABOVE BRONZE VALVES FOR INSTRUMENT AIR ISOLATION		600.00 EA	-	-	78,000	501	93.09 /MH	46,673	124,673
			VALVE - 1" CS FLANGED		4.00 EA	-	-	880	21	93.09 /MH	1,969	2,849
			VALVE - 6" CI POST INDICATOR 250 LB., MECHANICAL JOINT WITH BOXES BURIED VALVE		6.00 EA	-	-	4,080	28	93.09 /MH	2,568	6,648
			VALVES					2,860,785	4,228		393,610	3,254,395
			PIPING					4,156,499	63,131		5,876,900	10,033,399
	36.00.00		INSULATION									
		36.17.01	PIPE, CALCIUM SILICATE W/ALUMINUM JACKETING									
			CALCIUM SILICATE W/ALUMINUM JACKETING - 8" PIPE 1.5" THICK		2,520.00 LF	-	-	16,380	487	73.69 /MH	35,859	52,239
			1" CALCIUM SILICATE W/ALUMINUM JACKETING - 3" PIPE		1,260.00 LF	-	-	3,591	155	73.69 /MH	11,419	15,010
			1" CALCIUM SILICATE W/ALUMINUM JACKETING - 3" PIPE		5,660.00 LF	-	-	16,131	696	73.69 /MH	51,297	67,428
			1" CALCIUM SILICATE W/ALUMINUM JACKETING - 2.5" PIPE		380.00 LS	-	-	1,083	47	73.69 /MH	3,444	4,527
			1" CALCIUM SILICATE W/ALUMINUM JACKETING - 2.0" PIPE		4,140.00 LS	-	-	10,309	476	73.69 /MH	35,066	45,375
			PIPE, CALCIUM SILICATE W/ALUMINUM JACKETING					47,494	1,860		137,085	184,579
			INSULATION					47,494	1,860		137,085	184,579
	41.00.00		ELECTRICAL EQUIPMENT									
		41.33.00	HEAT TRACING									
			HEAT TRACING - 8" PIPE		2,520.00 LS	-	-	18,749	43	69.31 /MH	3,011	21,760
			HEAT TRACING - 3" PIPE		1,260.00 LF	-	-	9,374	22	69.31 /MH	1,506	10,880
			HEAT TRACING - 3" PIPE		5,660.00 LF	-	-	42,110	98	69.31 /MH	6,764	48,874
			HEAT TRACING - 2.5" PIPE		380.00 LS	-	-	2,827	7	69.31 /MH	454	3,281
			HEAT TRACING - 2.0" PIPE		440.00 LS	-	-	3,274	8	69.31 /MH	526	3,799
			HEAT TRACING					76,334	177		12,261	88,595
			ELECTRICAL EQUIPMENT					76,334	177		12,261	88,595
			151 MECHANICAL BOP			720,000	1,647,000	5,962,113	88,963		8,343,711	16,672,824
190			DEMOLITION / RELOCATION									
	11.00.00		DEMOLITION									
		11.99.00	DEMOLITION, MISCELLANEOUS									
			DEMOLITION - MISC	ALLOWANCE	1.00 LT	-	-	1,800,000	33,333	98.30 /MH	3,276,667	5,076,667
			DEMOLITION, MISCELLANEOUS					1,800,000	33,333		3,276,667	5,076,667
			DEMOLITION					1,800,000	33,333		3,276,667	5,076,667
			190 DEMOLITION / RELOCATION					1,800,000	33,333		3,276,667	5,076,667
201			ELECTRICAL BOP SYSTEM									
	41.00.00		ELECTRICAL EQUIPMENT									
		41.99.00	ELECTRICAL EQUIPMENT, MISCELLANEOUS									
			ELECTRICAL EQUIPMENT AND MISCELLANEOUS COMPONENTS	ALLOWANCE	1.00 LT	-	12,300,000	1,600,000	88,322	69.31 /MH	6,121,587	20,021,587
			ELECTRICAL COMMODITIES - CABLE	ALLOWANCE	1.00 LT	-	-	8,500,000	88,391	84.60 /MH	7,477,862	15,977,862
			ELECTRICAL COMMODITIES - CONDUITS, RACEWAY, ETC.	ALLOWANCE	1.00 LT	-	-	1,400,000	107,471	84.60 /MH	9,092,069	10,492,069
			ELECTRICAL EQUIPMENT, MISCELLANEOUS					12,300,000	11,500,000	284,184	22,691,518	46,491,518
			ELECTRICAL EQUIPMENT					12,300,000	11,500,000	284,184	22,691,518	46,491,518

ENTERGY ARKANSAS
 INDEPENDENCE STATION DRY (SDA) FGD
 CONCEPTUAL COST ESTIMATE



Area	Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Crew Rate	Labor Cost	Total Cost
211			201 ELECTRICAL BOP SYSTEM				12,300,000	11,500,000	284,184		22,691,518	46,491,518
			INSTRUMENTATION AND CONTROLS BOP SYSTEM									
	44.00.00		CONTROL & INSTRUMENTATION									
		44.99.00	CONTROL & INSTRUMENTATION, MISCELLANEOUS									
			CONTROL & INSTRUMENTATION - MISC	ALLOWANCE	1.00 LT	-	1,500,000	1,085,000	10,920	72.29 /MH	789,374	3,374,374
			CONTROL & INSTRUMENTATION, MISCELLANEOUS				1,500,000	1,085,000	10,920		789,374	3,374,374
			CONTROL & INSTRUMENTATION				1,500,000	1,085,000	10,920		789,374	3,374,374
			211 INSTRUMENTATION AND CONTROLS BOP SYSTEM				1,500,000	1,085,000	10,920		789,374	3,374,374

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ADEQ Hearing: Regional Haze SIP Revision

January 19th, 2018

GOOD AFTERNOON. MY NAME IS GLEN HOOKS, AND I AM THE DIRECTOR OF THE ARKANSAS SIERRA CLUB. THANK YOU FOR THE OPPORTUNITY TO WEIGH IN ON THE DRAFT REGIONAL HAZE SIP REVISION. SIERRA CLUB WILL BE SUBMITTING DETAILED TECHNICAL COMMENTS PRIOR TO THE FEBRUARY 2ND DEADLINE, BUT I'LL OFFER SOME PRELIMINARY COMMENTS TODAY.

WE BELIEVE THAT THE DRAFT SIP IS ENTIRELY TOO WEAK. IT REQUIRES ALMOST NO ACTIONS ON THE PART OF ENTERGY TO CLEAN UP THE AGING, DIRTY, AND UNSCRUBBED WHITE BLUFF AND INDEPENDENCE COAL PLANTS. IT ALSO CONTEMPLATES A NOX TRADING PROGRAM THAT WILL PUT ARKANSAS COMMUNITIES AT RISK, AND FRANKLY CONTINUES AN UNBELIEVABLE DELAY IN ARKANSAS HAZE REDUCTION THAT IS ALREADY MORE THAN A DECADE OVERDUE.

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SINCE 1999, THE CLEAN AIR ACT HAS REQUIRED NUMEROUS STATES TO TAKE ACTION TO REDUCE SMOG/HAZE IN CERTAIN NATIONAL PARKS AND WILDERNESS AREAS, WITH THE GOAL OF RESTORING NATURAL VISIBILITY. HAZE IS LARGELY CAUSED BY POWER-PLANT AND INDUSTRIAL POLLUTION, AND COAL-BURNING POWER PLANTS ARE, BY FAR, THE LARGEST ^{SINGLE} EMITTERS OF HAZE-CAUSING POLLUTANTS IN ARKANSAS. AFFECTED STATES ARE REQUIRED TO DRAFT THEIR PLANS FOR HAZE REDUCTION AND GET THOSE PLANS APPROVED BY THE US ENVIRONMENTAL PROTECTION AGENCY. ARKANSAS IS ONE OF THOSE STATES.

TO BEGIN WITH, I'D LIKE TO ADDRESS OUR STATE'S INCREDIBLY IRRESPONSIBLE DELAY IN HAZE REDUCTION. THE ORIGINAL DEADLINE FOR ARKANSAS TO SUBMIT ITS STATE HAZE PLAN WAS IN 2007. ADEQ DRAFTED AND ~~FINALLY~~ SUBMITTED A HAZE REDUCTION PLAN IN ²⁰⁰⁸ 2011, WHICH EPA LARGELY REJECTED IN ²⁰¹² 2012 BECAUSE THE STATE FAILED TO ADDRESS THE BASIC

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REQUIREMENTS OF THE CLEAN AIR ACT—THE OBLIGATION TO ENSURE THAT THE OLDEST AND DIRTIEST SOURCES OF HAZE POLLUTION INSTALL “BEST AVAILABLE RETROFIT TECHNOLOGY” TO PROTECT AIR QUALITY IN NATIONAL PARKS AND WILDERNESS AREAS. INSTEAD OF SUBMITTING A REVISED PLAN FOR APPROVAL, ADEQ AFFIRMATIVELY CHOSE TO DO NOTHING AND NOT RESUBMIT.

THE STATE REFUSED TO RE-SUBMIT THE REJECTED PORTION, WHICH MEANT THAT THE EPA WAS REQUIRED BY FEDERAL LAW TO WRITE A PLAN FOR ARKANSAS. THE EPA TOOK ACTION, WROTE A PLAN, HELD A HEARING IN ARKANSAS, AND EVENTUALLY FINALIZED THE PLAN IN 2016, NEARLY A DECADE AFTER ARKANSAS WAS SUPPOSED TO SUBMIT THE ORIGINAL PLAN. THE EPA PLAN REQUIRED ENTERGY'S TWO OLDEST AND DIRTIEST COAL-BURNING POWER PLANTS (WHITE BLUFF AND INDEPENDENCE) TO INSTALL POLLUTION CONTROL EQUIPMENT ("SCRUBBERS"), AS A METHOD OF REDUCING THE HAZE PROBLEM IN OUR PARKS AND WILDERNESS AREAS. WHITE BLUFF AND INDEPENDENCE ARE AMONG THE LARGEST COAL-BURNING UNITS ANYWHERE IN THE COUNTRY THAT

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FOR ENTERGY TO REDUCE HAZE? BURN LOW-SULFUR COAL, WHICH
ENTERGY IS ALREADY DOING.

RESPECTFULLY, THIS IS NOT ENVIRONMENTAL ^{QUALITY} PROTECTION.

THIS IS A TIMELINE OF DELAY, REJECTED PLAN, A FAILURE TO TRY
AGAIN, THEN FIGHTING A WORTHY HAZE REDUCTION PLAN WHILE
SUBMITTING AN INFERIOR STATE PLAN YEARS AFTER THE FACT
THAT FAILS TO REDUCE HAZE BUT ADDS EVEN MORE DELAY.

IN ADDITION TO THE FAILURE TO REQUIRE SCRUBBERS ON
WHITE BLUFF AND INDEPENDENCE, THE DRAFT STATE PLAN GETS
RID OF SOURCE-SPECIFIC LIMITS ON NOX AND CONTEMPLATES
PARTICIPATION IN A TRADING PROGRAM INSTEAD. THE PROBLEM
HERE IS THAT SUCH A PLAN WILL ALLOW ENTERGY TO BUY
POLLUTION REDUCTION CREDITS IN FAR-AWAY STATES WHILE
CONTINUING TO POLLUTE ARKANSAS. WE URGE YOU TO SCRAP THIS
TRADING PROGRAM AND RETAIN THE SOURCE-SPECIFIC NOX LIMITS
THAT ARE CURRENTLY IN PLACE.

TO CONCLUDE: THE STATE HAZE REDUCTION PLAN BEING
CONSIDERED TODAY IS NOT SUFFICIENT. WE ARE MORE THAN A

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DECADE BEHIND IN HAZE REDUCTION EFFORTS—AND THAT IS
ALMOST ENTIRELY DUE TO THIS DEPARTMENT OF ENVIRONMENTAL
QUALITY DRAGGING ITS FEET AND THEN TRYING TO BLOCK
PROGRESS WHEN EPA STEPS IN AND MAKES PROGRESS HAPPEN.

IF YOU GENUINELY WANT HAZE REDUCTION, THEN REQUIRE
OUR STATE'S OLDEST, LARGEST, AND DIRTIEST UNSCRUBBED COAL
PLANTS TO INSTALL SCRUBBERS, JUST LIKE YOU DID IN THE ~~2011~~
HAZE REDUCTION PLAN THAT THIS DEPARTMENT SUBMITTED TO
EPA, ^{YEARS AGO}

INSTEAD

BUT IF YOU WANT DELAY AND YOU WANT NO PROGRESS ON
HAZE, AND YOU WANT OUR PARKS AND WILDERNESS AREAS TO
EXPERIENCE VISIBILITY PROBLEMS FOR EVEN LONGER THAN THEY
ALREADY HAVE—THEN CONTINUE BLOCKING A GOOD PLAN,
CONTINUE DELAY, AND APPROVE THIS WEAK, TOOTHLESS PLAN.

THANK YOU.

Public Comment Registration Card

Date 1-19 Verbal Comment Written Comment
Speaker # _____ (Attached or back of card)

Hearing Location ADEQ

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PLEASE PRINT LEGIBLY

Public Comment Registration Card

Date 1-19-18 Verbal Comment Written Comment
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Public Comment Registration Card

Date 1-19-18 Verbal Comment Written Comment
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Public Comment Registration Card

Date JAN 19 2018 Verbal Comment Written Comment
Speaker # _____ (Attached or back of card)

Hearing Location ADEQ

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Public Comment Registration Card

Date JAN 19 2018

Verbal Comment Speaker #

Written Comment
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ADEQ

ARKANSAS
Department of Environmental Quality
www.adeq.state.ar.us

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY

HEARING/MEETING REGISTRATION

Name <i>Please Print Legibly</i>	Address Street City State Zip	Organization Represented
GLEN Hooks	1309 W 2 ND LR AR 72201	SIERRA CLUB
SCHARME ROUSSEL	70 Reservoir Heights Dr LR 72227	Ark- IPL
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Paul Means	P.O. Box 551 L.R. 72203	Entergy
Sandra Byrd	1 Cooperative Way, LR 72219	AECC
Tracy Johnson	425 W Capital Ave, LR 72201	Entergy
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Kelley Crouch	285 Highway 71 S, Ashdown, AR 71822	Domtar
Charles Miller	415 N McKinley Suit 835 LR 72205	AIEF
Erin Hantson	1307 Prairie St. Conway AR	Conway Corp.
John Piserich	101 Morgan Keegan LR AR	PP&MR
STEPHEN C.A.M	121 LR AR	AECC
Josh Hatten	501 Wood Lane	Mule Assn,
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Dand Triplett	425 W Capital Ave Suite 220, LR, AR 72201	Entergy
Dina Nash	125 Fontainebleau Dr, Maumelle	S Club, CCL-
Jennifer Lorciano	LR, AR	AECC
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Jamie Ewing	Attorney Generals Office	AG
Rei Corbin	4715 W 29th LR AR 72204	self



February 2, 2018

By E-Mail to treecep@adeq.state.ar.us and by First Class Mail

Tricia Treece, Office of Air Quality
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

Re: Revisions to the Arkansas State Implementation Plan:
Regional Haze SIP Revisions for 2008-2018 Planning Period

Dear Ms. Treece:

Earthjustice, National Parks Conservation Association (“NPCA”), and Sierra Club (collectively, the “Conservation Groups”) hereby submit comments on “Revisions to the Arkansas State Implementation Plan: Regional Haze SIP Revisions for 2008-2018 Planning Period” (“Draft SIP”), a public review draft proposal issued by the Arkansas Department of Environmental Quality (“ADEQ”) in October 2017. Among other things, the proposal evaluates requirements for best available retrofit technology (“BART”) at the White Bluff coal-burning plant, and requirements for reasonable progress at the Independence coal-burning plant. For the reasons set forth in this letter, and under applicable standards, the proposal is unlawful and arbitrary, and must be withdrawn or significantly changed prior to issuance in final form.

I. REGIONAL HAZE

Air pollution destroys scenic vistas in our treasured national parks and wilderness areas. When Congress amended the Clean Air Act in 1977, it declared “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.” 42 U.S.C. § 7491(a)(1). “Mandatory class I” areas include 156 of the nation’s major parks and wilderness areas, including the Caney Creek Wilderness Area and the Upper Buffalo Wilderness Area. *Id.* § 7472; 40 C.F.R. § 81.404. The impairment of visibility, or haze, “reduces the clarity, color, and visible distance that one can see . . . [and] occurs virtually all the time at most national park and wilderness areas.” 76 Fed. Reg. 64,186, 64,188 (Oct. 17, 2011). The fine particulate

matter and other pollutants that impair visibility also can cause serious health effects and mortality in humans. *See* 64 Fed. Reg. 35,714, 35,715 (July 1, 1999).

Under the Act, each state in which a Class I area is located or which is the source of emissions that “may reasonably be anticipated to cause or contribute to any impairment of visibility” in a Class I area must submit an implementation plan that contains emission limits and compliance schedules “necessary to make reasonable progress toward meeting the national goal” of preventing and remedying visibility problems in the affected areas. 42 U.S.C. § 7491(b)(2). The U.S. Environmental Protection Agency (“EPA”) must approve or disapprove these plans based on whether they meet applicable requirements of the Clean Air Act. *Id.* § 7410(k), (l). If EPA finds that a state has failed to timely submit a required implementation plan or disapproves a submitted plan, EPA must promulgate a federal implementation plan (“FIP”) within two years of the finding of disapproval unless the state submits and EPA approves a plan before this deadline. *Id.* § 7410(c)(1).

A. Best Available Retrofit Technology

BART controls are required at fossil fuel-fired power plants and other major stationary sources that “may reasonably be anticipated to cause or contribute to any impairment of visibility in any such [mandatory Class I Federal] area,” and were in existence in 1977, but were not in operation before 1962. 42 U.S.C. § 7491(b)(2)(A); *see* 40 C.F.R. § 51.308(e).¹ BART is defined as “an emission limitation based on the degree of reduction achievable through the application of the *best* system of continuous emission reduction for each pollutant which is emitted by an existing stationary facility.” 40 C.F.R. § 51.301 (emphasis added).

When determining BART, the states and EPA must analyze “the best system of continuous emission control technology available” by taking into consideration five factors: (1) the costs of compliance, (2) the energy and non-air quality environmental impacts of compliance, (3) existing pollution controls at the source, (4) the remaining useful life of the source, and (5) the degree of visibility improvement from pollution controls. *Id.* § 51.308(e)(1)(ii)(A). BART is an essential component of the regional haze program because Congress largely grandfathered these antiquated sources into many of the Clean Air Act’s other requirements. *See* 70 Fed. Reg. 39,104, 39,111 (July 6, 2005). BART compels these older, disproportionately polluting sources to install up-to-date and cost-effective pollution controls. BART is a mandatory measure that must be implemented as part of a plan to achieve reasonable progress toward restoration of natural visibility conditions. 42 U.S.C. § 7491(b)(2). BART is subject to limited exceptions (*see id.* § 7491(c)) that are not applicable here, given the significant impact Arkansas sources have on Class I areas.

B. Reasonable Progress Goals and Controls

One of the main features of the Regional Haze Rule is the establishment of goals, expressed in deciviews to measure visibility impairment, that “provide for reasonable progress

¹ The term “major stationary source” includes any source that has the potential to emit 250 tons per year or more of any pollutant, and falls within one of 26 categories of industrial sources defined by the Act. 42 U.S.C. § 7491(g)(7).

towards achieving natural visibility conditions.” 40 C.F.R. § 51.308(d)(1). In developing these “reasonable progress goals” (“RPGs”) and the emission reductions needed to meet them, the state must consider four factors: (1) the costs of compliance, (2) the time necessary for compliance, (3) the energy and non-air quality environmental impacts of compliance, and (4) the remaining useful life of any potentially affected sources. 42 U.S.C. § 7491(g)(1); 40 C.F.R. § 51.308(d)(1)(i)(A).²

For each Class I area within its borders, a state must determine the uniform rate of progress (“URP”), which is the amount of progress that, if kept constant each year, would ensure that natural visibility conditions are achieved in 2064. *See* 40 C.F.R. § 51.308(d)(1)(i)(B). If a state selects a reasonable progress goal that achieves a slower rate of progress than the URP, the state must demonstrate, based on the four reasonable progress factors, “that the rate of progress for the implementation plan to attain natural conditions by 2064 is not reasonable; and that the progress goal adopted by the State is reasonable.” *Id.* § 51.308(d)(1)(ii).

C. Long-Term Strategy

A regional haze implementation plan must include, among other things, emission limits, schedules of compliance, and any other measures necessary to achieve the reasonable progress goals; these enforceable measures are called the long-term strategy. 40 C.F.R. § 51.308(d)(3)(ii). To eliminate haze caused by manmade air pollution, states must consider all air pollution sources that contribute to impairment in Class I areas. In developing a long-term strategy, a state must look at and beyond major stationary sources, including area, mobile, and minor sources as well as a number of other sources of impairment such as construction, agricultural, and forestry practices. *Id.* § 51.308(d)(3)(iv, v). The long-term strategy must achieve reasonable progress for both the Class I areas within a state’s borders as well as the out-of-state areas affected by the state’s emissions. *Id.* § 51.308(d)(3). To ensure that each state does its part to address regional haze, a state that contributes to impairment at another state’s Class I area must consult with the state that is home to the Class I area. *Id.* § 51.308(d)(3)(i).

II. REGIONAL HAZE IN ARKANSAS

A. Class I Areas Polluted by Emissions from Arkansas Sources

Emissions from Arkansas sources impact two in-state Class I areas: Caney Creek Wilderness Area and Upper Buffalo Wilderness Area. Caney Creek straddles two different sections of the Ouachita Mountains in western Arkansas. The Fourche Mountain subsection is characterized by deep slices carved by streams out of the ridges, large rock flows, and sandstone bluffs.³ The Upper Buffalo Wilderness Area in the Ozark Mountains provides visitors the opportunity to “be among the headwaters of the extraordinarily pretty

² In contrast to the definition of BART, the statute does not list visibility improvement as a fifth factor in the reasonable progress analysis. *Compare* 42 U.S.C. § 7491(g)(1) *with id.* § 7491(g)(2).

³ “Wilderness Stewardship Challenge: Air Quality Values Monitoring Plan for Ouachita National Forest, Arkansas and Oklahoma,” p. 17 (Sep. 30, 2009) available at: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3811710.pdf.

Buffalo National River, which flows down the center of this Wilderness through a rough forested land of steep slopes that descend into deep valleys.”⁴ The Whitaker Point Trail winds its way to the top of Hawksbill Crag,⁵ a scenic rocky outcropping which is one of the most photographed places in Arkansas.⁶

Air pollution from Arkansas sources mars the unique scenery outside of the state too, including in Missouri’s Hercules Glades Wilderness Area and Mingo National Wildlife Refuge. The Hercules Glades Wilderness spans 12,413 acres of some of the “most scenic and unique country in the Midwest” with “[i]ts combination of open grassland, forested knobs, steep rocky hillsides, and narrow drainages offers unusual beauty.”⁷ The 21,592-acre Mingo National Wildlife Refuge provides food and shelter for migratory waterfowl and protects a bottomland hardwood forest.⁸

B. Arkansas Haze Pollution Sources

Electric generating units (“EGUs”) emit the overwhelming majority of haze-causing pollutants in Arkansas. Of these pollutants, sulfates and nitrates contribute most significantly to the visibility problem in Arkansas’s Class I areas.⁹

The Independence plant is an 1,800 MW coal-burning electric generating station operated by Entergy Arkansas, Inc. The plant consists of two nearly identical 900 MW units which burn subbituminous coal. The Independence units began operation in 1983 and 1984, respectively, are not BART-eligible, and have no SO₂ controls. In 2017, Entergy installed low-NO_x burners and separated over-fire air (“LNB/SOFA”) at Independence Units 1 and 2.¹⁰ The units are equipped with electrostatic precipitators to control particulate matter emissions. According to emissions data from EPA’s Clean Air Markets Database, Independence was the largest point source of both sulfur dioxide and nitrogen oxide emissions in the state in 2016.¹¹ The Independence plant contributes significantly to visibility impairment at all four Class I areas modeled by EPA, with the largest SO₂ impacts at Caney Creek Wilderness Area (98th percentile impairment of 2.412 deciviews), Upper Buffalo Wilderness Area (98th percentile

⁴ “Upper Buffalo Wilderness,” Wilderness.net, *available at*:

<http://www.wilderness.net/NWPS/wildView?WID=621&tab=General> (last visited July 8, 2015).

⁵ “Upper Buffalo Wilderness Area,” *available at*:

<http://www.fs.usda.gov/recarea/osfnf/recreation/camping-cabins/recarea/?recid=43499&actid=34>

⁶ “Adventure Arkansas: Hawksbill Crag,” *available at*: <http://5news.com/2014/05/24/adventure-arkansas-hawksbill-crag/>

⁷ “Hercules Glades Wilderness,” *available at*:

<http://www.fs.usda.gov/recarea/mtnf/recreation/recarea/?recid=21754&actid=51>

⁸ “Mingo National Wildlife Refuge,” U.S. Fish and Wildlife Service *available at*:

<https://www.fws.gov/uploadedFiles/MNGgeneral15.pdf>.

⁹ ADEQ, “State Implementation Plan Review for the Five-Year Regional Haze Progress Report,” Revised May 2015, at 17, Figure 2.2, *available at*:

http://www.adeq.state.ar.us/air/planning/pdfs/ar_5yr_prog_rep_review-final-6-2-2015.pdf

¹⁰ *See* Ex. A (Entergy Am. and Substituted Mot. to Stay Final Rule, Decl. of Bryan Sikes ¶ 10, *Arkansas v. U.S. E.P.A.*, Case No. 16-4270 (filed 8th Cir. Jan. 11, 2018) (ECF No. 4619424).

¹¹ <https://ampd.epa.gov/ampd/>

impairment of 1.764 deciviews), and Hercules-Glades Wilderness Area (98th percentile impairment of 1.704 deciviews). 80 Fed. Reg. 18,944, 18,994, Table 64.

The White Bluff plant is a 1,700 MW coal-burning electric generating facility operated by Entergy. The plant consists of two nearly identical 850 MW tangentially fired boilers that burn subbituminous coal. 80 Fed. Reg. at 18,969. White Bluff Units 1 and 2 currently have no SO₂ controls, but Entergy has installed low-NO_x burners and separated over-fire air (“LNB/SOFA”) at White Bluff Unit 2 and intended to install LNB/SOFA at White Bluff Unit 1 in mid-January to comply with EPA’s regional haze FIP and other requirements.¹² The plant is equipped with electrostatic precipitators to control particulate matter emissions. According to 2016 emissions data in EPA’s Clean Air Markets Database, the White Bluff plant was the second largest point source of emissions of both sulfur dioxide and nitrogen oxide in the state. White Bluff Units 1 and 2 contribute significantly to visibility impairment at all four Class I areas modeled by EPA, with the largest impacts at Caney Creek Wilderness Area (98th percentile impairment of 3.323 dvs), Upper Buffalo Wilderness Area (98th percentile impairment of 2.325 dvs), and Hercules-Glades Wilderness Area (98th percentile impairment of 2.101 dvs). *See id.* at 18,970, Table 31.

C. Development of the Regional Haze Plan for Arkansas

The current ADEQ SIP proposal is the latest in a series of actions regarding regional haze in Arkansas. ADEQ submitted a proposed regional haze SIP to EPA in 2008 and 2010, and supplemented its proposal in 2011. 77 Fed. Reg. 14,603, 14,604 (Mar. 12, 2012). In 2012, EPA issued a final rule approving in part and disapproving in part Arkansas’s regional haze and interstate transport SIP. *Id.* at 14,604. Among other things, EPA disapproved ADEQ’s BART determination for Entergy White Bluff Units 1 and 2, and disapproved ADEQ’s reasonable progress goals for failure to consider all four required factors. *Id.* at 14,605.

EPA issued a final Arkansas haze federal implementation plan in 2016. EPA’s FIP established new BART requirements for White Bluff and other sources. 81 Fed. Reg. 66,332, 66,339 (Sept. 27, 2016). The FIP also established limits on nitrogen oxides and sulfur dioxide for Independence under reasonable progress requirements. *Id.* at 66,352-54. In April 2017, EPA announced its reconsideration of some elements of the FIP, and later issued a 90-day administrative stay of NO_x compliance dates in the FIP. 82 Fed. Reg. 18,994.

On May 26, 2017, in advance of haze state plan revisions, the Conservation Groups submitted technical information to ADEQ regarding best available retrofit technology limits at White Bluff and reasonable progress requirements for Independence.¹³

In July 2017, ADEQ submitted a SIP revision to replace nitrogen oxide limits under the FIP, including limits per BART and reasonable progress, with reliance on the federal Transport

¹² *See Ex. A (Entergy Am. and Substituted Mot. to Stay Final Rule, Decl. of Bryan Sikes ¶ 10, Arkansas v. U.S. E.P.A., Case No. 16-4270 (filed 8th Cir. Jan. 11, 2018) (ECF No. 4619424).*

¹³ Conservation Groups, Letter to ADEQ, Technical Information Regarding BART Limits for White Bluff and Reasonable Progress Limits for Independence, May 26, 2017.

Rule.¹⁴ On January 26, 2018, EPA signed the pre-publication version of a final rulemaking approving the NO_x SIP and withdrawing the NO_x FIP. Also, in advance of the current SIP proposal, Conservation Groups submitted information on reasonable progress for sulfur dioxide at Independence.¹⁵

III. WHITE BLUFF

The proposed state plan evaluates best available retrofit technology for White Bluff based on a five-factor analysis submitted by Entergy (at 21-25). The plan evaluates four technically feasible controls for sulfur dioxide (low sulfur coal, dry sorbent injection, dry scrubbers and wet scrubbers) in terms of the five BART factors, and ratifies Entergy's proposal that low sulfur coal with an emission rate of 0.6 lb/MMBtu on a 30-day rolling average is BART for White Bluff Units 1 and 2 (at 25). The proposal relies on an administrative order ("AO") that will include "enforceable limitations and compliance dates consistent with ADEQ's determination" (at 25). The proposal also notes EPA's approval in 2012 of BART limits for particulate matter (at 25).

The proposed SO₂ BART determination is arbitrary and unlawful for several reasons.

A. ADEQ Improperly Relies on an Administrative Order that Is Vague and Unenforceable.

In its proposed plan, ADEQ relies on provisions contained in administrative orders for several plants. Proposed SIP, Tab C. For White Bluff, ADEQ's issuance of a BART determination that impermissibly relies upon an unenforceable and vague administrative order violates both the requirement that BART include enforceable emission limits, 40 C.F.R. pt. 51, App. Y § V, as well as the requirement that BART be installed and operated as expeditiously as practicable, 42 U.S.C. § 7491(b)(2)(A).

First, ADEQ's reliance on the draft AO unlawfully fails to include enforceable emission limits because the administrative order for White Bluff as well as other plants are not final actions. A BART determination that relies on an unsigned, draft order cannot be approved by EPA.

Second, even if the AO were not in draft form, the terms of the administrative order for White Bluff would still be vague and unenforceable, in violation of the requirement that BART include enforceable emission limits, 40 C.F.R. pt. 51, App. Y § V ("To complete the BART process, you must establish enforceable emission limits that reflect the BART requirements and require compliance within a given period of time. In particular, you must establish an enforceable emission limit for each subject emission unit at the source and for each pollutant subject to review that is emitted from the source.").¹⁶ The White Bluff AO provides that the

¹⁴ ADEQ, Revisions to the Arkansas State Implementation Plan, Regional Haze SIP Revision for 2008-2018 Planning Period, July 2017.

¹⁵ Conservation Groups, Letter to ADEQ, Regional Haze Reasonable Progress Limits for Independence 1 and 2, Sept. 29, 2017.

¹⁶ ADEQ must determine BART for White Bluff pursuant to EPA's BART Guidelines because the entire White Bluff plant has a nameplate capacity greater than 750 MW. *See* 42 U.S.C. § 7491(b)(2).

units shall comply with sulfur dioxide limits “within three years of the effective date of this AO and with Entergy’s execution of its intended changes to operations at the White Bluff facility Units 1 and 2 indicated in their comments to EPA’s federal implementation plan of Aug. 7, 2015 cited in their Petition for Reconsideration dated Nov. 23, 2015¹⁷, no later than December 31, 2030.” Proposed SIP, Tab C, White Bluff Administrative Order, at pdf 1776 ¶ 3.

This draft order, even if it were fully executed and in final form, does not create an affirmative obligation to shut down White Bluff, or take any other action other than use low-sulfur coal, by December 31, 2030. Any limit that is contingent upon “Entergy’s execution of intended changes” as “indicated in their comments to EPA” is not an “enforceable emission limit” under the BART Guidelines. While the end of the quoted sentence purports to provide an outside deadline of December 31, 2030, the Entergy comments referenced in the AO state:

As part of a multi-unit plan to improve visibility and to better manage its generation assets for reliability and costs, Entergy proposes to cease burning coal at White Bluff Units 1 and 2 by 2027 and 2028, one unit per year, and is prepared to take an enforceable commitment to that effect. Such incorporation should not be construed to limit ADEQ’s discretion to reopen the requirements of this CAO for consistency with future state implementation plan revisions as stated in paragraph nine.

Entergy Arkansas Inc. Comments on the Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas, at 5 (Aug. 7, 2015) (Docket ID No. EPA-R06-OAR-2015-0189-0166). Under this provision, Entergy merely “*proposes* to cease burning coal” and “*is prepared* to take” a commitment. Moreover, Entergy includes a reopener for the entire White Bluff AO for “consistency,” which is not itself defined, with unspecified future state plans.

Entergy’s purported “intent” to cease coal burning comes with another problematic caveat. The Company maintains that its compliance with a final FIP, including installing dry scrubbers or, in the alternative, ceasing coal-burning operation at White Bluff, will be subject to Arkansas Public Service Commission hearing and review.¹⁸ Entergy appears to suggest that whether it ceases to burn coal at White Bluff is contingent on receiving approval from the Arkansas Public Service Commission. But a BART determination must be enforceable—it

¹⁷ Entergy Arkansas Inc. Petition for Reconsideration and Request for Stay of Entergy Arkansas Inc., at 6 (Nov. 23, 2015) (In re: Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan, EPA Docket No. EPA-R06-OAR-2015-0189) at p. 6 (“Entergy explicitly made such a commitment in its comments on the Proposed FIP: . . . ‘As part of a multi-unit plan to improve visibility and to better manage its generation assets for reliability and costs, Entergy proposes to cease burning coal at White Bluff Units 1 and 2 by 2027 and 2028, one unit per year, and is prepared to take an enforceable commitment to that effect.’”)(citing Entergy Arkansas Inc. Comments on the Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas, at 5 (Aug. 7, 2015) (Docket ID No. EPA-R06-OAR-2015-0189-0166)).

¹⁸ *Id.*

cannot be contingent on the approval of a state public service commission. The contingent nature of ADEQ's BART determination is unlawful.

Finally, for the same reasons, the Order's failure to require White Bluff to take a specific action by a specific date violates the statutory requirement to install and operate BART as expeditiously as practicable, but in no event later than five years after the date of approval of a plan. *See* 42 U.S.C. § 7491(b)(2)(A); *see also* 40 C.F.R. § 51.308(e)(1)(iv).

B. ADEQ Uses a Remaining Useful Life that is Unlawful.

In its proposal, ADEQ states that "Entergy's cost-effectiveness calculations are reasonable based on a remaining useful life of seven years and Entergy's proposal to take an enforceable limit regarding the timing of their planned changes in coal-fired operations date." Draft SIP at 24. Under ADEQ's analysis, the remaining useful life of seven years begins in 2023 and ends in 2030. The remaining useful life is flawed because both the beginning and ending dates do not comport with applicable requirements, as explained below.

1. The Remaining Useful Life of White Bluff Must Begin in 2021.

ADEQ acknowledges that "the remaining useful life calculation should begin on 'the date that controls will be put in place' (compliance date)," Draft SIP at 24, but misapplies the BART Guidelines to the facts here. The existing FIP requires White Bluff Units 1 and 2 to meet new SO₂ limits no later than October 27, 2021. 40 C.F.R. § 52.173(c)(7). The FIP's SO₂ limits for White Bluff remain in effect, as EPA has not reconsidered or stayed those provisions, and no court has stayed those provisions. As a result, the 2021 deadline in the existing FIP is the "date that [SO₂] controls will be put in place" at White Bluff and, under the BART Guidelines, October 27, 2021 must be the starting date for any remaining useful life analysis.

Even if it were permissible for ADEQ to ignore the FIP compliance deadline, which it is not, ADEQ provides no rational basis for assuming a 2023 compliance date for any SO₂ controls. Here, ADEQ proposes a SO₂ BART emission limit based on the use of low-sulfur coal. BART must be installed and operated as "expeditiously as practicable." 42 U.S.C. § 7491(b)(2)(A). White Bluff could switch to low-sulfur coal in less than five years, and thus it would violate 42 U.S.C. § 7491(b)(2)(A) to issue a BART determination based on the use of low-sulfur coal with a compliance deadline of 2023. Accordingly, ADEQ has no lawful basis for using 2023 as the beginning date for a remaining useful life analysis.

Even with respect to consideration of scrubbers as a BART control, it is arbitrary to use 2023 as the assumed compliance deadline. The existing FIP already requires White Bluff to meet SO₂ emission limits based on the use of new scrubbers. *See* 40 C.F.R. § 52.173(c)(6)-(7). If ADEQ were to require as BART an emission limit based on the use of scrubbers, it would be arbitrary to grant White Bluff a two-year compliance extension, because White Bluff is required to meet the limits in the FIP by the existing 2021 deadline.

2. *ADEQ Has No Rational Basis for Using 2030 as the End of The Remaining Useful Life of White Bluff.*

ADEQ notes the requirement in the BART Guidelines that if a shorter remaining useful life is used, based on a facility shutting down, “the permanent operations cessation date should be ‘assured by a federally- or State-enforceable restriction preventing further operation.’” Draft SIP at 24. ADEQ violates this requirement by assuming that White Bluff will shut down no later than 2030, yet failing to make this shutdown legally enforceable, as explained above, *supra* Section III.A. It is unlawful for ADEQ to assume, for purposes of the remaining useful life analysis, that White Bluff will shut down by a date certain unless ADEQ adds a new provision to the SIP that makes enforceable the requirement for White Bluff to cease burning coal or cease all operations by the date used in the remaining useful life analysis.

Furthermore, ADEQ provides no rationale for selecting 2030 as the end of White Bluff’s remaining useful life. Indeed, ADEQ’s assumption that White Bluff will cease to burn coal or retire by 2030 is inconsistent with the very comments that ADEQ cites in the administrative order for White Bluff. The AO reference’s Entergy’s comments, which state that Entergy proposes to cease burning coal by 2028—not 2030. Entergy Arkansas Inc. Comments on the Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas, at 5 (Aug. 7, 2015) (Docket ID No. EPA-R06-OAR-2015-0189-0166). ADEQ appears to have simply invented a 2030 shutdown date that has no support in the administrative record, even if it were assured by an enforceable restriction, which it is not.

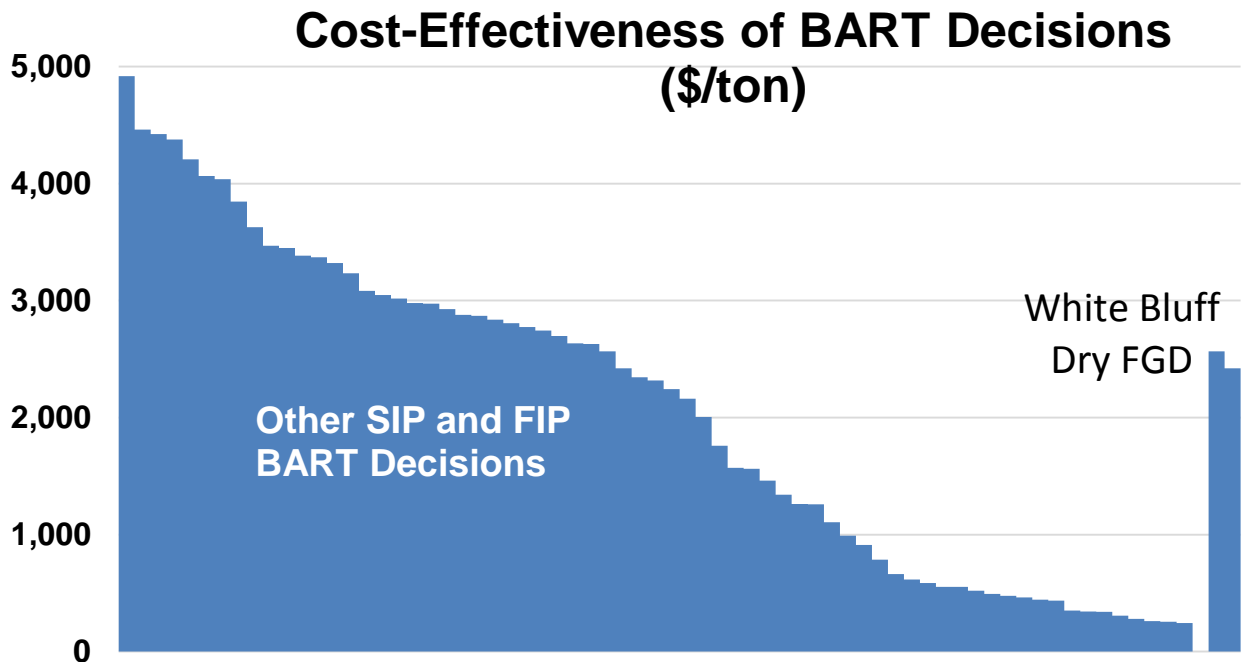
C. ADEQ Fails to Articulate Any Threshold for Determining When Controls are Cost-Effective.

In its review of technology options for White Bluff, ADEQ cites Entergy data regarding the cost-effectiveness of technology for reducing sulfur dioxide emissions, including dry sorbent injection (\$6,239 per ton of sulfur dioxide reduced), “enhanced” dry sorbent injection (\$6,405/ton), dry flue gas desulfurization, and low sulfur coal (\$1,150/ton). Draft SIP at 23. ADEQ then states: “The cost-effectiveness estimates for all control options evaluated, with the exception of LSC, are greater than what is *typically considered cost-effective*. *Id.* (emphasis added). Based on these cost-effectiveness estimates, ADEQ concludes that DSI, Dry FGD, and Wet FGD are not BART.”

However, ADEQ does not explain what is “typical” for cost-effectiveness, nor whose “consideration” of cost-effectiveness is the basis for its decision. Nor does ADEQ provide justification for why it should be regarding “typical” cost effectiveness as the standard for determining BART where BART is to be determined on a case-by-case basis taking into account the four other BART factors beyond cost. And ADEQ does not provide any supporting evidence for its assertion that the control costs for FGD and DSI “are greater than what is typically considered cost-effective.” Instead, ADEQ summarily, and improperly, dismisses three effective technologies for sulfur dioxide pollution control.

Moreover, contrary to ADEQ’s conclusory assertion, dry FGD for White Bluff would be well within the range of cost-effectiveness that states and EPA have found to be reasonable for BART, as shown in the table below. The table below reflects final BART FIP and SIP decisions

for NO_x and SO₂ for 71 different coal-burning EGUs across the country, as reported in the respective decision-making documents. *See* BART Cost Effectiveness Spreadsheet, Ex. B. These costs have not been updated or adjusted to a consistent cost year. But in some cases where cost effectiveness was reported on a source-wide basis, adjustments have been made to split those costs to a per-unit basis. As EPA concluded in its September 27, 2016 FIP, the installation of dry FGD at White Bluff units 1 and 2 would reduce SO₂ pollution by 14,363 and 15,221 tons per year, respectively; resulting in a cost-effectiveness of \$2,565/ton and \$2,421/ton, respectively. 80 Fed. Reg. at 18,971, 81 Fed. Reg. 66,386. This is well within the range of costs that EPA and other states have typically considered cost-effective.



D. The Proposed Compliance Deadline for Meeting Limits Based on the Use of Low-Sulfur Coal is Unsupported and Unlawful.

For the reasons explained above, ADEQ’s proposed BART determination for White Bluff is arbitrary and capricious and contrary to law. But even if ADEQ could lawfully approve low-sulfur coal as BART for White Bluff (which it cannot), ADEQ’s proposal to allow Entergy *another three years* to comply with that flawed BART emission limit, Draft SIP at 25, is flatly inconsistent with the record and the Clean Air Act. Under the plain terms of the Clean Air Act, ADEQ cannot allow Entergy three more years to comply with an emission limit that it is already capable of achieving.

The Clean Air Act and the Regional Haze Rule require any source subject to BART to install and operate the appropriate technology “*as expeditiously as practicable*” but in no event later than five years” after approval of a SIP or issuance of a FIP. 42 U.S.C. § 7491(b)(2)(A), (g)(4) (emphasis added). The time necessary for compliance generally should be considered on a

source-by-source basis, with “each source required to comply by the *soonest date* that can be considered reasonable.”¹⁹ Indeed, the common meaning of the phrase “as expeditiously as practicable” is as “promptly” as “feasible.”²⁰

In determining the appropriate compliance deadline for BART, EPA’s analogous “reasonably available control measure” (“RACM”) guidance for ensuring attainment of the National Ambient Air Quality Standards (“NAAQS”) is instructive. Like the BART provisions of the Act, sources in nonattainment areas (*i.e.*, those areas failing to meet the NAAQS) must implement all reasonably available control measures, including “reasonably available control technology” (“RACT”) emission limits “as expeditiously as practicable.” 42 U.S.C. § 7502(c)(1).²¹ In order for the EPA to determine whether a State has adopted all RACM necessary for attainment as expeditiously as practicable:

the State must explain why the selected implementation schedule is the earliest schedule *based on the specific circumstances* of that area. Such claims *cannot be general claims* that more time is needed but rather should be *specifically grounded in evidence of economic or technologic infeasibility . . .*²²

EPA must then review the state’s submission to “ensure that sufficient information is provided” for the EPA to determine whether the State has provided for implementation of all reasonably available control measures as expeditiously as practicable.²³ Just as EPA must ensure that the state provides *specific* information demonstrating that RACM is implemented as expeditiously as practicable, the agency must also closely examine the state’s submission to ensure that the state adequately explains any delay in implementing BART. *See North Dakota v. EPA*, 730 F.3d 750, 761 (8th Cir. 2013) (citing *Alaska Dep’t of Envtl. Conservation v. EPA*, 540 U.S. 461, 485, 490 (2004) (EPA must ensure that the state’s regional haze plan is “reasonably moored to the Act’s provisions” and based on “reasoned analysis” of the facts).

ADEQ proposes to require compliance with a low-sulfur coal emission limit “three years after approval of this SIP revision,” based solely upon Entergy’s assertion “[i]n communication with ADEQ” that “it is their practice to project how much coal will be needed in future years and to contract for a portion of their coal supply up to three years in advance.” Draft SIP at 25. However, there is no specific technical or economic evidence in the record to support Entergy’s conclusory assertion that more time is needed to implement EPA’s flawed low-sulfur coal BART

¹⁹ See EPA, 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 at 114 (July 2016) (emphasis added) (discussing appropriate time for compliance for measure to ensure reasonable progress).

²⁰ Webster’s New Collegiate Dictionary at 403, 902 (1976).

²¹ RACT is defined as an “emission limit” that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.

²² Ex. C, Memo. From John S. Seitz, Director, Office of Air Quality Planning and Standards, to Regional Air Division Directors, “Guidance to Clarify EPA’s Policy on What Constitutes ‘As Expeditiously as Practicable’ for Purposes of Attaining the One-Hour Ozone Standard for Serious and Severe Ozone Nonattainment Areas.” (Nov. 1999).

²³ *Id.*

determination. In fact, the “communication” that purportedly supports ADEQ’s compliance deadline is not even in the record.

In any event, the record flatly contradicts Entergy’s assertion that White Bluff needs three more years to transition to low-sulfur coal to meet a limit of 0.6 lbs/MMBtu. Indeed, the record indicates that Entergy is *already* capable of complying with—and indeed, already meeting—the 0.6 lbs/MMBtu limit. Draft SIP at 22 (“The average monthly emissions rate between 2014 and 2016 was 0.55 lb SO₂/MMBTU for Unit 1 and 0.58 lb SO₂/MMbtu for Unit 2.”). Thus, the only “specific” technical or economic evidence in the record makes clear that White Bluff is either already meeting that limit, or capable of doing so.

Moreover, nothing in the record demonstrates that it would be impracticable to meet a 30-day rolling average of 0.6 lbs/MMBtu right now. ADEQ states, without any support, that it is Entergy’s “practice to project how much coal will be needed in future years and to contract for a portion of their coal supply up to three years in advance.” Draft SIP at 25. But Entergy’s explanation fails to demonstrate that it is bound to any specific coal contract or practice, or that it is economically or technically impracticable to switch to low-sulfur coal now. At best, Entergy suggests that it would be inconvenient for the Company to do so. Under the Clean Air Act’s regional haze provisions, however, it is irrelevant whether compliance is inconvenient or a departure from preferred practice. Instead, BART must be installed “as expeditiously as practicable.” 42 U.S.C. § 7491(b)(2)(A). And the record indicates it would be practicable for White Bluff to meet a 30-day rolling average of 0.6 lbs/MMBtu right now.

Similarly, there is nothing in the record to suggest that additional equipment is needed at White Bluff to switch coal or blend its fuel stock. As ADEQ notes, “no capital investments in equipment are required” to switch to low-sulfur coal. Draft SIP at 25. Even if some additional equipment is required (and there is no evidence that it is), ADEQ has failed to provide a rational explanation for such a conclusion. In any event, Entergy clearly has the technical ability to blend its coal supply because, as the proposed SIP makes clear, the Company has been purchasing and using lower-sulfur coal for several years. *Id.* In sum, without basic information regarding Entergy’s existing equipment or the costs of obtaining any necessary new equipment, it is impossible for ADEQ to make a “reasoned” evaluation of the facts and rationally conclude that more time is necessary to meet ADEQ’s flawed BART limit. *See North Dakota v. EPA*, 730 F.3d at 761.²⁴

Finally, neither Entergy nor ADEQ considered alternatives to extending the compliance deadline by three years. There is no evidence in the record showing that ADEQ considered the costs for Entergy to purchase the low-sulfur coal and fuel blending equipment necessary to meet the compliance deadline before 2020. Nor is there any evidence that the State considered

²⁴ Even if Entergy had already contracted for a portion of its coal supply, the Company could accept penalties for cancellation. This would require no fuel blending equipment. But neither Entergy nor ADEQ seem to have explored such an option. At a minimum, ADEQ must verify that Entergy has contractual obligations for coal supplies, and should require information about the cost of penalties which would result from Entergy cancelling any portion of its supply that would preclude compliance with a 0.6 lb/mmBTU limit.

alternatives such as lengthening the averaging time, or complying with an annual limit for 2018 and 2019, followed by a 30-day rolling average for 2020.

E. A Proper BART Analysis Indicates that SO₂ BART for White Bluff is an Emission Limit Based on the Use of a Scrubber.

As explained above, and in the accompanying report of Vicki Stamper, currently there is no enforceable requirement for White Bluff Units 1 and 2 to cease burning coal or cease all operations by a date certain.²⁵ As a result, a 30-year remaining useful life is appropriate for assessing control options in the White Bluff BART analysis. Using a 30-year remaining useful life, the installation of dry FGD at White Bluff units 1 and 2 would reduce SO₂ pollution by 14,363 and 15,221 tons per year, respectively; resulting in a cost-effectiveness of \$2,565/ton and \$2,421/ton, respectively. 80 Fed. Reg. at 18,971, 81 Fed. Reg. 66,386. Those controls would result in a result in a greater than 5.6 dv visibility improvement across the four modeled Class I areas. 81 Fed. Reg. 66,343.

The remaining BART factors are neutral, as there are no non-air quality impacts of the controls that weigh against their selection, and there are no post-combustion SO₂ controls in use at White Bluff. The cost-effectiveness of dry FGD is well within the range of cost-effectiveness values of other BART determinations, *see supra* Section III.C; BART Cost Effectiveness Spreadsheet, Ex. A, and dry FGD would improve visibility significantly (and more than DSI or low-sulfur coal would).²⁶ For these reasons, SO₂ BART for White Bluff is an emission limit of 0.06 lb/MMBtu, based on the use of dry FGD.

Even if ADEQ were to finalize an enforceable instrument that unambiguously requires White Bluff to cease coal use by a date certain, BART must still be based on the use of dry FGD. As the accompanying Stamper Report indicates, dry FGD is still cost-effective even with a 5, 7, or 9-year remaining useful life.²⁷ Thus, under any BART analysis in which the remaining useful life is 5 years or greater, SO₂ BART for White Bluff is an emission limit of 0.06 lb/MMBtu, based on the use of dry FGD.

In the alternative, if ADEQ does not determine SO₂ BART to be dry FGD, SO₂ BART for White Bluff must, at a minimum, be based on the use of DSI. As explained in the Stamper Report, an emission limit based on the use of DSI—either at 50% or 80% reduction—is well within the range of costs that EPA and states have found reasonable if the remaining useful life is between 5 and 9 years.

²⁵ Ex. D at 4-6, Victoria R. Stamper, Technical Support Document to Comments of Conservation Organizations, Arkansas Department of Environmental Quality's October 2017 Proposed Revisions to the Arkansas State Implementation Plan Regional Haze SIP Revision for 2008-2018 Planning Period (Feb. 1, 2018) [hereinafter "Stamper Report"].

²⁶ According to Entergy's BART analysis, low sulfur coal would result in less than a deciview improvement across all four affected Class I areas. Entergy Arkansas, White Bluff Steam Electric Station, BART Five-Factor Analysis at 4-7 and 4-8 (Trinity Consultants (Aug. 18, 2017).

²⁷ *See* Stamper Report at 23 (Table 2), 25 (Table 3), 26 (Table 4).

IV. INDEPENDENCE

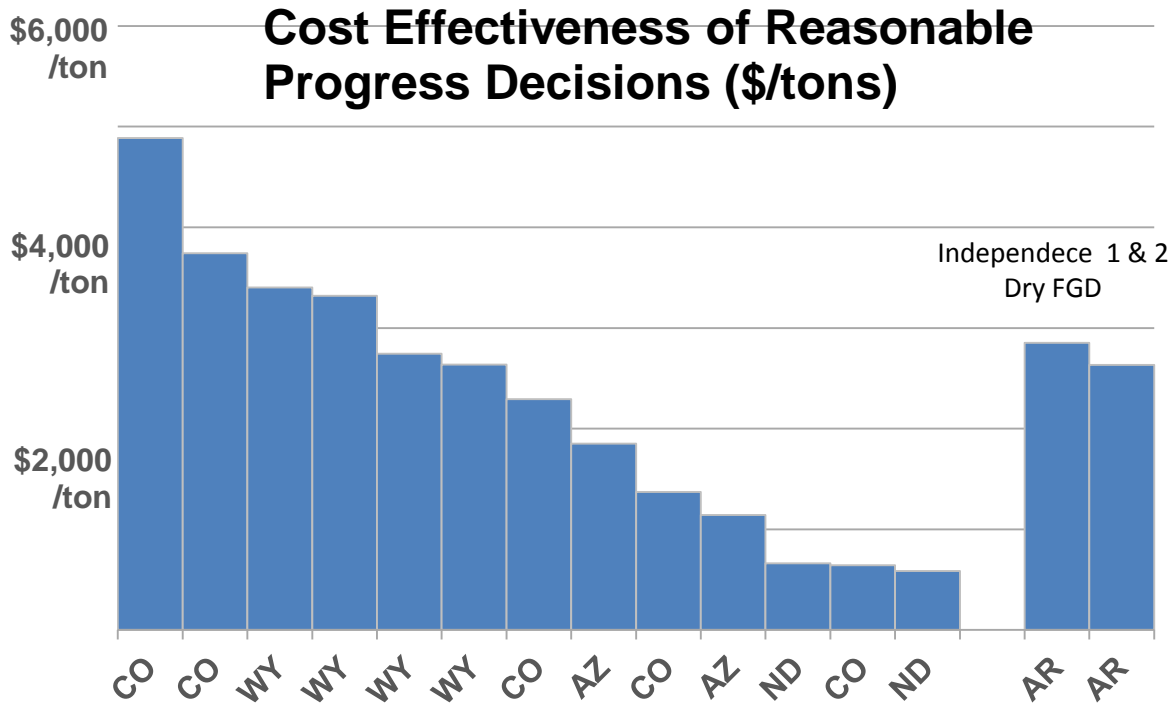
The Draft SIP describes how ADEQ considered reasonable progress controls for Independence (at 42-46). ADEQ describes Independence as similar in configuration to White Bluff, with similar control technology costs (at 42), although Independence is not subject to BART due to the date of boiler installation. ADEQ identified three technologically feasible control options at Independence: low sulfur coal, dry scrubbers, and wet scrubbers. ADEQ cited lower dispatch as an explanation for decreasing emissions from Independence (at 43). ADEQ reviewed the reasonable progress factors, and concludes that Independence should meet a limit based on low sulfur coal with no add-on controls (at 47).

As explained below, the proposed determination of SO₂ controls for Independence is arbitrary and capricious and contrary to law.

A. ADEQ's Assertion that the Cost-Effectiveness of Scrubbers Exceeds Screening Thresholds is Unsupported and Incorrect.

ADEQ rejects scrubbers as reasonable progress controls in part because “Both Entergy’s and EPA’s cost-effectiveness estimates for Dry FGD at Entergy Independence exceed screening thresholds used for cost-effectiveness in other approved reasonable progress analyses.” Draft SIP at 47. ADEQ provides only a single citation to support this assertion, the 2011 Kentucky regional haze rule, 76 Fed. Reg. 78,194. Draft SIP at 47 n.48.

But contrary to ADEQ’s assertion, scrubbers for Independence are more cost-effective than reasonable progress measures required in other haze plans. Indeed, as shown in the figure below, dry FGD for Independence would be well within the range of cost-effectiveness that states and EPA have found to be reasonable. The table below reflects final BART FIP and SIP decisions for NO_x and SO₂ for coal-burning EGUs across the country, as reported in the respective decision-making documents. *See* Cost Reasonable Progress Effectiveness Spreadsheet, Ex. E. As EPA concluded in its September 27, 2016 FIP, the installation of dry FGD at Independence units 1 and 2 would reduce SO₂ pollution by 12,912 and 13,990 tons per year, respectively; resulting in a cost-effectiveness of \$2,853/ton and \$2,634/ton, respectively. 80 Fed. Reg. at 18,993, 81 Fed. Reg. 66,386. This is well within the range of costs that EPA and other states have typically considered cost-effective for reasonable progress controls.



B. ADEQ’s Rejection of Scrubbers Because of High Capital Costs is Arbitrary and Capricious.

In addition to the purportedly high cost-effectiveness of scrubbers, ADEQ cites the high capital costs of new scrubbers as a basis for declining to require them for Independence. Draft SIP at 47. Specifically, ADEQ asserts that “[r]equiring a technology that does not involve a significant capital investment that must be amortized over a long period also provides Entergy with the flexibility to determine the continued viability of Entergy Independence based on market conditions rather than extending the possible life of the units based on the need to recover the capital costs of Dry FGD.” *Id.* This claim is unfounded.

To begin, ADEQ assumes that Entergy would install new scrubbers to meet an emission limit based on the use of new scrubbers. But ADEQ provides no support for this assumption. BART determinations do not require the use of any particular technology. Rather, BART is usually stated as an emission limit, and a facility is free to employ any technology that meets the emission limit. Here, the existing FIP requires Independence to meet a SO₂ limit of 0.06 lb/MMBtu, but Entergy could meet that limit by either installing new scrubbers or by retiring the unit and replacing it with other generation sources. ADEQ arbitrarily failed to consider the possibility that Entergy would choose to meet a new SO₂ emission limit by retiring Independence, and that the capital costs of replacement generation might be lower than the costs of new scrubbers.

Moreover, ADEQ’s own analysis indicates that market forces have already made Independence unable to compete with cheaper gas-burning generation, and therefore it may be economically rational to retire Independence rather than install new scrubbers—thus avoiding

the problem of stranded costs that ADEQ asserts is the basis for rejecting scrubbers. ADEQ's analysis shows that Independence has run far less in recent years as a result of market trends that have favored natural gas over coal-burning generation. Draft SIP at 43-44. ADEQ states that "the economic pressure on coal units due to low natural gas prices is expected to continue throughout the rest of the 2008–2018 planning period and beyond." *Id.* at 43. Based on ADEQ's own analysis of market pressures that are making coal more expensive than natural gas, it is arbitrary for ADEQ to assume that the cheapest option for complying with a new SO₂ limit would be to install new scrubbers.

Finally, ADEQ appears to be claiming that scrubbers should not be required because Independence may otherwise retire prior to the 30-year period over which the costs of scrubbers are usually amortized. *See* Draft SIP at 47. This resembles the shorter remaining useful life analysis that ADEQ relies on in its BART analysis for White Bluff. But ADEQ has not proposed to make the retirement of Independence legally enforceable as part of the SIP, and therefore it is inappropriate to reject otherwise reasonable controls based on the mere possibility that Independence may operate for less than 30 more years.

C. ADEQ Improperly Relies on an Administrative Order that is Unsigned and Unenforceable.

As with White Bluff, ADEQ relies on provisions contained in an administrative order for compliance with reasonable progress requirements. Draft SIP, Attachment D. And just as the White Bluff Order is unlawful, so too the Independence Order is unlawful for multiple reasons. First, this Order is an unsigned draft which is insufficient to rely on for purposes of fulfilling the reasonable progress provisions under the Regional Haze Rule. Second, so-called "reasonable progress controls" are required as part of the long-term strategy, which "must include *enforceable* emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas." 40 C.F.R. § 51.308(d)(3) (emphasis added).

Moreover, the Draft SIP and the Order allow Entergy three years "to burn through existing stocks" of high-sulfur coal. If ADEQ is to select low sulfur coal, this technology is available regardless of existing stocks of dirtier, high sulfur coal.

D. ADEQ's Consideration of Visibility Improvement is Flawed.

In its reasonable progress analysis for Independence, ADEQ discusses "degree of improvement in visibility" under a separate heading, on par with the actual factors described in the Clean Air Act (at 46). ADEQ purports to apply this factor as a basis for not modeling the visibility impacts of its selected technology, low sulfur coal (*id.*). However, as ADEQ itself readily concedes, "degree of improvement in visibility" is not a statutory factor in a reasonable progress analysis (*id.*). Even if it were permissible to consider visibility improvement, ADEQ's consideration of visibility improvement is flawed.

First, ADEQ purports to consider visibility improvement, but does not even mention the visibility benefits of new scrubbers when it weighs all of the information it has considered. *See* Draft SIP at 47. Specifically, while ADEQ alleges that the cost-effectiveness and capital costs of

new scrubbers are too high, ADEQ does not mention the other side of the ledger: the benefits of scrubbers, and specifically the visibility benefits. It is arbitrary and capricious for ADEQ to purport to consider visibility improvement, but then not even weigh the visibility benefits against the costs of controls when making its control determination.

E. ADEQ’s Analysis of Whether Measures Are Necessary to Make Reasonable Progress at Missouri Class I Areas Violates the Regional Haze Rule.

ADEQ’s consideration of whether measures are necessary to mitigate Arkansas’s impacts to Class I areas in Missouri violates both the revised regional haze rule as well as the former version of the rule. Thus, regardless of which version of the haze rule applies here, ADEQ’s analysis of controls that could reduce impacts to Missouri Class I areas is unlawful.

The Regional Haze Rule revisions issued in 2017 specify how ADEQ must consider whether measures are needed to make reasonable progress at Class I areas outside Arkansas:

If a State contains sources which are reasonably anticipated to contribute to visibility impairment in a mandatory Class I Federal area in another State for which a demonstration by the other State is required under (f)(3)(ii)(A), the State must demonstrate that there are no additional emission reduction measures for anthropogenic sources or groups of sources in the State that may reasonably be anticipated to contribute to visibility impairment in the Class I area that would be reasonable to include in its own long-term strategy. The State must provide a robust demonstration, including documenting the criteria used to determine which sources or groups of sources were evaluated and how the four factors required by paragraph (f)(2)(i) were taken into consideration in selecting the measures for inclusion in its long-term strategy.

40 C.F.R. § 51.308(f)(3)(ii)(B). As EPA noted in the 2017 revisions to the Regional Haze Rule, states have an “independent obligation to include in their SIPs enforceable emission limits and other measures that are necessary to make reasonable progress at *all* affected Class I areas, as determined by considering the four factors.” 82 Fed. Reg. 3078, 3095 (Jan. 10, 2017) (emphasis added).

The former version of the Regional Haze Rule contained the same core requirements, even if the language of the former haze rule differed slightly. Indeed, EPA made clear in the 2017 revisions that it intended merely to clarify existing Clean Air Act obligations that it believed had already existed for states to analyze measures for reducing impacts at out-of-state Class I areas.

For example, even before revising the Regional Haze Rule, EPA sought and was granted a voluntary remand to reconsider whether controls should be required at the Gerald Gentleman power plant in Nebraska to make reasonable progress at out-of-state Class I areas. *See Nebraska v. EPA*, No. 12-3084 (8th Cir. motion filed Feb. 6, 2015); *Nebraska v. EPA*, No. 12-3084 (8th Cir. order filed Mar. 19, 2015) (granting EPA’s motion for a voluntary remand). There, the State of Nebraska, and EPA itself, had relied on the same arguments that ADEQ makes here: that the neighboring state had not requested additional controls; and meeting the neighboring state’s

reasonable progress goal did not require additional controls. *See* 77 Fed. Reg. 40,150, 40,155-56 (July 6, 2012). EPA sought and the court granted a remand to reconsider this rationale for its reasonable progress control determination for the Gerald Gentleman plant. EPA's action indicates that even under the prior version of the Regional Haze Rule, EPA recognized that the arguments ADEQ advances here were flawed.

ADEQ's analysis of measures for making reasonable progress at out-of-state Class I areas is inconsistent with both the statute and the Regional Haze Rule. Where the Regional Haze Rule addresses "sources which are reasonably anticipated to contribute to visibility impairment in a mandatory Class I Federal area in another State" 40 C.F.R. § 51.308(f)(3)(ii)(B), and "other States cause or contribute to impairment in a mandatory Class I Federal area," *id.* § 51.308(d)(3)(ii), the proposal instead concludes that sources in Arkansas are not interfering with the achievement of Missouri's reasonable progress goals. Draft SIP at 51. ADEQ attempts to avoid the "contribute to visibility improvement" test by substituting a non-interference standard. This is a material difference because ADEQ's proposal admits that the contribution of Arkansas sources to light extinction at Missouri Class I areas has been projected to increase between 2002 and 2018. The ADEQ proposal fails to demonstrate that there are no additional emission reduction measures, for sources that contribute to out-of-state Class I area visibility impairment, that would be appropriate to include in the SIP, as required by the Regional Haze Rule.

As explained in our prior comments as well as the Stamper Report, there are control measures for Independence Units 1 and 2—namely, dry FGD—that satisfy all four of the reasonable progress factors and would significantly improve visibility at Missouri's Class I areas. ADEQ must require Independence Units 1 and 2 to meet an emission limit of 0.06 lb/MMBtu, based on the use of dry FGD, to improve visibility at Missouri's Class I areas.

F. ADEQ's Reasonable Progress Analysis Impermissibly Concludes that Controls Are Not Required Because the State is Currently On the Glidepath.

ADEQ unlawfully concludes that no additional controls are required at Independence in part because the state is on the "glidepath" toward natural visibility. As an initial matter, the glidepath is not an independently enforceable requirement. As EPA explained in its 2012 disapproval of Arkansas' regional haze SIP, which was never challenged, "[b]eing on the 'glidepath' does not mean that a state is allowed to forego an evaluation of the four statutory factors," as Arkansas did in its SIP. *See* 77 Fed. Reg. 14604, 14629 (Mar. 12, 2012).

That a Class I area is on "on the glidepath" does not relieve the state of conducting a reasoned analysis. To the contrary, EPA's long-standing interpretation of the regional haze rule is that "the URP does not establish a 'safe harbor' for the state in setting its progress goals." 79 Fed. Reg. 74,818, 74,834 (Dec. 16, 2014). If it is reasonable to make more progress than the URP, a state must do so, as EPA explained in the 1999 regional haze rule:

If the State determines that the amount of progress identified through the [URP] analysis is reasonable based upon the statutory factors, the State should identify this amount of progress as its reasonable progress goal for the first long-term strategy, unless it determines that additional progress beyond this amount is also reasonable. If the State determines that additional progress is reasonable based on

the statutory factors, the State should adopt that amount of progress as its goal for the first long-term strategy.

64 Fed. Reg. at 35,732.

V. THE DRAFT SIP AS A WHOLE VIOLATES THE CLEAN AIR ACT'S ANTI-BACKSLIDING PROVISION.

The SO₂ Draft SIP as a whole violates the Clean Air Act's "anti-backsliding" requirement, 42 U.S.C. § 7410(l), specifically applicable to reasonable further progress requirements. Compared to the existing federal plan, the State's plan would result in greater air pollution and worse visibility impairment at affected Class I areas. Section 110(l) of the Clean Air Act prevents a plan revision that would weaken the existing FIP requirements in this manner.

In the 2016 FIP, EPA determined that reasonable progress requires that Independence Units 1 and 2 meet SO₂ emission limits based on the use of new scrubbers. 81 Fed. Reg. at 68,319. Now, the State proposes a SIP that would replace those SO₂ emission limits with much higher limits based on the use of low-sulfur coal. In addition, whereas the existing FIP requires White Bluff Units 1 and 2 to meet SO₂ emission limits based on the use of new scrubbers, the proposed SIP revision would replace that requirement with a much higher emission limit as well as a vague and unenforceable administrative order. And the proposed SIP includes no reductions beyond those in the FIP that would compensate for allowing higher SO₂ emissions from both Independence and White Bluff.

As a result, and as shown in the table below, the proposed SIP would authorize significantly more SO₂ emissions and produce worse air quality than the existing FIP. The table below compares the total annual SO₂ reductions under EPA's 2016 FIP and the ADEQ SIP revision. As explained in the Stamper Report, ADEQ's SIP revision will not result in *any* emission reductions from Independence on an annual basis because the units are already achieving the 0.6 lb/MMBtu proposed emission limit.

Year	Total White Bluff + Independence SO₂ Emissions Under EPA's FIP, tpy²⁸	Total White Bluff + Independence SO₂ Emissions Under ADEQ's Proposed SIP, tpy²⁹	Increase in SO₂ Emissions with ADEQ's Proposed SIP Compared to EPA's Existing FIP, tpy
2020	62,293	62,293	0
2021	52,879	62,293	9,414
2022	5,807	62,293	56,486
2023	5,807	62,293	56,486
2024	5,807	62,293	56,486
2025	5,807	62,293	56,486
2026	5,807	62,293	56,486
2027	5,807	62,293	56,486
2028	5,807	62,293	56,486
2029	5,807	62,293	56,486
2030	5,807	62,293	23,973

This increase in SO₂ emissions under the SIP relative to the FIP violates the Clean Air Act's anti-backsliding provision, which provides that "[t]he 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). Section 110(l) is the Act's "anti-backsliding" provision. *See El Comité Para el Bienestar de Earlimart v. EPA*, 786 F.3d 688, 692 (9th Cir. 2015). The anti-backsliding provision prohibits plan revisions that would interfere with attainment of the NAAQS or other "applicable requirements" of the Act. Section 110(l) prohibits plan revisions that would interfere with an existing requirement to make reasonable further progress, including

²⁸ The emissions for White Bluff and Independence are based on EPA's baseline emissions (from 2009-2013) and projected emission reductions found at 80 Fed. Reg. at 18,971 (Table 32) and 18,993 (Table 6). These reductions would begin in 2022, the compliance deadline under the 2016 FIP. Prior to that, emissions would be similar to EPA's baseline emissions at each unit. This assumes White Bluff ceases burning coal in 2030.

²⁹ Under ADEQ's SIP replacement, emissions will be identical to EPA's baseline emissions because on an annual average basis, the White Bluff and Independence units were not exceeding 0.6 lb/MMBtu. This assumes White Bluff ceases burning coal in 2030.

a BART determination, 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).

When determining whether a plan revision interferes with NAAQS attainment, EPA has interpreted section 110(l) as preventing plan revisions that would increase overall air pollution or worsen air quality. For example, the Eleventh Circuit has upheld EPA’s section 110(l) interpretation as prohibiting plan revisions that would increase emissions or worsen air quality. *Ala. Env’tl. 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))). 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.*” *Kentucky Resources Council, Inc. v. EPA*, 467 F.3d at 995 (emphasis added). The Seventh Circuit has also upheld EPA’s interpretation. *Indiana v. EPA*, 796 F.3d 803, 812 (7th Cir. 2015) (noting that EPA allows “emissions-increasing SIP revisions” if a state “identif[ies] substitute emissions reductions such that net emissions are not increasing.”). Moreover, in a short discussion regarding a challenge to the Nevada regional haze plan, the Ninth Circuit suggested that a haze plan that “weakens or removes any pollution controls” would violate section 110(l). *WildEarth Guardians v. EPA*, 759 F.3d 1064, 1074 (9th Cir. 2014).

In sum, by allowing both Independence and White Bluff to increase SO₂ emissions beyond what would be allowed under the existing FIP, the proposed SIP revision would increase air pollution and worsen air quality, in violation of the anti-backsliding provision of 42 U.S.C. § 7410(l).

VI. ADEQ HAS AN OBLIGATION TO CONSIDER THE PUBLIC HEALTH BENEFITS OF THE REGIONAL HAZE PROGRAM.

Contrary to ADEQ’s conclusory assertion that it need not consider the effect of SO₂ emissions on human health, the Arkansas Air Pollution Control Act provides that, “in exercising their powers and responsibilities under this chapter,” the agency “*shall* take into account and give consideration” among other things, the (1) “[e]ffect on normal human health of particular air contaminants and (2) [t]he interference with reasonable enjoyment of life by persons in the area and conduct of established enterprises that can reasonably be expected from air contaminants. Ark. Code Ann. § 8-4-312(9) & (12) (emphasis added). Moreover, the very purpose of the Clean Air Act is “to protect and enhance the quality of the Nation’s air resources so as to promote the public health and welfare and the productive capacity of its population.” 42 U.S.C. § 7401(b)(1). Indeed, when Congress amended the Clean Air Act’s visibility provisions, it made clear that the paramount purpose and overriding commitment of the Act was the protection of public health and welfare. *See* H.R. Conf. Rep. 95-564, 1977 U.S.C.C.A.N. 1502, 1570. Thus, ADEQ has an obligation to consider the public health impacts of its proposal to

replace EPA's 2016 FIP with a SIP that effectively allows the largest Arkansas polluters to continue status quo operations.

The same pollutants that cause visibility impairment also cause significant public health impacts. According to EPA SO₂ "can harm the human respiratory system and make breathing difficult. Children, the elderly, and those who suffer from asthma are particularly sensitive" to its effects.³⁰ Moreover, SO₂ can penetrate deep into the lungs and cause a host of health problems, such as aggravated asthma, chronic bronchitis, and heart attacks.³¹ In 2005, EPA valued the regional haze program's health benefits nationally at \$8.4 to \$9.8 billion annually.³²

More specifically, EPA's regional haze plan for Arkansas would have decreased sulfur dioxide pollution from Arkansas EGUs by approximately 72,000 tons per year. 80 Fed. Reg. 18,971, 18,973, 18,993, 18,996. This pollution also causes significant public health impacts. Thus, EPA's plan would not only result in significant visibility improvements in Arkansas and Missouri Class I areas, but will result in significant, quantifiable benefits to human health across 14 states. *See* Thurston Decl. at 41-44. Indeed, using EPA-approved public health and air dispersion modeling, studies have demonstrated that the reductions in sulfur dioxide and associated fine particulate matter resulting from EPA's final rule would save 137 lives, prevent thousands of asthma events and hospitalizations, and avoid tens of thousands of lost work days *every year* that the controls are operational. *Id.* at 42, Tbl. 1. The total public health based economic benefits associated with the required pollution reductions will be at least \$1.3 billion annually across 14 states. *Id.*

Conversely, ADEQ's proposal to essentially allow Arkansas EGUs to continue emitting SO₂ at the same levels as those sources have been polluting for several years carries the risk of substantial harm to public health in Arkansas and neighboring states. ADEQ has an obligation to consider those public health impacts in finalizing any SIP. Ark. Code Ann. § 8-4-312(9) & (12).

VII. ARKANSAS LAW REQUIRES ADEQ TO SUBMIT THE REGIONAL HAZE SIP FOR LEGISLATIVE REVIEW BEFORE EPA'S FINAL APPROVAL.

Both Arkansas constitutional and statutory law require all state agencies to submit proposed rules for legislative review and approval. ADEQ's Draft SIP is plainly a rule within the meaning of state law, and therefore, ADEQ must submit it to the legislature through this process. Without legislative approval, the Draft SIP is illegal and invalid.

Arkansas has amended both its state constitution and administrative statutes to require legislative approval of new rules. Ark. Const. Art. 5, § 42 (incorporating Amendment 92); Ark. Code Ann. § 10-3-309. In particular, the Arkansas Constitution authorizes the General

³⁰ EPA, Health – Sulfur Dioxide, *available at* <https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#effects>.

³¹ EPA, Health – Particulate Matter, *available at* <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>.

³² EPA, Fact Sheet – Final Amendments to the Regional Haze Rule and BART Guidelines, *available at* https://www.epa.gov/sites/production/files/2016-02/documents/fs_2005_6_15.pdf.

Assembly to establish a procedure for “the review by a legislative committee of administrative rules promulgated by a state agency before the administrative rules become effective,” and provides that “administrative rules promulgated by a state agency shall not become effective until reviewed and approved by the legislative committee.” Ark. Const. Art. 5, § 42(a)(1)–(2). The General Assembly implemented this authorization by statute in 2015, requiring all state agencies to file proposed rules with the Legislative Council at least thirty days before the expiration of the comment period, as provided under the state Administrative Procedure Act (APA) “or other laws or policies pertaining to the rulemaking authority of that state agency.” Ark. Code Ann. § 10-3-309(c)(1). Upon receipt, the Legislative Council will assign review of the rule to the Administrative Rules and Regulations Subcommittee, which will allow a period of public comment, after which a majority of a quorum of its members will initially vote on whether to hold a substantive vote to approve or disapprove of the rule. *See id.* § 10-3-309(c)(1)–(3). If the Subcommittee declines the initial vote (approving the rule by default), or approves the rule in the substantive vote, a majority of a quorum of the entire Legislative Council may then hold initial and substantive votes on whether to approve or disapprove the rule. *See id.* § 10-3-309(c)(4). Thus, upon completion of the Subcommittee’s first review, both bodies may decline to hold any vote, approving the rule by default. *See id.* § 10-3-309(c)(3)–(4). The statute additionally prescribes the standard under which the rule may be disapproved, as contrary to state or federal law or legislative intent, and either body may submit the rule to a committee of the General Assembly for its nonbinding recommendations. *See id.* § 10-3-309(f)–(g).

These legal requirements plainly require ADEQ to submit the proposed regional haze SIP for legislative approval. Both the statute and Subcommittee regulations define “state agency” broadly to include an office, commission, department, “or other agency of state government having authority to promulgate or enforce rules,” and neither lists ADEQ in their specific exclusions. *Id.* § 10-3-309(b)(2)(A)–(B).³³ “Rule” is also defined broadly, as “a state agency statement of general applicability and future effect that implements, interprets, or prescribes law or policy or describes the organization, procedure, or practice of a state agency *and includes without limitation the amendment or repeal of a prior rule.*” Ark. Code Ann. § 10-3-309(b)(1)(A) (emphasis added); *LC Rules*, Rule 22(a)(1)(A). The specific exclusions of rules requiring legislative approval only reach a statement “that concerns the internal management of a state agency *and that does not affect the private rights or procedures available to the public,*” declaratory orders, or intra-agency memoranda. Ark. Code Ann. § 10-3-309(b)(1)(B) (emphasis added); *LC Rules*, Rule 22(a)(1)(B) (lacking statutory exception for certain Medicaid codes). ADEQ’s failure to submit the proposed SIP for legislative approval violates state law, and is therefore illegal.

ADEQ cannot bypass this process by labeling elements of the SIP revision as mere “administrative orders” under Ark. Code. Ann. § 8-4-103(d)(4). *See* SIP Revision, Tab A p. 4. As an initial matter, that provision applies only to civil penalties, and it only applies to parties that “violate[] any provision of this chapter and regulations, rules, permits, or plans issued pursuant to this chapter.” Ark. Code. Ann. § 8-4-103(c)(1)(A) & (d)(1)(A). None of the sources at issue here have violated any provision of Arkansas’ regulations, and therefore the state lacks

³³ *Rules of The Arkansas Legislative Council* (hereinafter “LC Rules”), Rule 22(a)(2)(A)–(B) (adopted May 19, 2017) (<http://www.arkleg.state.ar.us/assembly/2017/Documents/ALC%20Rules%20-%20Amended%20May%2019%202017.pdf>).

authority to invoke section 8-4-103 to avoid the legislative process. Separately, declaratory orders under Arkansas law pertain to the enforcement or “*applicability* of any rule,” not to the *establishment* of a rule, which this SIP revision does. A.C.A. § 25-15-206 (emphasis added).

Moreover, ADEQ is not merely submitting a new regulation, but “asks that the EPA *withdraw* from the SIP” currently active Regional Haze regulations. Draft SIP at 12. The action therefore represents “the amendment or repeal of a prior rule,” which requires legislative approval “without limitation.” Ark Code Ann. § 10-3-309(b)(1)(A); *LC Rules*, Rule 22(a)(1)(A). Regardless of ADEQ’s preferred terminology, the action repeals a prior rule, and thus must be reviewed and approved by the Legislative Council.

Arkansas constitutional and statutory law require all state agencies, including ADEQ, to submit proposed rules to the Legislative Council for review and approval. Here, the state’s submission to EPA contains no indication that ADEQ has, in fact, complied with these requirements. Indeed, neither the legal authority nor the public review and consultation provisions of the SIP contain any reference to legislative consultation. Further, the agendas of the Administrative Rules and Regulations Subcommittee of the Arkansas Legislative Council since August of 2017 do not show any consideration of the Draft SIP.³⁴ Thus, ADEQ has not complied with the legislative review requirement, and the Draft SIP is invalid under Arkansas law.

CONCLUSION

For the foregoing reasons, the Draft SIP is arbitrary, capricious, and contrary to law, and therefore should be withdrawn.

Sincerely,

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³⁴ See <http://www.arkleg.state.ar.us/assembly/2017/2018F/Pages/PastMeetings.aspx?committeecode=040> (last visited Jan. 31, 2018).

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Declaration of Bryan Sikes

Manager, Fleet Maintenance – Controls and Electrical, Entergy Services, Inc.

**DECLARATION OF BRYAN SIKES
IN SUPPORT OF MOTION TO STAY FINAL RULE OF THE
U.S. ENVIRONMENTAL PROTECTION AGENCY
BY ENTERGY ARKANSAS, INC., ENTERGY MISSISSIPPI, INC.,
ENTERGY POWER, LLC, AND ENERGY AND ENVIRONMENTAL
ALLIANCE OF ARKANSAS**

I, Bryan Sikes, hereby state as follows:

1. I am employed by Entergy Services, Inc. as Manager, Fleet Maintenance – Controls and Electrical. I am making this declaration in support of the motion by Entergy Arkansas, Inc. (“EAI”), Entergy Mississippi, Inc. (“EMI”), and Entergy Power, LLC (“EPI”) (collectively, the “Entergy Companies”), and Energy and Environmental Alliance of Arkansas (“EEAA”) to stay the final regional haze plan for Arkansas issued by the U.S. Environmental Protection Agency (“EPA”), titled “Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan” (“Final Rule”).
2. I am over 18 years of age, of sound mind, and in all respects competent to make this declaration.
3. I received a Bachelor of Science degree in Mechanical Engineering from the University of Arkansas at Fayetteville in 1994 and I am a registered Professional Engineer in the state of Arkansas. I have been employed by the company since 2004. I have held various positions at EAI and EMI, including Plant Engineer, Process Superintendent, Process Owner, and Production Superintendent. In my current position, at Entergy Services, Inc., I oversee a team of electrical and controls technical resources who provide project planning and execution support/oversight as well as power plant equipment and process subject matter expertise.

4. Entergy Services, Inc. provides administrative, accounting, legal, engineering, and other services primarily to the Entergy utility operating companies, including EAI and EMI. Entergy Services, Inc. is wholly owned by Entergy Corporation.
5. The Independence Steam Electric Station (“Independence”) is located in Newark, Arkansas, and has two coal-fired electric generating units, the 836-megawatt (“MW”) Unit 1 and the 842-MW Unit 2. Independence is owned by several co-owners, including EAI, EMI, and EPI, as well as several not-for-profit entities, such as Arkansas Electric Cooperative Corporation (“AECC”), East Texas Electric Cooperative, and the City of Osceola, and several members of EEAA, including the City of Conway, the City Water and Light Plant of the City of Jonesboro, and the City of West Memphis.
6. The White Bluff Electric Power Plant (“White Bluff”) is located in Redfield, Arkansas, and has two coal-fired electric generating units, the 815-MW Unit 1 and the 820-MW Unit 2. White Bluff is owned by several co-owners: EAI and several not-for-profit entities, such as AECC, and several members of EEAA, including the City of Conway, the City Water and Light Plant of the City of Jonesboro, and the City of West Memphis.
7. The Final Rule requires each coal-fired unit to meet a nitrogen oxides (“NO_x”) emission limit of 0.15 pounds per million British thermal units (“lb/MMBtu”) on a rolling 30-boiler operating day basis at loads of 50-100 percent of maximum heat input rating (the “full load limit”), and a rolling 3-hour average limit of 671 pounds per hour (“lb/hr”) at loads of less than 50 percent of maximum heat input rating (the “low load limit”). These emission limits are based on the installation of low-NO_x burners and separated overfire air (“LNB/SOFA”) on each unit. These limits must be met beginning April 27, 2018 (18 months after the effective date of the Final Rule).

8. To comply with the Final Rule, EAI must design, obtain preconstruction permits for, construct, install, and tune LNB/SOFA on all four units by April 27, 2018,¹ or cease operation of the units by that date.

Installation of LNB/SOFA

9. Installation of LNB/SOFA requires EAI to develop an application for and obtain, prior to construction, an air permit under the Clean Air Act's prevention of significant deterioration ("PSD") program; comply with the company's internal planning and prudence review procedures; complete a request for proposal ("RFP") process; select a vendor; procure equipment; schedule outages; install equipment; tune and test the equipment; and update the unit operating procedures and train staff to ensure proper operation of the equipment. For four units, this process would typically take well more than 18 months total.
10. EAI began implementing a truncated implementation schedule promptly after the Final Rule was issued, which required foregoing typical project steps. Physical installation of the LNB/SOFA equipment was completed at White Bluff Unit 2 on June 4, 2017, at Independence Unit 1 on October 20, 2017, and at Independence Unit 2 on December 19, 2017. However, tuning has not yet been completed at any of these units, as explained further below. Physical installation of the equipment at White Bluff Unit 1 is scheduled to commence in mid-January.
11. While physical installation of equipment has largely followed EAI's compressed schedule, the testing and tuning process is taking longer than expected due to unforeseen complications, thereby delaying the schedule for completion of the

¹ Although EAI already had obtained a preconstruction permit to install LNB/SOFA at White Bluff, and acquired the control equipment to do so on one unit at the time the Final Rule was published, a permit was still required to be obtained for Independence and equipment obtained for the second White Bluff unit and both Independence units.

project. EAI will not have sufficient time to appropriately tune the LNB/SOFA at White Bluff Unit 1 in the five- to six-week period that would be available between the completion of the physical installation of the equipment and the compliance deadline. Further, the controls that already have been installed on the other three units are not achieving the NO_x levels that were anticipated, particularly at low and high loads. EAI and its vendor continue to work on the controls to improve their performance, but it is unlikely that EAI will be able to fully comply with the NO_x limits by the deadline imposed by the Final Rule.

Compliance with the NO_x Emissions Limits

12. The White Bluff and Independence units are called on to operate by the Midcontinent Independent System Operation, Inc. (“MISO”) and are “load-following” units, which means that electricity generation varies over time in response to changes in consumer demand. As a result, they frequently operate at less than 50% capacity due to changes in electricity dispatch. The frequent operation at less than 50% capacity (“low load operation”) will make it difficult to comply with the NO_x emission limits in the Final Rule, even after installation of LNB/SOFA.
13. The Final Rule imposes a NO_x emission limit of 671 lb/hr on a rolling 3-hour average that applies when the White Bluff and Independence units are operating at less than 50 percent of their maximum heat input capacity. The 3-hour averaging period, which was introduced for the first time in the Final Rule, likely will result in exceedances of the limit in some operating conditions even after tuning of the required controls is complete. During periods of load transition and, in particular, periods of reduced load, NO_x formation is very sensitive to changing conditions such as air flow, fuel flow, and burner tilt position. When load is being ramped up or down, and mills are put in or out of service, NO_x emissions can

spike to levels well above typical for short periods of time. Within minutes of the excursion, NO_x emissions typically will return to and stabilize at the steady state level. Air permits and regulations normally take these equipment limitations, which occur even when best operational practices are followed, into consideration. With the short 3-hour averaging period, a single 15-minute spike in NO_x emissions could result in NO_x exceeding the low-load NO_x emission limit for a 3-hour period, even if the remaining 165 minutes were below compliance levels. A 30-boiler-operating-day averaging period is necessary to moderate the variations in NO_x due to load transition and low load.

14. The *level* of the low-load NO_x emission limit also is problematic. It offers no compliance margin, which is necessary to account for increased NO_x levels that occur as a function of low load operation, and the unavailability of the SOFA system when a unit is operated at less than 30 percent of capacity. When load falls below 50 percent, NO_x levels increase as a percentage of heat input, trending upwards as load is reduced. This phenomenon is due to the increased levels of excess air that are used to ensure safe boiler operation during low loads. During load swings, control systems lead load increases with increases in air flow and follow load decreases with reductions in air flow. This excess air leads to NO_x formation from nitrogen-laden air. Not only are NO_x emissions generated at a higher rate at low load, but NO_x control options are limited during these periods. SOFA cannot be employed when the boiler operates below 30 percent capacity, including during startup, because there is insufficient air to support both good combustion and maintain overfire air flow to the boiler. As a result, the SOFA system cannot provide any NO_x reduction during these operational periods. *See* Memorandum from Foster Wheeler (Nov. 22, 2016) (attached as Exhibit A).

15. The information gained to date from the currently ongoing tuning of the installed LNB/SOFA equipment indicates that the White Bluff and Independence units cannot achieve full compliance with the low-load NO_x emission limits across all operating conditions. Specifically, to date, based on EAI's review and analysis of the data, which is only available for two of the units so far, one of the units has only been able to meet the low load limit between 25% and 75% of the time. The other unit has had more success and has met the low load limit almost 94% of the time. Nonetheless, neither unit is consistently achieving compliance with the low load NO_x limit across all operating conditions.
16. The information gained from the currently ongoing tuning of the installed LNB/SOFA equipment also indicates that the full-load NO_x emission limit cannot be achieved at this time at all units across all operating conditions. Entergy's vendor has indicated that it may not be able to satisfy the performance guarantee while the unit simultaneously complies with its carbon monoxide ("CO") emission limit in its Prevention of Significant Deterioration permit. To date, one of the units for which data is available has only been able to meet both the NO_x and CO limits approximately 30 to 60% of the time. The other unit has been able to meet both limits approximately 70% of the time. Based on the available data, the units are far from consistently achieving compliance with the full load NO_x limit across all operating conditions.
17. Entergy is required to operate in compliance at all times, not just 25% or 75% or even 94% of the time. As a consequence of the issues identified above, if a stay is not granted, EAI likely will have to implement temporary operational restrictions to meet both the low load and full load NO_x limits. With tuning ongoing, the company has not yet determined the exact extent of those temporary operational restrictions, but any such limitations would result in decreased unit operating

efficiency and corresponding increased fuel costs and/or impact the ability of the plants to meet demand. If a stay of the NOx limits is not granted and EAI is forced to adopt temporary operational restrictions on the units to meet the NOx limits, EAI would suffer irreparable harm as the operating restrictions would have significant negative financial impacts for the company. *See* Declaration of Kurtis Castleberry, Entergy Arkansas, Inc., at ¶ 13.

I declare under penalty of perjury that the foregoing statements are true and correct based on my personal knowledge and information gathered and provided to me by the Entergy Companies' personnel and consultants.

Executed this 11th day of January, 2018.

A handwritten signature in black ink, appearing to read "Bryan Sikes", written over a horizontal line.

Bryan Sikes

Exhibit A

Memorandum from Foster Wheeler (Nov. 22, 2016)



11/22/2016

Attn: David Triplett

Amec Foster Wheeler Proposal No. 65-142232-00 Rev. 2

Reference: Entergy White Bluff/Independence - NOx Limitations at Reduced Load

Dear Mr. Triplett,

The following is intended to explain the limitations and issues associated with NOx reduction at reduced load, specifically below 50% of Maximum Continuous Rating (MCR).

First, it is important to understand how NOx is created in boilers and how specific boiler designs can result in increased NOx emissions at reduced load.

NOx Formation

There are two common mechanisms of NOx formation, thermal NOx and fuel NOx. Thermal NOx refers to the NOx formed through high temperature oxidation of nitrogen found in combustion air. The rate at which airborne nitrogen converts to NOx is a strong direct function of temperature and residence time at temperature and is generally known to contribute on the order of 20% of boiler exit NOx.

NOx is also formed from nitrogen in the fuel. When a carbon based fuel such as coal is burned, the elemental nitrogen is exposed to oxygen at high temperature converting it to NOx. Laboratory studies indicate that fuel laden nitrogen contributes approximately 80% of boiler exit NOx in boilers without firing systems designed specifically with NOx emissions in mind.

Regardless of origin, whether from air or in fuel, nitrogen will convert to NOx when temperatures exceed 2000°F in the presence of oxygen. Low NOx firing systems are therefore designed to minimize the duration and magnitude of peak flame temperatures in excess of this value while also keeping local levels of oxygen to a minimum.

Current NOx Emissions

Consider Figure 1 below, which is the NOx data reported to the EPA for Entergy White Bluff Unit 1 for the period from June 2015 to June 2016.

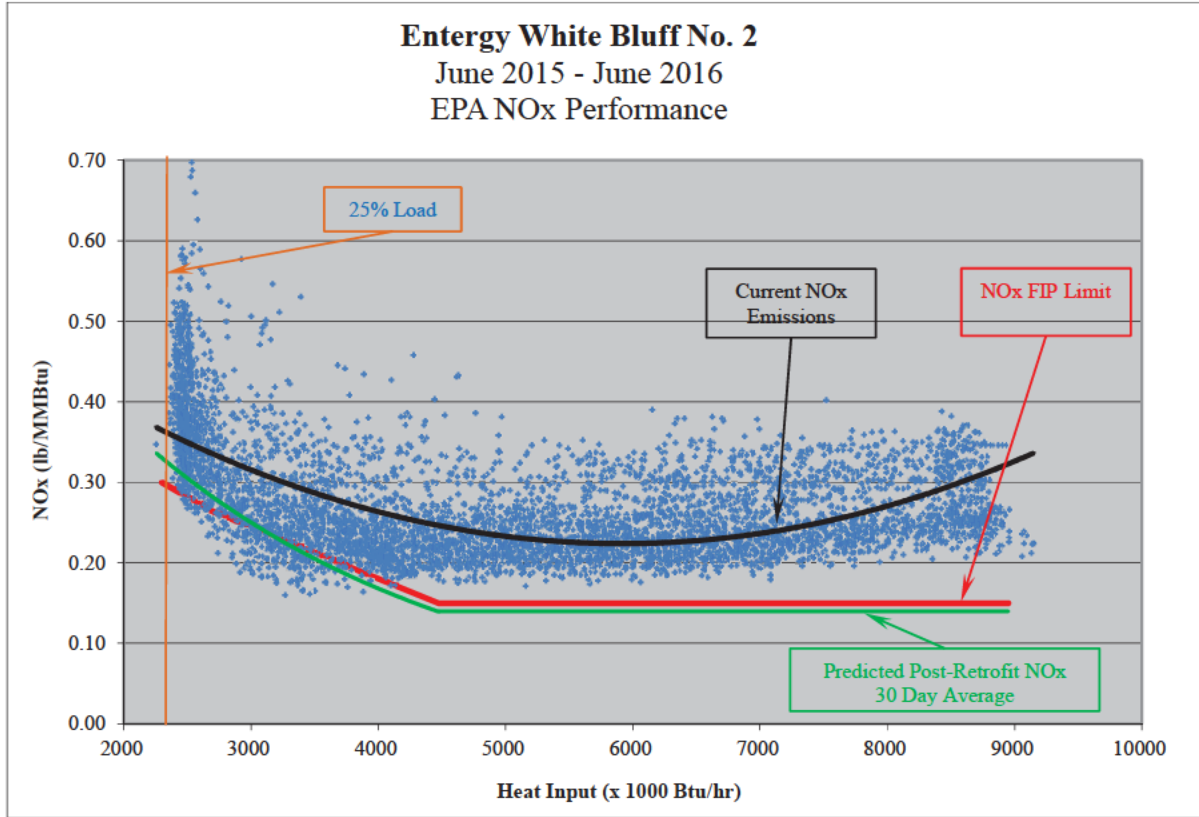


Figure 1 - EPA NO_x Emissions for White Bluff No. 1

The scatter data plotted above is the hourly input provided to the EPA over the past year; the black line is the average of that data. The red line represents the NO_x limit required by the Arkansas Regional Haze Federal Implementation Plan across the range from 25 to 100 percent heat input, which is 0.15 #/MMBtu from 50 to 100% of maximum load and 671 lb NO_x/hr (3-hour average) from 25 to 50% of maximum load (“NO_x FIP limit”).

The curve exhibits a NO_x trend that is typical of tangential (or corner-fired) boilers across their load range. Specifically, the amount of NO_x formed is fairly level from 50% (4,475 MMBtu/hr) to 100% heat input (8,950 MMBtu/hr) as a function of firing rate. However, below 50% heat input NO_x levels increase as a percent of heat input, trending upwards as load is reduced.

The heat input at less than 50% load is substantially reduced so the increase in NO_x does not come from nitrogen in the fuel, but from an elevated conversion of air laden nitrogen. This is largely an expected phenomenon because boilers firing at low loads use increased levels of excess air to keep boiler operation safe. Additionally, to keep boiler operations safe during load swings, control systems always lead load increases with air flow first and follow load decreases with reductions in air flow last. This control logic results in excess air above set point during all load swings, contributing further to NO_x formation, especially at low loads.

Proposed NO_x Control Solution

Entergy proposes to install low-NO_x burners and separated overfire air on all four White Bluff and Independence boilers to reduce NO_x emissions across the load range. Most suppliers will guarantee

performance of the overfire system across the load range from 50-100%; this range is typically known as the control range and is the range where overfire air is considered safe for use in reducing NOx.

Overfire air systems are based on the application of secondary air staging technology commonly referred to as “overfire air”. Staging of secondary combustion air has been well documented throughout the international boiler industry to be the single most effective technique for reducing NOx emissions from tangentially fired boilers. By redirecting a portion of the combustion air above the upper fuel elevation, fuel nitrogen conversion and thermal NOx production is normally reduced by more than 50%.

The systems being installed at White Bluff/Independence will feature the addition of a single level of separated overfire air to the boilers which already have overfire air in the main windbox.

White Bluff No. 1 Reheat Temperature Control

Most steam generator or boiler manufacturers use an increased amount of (excess) air in their boilers at reduced load to maintain steam temperatures.

However, tangential-fired boilers have a second unique method for controlling reheat steam temperature across the load range of the boiler. Specifically, the coal burners and secondary air nozzles can tilt vertically up or down from a horizontal position by 30 degrees. A downward tilt pushes the fireball lower in the furnace which increases furnace thermal absorption and reduces furnace exit gas temperature (FEGT). The converse is also true: tilting the coal burners upwards in the furnace increases the furnace exit gas temperature.

Based on Figure 1, it is apparent at reduced load that the increase in overall NOx is due to an increase in thermal NOx. This increase is being caused directly by main windbox tilt position, (most likely above horizontal to control reheat temperature), high excess air, and mills in service (upper elevation mills in service results in higher FEGT).

NOx Control at Reduced Load

When installed, overfire air systems are optimized for operation across the load range. The following is a typical curve for an overfire system installed on a tangential-fired boiler.

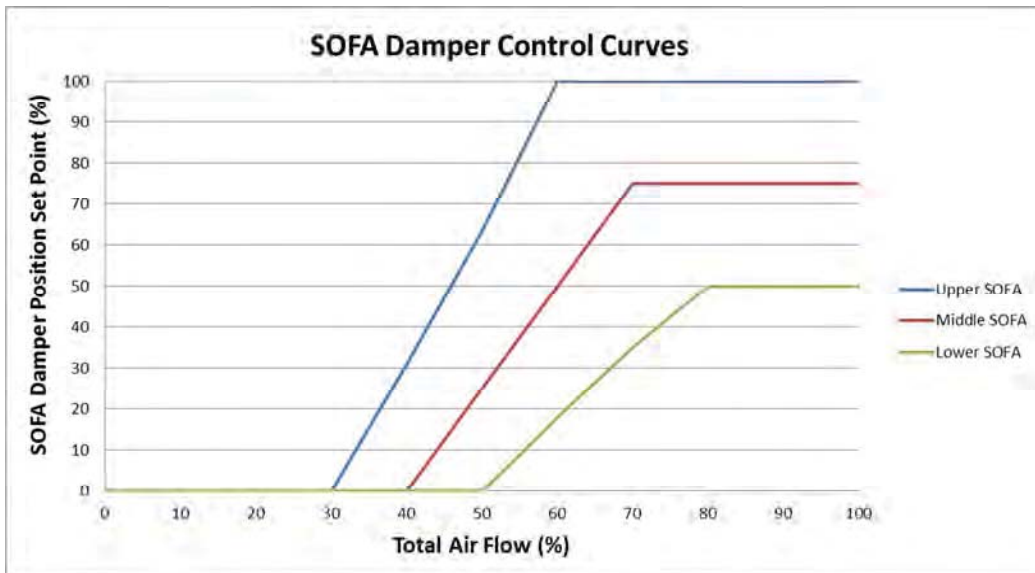


Figure 2 - SOFA Damper Control Curve

As can be seen from above, no overfire air is introduced to the boiler below 30% boiler load. This is because at reduced load, there is insufficient air to support both good combustion and maintain overfire air flow to the boiler. This means that the overfire system below this point does not provide any NOx reduction.

It should be noted here that the rate at which NOx is generated between the load points of 20 and 30 percent heat input is 2.38 times the rate between 30 and 50 percent. To alleviate issues with low load operation, the limit should increase from 671.25 #/hr to 895 #/hr. This change, which is reflective of the issues of instability at low load where separated overfire air is not available to use for NOx control, would then result in an FIP limit curve as shown in red below in Figure 3.

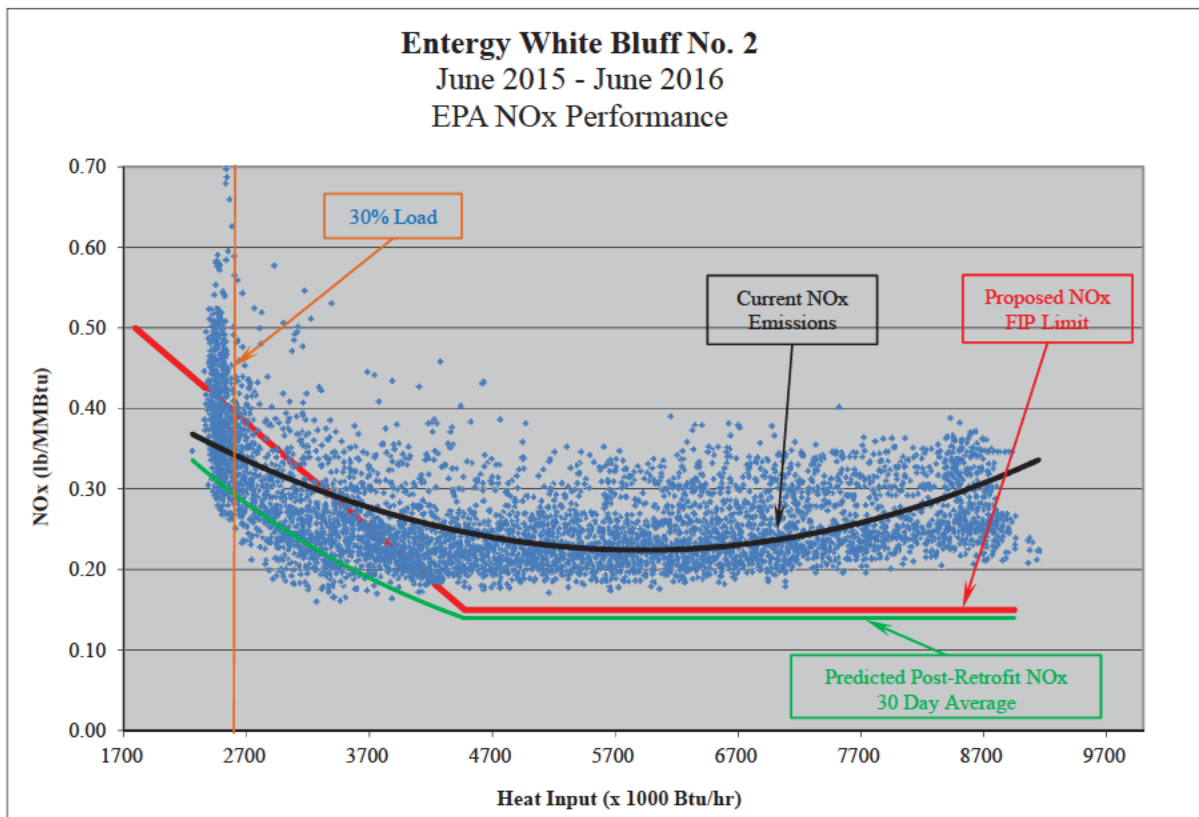


Figure 3 - NOx Generation at < 30% Load

With no overfire air system available to reduce NOx, the NOx reduction strategy at reduced load focuses on the direct causes of increased NOx: namely, up-tilt of the burner nozzles and high levels of excess air.

1.) Up-tilt of Coal Burners

To reduce NOx, the current burner tilts would have to be lowered below horizontal. This will reduce NOx emissions but will also result in reduced steam temperatures, causing a loss in boiler efficiency.

2.) Excess Air

The current boiler excess air levels would be reduced to promote NO_x reduction. Again, as with the burner tilts, this change will result in lower steam temperatures and reduced boiler efficiency.

All of these parameters will be optimized during the tuning process with the expectation of running with lower excess air levels and with tilts closer to horizontal. These factors alone will significantly reduce NO_x at this load, which is important because the NO_x reduction from the Tangential Low NO_x TLN system will be minimal due to a low mass flow of overfire air.

NO_x and Variable Load

NO_x concentrations remain relatively flat during periods of steady-state operation. However, during periods of load transition, and in particular at reduced load, NO_x is very sensitive to changing conditions such as air flow; fuel flow and burner tilt position. When load is being ramped up or down, and mills are put in or out of service, NO_x can spike to levels well above permitted values for short periods of time. Within minutes of the excursion, NO_x will typically return to and stabilize at the steady state level.

However, the issue lies with the duration of the reporting period: if the period is short (3-hours), the excursion in NO_x (which may last only 15 minutes) will result in an exceedance over the permitted 3-hour value as the spike in NO_x will not be averaged out by lower NO_x values achieved for the remaining 165 minutes. See Figure 4 below for an illustration of this time period.

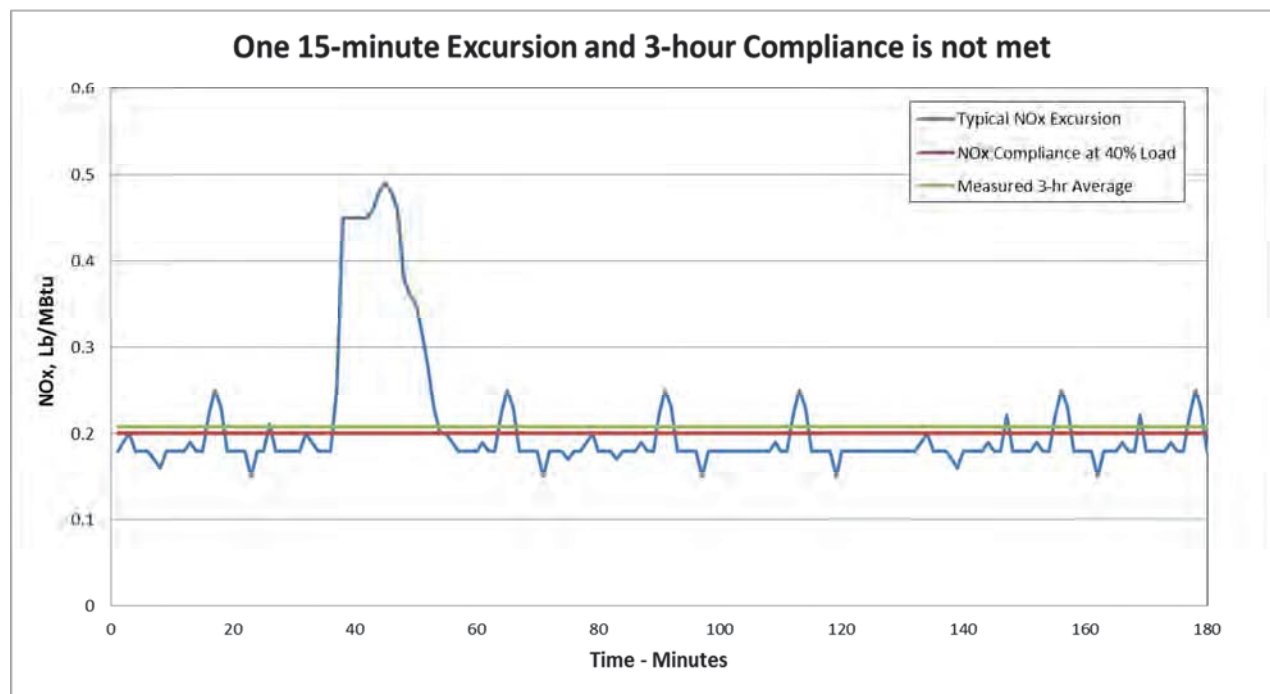


Figure 4 - 3-hour NO_x Reporting Period

If the reporting period is longer, such as for the 30-boiler-operating-day limit for the high-load limit (50-100%) of the final FIP, then the occasional spike in NO_x due to load transition can be accounted for by

the majority of the reported NOx data being below permitted values. Figure 5 illustrates the impact of this longer reporting period.

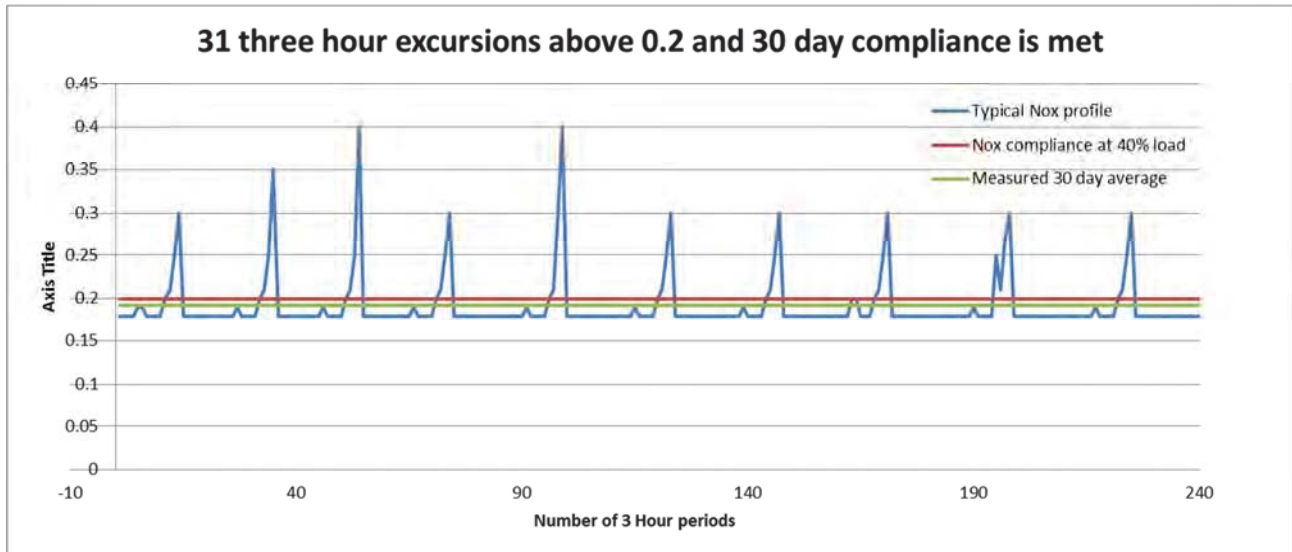


Figure 5 - 30-Day NOx Reporting Period

Boiler Start-up

A systematic approach is required for the start-up of any boiler that has been out of service for a period of time. These approaches can vary depending on the boiler design, but all approaches are based on the same premise: safe start-up procedures that prevent damage to the equipment and ensure personnel safety.

To ensure safe start-up, certain procedures are in place: these include support fuel to ensure ignition of the coal, high excess air to promote stable combustion and up-tilt on the coal burners to push the combustion zone upwards in the furnace and promote an appropriate rise in temperature and pressure.

The National Fire Protection Agency (NFPA) also recommends that, on boilers fitted with overfire air systems, the “boiler shall be operating in a stable manner before the overfire is introduced.” This means that during boiler start-up, the overfire system is not in service and NOx is predominantly uncontrolled.

Unfortunately, all of the procedures in place to promote a safe boiler start-up are parameters that adversely impact NOx. It is not until stable combustion is achieved and the overfire air system is put into service that NOx can be controlled on a continuous basis.

Summary

Operation: Maintaining compliance at loads below 50% heat input will be difficult primarily due to the short reporting period. If compliance becomes troublesome, then following implementation of the NOx FIP limit, Entergy may have to institute new operating procedures that limit ramp rates or otherwise deviate from OEM recommended boiler operating practices. As has been stated, NOx control below 50% will be difficult, especially during boiler start-up and load swings, as the new overfire air system will be limited in its effectiveness because secondary air will almost entirely be directed to the main windbox for safe unit operation.

Reporting Period Duration: The swings that are normative at reduced load make the permitting levels difficult to achieve in short reporting periods. A single 15-minute spike in NOx could result in NOx exceeding the permitted level in a 3-hour reporting period, even if the remaining 165 minutes are under compliance levels.

In the case of a longer reporting period, e.g. 30 - boiler operating days, these same NOx spikes seen during load transition can be accommodated and NOx levels can be maintained below required reporting levels.

If you have any questions or require further information, please do not hesitate to contact Steve deMello (office: 908-713-2281) or myself.

Sincerely,

Kenneth McCarthy
Amec Foster Wheeler North America
Director, Firing Systems
Hampton, NJ 08827-9000
Office: 908-713-3209
Cell: 908-500-7036



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

November 30, 1999

**OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS**

MEMORANDUM

SUBJECT: Guidance on the Reasonably Available Control Measures (RACM) Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas

FROM: John S. Seitz, Director
Office of Air Quality Planning and Standards

TO: Regional Air Division Directors
Regions I–X

Attached is guidance that clarifies EPA's policy on what constitutes "as expeditiously as practicable" for the purposes of attaining the national ambient air quality standards (NAAQS) for ozone nonattainment areas. The guidance contains information on EPA's determination of whether a State's submission provides for all RACM needed for attainment and whether implementation of those measures occurs as expeditiously as practicable. This guidance should be used by ozone nonattainment areas that are subject to the Clean Air Act requirement to submit an attainment demonstration and to submit RACM.

If you have any questions on this guidance, please contact Sharon Reinders at (919) 541-5284.

Attachment

cc: Bill Becker, STAPPAIALAPCO

**Guidance on the Reasonably Available Control Measures
(RACM) Requirement and Attainment Demonstration
Submissions for Ozone Nonattainment Areas**

Preface

The purpose of this guidance is to set forth EPA's current interpretation of the relationship of the "as expeditiously as practicable" requirement and the attainment demonstration requirement for ozone nonattainment areas. While EPA intends to proceed under the guidance that it is setting out today, the EPA will finalize this interpretation only when it applies in the appropriate context of individual rulemakings addressing specific attainment demonstrations for ozone nonattainment areas. At that time and in that context, judicial review of the EPA's interpretation would be available.

Background

Sections 172(a)(2)(A) and 181 (a) of the Act require ozone nonattainment areas for to attain the ozone NAAQS as expeditiously as practicable and provide outer-limit dates for attainment based on an area's classification. Furthermore, section 172(c)(1), provides for "the implementation of all reasonably available control measures as expeditiously as practicable." This policy addresses how EPA interprets these requirements with respect to the adoption of control measures within the intrastate portion of the modeling domain for ozone nonattainment areas.

To ensure compliance with the Act, EPA will review each attainment demonstration submission for the ozone NAAQS to determine whether it provides for all RACM necessary to attain the standard as expeditiously as practicable and provides for implementation of those measures as expeditiously as practicable. The State's submission needs to contain sufficient information for EPA to make such determinations.

In order for the EPA to determine whether a State has adopted all RACM necessary for attainment as expeditiously as practicable, the State will need to provide a justification as to why measures within the arena of potentially reasonable measures have not been adopted. The justification would need to support that a measure was not "reasonably available" for that area and could be based on technological or economic grounds. Sources of potentially reasonable measures include measures adopted in other nonattainment areas and measures that the EPA has identified in guidelines or other documents.

In order for the EPA to determine whether an area has provided for implementation as expeditiously as practicable, the State must explain why the selected implementation schedule is the earliest schedule based on the specific circumstances of that area. Such claims cannot be general claims that more time is needed but rather should be specifically grounded in evidence of economic or technologic infeasibility. While it may be appropriate for some control measures to be implemented shortly after adoption, the EPA recognizes that other measures may need a longer period.

The EPA will review the State's submission to ensure that sufficient information is provided for the EPA to determine whether the State has adopted all RACM necessary for attainment as expeditiously as practicable and provided for implementation of those measures as expeditiously as practicable. The EPA will make those determinations based on the information provided by the State and any other information available to the EPA at the time the Agency approves or disapproves the attainment demonstration.

**TECHNICAL SUPPORT DOCUMENT
TO COMMENTS OF CONSERVATION ORGANIZATIONS**

**Arkansas Department of Environmental Quality's October 2017
Proposed Revisions to the Arkansas State Implementation Plan
Regional Haze SIP Revision for 2008-2018 Planning Period**

*Prepared by
Victoria R. Stamper*

February 1, 2018

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INTRODUCTION

In October 2017, the Arkansas Department of Environmental Quality (ADEQ) proposed a revision to its Regional Haze State Implementation Plan (SIP) to address portions of the Arkansas Regional Haze SIP that EPA disapproved on March 12, 2012.¹ This Technical Support Document provides a review and analyses of Regional Haze requirements for two sources addressed in ADEQ's proposed SIP revision: the White Bluff power plant (Units 1 and 2) and the Independence Power Plant (Units 1 and 2).²

I. Evaluation of ADEQ's Proposed Determination of Sulfur Dioxide Best Available Retrofit Technology (BART) for White Bluff Units 1 and 2.

On September 27, 2016, EPA finalized a regional haze Federal Implementation Plan (FIP) to address those portions of the Arkansas Regional Haze SIP that EPA disapproved on March 12, 2012.³ In the FIP, EPA proposed as best available retrofit technology (BART) for sulfur dioxide (SO₂) emissions at White Bluff Units 1 and 2 an emission limit of 0.06 lb/MMBtu based on installation of a dry flue gas desulfurization system (dry FGD) or other technology that achieves that same level of control.⁴ Compliance is required no later than 5 years from the effective date of EPA's rule, or by October 27, 2021.⁵ On April 25, 2017, EPA issued a temporary, 90-day stay of parts of the FIP in response to petitions for reconsideration filed by various entities.⁶ Among other things, EPA announced its granting of reconsideration of the SO₂ emission limits for White Bluff based on statements made by Entergy regarding the future operation of the White Bluff plant that arose after the close of the comment period on EPA's proposed FIP.⁷ However, after the 90-day stay expired in July 2017, there has been no further stay of the FIP requirements. As a result, Entergy is required to meet an SO₂ limit of 0.06 lb/MMBtu on a 30-boiler operating day average basis by October 27, 2021.⁸

At the request of ADEQ, Entergy prepared a new BART analysis for SO₂ for the White Bluff units which ADEQ is proposing to rely on in its October 2017 proposed rulemaking.⁹ Entergy made two significant changes to past BART analyses conducted for the White Bluff units. First, Entergy evaluated the burning of slightly lower sulfur coal as a control strategy to meet BART.¹⁰ Second, Entergy submitted revised cost effectiveness analyses for SO₂ controls

¹ 77 Fed. Reg. 14,604.

² This Technical Support Document was prepared by Victoria R. Stamper, Boise, ID. Ms. Stamper is an independent air quality consultant and engineer with extensive experience spanning government and the private sector. Ms. Stamper's experience includes ten years working in EPA's Region VIII NSR Program and significant work on regional haze and Class I air quality matters, including work on permit and plan review and analysis. Ms. Stamper's Curriculum Vitae is included at Attachment A.

³ 81 Fed. Reg. 66,332.

⁴ 81 Fed. Reg. 66,339, 66,343, and 66,416.

⁵ 81 Fed. Reg. 66,416.

⁶ 82 Fed. Reg. 18,994.

⁷ 82 Fed. Reg. 18,995.

⁸ 40 C.F.R. 52.173(c)(6) and (7).

⁹ October 2017 Revisions to the Arkansas Regional Haze SIP for the 2008-2018 Planning Period, Public Review Draft, at 21 and Appendix D (hereinafter "October 2017 Public Review Draft").

¹⁰ *Id.* at 22.

which assumed a shortened remaining useful life of coal-burning at the White Bluff units that varied between 7 to 9 years depending on the control technology being evaluated based on a planned date to cease burning coal at the units.¹¹ Based on this revised BART analyses, ADEQ determined that BART for SO₂ would be met by the use of low sulfur coal at White Bluff Units 1 and 2 to meet an SO₂ emission limit of 0.6 lb/MMBtu.¹² Below, I provide comments on Entergy's revised BART analysis and ADEQ's proposed SO₂ BART determination.

A. Based on the Draft Administrative Order in ADEQ's October 2017 Regional Haze Rulemaking Package, it Does Not Appear that ADEQ is Specifically Requiring Entergy to Cease Burning Coal at White Bluff Units 1 and 2.

As stated above, one of the primary justifications for this revised BART analysis is to take into account a shortened remaining useful life of coal-burning at the White Bluff units.¹³ In the un-redacted version of Entergy's August 2017 revised BART analysis which ADEQ made publicly available on December 18, 2017, Entergy stated it intended to cease the use of coal at White Bluff Units 1 and 2 by the end of 2028 and that it is prepared to take an enforceable restriction on its remaining useful life.¹⁴ However, in the draft Administrative Order applicable to Entergy that was included with the October 2017 rulemaking package, ADEQ did not specifically require that Entergy cease burning coal at White Bluff at all. Specifically, the draft Administrative Order states the following with respect to the White Bluff Units 1 and 2:

White Bluff Unit 1 (SN-01) and White Bluff Unit 2 (SN-02) shall comply with an emission limit of 0.6 pounds of sulfur dioxide per million British thermal units (0.60 lb/MMBtu) on a rolling 30-boiler-operating-day averaging period within three years of the effective date of this AO and with Entergy's execution of its intended changes to operations at the White Bluff facility Units 1 and 2 indicated in their comments to EPA's federal implementation plan of Aug. 7, 2015 cited in their Petition for Reconsideration dated Nov. 23, 2015 [fn omitted], no later than December 31, 2030.

Draft ADEQ Administrative Order for Entergy Arkansas, Inc. at Condition 3.¹⁵

Instead of directly requiring Entergy to cease burning coal at White Bluff Units 1 and 2 by a date certain, the Administrative Order requires Entergy to "comply...with Entergy's execution of its intended changes to operations...indicated in their comments to EPA's federal implementation plan of Aug. 7, 2015..."¹⁶ A review of Entergy's August 7, 2015 comments on

¹¹ See Entergy's August 18, 2017 Updated BART Analysis for SO₂ for White Bluff Units 1 and 2 at 4-4., un-redacted version made available by ADEQ in its December 18, 2017 Notice of Data Availability (hereinafter "August 18, 2017 White Bluff BART Update").

¹² October 2017 Public Review Draft at 25.

¹³ *Id.* at 24.

¹⁴ See August 18, 2017 White Bluff BART Update at 4-4.

¹⁵ In October 2017 Public Review Draft at pdf page 1776.

¹⁶ It appears the language in the Administrative Order is directing Entergy to its Aug. 7, 2015 comments to EPA but it could also be directing Entergy to its Nov. 23, 2015 Petition for Reconsideration.

EPA's FIP shows that Entergy told EPA "[a]s part of a multi-unit plan to improve visibility and to better manage its generation assets for reliability and costs, Entergy proposes to cease burning coal at White Bluff Units 1 and 2 by 2027 and 2028, one unit per year, and is prepared to take an enforceable commitment to that effect."¹⁷ It is not clear why ADEQ's draft Administrative Order does not instead refer to Entergy's more recent August 18, 2017 White Bluff BART Update that was submitted to ADEQ, which states that Entergy "anticipates Unit 1 and Unit 2 will cease to use coal by end of year 2028."¹⁸ In addition, there is a discrepancy between the draft Administrative Order and Entergy's updated BART analyses which ADEQ is relying on. Specifically, the draft Administrative Order states that Entergy shall comply with "execution of its intended changes to operations" at White Bluff Units 1 and 2 no later than December 31, 2030, but the cost effectiveness analyses in Entergy's Updated BART Analysis is based on the assumption that the White Bluff units will cease firing coal by December 31, 2028.¹⁹ It also is important to note that Entergy's August 18, 2017 BART Update seems to condition Entergy's willingness to take an enforceable date to cease firing coal at White Bluff upon "acceptance of the BART determinations contained herein in an approved SIP."²⁰ Thus, it seems that the vagueness of ADEQ's draft Administrative Order may be attempting to provide some flexibility to Entergy to address the possibility that Entergy might not cease firing coal at the White Bluff units by 2028 if EPA does not approve low sulfur coal to meet an SO₂ limit of 0.6 lb/MMBtu as BART.

EPA's BART Guidelines make clear that where the remaining useful life of a source affects the BART determination, the date the facility permanently stops operations "*must* be assured by a federally- or State-enforceable restriction preventing further operation."²¹ EPA's BART determination in its FIP promulgated on September 27, 2016 found that the installation of new dry scrubbers at White Bluff Units 1 and 2 to meet an SO₂ limit of 0.06 lb/MMBtu was justified to meet BART because the costs of controls were reasonable at \$2,565/ton SO₂ removed at Unit 1 and at \$2,421/ton SO₂ removed at Unit 2 in 2012 dollars (or \$2,377/ton and \$2,243/ton in 2016 dollars²²) and because these controls would result in "considerable visibility improvement."²³ EPA's BART determination was based on a 30-year life of the units.²⁴ Entergy assumed the same 30-year life in its 2013 BART analysis submitted to ADEQ, stating that "[t]he remaining useful life of [White Bluff Units 1 and 2] does not impact the annualized capital costs for either semi-dry scrubbing or wet scrubbing because the useful life of the units is anticipated to be at least as long as the capital cost recovery period, which is 30 years...."²⁵

ADEQ is now claiming in this proposed SIP revision that, with a shortened remaining useful life, dry scrubbers are no longer cost effective and thus ADEQ has proposed to find that dry scrubbers – or any other add-on SO₂ controls - are no longer justified as BART.²⁶

¹⁷ August 7, 2015 Entergy Comments to EPA's Federal Implementation Plan at 5.

¹⁸ August 18, 2017 White Bluff BART Update at 4-4.

¹⁹ *Id.*

²⁰ *Id.*

²¹ 40 C.F.R. Part 51, Appendix Y, Section IV.D.4 k.2. under "How do I take into account a project's 'remaining useful life' in calculating control costs?" [Emphasis added].

²² Based on differences in CEPCI indices for 2012 and 2016 (i.e., 2012 cost basis multiplied by (541.7/584.6)).

²³ 81 Fed. Reg. 66,332 at 66,343 and 66,416.

²⁴ 80 Fed. Reg. 18,971 (Apr. 8, 2015); 81 Fed. Reg. 66,360 (Sept. 27, 2016).

²⁵ October 14, 2013 Entergy White Bluff Revised BART Analysis at 5-7.

²⁶ October 2017 Public Review Draft at 24.

Accordingly, the remaining useful life of the White Bluff units must be assured by a federally- or state-enforceable restriction that clearly defines the end of the remaining useful life of the White Bluff units. The draft Administrative Order provided in the October 2017 ADEQ Regional Haze Rulemaking Package does not specifically require that Entergy shut down the White Bluff units or that Entergy cease burning coal at the White Bluff units by any date certain. Without a clearly enforceable date by which Entergy must shut down or cease burning coal at the White Bluff units, there is no basis for assuming a shortened remaining useful life in the SO₂ BART cost calculations. Thus, EPA's BART FIP requirements that each unit meet an SO₂ BART limit of 0.06 lb/MMBtu by October 27, 2021 are still justified because the controls are cost effective and would result in considerable visibility improvement.²⁷

Indeed, in the August 5, 2015 Technical Support Document of Conservation Organizations submitted to EPA in comments on its proposed FIP, I provided cost analyses for wet and dry FGD systems at White Bluff that also showed these controls were very reasonable at \$2,229/ton and \$2,526/ton (2012 \$) at White Bluff, Units 1 and 2 respectively, which were also based on a 30-year life of controls.²⁸ These costs would be \$2,065/ton and \$2,341/ton in 2016 dollars, based on changes in the CECPI index from 2012 to 2016. In the event ADEQ does not adopt an enforceable deadline by which Entergy must shut down or cease coal-firing at the White Bluff units in this proposed Regional Haze plan revision, I incorporate by reference and attach my August 5, 2015 report and relevant exhibits into these comments on ADEQ's proposed regional haze SIP rulemaking.²⁹

Assuming ADEQ does ultimately adopt an enforceable deadline by which Entergy must shut down or cease coal-firing at the White Bluff units in this proposed Regional Haze plan revision, I have prepared revised cost effectiveness analyses for dry FGD systems and also for dry sorbent injection (DSI) based on a shortened remaining useful life of controls. These analyses are discussed further below.

B. Entergy's Revised Cost Effectiveness Analyses for White Bluff Are Flawed and Do Not Demonstrate that the Costs of Add-on SO₂ Controls at White Bluff Units 1 and 2 Are Not Reasonable.

As previously stated, ADEQ is proposing in the October 2017 Regional Haze SIP rulemaking to find that SO₂ BART for White Bluff Units 1 and 2 would be met by the use of low sulfur coal at White Bluff Units 1 and 2 to meet an emission limit of 0.6 lb/MMBtu, based on Entergy's revised cost effectiveness analyses that, among other things, reflect a shortened remaining useful life of the White Bluff units.³⁰ ADEQ found that neither DSI nor dry FGD SO₂ control technologies would be cost effective with the shortened remaining useful life of the units assumed in Entergy's August 18, 2017 revised cost effectiveness analyses.³¹ Specifically,

²⁷ 40 C.F.R. 52.173(c)(6) and (7); 81 Fed. Reg. 66,332 at 66,343, 66,416.

²⁸ August 5, 2015 Technical Support Document to Comments of Conservation Organizations, EPA's Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas, at 30-32.

²⁹ See August 5, 2015 Technical Support Document to Comments of Conservation Organizations (Ex. 1) at 28-34 and relevant exhibits to that report, which are included with Ex. 1.

³⁰ October 2017 Public Review Draft at 24, 25.

³¹ *Id.* at 23.

ADEQ relied on Entergy's revised cost effectiveness analyses that showed that dry FGD had an average cost effectiveness of \$5,403 per ton of SO₂ removed and DSI would have costs exceeding \$6,000/ton.³² ADEQ stated that the costs of these controls were "greater than what is typically considered cost effective."³³ However, Entergy's revised cost effectiveness numbers for dry FGD or even DSI are not outside the range of the costs of controls that similar sources have had to incur to meet BART. EPA's longstanding policy in evaluating costs of pollution controls is that, if other similar sources have had to incur similar costs to meet BART and regional haze control requirements, then those costs of control should not be considered unreasonable.

Data compiled by the National Park Service of State SO₂ BART determinations shows that the costs of SO₂ controls to meet BART at EGUs ranges from \$1,571/ton to as high as \$7,309/ton at the Silver Bay Power Plant in Minnesota.³⁴ In addition, EPA imposed a FIP of reasonable progress measures based on switching to a lower sulfur fuel oil at the fuel oil-fired boilers at the Kanoelehua Hill Power Plant, the Puna Power Plant, and the Shipman Power Plant in Hawaii at a cost effectiveness of approximately \$5,600/ton.³⁵ To address regional haze requirements for SO₂, the state of Wyoming found that a new dry scrubber and baghouse at Dave Johnston Unit 4 was cost effective at \$5,028 per ton of SO₂ removed.³⁶ Thus, cost effectiveness values in the \$5,000 per ton range for SO₂ BART are not out of the range that similar sources have had to incur to meet BART or reasonable progress.

Further, a review of the available information on Entergy's updated SO₂ cost effectiveness analyses shows that Entergy incorporated costs and methods would improperly inflate the cost effectiveness values for installing DSI or dry FGDs at each White Bluff unit as discussed below.

1. Entergy's Cost Effectiveness Evaluation of Low Sulfur Coal is Deficient.

Entergy's cost effectiveness evaluation for use of low sulfur coal (LSC) to meet an emission limit of 0.6 lb/MMBtu is deficient in several respects and also is inconsistent with how Entergy determined cost effectiveness for the add-on pollution controls evaluated, which makes all of Entergy's evaluations of the incremental cost effectiveness of add-on SO₂ controls inaccurate.

First, Entergy used a baseline period of 2009-2013, when it had previously used a baseline period of 2001-2003 in its 2013 BART analysis that EPA relied on, in part, in its FIP.³⁷ Entergy provided no basis for this change in baseline period. Entergy also evaluated a new control not previously evaluated of LSC to meet an emissions level of 0.6 lb/MMBtu.³⁸

³² *Id.*

³³ *Id.*

³⁴ See March 2011 National Park Service spreadsheet "EGUs with Proposed BART Controls." (Ex. 2).

³⁵ 77 Fed. Reg. 61,477, 61,490 (Oct. 9, 2012); see also 77 Fed. Reg. 31,691, 31,711-12 (May 29, 2012).

³⁶ See May 28, 2009 Wyoming Department of Environmental Quality BART Application Analysis, Dave Johnston Plant, at 23 (Ex. 3).

³⁷ See August 18, 2017 White Bluff BART Update at 1-1; see also 80 Fed. Reg. 18,969 (Apr. 8, 2015).

³⁸ August 18, 2017 White Bluff BART Update at 1-1, 4-1.

However, a review of the 2009-2013 annual average SO₂ rate based on emissions data submitted to EPA's Air Markets Program Database shows that each White Bluff unit had annual average emission rates less than 0.6 lb/MMBtu, with each unit's SO₂ rate averaging at 0.57 lb/MMBtu over the 2009-2013 timeframe.³⁹ Because cost effectiveness of a pollution control is measured on an annual basis, Entergy's evaluation of LSC based on a 2009-2013 baseline would not result in any reductions in SO₂ emissions on an annual basis and thus the cost effectiveness of LSC should be based on zero tons of SO₂ reduced. This is presumably why Entergy's consultant, Trinity Consultants, applied a different methodology to determining the tons of pollution removed in the cost effectiveness for LSC compared to how it determined the tons of pollution removed for the add-on SO₂ pollution controls. Specifically, Trinity states:

Trinity determined the values for annual tons of SO₂ reduced by subtracting the estimated controlled annual emission rate from the baseline annual emission rate. The baseline annual emission rate was based on the average rate for the 2009-2013 baseline period.[fn19] The controlled annual emission rates were based on the lb/MMBtu levels listed in Table 4-2 multiplied by the future annual heat input, which was based on the average actual heat input from CAMD for the 2009-2013 baseline period. *For the LSC scenario, "controlled" annual emission rates were based on an 8.75 percent decrease compared to baseline annual emission rates, which is estimated by comparing the maximum 30-boiler operating day rolling average to the controlled emission rate of 0.6 lb/MMBtu.*

August 18, 2017 White Bluff BART Update at 4-4 [Emphasis added].

By applying this different approach to calculating the reduction in emissions for LSC, the cost effectiveness value of using LSC was improperly inflated and should instead be zero if using a baseline of 2009-2013, because no SO₂ emissions would need to be reduced on an annual average basis to meet a 0.6 lb/MMBtu emission limit with LSC at White Bluff Units 1 and 2.

To compound the problem, Trinity used a different methodology for calculating emission reductions from add-on controls than it used for low-sulfur coal, using the typically-applied method⁴⁰ of reducing annual average baseline emissions by the percent reduction from the annual average baseline SO₂ rate in lb/MMBtu to the proposed SO₂ lb/MMBtu rate for each add-on BART control option. This means that comparisons between the emission reductions from add-on controls and low-sulfur coal are not apples-to-apples comparisons. Further, because Trinity calculated the tons of SO₂ reduced with DSI and a dry FGD based on a very different method than the method used for LSC, Trinity's determination of incremental cost effectiveness of either DSI or dry FGD compared to low sulfur coal is erroneous. ADEQ must ensure that cost effectiveness and incremental cost effectiveness for all controls evaluated are based on the same methodology for calculating annualized cost of control and annualized emission reductions. If Entergy is going to update its cost effectiveness analysis baseline to be based on 2009-2013, then the cost effectiveness of using LSC must be considered as zero since emissions won't be reduced

³⁹ See Ex. 4, spreadsheet with IPM Cost Models DSI Cost Analyses at tabs "WB 1 Baselines" and "WB 2 Baselines."

⁴⁰ 40 C.F.R. Part 51, Appendix Y, Section IV.D.4.c.

on an annual average basis, and all incremental cost effectiveness analyses need to be revised accordingly.

2. Entergy's Cost Effectiveness Analysis of DSI at 50% Control Is Based on Unrealistic Design Parameters that Would Tend to Overestimate Costs of Control.

Entergy's cost estimates for DSI developed by Sargent & Lundy at 50% control are overstated. First, in determining capital costs for the system, Sargent & Lundy designed the system based on 50% removal from a design inlet concentration of 0.76 lb/MMBtu, based on the highest 5% of SO₂ emissions from 2009-2013.⁴¹ Yet, in the 2009-2013 baseline period used in Entergy's cost effectiveness analyses, uncontrolled SO₂ averaged much lower at 0.57 lb/MMBtu on an annual average basis.⁴² Over a more appropriate baseline of 2001-2003 when the units burned somewhat higher sulfur coal, annual average uncontrolled SO₂ emissions still averaged only 0.69 lb/MMBtu at Unit 1 and 0.66 lb/MMBtu at Unit 2.⁴³ Cost effectiveness of pollution controls is to be based on an annualized cost effectiveness – that is the annual cost of controls divided by the annual tons of pollutant removed.⁴⁴ As such, the design and cost of controls should be based on the average annual reductions in SO₂ emission rate, not the highest 5% of SO₂ emissions over the baseline period.

Entergy has also proposed an SO₂ emission limit achievable with this control of only 0.35 lb/MMBtu based on a maximum 30-day average from 2014-2016 of 0.66 lb/MMBtu.⁴⁵ It is not clear why Entergy used 2014-2016 data when its cost analysis is based on a 2009-2013 baseline. Further, the 0.35 lb/MMBtu proposed SO₂ limit with DSI only reflects 47% SO₂ control from the maximum 30-day average from 2014-2016. Moreover, the proposed 0.35 lb/MMBtu limit only reflects 39% control from the 2009-2013 annual average baseline SO₂ emission rate of 0.57 lb/MMBtu. Thus, the capital and operating costs for the DSI system evaluated by Entergy are inflated based on the cost to reduce SO₂ by 50% from uncommonly high SO₂ rate for the White Bluff units and then the annual tons per year reduced are understated by basing the achievable emission limit on less than a 50% reduction in annual average SO₂ emissions.

Moreover, these and other unrealistic design considerations were carried over into an ESP upgrade that Sargent & Lundy stated may not even be needed at the White Bluff units with DSI at 50% control but yet included the costs in its DSI cost effectiveness analysis. Specifically, Sargent & Lundy's DSI analysis indicates that the ESPs at White Bluff Units 1 and 2 are large and operate at high removal efficiencies⁴⁶, and that the addition of DSI sodium compounds to the fly ash "lowers the overall resistivity of the particulate being captured as well as shifting the particle size distribution" which can "improve the removal efficiency of an ESP" in some cases

⁴¹ Sargent & Lundy, White Bluff DSI Cost Estimate Basis Document, August 3, 2017, at 2, included in Entergy's August 2017 White Bluff BART Update.

⁴² *Id.*

⁴³ See Ex. 4, spreadsheet with IPM Cost Models DSI Cost Analyses at tabs "WB 1 Baselines" and "WB 2 Baselines."

⁴⁴ See 40 C.F.R. Part 51, Appendix Y, Section IV.D.4.b. and c.

⁴⁵ Sargent & Lundy, White Bluff DSI Cost Estimate Basis Document, August 3, 2017, at 2, included in August 18, 2017 White Bluff BART Update.

⁴⁶ *Id.* at 7 and in attachment of FuelTech's October 17, 2016 at 4.

enough to offset the increased particulate loading from DSI.⁴⁷ Yet, Sargent & Lundy included the costs of rebuilding the ESPs in the DSI cost effectiveness calculations.

Sargent & Lundy obtained an analysis of whether an ESP upgrade would be needed from FuelTech, who provided a cost estimate for an ESP rebuild that is included in Entergy's DSI cost analyses.⁴⁸ FuelTech determined that a complete ESP rebuild would be necessary due to the 22,500 lb/hr of trona injection, the inlet ash loading of 55,000 lb/hr, and a design outlet PM emission rate of 0.015 lb/MMBtu or lower.⁴⁹ As previously stated, the trona loading is based on an overly high uncontrolled SO₂ inlet rate reflective of the maximum 5% of uncontrolled SO₂ emission rates at the White Bluff units over 2009-2013. Thus, the trona injection rate of 22,500 lb/hr is higher than will likely be required at White Bluff Units 1 and 2. Moreover, an ash loading of 55,000 lb/hr reflects a much higher ash content coal than currently and historically used at White Bluff Units 1 and 2. Specifically, a review of coal used at the White Bluff units from the Energy Information Administration's coal data browser shows that the ash content of the coal used at the White Bluff units has generally been between 5-6% ash and sometimes even closer to 4% ash.⁵⁰ Based on EPA's AP-42 emission factors for uncontrolled coal, an approximate average heat value of the coal used at White Bluff of 8600 Btu/lb⁵¹, and a maximum hourly heat input to each boiler of 8950 MMBtu/hr⁵² and assuming 5.5% ash content, the particulate loading to the ESPs at the White Bluff units would be significantly lower at 28,620 lb/hr.⁵³

Not only was FuelTech's estimate that an ESP rebuild would be needed with DSI at each White Bluff unit based on an overly high ash and trona loading to the ESP, but FuelTech also assumed the outlet PM emission rate had to be 0.015 lb/MMBtu or lower.⁵⁴ The White Bluff units are subject to a much higher PM emission limit of 0.10 lb/MMBtu.⁵⁵ Sargent & Lundy relied on EPA program ESPVI 4.0W to claim that the White Bluff ESP operates at a control level to meet a filterable PM emission limit of 0.0155 lb/MMBtu,⁵⁶ yet the units are instead subject to a PM emission limit that is more than 6 times higher than 0.0155 lb/MMBtu. While it is understood that Entergy would want to ensure that actual PM emissions do not increase above PSD significance levels and trigger PSD permitting⁵⁷, Entergy does not need to reduce PM emissions to avoid PSD. Yet, that is how Sargent & Lundy asked FuelTech to evaluate the need for ESP upgrades and for design of the ESP upgrades. Entergy's BART Update did not even include stack test data to show what filterable PM emission rates the White Bluff units are actually emitting. Stack test data from 2010 show that Unit 1 was emitting filterable PM at

⁴⁷ *Id.* at 5.

⁴⁸ *Id.*, in attachment of FuelTech's October 17, 2016 ESP Retrofit Estimate.

⁴⁹ *Id.*, FuelTech's October 17, 2016 ESP Retrofit Estimate at 3-4.

⁵⁰ See printout of coal shipments to the White Bluff plant from EIA's Coal Data Browser, available at <https://www.eia.gov/beta/coal/data/browser/>, attached as Ex. 5.

⁵¹ Per Entergy, see August 18, 2017 White Bluff BART Update at 3-1.

⁵² Per October 2017 Public Review Draft at 21.

⁵³ See EPA's AP-42, Table 1.1-4 (uncontrolled PM emission factors for dry bottom boilers).

⁵⁴ Sargent & Lundy, White Bluff DSI Cost Estimate Basis Document, August 3, 2017, in attached FuelTech October 17, 2016 ESP Retrofit Estimate at 3.

⁵⁵ 77 Fed. Reg. 14,604 at 14,636, 14,675 (Mar. 12, 2012).

⁵⁶ Sargent & Lundy, White Bluff DSI Cost Estimate Basis Document, August 3, 2017 at 6.

⁵⁷ As stated in Sargent & Lundy, White Bluff DSI Cost Estimate Basis Document, August 3, 2017, at 2.

0.019 lb/MMBtu⁵⁸ and Unit 2 was emitting filterable PM at 0.016 lb/MMBtu, both of which are higher than FuelTech’s design outlet emissions rate of 0.015 lb/MMBtu or lower.⁵⁹ Based on these unrealistic design parameters, FuelTech determined that retrofits to the White Bluff ESPs would be required and that the ESPs would need to be built to “‘as-new’ condition with the most state-of-the-art technology options.”⁶⁰ FuelTech estimated a total cost for materials and installation of \$50,000,000 per unit, more than half of Sargent & Lundy’s direct capital cost estimate for DSI at each White Bluff unit.⁶¹

In summary, Sargent & Lundy’s assumptions, and the unrealistic design parameters behind those assumptions, added significantly to the cost estimates for DSI to achieve 50% control from the highest uncontrolled SO₂ emission rates at White Bluff Units 1 and 2 and by assuming a complete ESP retrofit would be required, when it is not even clear that any changes to the ESP will be required to meet the proposed SO₂ emission rate of 0.35 lb/MMBtu.

3. Entergy’s Cost Analysis of “Enhanced DSI” is Also Based on Design Parameters that Would Overestimate Costs of Control.

In evaluating DSI at higher SO₂ removal rates, Entergy evaluated the addition of a baghouse along with DSI, a control option Entergy labelled “Enhanced DSI.”⁶² As with its evaluation of DSI, Entergy’s cost estimates for Enhanced DSI developed by Sargent & Lundy are overstated. First, in determining capital costs for the system, Sargent & Lundy designed the system based on 80% removal from a design inlet concentration of 0.76 lb/MMBtu, based on the highest 5% of SO₂ emissions from 2009-2013.⁶³ Yet, in the 2009-2013 baseline period used in Entergy’s cost effectiveness analyses, uncontrolled SO₂ averaged much lower at 0.57 lb/MMBtu on an annual average basis.⁶⁴ Over a more appropriate baseline of 2001-2003 when the units burned somewhat higher sulfur coal, annual average uncontrolled SO₂ emissions still averaged only 0.69 lb/MMBtu at Unit 1 and 0.66 lb/MMBtu at Unit 2.⁶⁵ Cost effectiveness of pollution controls is to be based on an annualized cost effectiveness – that is the annual cost of controls divided by the annual tons of pollutant removed.⁶⁶ As such, the design and cost of controls should be based on the average annual reductions in SO₂ emission rate, not the highest 5% of SO₂ emissions over the baseline period.

⁵⁸ See Source Emissions Survey of Entergy Services, Inc. White Bluff Steam Electric Station Unit Number 1 Stack (SN-01), April 2010, at 2 (Ex. 6).

⁵⁹ See Source Emissions Survey of Entergy Services, Inc. White Bluff Steam Electric Station Unit Number 2 Stack (SN-02), April 2010, at 2 (Ex. 7).

⁶⁰ FuelTech’s October 17, 2016 ESP Retrofit Estimate at 4.

⁶¹ Sargent & Lundy, White Bluff DSI Cost Estimate Basis Document, August 3, 2017, “Entergy Arkansas White Bluff Units 1 or 2 (Single Unit) DSI System EPA at 2.

⁶² August 18, 2017 White Bluff BART Update at 4-2.

⁶³ Sargent & Lundy, White Bluff Enhanced DSI Cost Estimate Basis Document, August 3, 2017, at 2, included in Entergy’s August 2017 White Bluff BART Update.

⁶⁴ *Id.*

⁶⁵ See Ex. 4, Spreadsheet with IPM Cost Models DSI Cost Analyses, at tabs “WB 1 Baselines” and “WB 2 Baselines.”

⁶⁶ See 40 C.F.R. Part 51, Appendix Y, Section IV.D.4.b. and c.

Entergy has also proposed an SO₂ emission limit achievable with this control of only 0.15 lb/MMBtu based on a maximum 30-day average from 2009-2013 of 0.66 lb/MMBtu.⁶⁷ The 0.15 lb/MMBtu proposed SO₂ limit only reflects 77.3% SO₂ control from the maximum 30-day average from 2009-2013. Moreover, the proposed 0.15 lb/MMBtu limit only reflects 73.7% control from the 2009-2013 annual average baseline SO₂ emission rate of 0.57 lb/MMBtu. Yet, the Enhanced DSI system reagent injection rates were based on 80% control.⁶⁸ Thus, the capital and operating costs for the DSI system evaluated by Entergy are inflated based on the cost to reduce SO₂ by 80% from uncommonly high SO₂ rate for the White Bluff units and then the annual tons per year reduced are understated by basing the achievable emission limit on less than a 80% reduction in annual average SO₂ emissions. Consequently, Entergy's cost effectiveness values for enhanced DSI at White Bluff Units 1 and 2 are likely inflated.

4. ADEQ Must Ensure that the Cost Effectiveness Analyses Relied on for its Revised BART Determinations Are Not Based on Costs that EPA Does Not Allow in BART Cost Effectiveness Analyses.

EPA requires that BART cost determinations be based on the methodology of EPA's Control Cost Manual.⁶⁹ However, it appears Entergy does not agree with EPA's requirement, and it is not clear whether the cost effectiveness numbers being relied on by ADEQ comport with the methodology of EPA's Control Cost Manual.

Entergy provided two summary tables of cost effectiveness analyses of SO₂ controls in its 2017 White Bluff BART Update: "Summary of SO₂ Controls Cost Effectiveness for Unit 1 and Unit 2 Based on Actual Costs" in Table 4-3 of Entergy's August 18, 2017 submittal and "Summary of SO₂ Controls Cost Effectiveness for Unit 1 and 2 *Based on Costs Adjusted for EPA-Exclusions for Illustration Purposes*" in Table 4-4 of Entergy's August 18, 2017 submittal to ADEQ [Emphasis added]. The cost effectiveness values listed in ADEQ's October 2017 Public Review Draft and associated documents appear to indicate that ADEQ is relying on the cost effectiveness numbers "Adjusted for EPA-Exclusions" in Table 4-4 of Entergy's August 18, 2017 BART Update⁷⁰, although ADEQ does not state this directly. While it appears that Entergy's adjusted costs for EPA exclusions did not include "Allowance for Funds Used During Construction" (AFUDC)⁷¹ it is unclear if all other costs were excluded that are not consistent with the costing methodology of EPA's Control Cost Manual.

⁶⁷ Sargent & Lundy, White Bluff Enhanced DSI Cost Estimate Basis Document, August 3, 2017, at 2, included in August 18, 2017 White Bluff BART Update.

⁶⁸ *Id.*

⁶⁹ See 40 C.F.R. Part 51, Appendix Y, Section IV.D. under Step 4.a. Impact analysis part 1: How do I estimate the cost of control?

⁷⁰ October 2017 Public Review Draft at 23. See also spreadsheet in ADEQ files with filename "wb-cost-calcs" in which ADEQ calculates the annualized costs, average cost effectiveness, and incremental annualized costs that were redacted in Table 4-4 of Entergy's August 18, 2017 White Bluff BART Update based on the incremental cost effectiveness data and tons of SO₂ removed. Thus, it is clear that ADEQ is relying on Entergy's cost calculations that excluded AFUDC and possibly other costs not allowed by EPA.

⁷¹ August 18, 2017 Entergy Updated BART Five-Factor Analysis for SO₂ for Units 1 and 2 at 4-5.

EPA requires that BART cost determinations be based on EPA's Control Cost Manual to have a consistent basis for comparison to other States' BART cost determinations.⁷² This is very important because, as EPA has done for years with BACT determinations, the costs that other subject-to-BART sources have had to bear to comply with regional haze requirements are used as a benchmark for determining if the cost of pollution control at a source in question is reasonable.⁷³ In other words, if other similar sources have had to bear similar costs for a particular control technology to meet BART, then such costs should be considered reasonable for another source of the same source category, taking into account other factors that define BART including the degree of improvement in visibility expected to result with the pollution control. The only way such comparisons can be properly made is with the consistent use of the same cost methodology.

The costing methodology of the Control Cost Manual is based on the "overnight" method of cost estimation, widely used in the utility industry.⁷⁴ The overnight method is the cost of a construction project if no interest is incurred during construction, as if the project is completed "overnight." The overnight cost is the present value cost that would have to be paid as a lump sum up front to completely pay for a construction project.⁷⁵ The overnight costing methodology converts the capital cost estimates into an annual cost in current real dollars without any inflation. The overnight costing methodology must be used regardless of the source of the capital cost data. The only exceptions are as to the source of capital cost estimates – vendor quotes, equipment bids, budget estimates.

This overnight method is uniformly used in regulatory cost effectiveness analyses specifically so cost effectiveness is meaningful. There are no alternate cost methodologies for determining cost effectiveness. This issue is well settled and has consistently been EPA's position on cost effectiveness analyses for BART and reasonable progress determinations. *See*, for example, EPA's responses to comments on the Oklahoma Regional Haze Plan, the EPA's BART determination for the San Juan Power Plant, and correspondence with North Dakota regarding BART.⁷⁶

It appears that Entergy's cost effectiveness analysis that it is relying on is based on an entirely different "all in" costing methodology, which seek to determine the actual cost to the owner. These methods inflate costs to future build date, include taxes, interest, bond charges, allowance for funds used during construction (AFUDC), and other cost components, which in the real world may be incurred, but are irrelevant and inappropriate for a regulatory cost effectiveness analysis. A regulatory cost effectiveness analysis does not seek to determine owner

⁷² See 40 C.F.R. Part 51, Appendix Y, Section IV.D. under Step 4.a. Impact analysis part 1: How do I estimate the cost of control?

⁷³ See October 1990, New Source Review Workshop Manual, U.S. EPA, at B.29.

⁷⁴ See Cost Control Manual, Section 2.3 to 2.4.

⁷⁵ Steven Stoft, Power Economics: Designing Markets for Electricity, 2002.

⁷⁶ See Response to Technical Comments for Sections E. through H. of the Federal Register Notice for the Oklahoma Regional Haze and Visibility Transport Federal Implementation Plan, 12/13/2011 [Docket ID EPA-R06-OAR-2010-0190-0057 in docket for the Oklahoma FIP] Ex. 8; U.S. EPA, Complete Response to Comments for NM Regional Haze/Visibility Transport FIP, 8/5/2011, EPA-R06-OAR-2010-0846-0127 (Ex. 9); and May 10, 2010 Letter from Andrew M. Gaydosh, Assistant Regional Administrator, EPA Region 8, to Terry O'Clair, Director, Division of Air Quality, North Dakota Department of Health, Re: EPA's Comments on the North Dakota Department of Health's April 2010 Draft BACT Determination for NOx for the Milton R. Young Station, at 14-16 (Ex. 10).

costs, but rather to compare costs among similarly-situated sources by using a method that involves the smallest amount of guesswork possible. The overnight method eliminates guessing what future prices, inflation rates, and taxes, for example, will be and instead relies only on what everyone can discover today, currently, in real-time, and real dollars, when the estimate is being prepared.

In its cost estimates provided in Table 4-4 of its August 18, 2017 BART Update, i.e., “Costs Adjusted for EPA-Exclusions for Illustration Purposes,” which ADEQ appears to rely on, Entergy does not state what other costs aside from AFUDC were excluded from the costs in its Table 4-4 of its August 18, 2017 BART Update. It is difficult to determine whether Entergy excluded other “all-in costs” that would not be allowed in overnight cost method of the Control Cost Manual that it did take into account in its detailed cost estimates presented in its August 2017 BART Update. For example, escalation of costs during construction, which takes into account changes in labor and material prices over the time period of construction, are not be allowed in the overnight costing method of the Control Cost Manual which, as stated earlier, is to reflect the present value of the cost to construct a project as if construction were completed overnight.⁷⁷ Further, EPA does not consider owner’s costs to be valid costs under its Control Cost Manual.⁷⁸ In addition, if Entergy took into account the sales tax cost of controls, ADEQ must not allow the sales tax to be included if Arkansas offers an exemption for sales taxes for construction of pollution control equipment as is allowed in many states.

ADEQ must ensure to the public that the Entergy cost numbers it is relying on for its Regional Haze SIP revision do not include escalation of costs during construction, owner’s costs, AFUDC, or other costs not allowed by the overnight costing method.

5. Entergy Appropriately Assumed Compliance with DSI Could Occur by 2019 for DSI and Entergy Should Have Assumed an October 27, 2021 BART Compliance Date for a Dry FGD System.

In determining the remaining useful life of the White Bluff units to calculate annualized capital costs of controls, Entergy’s updated BART analysis assumes DSI would be installed and operating by the end of 2019 and that dry FGD systems would be installed and operating by the end of 2021.⁷⁹ It was appropriate for Entergy to assume a 2019 compliance date for DSI, which can be installed quite readily as is discussed below. However, Entergy should not have assumed a compliance date for installation of dry FGD systems any later than the current BART compliance date of EPA’s FIP of October 27, 2021 (40 C.F.R. §52.173(c)(7)). Thus, if ADEQ adopts an enforceable requirement mandating that White Bluff Units 1 and 2 shut down or cease burning coal by December 31, 2028 as proposed by Entergy⁸⁰, then a remaining useful life of 7 years and 2 months (or 7.17 years) should be used in the revised cost analyses for dry FGD

⁷⁷ See 81 Fed. Reg. 66,332 at 66,383 (Sept. 27, 2016). See also EPA’s Response to Comments on its FIP at 336, 338, and pdf page 341-343 (Ex. 11).

⁷⁸ As stated in EPA’s final Arkansas FIP at 81 Fed. Reg. 66,383 (Sept. 27, 2017).

⁷⁹ Entergy’s August 18, 2017 BART Update at 4-4.

⁸⁰ *Id.* Note that Entergy’s August 7, 2015 comments to EPA, which ADEQ cites to in its draft Administrative Order, stated that Entergy proposed to cease all coal-fired operations at one White Bluff unit by 2027 and at the other unit by 2028. See August 7, 2015 Entergy Comments to EPA at 2, 5.

systems. While Entergy may claim that dry FGD systems would require an additional 5 years after adoption of the SIP revision, dry FGD systems have been installed more readily than 5 years. There are numerous examples of SO₂ pollution controls being installed in less than 5 years.

During the adoption of the Mercury and Air Toxics Standards (MATS), EPA found that EGUs could install required controls, including scrubbers, within 3 years. Specifically, EPA stated in 2011 that “[u]nits that choose to install dry or wet scrubbing technology should be able to do so within the compliance schedule required by the [Clean Air Act] as this technology can be installed within the 3-year window.”⁸¹ In support of this claim, EPA referenced a letter to Senator Carper dated November 3, 2010, in which David Foerter, executive director of the Institute of Clean Air Companies (ICAC), stated that wet scrubbers could be installed in 36 months, dry scrubbing technology could be installed in 24 months, and dry sorbent injection could be installed in 12 months.⁸² ICAC’s claims were based on 7 years of pollution control installation at coal-fired EGUs under the Clean Air Interstate Rule (CAIR) and under the NO_x SIP Call. The ICAC letter states that, between 2008 to 2010, flue gas desulfurization (FGD) controls were installed at numerous EGUs with combined capacity of 60 gigawatts (GW) while, concurrently, selective catalytic reduction was installed at roughly 20 GW of EGUs.⁸³ During that timeframe of significant pollution control installation, there were no labor shortages.⁸⁴

In analyses conducted for the MATS rule, EPA similarly found that there were significant FGD and SCR retrofits in recent years, and stated:

These data depict a recent ramp-up in the [Air Pollution Control] deployment capabilities of all industry participants, including plant owners, the [Air Pollution Control] supply chain, and state and local permitting agencies. These expanded [Air Pollution Control] capabilities are still active today...⁸⁵

The compliance deadline for the MATS rule was April 2015, with the possibility of a one-year extension until April 2016. Because those deadlines are past, there should not be labor shortages for installing SO₂ controls to meet EPA’s proposed SO₂ BART requirements at the White Bluff plant.

EPA’s predictions regarding MATS provided to be true, as many scrubbers were installed to meet MATS within three to four years, at most. Table 1 below provides several examples of EGUs which are in the process of installing SO₂ scrubbers and which will be completed within three to four years.

⁸¹ 76 Fed. Reg. 24976, 25054 (May 3, 2011).

⁸² *Id.*, fn 172.

⁸³ See November 3, 2010 letter from David C. Foerter, ICAC to Senator Carper, at 4 (Ex. 12).

⁸⁴ *Id.*

⁸⁵ See U.S. EPA, An Assessment of the Feasibility of Retrofits for the Toxics Rule, March 9, 2011, at 5. (Ex. 13).

Table 1. Examples of FGD System Installation Timeframes

State	Facility	Unit	Time to Install FGD
MI	Dan E Karn	1 and 2	Contract for design and supply for dry scrubbers was issued in August 2011. ⁸⁶ According to CAMD, dry lime scrubber began operation at Unit 1 on June 6, 2014. The scrubber on Unit 2 became operational in May of 2015. ⁸⁷
TN	Gallatin	1, 2, 3, 4	FGD design for all four units began in September 2011. The FGD at Unit 4 was expected to be in operation by April 2015, Unit 3 by June 2015, Unit 1 by November 2015, and Unit 2 by January 2016. ⁸⁸
PA	Homer City	1 and 2	Construction of FGDs began in 2012 and final tie-in to be completed by end of third quarter of 2015. ⁸⁹
MI	JH Campbell	2, 3	Engineering for the Unit 2 FGD began in late 2012 and the FGD is expected to be installed and operational by early 2016. ⁹⁰
KS	La Cygne	1, 2	Contract for design and supply of wet FGD systems issued in December 2011. ⁹¹ Installation of wet FGD systems to be completed by June 1, 2015. ⁹²

⁸⁶ See August 3, 2011 “B&W gets contract for dry scrubber project at Karn coal plant.” (Ex. 14).

⁸⁷ See December 17, 2014 Extension Request for Consumers Energy Company’s D.E. Karn Plant (SRN B2840) Units 1 & 2 for Compliance with the Mercury and Air Toxics Standard (40 CFR 63 Subpart UUUUU) and the Michigan Mercury Rule (R336.2501) at 2 (Ex. 15). Exact date of scrubber startup obtained from EPA’s Air Markets Program Database.

⁸⁸ See July 9, 2014 TVA – Gallatin Fossil Plant (GAF) – Request for Compliance Extension - Mercury and Air Toxics (MATS), Enclosure at page 4 (Ex. 16). Based on information in EPA’s Air Markets Program Database, Unit 4’s FGD became operational in April of 2015, Unit 3’s FGD was operational in April 2015, and Unit 2’s FGD was operational in January 2016.

⁸⁹ See November 5, 2013 Request for One-Year Extension of the Compliance Deadline for the Mercury and Air Toxics Standards and of the Expiration Date of the Plan Approval for the Installation of Flue Gas Desulfurization Units at 1-2 (Ex. 17). Based on information in EPA’s Air Markets Program Database, Homer City Unit 1’s FGD was operational in October 2015 and Unit 2’s FGD was operational in April 2016.

⁹⁰ See October 4, 2012 Construction Extension for Consumers Energy Company’s JH Campbell Facility Pursuant to the Mercury and Air Toxics Standard (40 CFR 63 Subpart UUUUU, also known as MATS) as well as the Michigan Mercury Rule (R336.2501, *et seq.*), Exhibit B, Figures B-1c and B-1d (Ex. 18). Based on information in EPA’s Air Markets Program Database, J H Campbell Unit 2’s FGD was operational in May 2016 and Unit 3’s FGD was operational in August 2016.

⁹¹ See “Hitachi Power Systems America Awarded Contract to Supply Pollution Controls Equipment for KCP&L.” (Ex. 19).

⁹² See June 22, 2012 Request for Extension of the Mercury and Air Toxics Standards (MATS) Compliance Deadline KCP&L La Cygne, Source ID No. 1070005, at 1 (Ex. 20). Based on information in EPA’s Air Markets Program Database, La Cygne Unit 1’s FGD was operational in March 2015 and Unit 2’s FGD was operational in October 2014.

IN	Michigan City	12	Planning for the dry FGDs began in 2011 with final operation scheduled for 1 st quarter 2016 for Unit 12. ⁹³
IN	RM Schahfer	14, 15	Co-located with the Michigan City Plant, FGD systems were installed and became operational at Unit 14 on November 1, 2013 and at Unit 15 on October 26, 2014 according to CAMD. ⁹⁴

For those plants that will have multiple units at which scrubbers are to be installed under EPA’s proposed BART rulemaking, those plants will benefit from coordinated and shared engineering design and FGD fabrication, economies of scale benefits with FGD suppliers, and more consistent staffing levels with on-site contractors for concurrent FGD installations.⁹⁵ This is demonstrated in the table above. For example, the Gallatin plant had four FGDs installed within approximately four years from design to operation.

With respect to White Bluff, Entergy presumably should have been planning for installation of dry scrubbers to meet an SO₂ limit of 0.06 lb/MMBtu at White Bluff Units 1 and 2 since at least 2013, when it first proposed such controls to ADEQ and EPA to meet BART.⁹⁶ EPA’s BART FIP requiring the White Bluff units to meet a 0.06 lb/MMBtu SO₂ limit was promulgated by EPA on September 27, 2016.⁹⁷ Given that Entergy initially proposed to install dry FGDs at White Bluff Units 1 and 2 in 2013, one would presume that Entergy has already had some of the engineering work completed to know that it was reasonable and feasible for the company to propose to install dry scrubbers to meet an SO₂ limit of 0.06 lb/MMBtu. In any event, Entergy could realistically meet the October 27, 2021 BART compliance deadline for installation of dry FGD systems and the remaining useful life should have been based on that start date of dry FGD systems in the cost analysis for those controls.

It was appropriate for Entergy to assume a 2019 compliance date in determining the remaining useful life of dry sorbent injection. Indeed, DSI systems can be designed and installed very quickly, in as little time as 1 year according to the Institute of Clean Air Companies.⁹⁸ For example, the R Gallagher power plant in Indiana was required to install dry sorbent injection systems pursuant to a settlement with the U.S. Department of Justice after a federal jury found in May 2009 that Duke Energy made modifications to Gallagher Units 1 and 2 that were not properly permitted.⁹⁹ According to information in EPA’s Air Markets Program Database, DSI was installed and operational at Gallagher Unit 2 in November 2010, about 1.5 years after the

⁹³ See January 30, 2013 NIPSCO – Michigan City and R.M. Schahfer Generation Stations Request for Extension of Time to Comply with the Utility MATS NESHAP at 1. (Ex. 21). Based on information in EPA’s Air Markets Program Database, Michigan City Unit 1’s FGD was operational in November 2015.

⁹⁴ See EPA’s Clean Air Markets Database for RM Schahfer. See also January 30, 2013 NIPSCO – Michigan City and R.M. Schahfer Generation Stations Request for Extension of Time to Comply with the Utility MATS NESHAP at 1 (Ex. 21).

⁹⁵ See, e.g., testimony of Mr. Chad Teply, PacifiCorp, before the Wyoming Public Service Commission at 8-9, which outlines of the benefits of installation of multiple SCRs at the Jim Bridger Power Plant. (Ex. 22).

⁹⁶ See Entergy’s February 2013 BART Five Factor Analysis, White Bluff Steam Electric Station at 5-13.

⁹⁷ 81 Fed. Reg. 66,332-66,421 (Sept. 27, 2016).

⁹⁸ See November 3, 2010 letter from Institute of Clean Air Companies to Senator Carper at 3 (Ex. 12).

⁹⁹ See Duke Energy Gallagher Plant Clean Air Act Settlement” available at <https://www.epa.gov/enforcement/duke-energy-gallagher-plant-clean-air-act-settlement> (last accessed December 13, 2017).

company was found to have modified the unit without proper permitting. As another example, the Boardman Power Plant in Oregon was required to install dry sorbent injection to meet BART despite its enforceable requirement to shut down by December 31, 2020. In June 2012, it was announced that the Shaw Group Inc. was awarded a contract to engineer, procure and construct a DSI system and balance of plant equipment.¹⁰⁰ According to information in the Air Markets Program Database, the DSI system was installed and operating by July 2014, or about two years after the contract was awarded for engineering and construction of a DSI system. This was also 3.5 years from the date of Oregon's final adoption of the BART requirement to install DSI at Boardman¹⁰¹ and 3 years from the date of EPA's final approval of the Boardman BART requirements.¹⁰²

Even if a baghouse is required with the DSI system, baghouses have been installed in less than five years as well. It could very well be that only a polishing baghouse would be required downstream of the existing ESP, which can be designed, delivered and installed fairly readily. For example, a polishing baghouse for the Lon D. Wright power plant in Nebraska was designed and delivered within 18 months and then installed in a planned outage.¹⁰³ If the ESP had to be replaced with a baghouse, that can be accomplished in less than five years. For example, in April 2008, PacifiCorp applied for an air permit to, among other things, replace the existing ESP at Huntington Unit 1 power plant in Utah with a baghouse, and that permit had a planned date for installation of the baghouse to be completed by November 22, 2010 (i.e., 2.5 years from submittal of a construction permit application).¹⁰⁴ According to information in EPA's Air Markets Program Database, the baghouse began operating by November 2010 at Huntington Unit 1 as originally projected. The Big Stone Power Plant converted an existing ESP to a baghouse over a period of approximately 2 years.¹⁰⁵

In summary, Entergy and ADEQ should have based the remaining useful life for determining annualized cost of dry FGD systems based on the current BART compliance date of October 27, 2021. There is ample justification that a dry scrubber could be installed by October 27, 2021. Assuming ADEQ adopts an enforceable requirement for White Bluff Units 1 and 2 to shut down or cease firing coal by December 31, 2028, the remaining useful life assumed in the BART cost analyses should be no shorter than 7.17 years (7 years and 2 months). And for the cost analysis of DSI, it was entirely appropriate for Entergy to assume that such controls could be installed by December 31, 2019, even if a baghouse is required.

¹⁰⁰ See "Shaw to Install Emissions Reduction Equipment at Boardman Station in Oregon," June 18, 2012, attached as Ex. 23, available at <https://www.businesswire.com/news/home/20120618005446/en/Shaw-Install-Emissions-Reduction-Equipment-Boardman-Station> (last accessed December 13, 2017).

¹⁰¹ Oregon adopted the requirement to install DSI at Boardman in December of 2010, with a compliance deadline for Boardman to install DSI by July of 2014. See 76 Fed. Reg. 12,651 at 12,662 (Mar. 8, 2011).

¹⁰² 76 Fed. Reg. 38,997 (July 5, 2011).

¹⁰³ See Shellenberger, Jeffrey, "Upgrade Helps Coal Plant Control Particulate and Air Toxic Emissions," Power Engineering, June 20, 2016, available at <http://www.power-eng.com/articles/print/volume-120/issue-6/features/upgrade-helps-coal-plant-control-particulate-and-air-toxic-emissions.html> (last accessed December 13, 2017) and attached as Ex. 24.

¹⁰⁴ See April 11, 2008 Huntington Power Plant Notice of Intent, Submitted to Utah Division of Air Quality, at 1 and 5. (Ex. 25).

¹⁰⁵ See Lugar, Thomas W. et al., The Ultimate ESP Rebuild: Casing Conversion to a Pulse Jet Fabric Filter, a Case Study, at 1, 6 (Ex. 26) A decision to undertake the conversion was made in 2005 and with the final conversion completed in late December 2007.

C. Revised Cost Effectiveness Analyses Using Cost Spreadsheets Relied upon by EPA in Other Rulemakings Demonstrate that Add-on SO₂ Pollution Controls Are Still Cost Effective Even with a Shortened Remaining Useful Life of White Bluff Units 1 and 2.

In this section of the comments, I provide cost effectiveness analyses for SO₂ BART at the White Bluff units to address some of the issues identified above with Entergy's analyses. For illustration purposes only, I have calculated the cost-effectiveness of DSI and FGD using several remaining useful life periods for White Bluff. To be clear, given that none of the remaining useful life periods I use below are currently enforceable, it is not appropriate to use any of these remaining useful lives in a BART analysis.

For the purposes of these analyses, the following periods of remaining useful live were assumed:

- 1) a 9.17 year remaining useful life which reflects BART compliance by the October 27, 2021 deadline of the current FIP and which assumes ADEQ adopts an enforceable requirement explicitly requiring that the White Bluff units either shut down or cease firing coal by December 31, 2030;
- 2) a 7.17 year remaining useful life which reflects BART compliance by the October 27, 2021 FIP deadline and which assumes ADEQ adopts an enforceable requirement that the White Bluff units cease firing coal by December 31, 2028, consistent with Entergy's proposed date for cessation of coal-firing at the White Bluff units¹⁰⁶;
- 3) a 5 year remaining useful life to reflect the claim made by Entergy's consultant Trinity Consultants in the August 2017 BART Update report that installation of a dry FGD system may take until 2023¹⁰⁷ and which assumes that ADEQ adopts an enforceable requirement that Entergy cease firing coal at the White Bluff units by December 31, 2028; and
- 4) for DSI, an 11 year remaining useful life which reflects compliance by December 31, 2019 as Entergy's revised BART analysis assumed for this control¹⁰⁸ and assuming ADEQ adopts an enforceable requirement for the White Bluff units to cease burning coal by December 31, 2030. If ADEQ adopts an enforceable requirement for the White Bluff units to cease firing coal by December 31, 2028 as Entergy has proposed, then my analysis using a 9.17 year life is generally reflective of DSI cost effectiveness based on compliance by 2019 and cessation of coal-firing by 2028.

If ADEQ does not adopt an enforceable deadline for shutting down or ceasing coal-burning at White Bluff Units 1 and 2, then the remaining useful life of the units should not be considered as limited in the cost effectiveness analyses. As previously shown by EPA in its FIP and in my August 5, 2015 Technical Support Document, the costs of dry FGD systems to meet an SO₂ limit of 0.06 lb/MMBtu assuming a 30-year life are reasonable at approximately \$2,200

¹⁰⁶ August 18, 2017 White Bluff BART Update at 4-4.

¹⁰⁷ *Id.* at 4-4, footnote 18.

¹⁰⁸ *Id.* at 4-4.

to \$2,600/ton (2012 dollars), or \$2,040/ton to \$2,400/ton in 2016 dollars¹⁰⁹, and are justified given the “considerable visibility improvement” that is expected from such controls.¹¹⁰

For the cost effectiveness analyses presented herein, I focused the same control options that Entergy/ADEQ evaluated but with some additional analyses specifically related to DSI. Entergy’s August 2017 BART Update evaluated the following add-on pollution controls to meet BART:

- Dry FGD to meet an SO₂ limit of 0.06 lb/MMBtu
- DSI to achieve 50% control from 2001-2003 baseline rates
- DSI to achieve 80% control from 2001-2003 baseline rates
- DSI plus a retrofit baghouse to achieve 80% control from 2001-2003 baseline rates

More detail on why these controls were evaluated as BART will be provided below.

The emissions and operational data for the years 2001-2003 were used to estimate baseline emissions for the BART controls options at White Bluff Units 1 and 2, rather than the 2009-2013 baseline as used by Entergy in its August 18, 2017 BART Update. As discussed above, Entergy’s more recent 2009-2013 baseline reflects the level of low sulfur coal on an annual basis that the company and ADEQ are evaluating as a BART option (the “LSC” BART option). Because Entergy and ADEQ are proposing LSC as a BART option to achieve 0.6 lb/MMBtu and because the annual average SO₂ rate at White Bluff Units 1 and 2 over 2009-2013 is lower than 0.6 lb/MMBtu, use of an earlier baseline is the more appropriate way to properly evaluate LSC as a control option, particularly in comparison to other BART control options. This is consistent with how EPA has evaluated BART for sources that installed controls after the typical 2000-2004 baseline period but before EPA proposed action on the regional haze plan. Specifically, in other BART evaluations where a source has installed low NO_x burners and overfire air before the BART determination, EPA has evaluated NO_x BART based on a baseline period from before the installation of the pollution controls.¹¹¹

Moreover, use of a 2001-2003 baseline period is most consistent with the baseline period that EPA has stated is to be used for baseline visibility conditions in EPA’s regional haze rules. As EPA stated in its July 1, 1999 regional haze rulemaking:

After considering public comments on the baseline issue, EPA has determined that the most appropriate “baseline period” would be a fixed, 5-year period extending from calendar year 2000 through calendar year 2004. The EPA concluded that a standard baseline period provides for greater national consistency in establishing this important value, and therefore, is preferable to a provision allowing the baseline period to be a variable number of years. Using a common number of years and data points to calculate the baseline value for each

¹⁰⁹ Based on the ratio of the 2016 CEPCI index to the 2012 CEPCI index (i.e., 541.7/584.6).

¹¹⁰ 81 Fed. Reg. 66,332 at 66,343 and 66,416. *See also* August 5, 2015 Technical Support Document to Comments of Conservation Organizations at 28-32 and Exs. 24, 25 and 100 to that report (Exs. 1, 1A, 1B, and 1C to this report).

¹¹¹ *See, e.g.*, 78 Fed. Reg. 8285 (February 5, 2013) (Proposed Rulemaking for Navajo Regional Haze Plan); 78 Fed. Reg. 34738 (June 10, 2013) (Proposed rulemaking for Wyoming Regional Haze Plan).

site is consistent with fundamental statistical principles and will provide for easy comparison of data from multiple sites as the program is implemented.

64 Fed. Reg. 35728 (July 1, 1999).

While this regional haze requirement primarily pertains to baseline visibility conditions to determine the necessary rate of progress to attain natural background visibility conditions by 2064, EPA's "consistency" rationale requires that the baseline for the BART cost analysis cover a similar period. That way, when one is evaluating BART, one is evaluating both the costs and the visibility benefits of getting from the same baseline levels of emissions to the controlled emission level being evaluated as BART.

For determining the cost effectiveness of dry FGDs and DSI, I prepared revised cost analyses using SO₂ control cost spreadsheets that EPA used in the 2016 and 2017 Texas Regional Haze and BART rulemakings.¹¹² EPA's SO₂ control cost spreadsheets were, in turn, based on the Sargent & Lundy IPM cost modules for dry FGD and DSI systems.¹¹³ EPA used these cost modules in its cost evaluation of SO₂ controls for several EGUs in Texas. I modified EPA's SO₂ cost spreadsheets used in the Texas Regional Haze rulemaking for use in this Arkansas Regional Haze rulemaking, basing cost effectiveness calculations on the 2001-2003 annual average SO₂ emissions (in tons per year and lb/MMBtu), heat input, capacity factor, and gross generation.¹¹⁴

EPA has relied on these cost modules of the Integrated Planning Model for BART and reasonable progress determinations in several states including Arizona, Wyoming, Montana, and Texas.¹¹⁵ In addition, EPA has relied on the IPM cost modules for Selective Catalytic Reduction in its Control Cost Manual.¹¹⁶ The algorithms of the IPM cost modules were based on actual cost data of retrofit pollution controls and other studies and evaluations of costs of a control. For

¹¹² See EPA's FIP for Texas Regional Haze at 81 Fed. Reg. 296 (Jan. 5, 2016) (Final Rulemaking); 79 Fed. Reg. 74,817 (Dec. 16, 2014) (Proposed Rulemaking); EPA Technical Support Document for the Cost of Control Calculations for the Texas Regional Haze Federal Implementation Plan (Cost TSD); EPA spreadsheets "SDA Cost IPM 5-13 TX Sources.xlsx" and "Wet FGD Cost IPM TX Sources.xlsx." See also EPA's Texas BART determinations at 82 Fed. Reg. 912 at 925 (Jan. 4, 2017) (Proposed Rulemaking); 82 Fed. Reg. 48324 (Oct. 17, 2017) (Final Rulemaking); EPA's Technical Support Document for the Texas Regional Haze BART Federal Implementation Plan, and EPA spreadsheets "TX187-0007-0004_-_IPM_COST_Models_-_SDA_Cost_OPM_5-13_TX_BART.xls" and "TX187-0007-0002_-_IPM_COST_Models_-_DSI_Cost_OPM_5-13_TX_BART.xls." All of these documents are in Docket ID EPA-R06-OAR-2014-0754-0008 for the EPA's Texas Regional Haze and BART rulemakings, available through EPA's Docket website at www.regulations.gov.

¹¹³ *Id.* See also Sargent & Lundy, IPM Model – Updates to Cost and Performance for APC Technologies, Dry Sorbent Injection for SO₂ Control Cost Development Methodology, Final, March 2013 (Ex. 27) and Sargent & Lundy, IPM Model – Updates to Cost and Performance for APC Technologies, SDA FGD Cost Development Methodology, Final, March 2013 (Ex. 28).

¹¹⁴ The analyses provided with this report utilize EPA's dry FGD and DSI cost spreadsheets from the docket for the Texas Regional Haze Implementation Plan [Docket ID EPA-R06-OAR-2014-0754].

¹¹⁵ 77 Fed. Reg. 42,834 at 42,852 (July 20, 2012); February 7, 2013 Memo from Jim Staudt, Andover Technology Partners, to EPA (Wyoming Regional Haze Plan Docket ID EPA-R08-OAR-2012-0026-0086); 77 Fed. Reg. 24,044 (Apr. 20, 2012); 79 Fed. Reg. 74,818 at 74,876 (Dec. 16, 2014), and EPA's Technical Support Document for the Cost of Controls Calculations for the Texas Regional Haze Federal Implementation Plan, November 2014, at 3 (Docket ID EPA-R06-OAR-2014-0754-0008).

¹¹⁶ EPA Control Cost Manual, Selective Catalytic Reduction, May 2016, at 2-51, available at https://www3.epa.gov/ttn/ecas/docs/SCRCostManualchapter7thEdition_2016.pdf.

example, for the wet FGD cost module, Sargent & Lundy based its cost algorithms on regional planning organization data, studies commissioned by the utility industry, published papers, and Sargent & Lundy's in-house data from 2007 to 2012.¹¹⁷ For the DSI cost module, the primary cost is the cost of the sorbent. Thus, the proper determination of the Normalized Stoichiometric Ratio (NSR) based on the uncontrolled SO₂ at the unit and the desired removal efficiency is the key to a projection of the costs of these controls.¹¹⁸ All of the SO₂ control cost modules require EGU-specific data on size, type of coal, heat rate, current SO₂ rate, etc. to ensure that the cost of the controls is refined to be specific to the SO₂ removal needs of each unit.¹¹⁹

The IPM cost modules are sufficiently grounded in real costs for SO₂ pollution control retrofits for EGUs, while still being tailored to the specifics of each EGU that would affect SO₂ removal. The IPM cost modules are considered as appropriate for a study-level cost estimate, as required by EPA's Control Cost Manual, and are therefore appropriate to use in this BART analyses for White Bluff Units 1 and 2. However, some modifications are needed to the IPM cost modules to make the cost effectiveness calculations consistent with the methodology of the Control Cost Manual.

In the Texas cost spreadsheets developed by EPA from the IPM cost modules, EPA modified the cost modules to be consistent with the overnight costing method of the EPA's Control Cost Manual. For example, although the IPM cost modules include owner's costs and Allowance for Funds Used During Construction (AFUDC), EPA did not include those costs in its cost effectiveness analysis.¹²⁰ EPA also added algorithms for calculating annual costs and annual emissions reductions with each control, so that average cost effectiveness is calculated for each control and unit evaluated. For annualizing capital costs, EPA assumes a 7% interest rate, and I have assumed the same 7% interest rate for these cost calculations.

For determining annualized costs of a baghouse at each White Bluff unit, which I evaluated with the costs of DSI to achieve 80% SO₂ removal, I made cost projections using the Sargent & Lundy IPM Model Particulate Control Cost Development Methodology.¹²¹ The example calculations and algorithms from the Sargent & Lundy baghouse cost documentation were input into a spreadsheet. Then, projected annualized costs were calculated for White Bluff Units 1 and 2 based on the specifics of each unit, assuming a 7% interest rate and a varying remaining useful life as was assumed for the DSI and dry FGD controls. The cost algorithms for a baghouse to be used as a sole particulate capture system, with an air-to-cloth ratio of 4.0, was used for these analyses (as opposed to a higher air-to-cloth ratio system that reflects a polishing baghouse). Sargent & Lundy indicate that the lower air-to-cloth ratio "will provide for better fabric filter bag life with the high inlet particulate loading expected for the single particulate capture device in the process."¹²² The annualized costs of DSI at 80% control were then added

¹¹⁷ See Sargent & Lundy, IPM Model – Updates to Cost and Performance for APC Technologies, Wet FGD Cost Development Methodology, March 2013, at 1 (Ex. 29).

¹¹⁸ See Sargent & Lundy, IPM Model – Updates to Cost and Performance for APC Technologies, Dry Sorbent Injection for SO₂ Control Cost Development Methodology, March 2013, at 1-2 (Ex. 27).

¹¹⁹ See, e.g., Sargent & Lundy, IPM Model – Updates to Cost and Performance for APC Technologies, SDA FGD Cost Development Methodology, Final March 2013, at 6-7 (Ex. 28).

¹²⁰ See EPA's Technical Support Document for the Texas Regional Haze BART FIP at 54, 60, and 64.

¹²¹ Sargent & Lundy IPM Model – Revisions to Cost and Performance for APC Technologies, Particulate Control Cost Development Methodology, March 2013, attached as Ex. 30.

¹²² *Id.* at 4.

to the annualized cost of a full-scale baghouse at each unit to arrive at a cost per ton of SO₂ removed for DSI plus a baghouse to achieve 80% control.

For DSI, I evaluated cost effectiveness for 50% control and at 80% control, consistent with the SO₂ removal efficiencies assumed in Entergy’s analysis of DSI. These are also the removal efficiencies that EPA has evaluated in other cost evaluations of DSI with ESPs.¹²³ For the 80% control scenario, I evaluated DSI both with and without the addition of a full-scale baghouse. My evaluation of DSI with a retrofit baghouse at 80% SO₂ removal was done to directly compare to Entergy’s “Enhanced DSI” BART control option, which was also based on DSI plus a baghouse to achieve 80% reduction in SO₂.¹²⁴ For dry FGD, I estimated cost effectiveness to achieve an emission limit of 0.06 lb/MMBtu, which is the currently required BART limit of EPA’s FIP based on the installation of a dry FGD system.¹²⁵ The results of my cost calculations are provided in the tables below.

Table 2. SO₂ Control Cost Effectiveness Evaluations for White Bluff Units 1 and 2 Based on IPM Cost Modules, a 2001 – 2003 Baseline, and a Remaining Useful Life of 9.17 Years¹²⁶

White Bluff Unit	SO ₂ Control	Total Annualized Costs, 2016\$	Tons SO ₂ Removed	Cost Effectiveness, 2016 \$/ton	Entergy’s Cost Effectiveness of DSI Based on 2011-2015 Baseline, 9 year life, 2016 \$/ton ¹²⁷
1	Dry FGD	\$58,382,308	17,995 tpy	\$3,244	-----
1	DSI + BH at 80%	\$53,934,012	15,773 tpy	\$3,419	\$6,426
1	DSI at 80%	\$46,251,044	15,773 tpy	\$2,932	-----
1	DSI at 50%	\$25,602,224	9,858 tpy	\$2,597	\$6,268
2	Dry FGD	\$58,284,385	15,459 tpy	\$3,770	-----
2	DSI + BH at 80%	\$50,923,572	13,606 tpy	\$3,743	\$6,384
2	DSI at 80%	\$40,679,333	13,606 tpy	\$2,990	-----
2	DSI at 50%	\$22,732,552	8,504 tpy	\$2,673	\$6,211

¹²³ EPA’s FIP for Texas Regional Haze at 81 Fed. Reg. 296 (Jan. 5, 2016) (Final Rulemaking); 79 Fed. Reg. 74,817 (Dec. 16, 2014) (Proposed Rulemaking). See also EPA’s Texas BART determinations at 82 Fed. Reg. 912 at 925 (Jan. 4, 2017) (Proposed Rulemaking); 82 Fed. Reg. 48324 (Oct. 17, 2017) (Final Rulemaking)

¹²⁴ August 18, 2017 White Bluff BART Update at 4-2 and Sargent & Lundy, White Bluff Enhanced DSI Cost Estimate Basis Document, August 3, 2017, at 2, included in Entergy’s August 2017 White Bluff BART Update

¹²⁵ 40 C.F.R. 52.173(c)(6) and (7); 81 Fed. Reg. 66,416 (Sept. 21, 2016).

¹²⁶ See Spreadsheets at Ex. 4 (IPM Cost Models DSI Cost Analyses at tabs “WB 50%” and “WB 80%” (under Option A)), Ex. 31 (IPM Cost Models Baghouse plus DSI 80 Percent Cost Analyses at tabs “WB 1 9.17 yr life” and “WB 2 9.17 yr life”); and Ex 32 (IPM Cost Models Dry FGD Cost Analyses at tabs “WB 1” and “WB 2” (under Option A)).

¹²⁶ August 18, 2017 White Bluff BART Update at 4-5 (Table 4-4, Summary of SO₂ Controls Cost Effectiveness for Unit 1 and Unit 2 Based on Costs Adjusted for EPA-Exclusions for Illustration Purposes). As stated above, it appears that ADEQ is relying on Entergy’s costs numbers adjusted for EPA-exclusions in its current rulemaking.

¹²⁷ *Id.* Note that only Entergy’s cost effectiveness numbers for DSI are included here for comparison purposes, because those are the only controls evaluated based on a 9 year life (i.e., compliance by 2019, cessation of coal-firing by 2028).

The above cost effectiveness numbers reflect a compliance date of October 2021 and an enforceable shutdown date of December 31, 2030. However, the analyses for DSI cost effectiveness are consistent with the installation of DSI by October of 2019 and shutdown/cessation of burning coal by December 31, 2028 as assumed by Entergy in its revised BART analysis for DSI¹²⁸, although the remaining useful life assumed by Entergy was 9 years rather than 9.17 years shown above. As will be discussed further below, all of these costs are reasonable, in that other similar sources have had to bear similar costs for pollution control to address BART and regional haze requirements.

These control options are also cost effective when evaluated on a shorter remaining useful life. Table 3 below provides the cost effectiveness analyses for the same suite of controls as shown in Table 2 above with a 7.17 year remaining useful life, which assumed compliance by October 2021 and that ADEQ adopts an enforceable requirement that White Bluff cease coal-firing by December 31, 2028.¹²⁹ This is consistent with how Entergy evaluated cost effectiveness for dry FGD systems in its August 2017 updated BART analyses.¹³⁰ The cost effectiveness calculations were calculated in the same manner as was described for Table 2 (i.e., 2001-2003 baseline, Sargent & Lundy cost spreadsheets revised to be consistent with the EPA's Control Cost Manual, etc.), with the only change being that the annualized capital costs were based on a shorter remaining useful life of only 7 years (reflective of compliance with BART by October 21, 2023 and assuming an enforceable requirement to shut down or cease burning coal by December 31, 2028).

¹²⁸ August 18, 2017 White Bluff BART Update at 4-4.

¹²⁹ *Id.*

¹³⁰ *Id.*

Table 3. SO2 Control Cost Effectiveness Evaluations for White Bluff Units 1 and 2 Based on IPM Cost Modules, a 2001 – 2003 Baseline, and a Remaining Useful Life of 7.17 Years (Compliance with BART by October 27, 2021 and Cessation of Coal-Firing by December 31, 2028)¹³¹

White Bluff Unit	SO2 Control	Total Annualized Costs, 2016\$	Tons SO2 Removed	Cost Effectiveness, 2016 \$/ton	Entergy's Cost Effectiveness of Dry FGD Based on 2011-2015 Baseline, 7 year life, 2016 \$/ton ¹³²
1	Dry FGD	\$67,685,099	17,995 tpy	\$3,761	\$5,420
1	DSI + BH at 80%	\$58,578,839	15,773 tpy	\$3,714	-----
1	DSI at 80%	\$46,922,891	15,773 tpy	\$2,975	-----
1	DSI at 50%	\$26,136,044	9,858 tpy	\$2,651	-----
2	Dry FGD	\$67,862,235	15,459 tpy	\$4,390	\$5,387
2	DSI + BH at 80%	\$55,768,105	13,606 tpy	\$4,099	-----
2	DSI at 80%	\$41,362,357	13,606 tpy	\$3,040	-----
2	DSI at 50%	\$23,268,876	8,504 tpy	\$2,736	-----

Table 4 below shows the cost effectiveness assuming an even shorter remaining useful life of 5 years. This is to reflect Trinity Consultants' claim that dry FGD systems may take until 2023 to install at White Bluff¹³³, although they did not make the same claim for DSI which they said could be installed earlier, and assuming ADEQ imposes an enforceable limit requiring White Bluff to cease burning coal by December 31, 2028.

¹³¹ See Spreadsheets at Ex. 4 (IPM Cost Models DSI Cost Analyses at tabs "WB 50%" and "WB 80%" (under Option B)), Ex. 31 (IPM Cost Models Baghouse plus DSI 80 Percent Cost Analyses at tabs "WB 1 7.17 yr life" and "WB 2 7.17 yr life"); and Ex 32 (IPM Cost Models Dry FGD Cost Analyses at tabs "WB 1" and "WB 2" (under Option B).

¹³¹ August 18, 2017 White Bluff BART Update at 4-5 (Table 4-4, Summary of SO2 Controls Cost Effectiveness for Unit 1 and Unit 2 Based on Costs Adjusted for EPA-Exclusions for Illustration Purposes).

¹³² August 18, 2017 White Bluff BART Update at 4-5 (Table 4-4, Summary of SO2 Controls Cost Effectiveness for Unit 1 and Unit 2 Based on Costs Adjusted for EPA-Exclusions for Illustration Purposes). As stated above, it appears that ADEQ is relying on Entergy's costs numbers adjusted for EPA-exclusions in its current rulemaking.

¹³³ August 18, 2017 White Bluff BART Update at 4-4, footnote 18.

Table 4. SO2 Control Cost Effectiveness Evaluations for White Bluff Units 1 and 2 Based on IPM Cost Modules, a 2001 – 2003 Baseline, and a Remaining Useful Life of 5 Years (Compliance with BART not achieved until December 2023 and Cessation of Coal-Firing by December 31, 2028)¹³⁴

White Bluff Unit	SO2 Control	Total Annualized Costs, 2016\$	Tons SO2 Removed	Cost Effectiveness, 2016 \$/ton
1	Dry FGD	\$86,408,101	17,995 tpy	\$4,802
1	DSI + BH at 80%	\$67,927,121	15,773 tpy	\$4,307
1	DSI at 80%	\$48,275,066	15,773 tpy	\$3,061
1	DSI at 50%	\$27,210,422	9,858 tpy	\$2,760
2	Dry FGD	\$87,138,827	15,459 tpy	\$5,637
2	DSI + BH at 80%	\$65,518,317	13,606 tpy	\$4,815
2	DSI at 80%	\$42,737,028	13,606 tpy	\$3,141
2	DSI at 50%	\$24,348,291	8,504 tpy	\$2,863

Last, Table 5 below provides the cost effectiveness of DSI based on an 11 year life, assuming compliance is required by December 31, 2019 as Entergy’s BART Update indicated could be achieved and assuming ADEQ adopts an enforceable requirement for Entergy to cease coal firing at the White Bluff units by December 31, 2030.

Table 5. SO2 Control Cost Effectiveness Evaluations for DSI at White Bluff Units 1 and 2 Based on IPM Cost Modules, a 2001 – 2003 Baseline, and a Remaining Useful Life of 11 Years (Compliance with BART Required by December 2019 and Cessation of Coal-Firing by December 31, 2030)¹³⁵

White Bluff Unit	SO2 Control	Total Annualized Costs, 2016\$	Tons SO2 Removed	Cost Effectiveness, 2016 \$/ton
1	DSI + BH at 80%	\$51,200,405	15,773 tpy	\$3,246
1	DSI at 80%	\$45,855,643	15,773 tpy	\$2,907
1	DSI at 50%	\$25,288,056	9,858 tpy	\$2,565
2	DSI + BH at 80%	\$48,072,433	13,606 tpy	\$3,533
2	DSI at 80%	\$40,277,354	13,606 tpy	\$2,960
2	DSI at 50%	\$22,416,912	8,504 tpy	\$2,636

All of these cost evaluations summarized in Tables 2 through 5 above show that the cost effectiveness of SO2 controls, even with an enforceable remaining useful life as short as five years, are not outside the range of costs that similar sources have had to bear to meet BART and

¹³⁴ See Spreadsheets at Ex. 4 (IPM Cost Models DSI Cost Analyses at tabs “WB 50%” and “WB 80%” (under Option C)), Ex. 31 (IPM Cost Models Baghouse plus DSI 80 Percent Cost Analyses at tabs “WB 1 5 yr life” and “WB 2 5 yr life”); and Ex. 32 (IPM Cost Models Dry FGD Cost Analyses at tabs “WB 1” and “WB 2” (under Option C)).

¹³⁵ See Spreadsheets at Ex. 4 (IPM Cost Models DSI Cost Analyses at tabs “WB 50%” and “WB 80%” (under Option D)) and Ex. 31 (IPM Cost Models Baghouse plus DSI 80 Percent Cost Analyses at tabs “WB 1 11 yr life” and “WB 2 11 yr life”).

¹³⁵ 82 Fed. Reg. 926 (Jan. 4, 2017), Table 10.

regional haze requirements. Data compiled by the National Park Service of State SO₂ BART determinations shows that the costs of SO₂ controls to meet BART at EGUs ranges from \$1,571/ton to \$7,309/ton.¹³⁶ While the cost effectiveness of dry FGD systems and DSI plus a baghouse are on the high end of this range for a remaining useful life of 7.17 years (more so at White Bluff Unit 2 than at White Bluff Unit 1), the cost of SO₂ controls based on the Sargent & Lundy IPM cost modules even with the remaining useful life assumed by Entergy of approximately 7 years are not outside the range of costs that similar sources have had to bear to meet BART. For example, EPA imposed a FIP of reasonable progress measures based on switching to a lower sulfur fuel oil at the fuel oil-fired boilers at the Kanoelehua Hill Power Plant, the Puna Power Plant, and the Shipman Power Plant at a cost effectiveness of approximately \$5,600/ton.¹³⁷ To address regional haze requirements for SO₂, the state of Wyoming found that a new dry scrubber and baghouse at Dave Johnston Unit 4 was cost effective at \$5,028 per ton of SO₂ removed.¹³⁸ EPA based its SO₂ BART determination for the Flint Creek Unit 1 in Arkansas on installation of a NID™ circulating dry scrubber, finding that a cost of \$3,845 per ton was a reasonable cost,¹³⁹ and ADEQ has concurred in its current Regional Haze rulemaking that a NID™ scrubber at a cost effectiveness of \$3,845 per ton was cost effective. EPA approved installation of a dry FGD at the Colorado Springs Nixon Unit 1 as a reasonable progress measure at a cost effectiveness of \$3,744/ton.¹⁴⁰ Oregon required the Boardman power plant to install DSI to meet SO₂ BART at a cost effectiveness of \$3,370/ton, which was based on the enforceable commitment to cease firing coal by December 2020.¹⁴¹

The projected costs for these SO₂ controls at the White Bluff units are also comparable to costs for NO_x controls that EPA and states have found to be reasonable to meet BART. Colorado found that the costs of SCR at Hayden Units 1 and 2 were reasonable at \$3,385/ton and \$4,064/ton, respectively.¹⁴² In its final action on the Wyoming regional haze plan, EPA found that costs for SCR plus low NO_x burners and overfire air ranging from \$2,635/ton to \$4,461/ton (2008 dollars), or \$2,480/ton to \$4,200/ton in 2016 dollars, were reasonable to require SCR as BART at Naughton Unit 3, Dave Johnston Unit 3, and at Laramie River Units 1, 2, and 3.¹⁴³ EPA also approved Wyoming's adoption of reasonable progress requirements for each of the Jim Bridger units to install SCR at a cost effectiveness ranging from \$2,743/ton to \$3,403/ton, \$ in 2013 dollars, or \$2,619/ton to \$3,249/ton in 2016 dollars.¹⁴⁴ In its FIP for Arizona regional haze, EPA required SCR along with combustion controls to meet BART at the BART-subject coal-fired units at Apache, Cholla, and Coronado power plants at cost effectiveness values up to \$3,450/ton.¹⁴⁵ Moreover, the state of Arizona has stated that a cost effectiveness value of more

¹³⁶ See March 2011 National Park Service spreadsheet "EGUs with Proposed BART Controls." (Ex. 2).

¹³⁷ 77 Fed. Reg. 61,477, 61,490 (Oct. 9, 2012); *see also* 77 Fed. Reg. 31,691, 31,711-12 (May 29, 2012).

¹³⁸ See May 28, 2009 Wyoming Department of Environmental Quality BART Application Analysis, Dave Johnston Plant, at 23 (Ex. 3).

¹³⁹ Note that this cost projection developed in 2012 was projected to be based on 2016 dollars, and EPA found that projecting based on a future build date is not acceptable for a BART analysis. None-the-less, EPA found that a cost effectiveness of \$3,845/ton was reasonable to justify the NID™ CDS to meet BART at Flint Creek. 67 Fed. Reg. 18,944 at 18,965-7 (Apr. 8, 2015). *See also* final rulemaking on Arkansas BART at 81 Fed. Reg. 66,332 at 66,387, 66,416 (Sept. 27, 2016).

¹⁴⁰ 77 Fed. Reg. 18052, 18082 (Mar. 26, 2012).

¹⁴¹ 76 Fed. Reg. 12,651 at 12,660-662 (Mar. 8, 2011).

¹⁴² 77 Fed. Reg. 18,069 (Mar. 26, 2012); 77 Fed. Reg. 76,871 (Dec. 31, 2012).

¹⁴³ 79 Fed. Reg. 5032-5222, at 5039-5043 (January 30, 2014).

¹⁴⁴ *See* 79 Fed. Reg. 5032, 5040-41, 5046 (January 30, 2014).

¹⁴⁵ 77 Fed. Reg. 42857, 42860, 42862 (July 20, 2012); 77 Fed. Reg. 72,538 (Dec. 5, 2012).

than \$4,489/ton of NO_x removed is cost effective.¹⁴⁶ EPA Region IX has required SCR as BART for the Four Corners Units 1 - 5 to meet a NO_x limit of 0.11 lb/MMBtu at a cost effectiveness of \$2,515/ton to \$3,163/ton in 2008 dollars,¹⁴⁷ or \$2,434/ton to \$3,060/ton in 2016 dollars. In its FIP for Utah, EPA found that the cost effectiveness of SCR controls plus low NO_x burners/overfire air was cost effective to require as BART at Hunter Units 1 and 2 and Huntington Units 1 and 2 at costs ranging from \$2,697/ton to \$2,928/ton in 2014 dollars, or \$2,606/ton to \$2,830/ton in 2016 dollars.¹⁴⁸

Thus, the costs of add-on SO₂ controls at White Bluff using either a dry FGD or DSI at 50-80% control are not outside the range of the costs that other similar sources have had to incur to meet BART, even with an enforceable shortened remaining useful life of the units. Further, there is precedent for requiring pollution controls to meet BART despite a source taking an enforceable limit on its remaining useful life. For example, the Boardman Power Plant in Oregon was a BART-subject EGU that was subject to an enforceable emission limit on the unit's remaining useful life to shut down or cease firing coal by December 31, 2020, and yet was still required to install pollution controls to meet BART despite the significantly shortened remaining useful life. Specifically, the Boardman Power Plant was required to install low NO_x burners and modified overfire air to meet NO_x BART and also DSI to meet SO₂ BART, along with its enforceable requirement to shut down by December 31, 2020.¹⁴⁹ The SO₂ control requirements were imposed with a required compliance date of July 2014, which gave the unit a remaining useful life for the cost effectiveness analyses of only 6.5 years from the BART compliance date to the date of required shut down or cessation of burning coal.¹⁵⁰ As stated above, Oregon DEQ found that the costs of DSI at Boardman were reasonable at \$3,370/ton, even with the enforceable commitment to cease firing coal by December 2020.¹⁵¹ Because the Boardman plant was not proposing to shut down or cease firing coal until after the BART compliance deadline (i.e., within 5 years of EPA's approval of the regional haze SIP pursuant to 40 C.F.R. 51.308(e)(1)(iv)), Oregon found that those controls that were cost effective would be required to meet BART in the interim until the plant shut down or ceased firing coal.¹⁵²

Similarly, the Centralia Power Plant in Washington state has two EGUs both of which were subject to BART. Despite being subject to an enforceable requirement to cease burning coal by December 31, 2020 at one unit and by December 31, 2025 at the other units, the state of Washington found that installation of selective non-catalytic reduction (SNCR) plus changing coal to a higher heat content coal and lower sulfur and nitrogen content coal (termed "Flex Fuel") was necessary to meet BART.¹⁵³ In addition, one of BART-subject Units 3 or 4 of the

¹⁴⁶ Letter from Arizona Department of Environmental Quality to Steve Fry, EPA Region IX, Re: Consultation Regarding Best Available Retrofit Technology Analyses for the Four Corners Power Plant and Navajo Generating Station, May 12, 2008. Ex. 33.

¹⁴⁷ See 75 Fed. Reg. 64227 (October 19, 2010). See also 77 Fed. Reg. 51620, 51621-2 (August 24, 2012).

¹⁴⁸ 81 Fed. Reg. 43,894 at 43,903, 43,905-7 (Jul. 5, 2016).

¹⁴⁹ 2008 Oregon Regional Haze Plan, as revised December 9, 2010, at 155-6; as discussed in EPA's proposed approval of Oregon's Regional Haze Plan, 76 Fed. Reg. 12,651 at 12,660-662 (Mar. 8, 2011).

¹⁵⁰ 76 Fed. Reg. 12,662 (Mar. 8, 2011).

¹⁵¹ 76 Fed. Reg. 12,651 at 12,660-662 (Mar. 8, 2011).

¹⁵² Oregon considered as an option in its regional haze plan that, if Boardman shut down by 2015-/2016, no SO₂ BART controls would be required because Boardman would have shut down in lieu of installing SO₂ controls by the BART compliance deadline. See 2008 Oregon Regional Haze Plan, as revised December 9, 2010, at 154.

¹⁵³ See 77 Fed. Reg. 30,467 at 30,470-2 (May 23, 2012).

Northeastern Power Plant in Oklahoma was required to install DSI plus baghouses despite being subject to an enforceable limit to shut down by December 31, 2026, while the other unit was not required to install DSI and a baghouse but was required to shutdown much earlier by April 16, 2016.¹⁵⁴

D. Revisions to Entergy’s Cost Effectiveness and Visibility Improvement with Low Sulfur Coal Show Lower Costs and Lower Visibility Improvement than Projected by Entergy.

As discussed in Section I.B.1. above, Entergy applied a flawed approach to determining cost effectiveness of LSC. To compare costs of LSC to the add-on pollution controls for which revised cost effectiveness are presented herein, I have calculated revised cost effectiveness values for use of LSC at White Bluff Units 1 and 2. I assumed a baseline of 2001-2003 for the reasons provided in Section I.C. above, including to reflect an SO2 emission reduction from use of LSC since the annual average SO2 rate over the 2009-2013 baseline used by Entergy is lower than the 0.6 lb/MMBtu SO2 limit that Entergy has proposed with LSC. For the purpose of this analysis, I assume Entergy’s cost estimate of an additional \$0.50 per ton of coal for lower sulfur coal is an accurate cost projection, which Entergy claimed “was the premium provided to EAI’s fuel purchasing department by its coal suppliers.”¹⁵⁵ I converted this cost estimate to a \$ per MMBtu value by using Entergy’s claimed heating value of the coal of 8,587 Btu/lb which Entergy stated was based on 2009-2013 values¹⁵⁶ (which also reflects when the units were burning more lower sulfur coal, having an annual average SO2 rate of less than 0.6 lb/MMBtu as previously stated). Annual emission reductions were estimated based on the percent reduction from the 2001-2003 annual average SO2 emission rate at each unit to a 0.60 lb/MMBtu emission rate reflective of low sulfur coal. I also assumed the annual heat input would be the same as the 2001-2003 annual average heat input. The table below shows revised cost effectiveness values for LSC based on the methodology and inputs described above.

Table 6. Revised Cost Effectiveness for LSC Using 2001-2003 Baseline and Heat Input¹⁵⁷ and Entergy’s LSC Premium of \$0.50 per Ton

White Bluff Unit	Annual Costs of LSC	Annual SO2 Reductions, tpy	Cost Effectiveness of LSC, \$/ton
1	\$1,665,805	2,508	\$664
2	\$1,501,780	1,528	\$983

This revised analysis shows that the costs per ton for use of LSC are much lower per ton than Entergy’s calculation of cost effectiveness of LSC which was \$1,150/ton for White Bluff Unit 1 and \$1,148 /ton for White Bluff Unit 2.¹⁵⁸

¹⁵⁴ See 78 Fed. Reg. 51,686 at 51,690-692 (Aug. 21, 2013).

¹⁵⁵ August 18, 2017 White Bluff BART Update at 4-4.

¹⁵⁶ August 18, 2017 White Bluff BART Update at 3-1.

¹⁵⁷ See Ex. 34, Spreadsheet with White Bluff LSC Calculations at tabs “LSC CE from 01-03 Baseline WB1” and “LSC CE from 01-03 Baseline WB2.”

¹⁵⁸ August 18, 2017 White Bluff BART Update at 4-5.

E. Entergy's Revised SO₂ Modeling Analysis for White Bluff Should Have Been Based on Baseline Emissions from 2001-2003.

Entergy submitted revised visibility modeling in its August 18, 2017 BART Update using baseline emissions based on 2009-2013 for all pollutants.¹⁵⁹ In its previous BART modeling which EPA relied on in issuing its FIP¹⁶⁰, Entergy relied on 2001-2003 emissions for baseline SO₂ emissions, but relied on more recent emissions from 2009-2011 for other pollutants primarily because NO_x emission rates had decreased due to installation of a neural net system and extensive boiler tuning completed in 2006.¹⁶¹ For the reasons discussed above regarding the cost effectiveness analyses, the baseline SO₂ emissions in Entergy's updated BART analysis should have been based on 2001-2003 emissions rather than on 2009-2013 emissions.

Specifically, use of a 2001-2003 baseline period is consistent with the baseline period that EPA has stated is to be used for baseline visibility conditions in EPA's regional haze rules. As EPA stated in its July 1, 1999 regional haze rulemaking:

After considering public comments on the baseline issue, EPA has determined that the most appropriate "baseline period" would be a fixed, 5-year period extending from calendar year 2000 through calendar year 2004. The EPA concluded that a standard baseline period provides for greater national consistency in establishing this important value, and therefore, is preferable to a provision allowing the baseline period to be a variable number of years. Using a common number of years and data points to calculate the baseline value for each site is consistent with fundamental statistical principles and will provide for easy comparison of data from multiple sites as the program is implemented.

64 Fed. Reg. 35728 (July 1, 1999).

Entergy has not provided any basis for deviating from the 2001-2003 baseline period for SO₂ emissions for its BART visibility modeling. The fact that Entergy has added low sulfur coal as a BART control option further necessitates the use of a 2001-2003 baseline for the cost effectiveness analysis because a review of the more recent 2009-2013 SO₂ emissions at White Bluff Units 1 and 2 shows that the units were emitting SO₂ at annual average rates below the assumed 0.60 lb/MMBtu LSC emission rate.¹⁶² However, for the purpose of this revised BART analysis, it is the only modeling available to show the visibility improvements expected with DSI and LSC, because Entergy's prior BART modeling which EPA relied on for its FIP only evaluate the visibility benefits from two controls – dry FGD and a wet FGD system at White Bluff Units 1 and 2.¹⁶³

¹⁵⁹ August 18, 2017 White Bluff BART Update at 3-1.

¹⁶⁰ See 80 Fed. Reg. 18,944 at 18,972 (Apr. 8, 2015).

¹⁶¹ See Entergy's October 14, 2013 BART Analysis at 4-1 in Docket for EPA's September 21, 2016 FIP.

¹⁶² See Ex. 4, Spreadsheet with IPM Cost Models DSI Cost Analyses, at tabs "WB 1 Baselines" and "WB 2 Baselines," cell I14.

¹⁶³ See 80 Fed. Reg. 18,972 (Apr. 8, 2015).

F. Entergy's Revised Modeling Analysis Overstated the Visibility Benefits of Low Sulfur Coal from Entergy's 2009-2013 Baseline.

To determine the visibility benefits of BART control options, one generally compared modeling of baseline emission rates and modeling of projected controlled emission rates for each BART option. Because visibility impacts are measured on a 24-hour basis, the highest emitting day mass emission rate is modeled for the baseline scenario, and a projected highest emitting day for the BART control is modeled which is based on the control efficiency of the BART control option applied to the baseline highest emitting day mass emission rate.¹⁶⁴ However, Entergy did not follow the approach outlined in EPA's BART Guidelines for determining the daily emission rate to model for low sulfur coal. In fact, Entergy's projection of the maximum hourly SO₂ rate for modeling LSC resulted in a much lower emissions rate than a properly calculated maximum hourly rate with LSC based on the 2009-2013 baseline used in Entergy's revised modeling.

Entergy assumes a 0.6 lb/MMBtu emission rate achievable with LSC.¹⁶⁵ Assuming that Entergy is proposing this emission limit as a 30-boiler operating day average¹⁶⁶, a comparison of the LSC emission limit with the maximum 30-boiler operating day average lb/MMBtu SO₂ rates at White Bluff Units 1 and 2 over Entergy's 2009-2013 baseline period shows that a 0.6 lb/MMBtu 30-boiler operating day average emission limit reflects an 8.68% reduction from the maximum 30-boiler operating day average SO₂ rate at each White Bluff unit over 2009-2013 of 0.657 lb/MMBtu.¹⁶⁷ Based on this, Entergy should have projected maximum daily pound per hour SO₂ emission rates for LSC modeling based on an 8.68% reduction from the maximum daily pound per hour SO₂ rates over Entergy's 2009-2013 baseline period for its modeling of each unit with LSC. Instead of following this method outlined in EPA's BART Guidelines, it appears that Entergy projected maximum daily emissions with LSC simply based on the maximum permitted heat input capacity of each White Bluff unit of 8950 MMBtu/hour multiplied by the proposed 0.6 lb/MMBtu LSC emission rate¹⁶⁸, which assumes the White Bluff units will not emit SO₂ at daily emission rates any higher than what the proposed BART limit would require on a 30-boiler operating day average basis. This greatly understates the maximum daily SO₂ emissions that could be allowed at White Bluff Units 1 and 2 and still enable the units to comply with a 30-boiler operating day average 0.6 lb/MMBtu emission limit with LSC. Table 7 below shows the pound per hour SO₂ rate that Entergy modeled for White Bluff Units 1 and 2 based on the methodology outlined in EPA's BART Guidelines compared to what should have been modeled based on a proper projection of emissions.

¹⁶⁴ See EPA's BART Guidelines at 40 C.F.R. Part 51, Appendix Y, Section IV.D.5.

¹⁶⁵ August 18, 2017 White Bluff BART Update at 1-2.

¹⁶⁶ Entergy's August 18, 2017 states that 0.6 lb/MMBtu can be met on a rolling 30 day average basis, although Entergy also compares the 0.6 lb/MMBtu rate with LSC to maximum 30-boiler operating date average SO₂ rates during the 2009-2013 baseline. See August 18, 2017 White Bluff BART Update at 1-2, 4-1 (fn 15), and 4-4.

¹⁶⁷ See Ex. 34, spreadsheet with White Bluff LSC Calculations at tabs "WB 1" and "WB 2," cell T10. Note Entergy calculates an 8.75% reduction based on a comparison to the maximum 30-boiler operating day SO₂ rate during the baseline period, but did not cite the maximum 30-boiler operating day average rate for each White Bluff unit during the baseline period. See August 18, 2017 White Bluff BART Update at 4-1, fn 15.

¹⁶⁸ That is, 8950 MMBtu/hour x 0.6 lb/MMBtu = 5,370.0 lb/hour.

Table 7. Comparison of Entergy’s Modeled SO2 Emission Rate for LSC Compared to the SO2 Emission Rate Reflective of 8.68% Reduction in Maximum Daily SO2 Baseline Emissions¹⁶⁹

White Bluff Unit	Entergy’s Baseline Modeled SO2 Rate, lb/hr	Entergy’s LSC Modeled SO2 Rate, lb/hr	Properly Projected LSC lb/hr SO2 rate based on 8.68% Reduction from Maximum Daily Baseline Emissions, lb/hr	Percent SO2 Reduction Assumed in Entergy’s LSC Modeling from Baseline
1	6,771.9	5,370.0	6,184.4	20.7%
2	6,622.3	5,370.0	6,047.7	18.9%

It must be noted that the percent reduction required by Entergy’s proposed low sulfur coal BART limit of 0.6 lb/MMBtu could be even less than 8.68%. That is because Entergy has a proposed a 0.6 lb/MMBtu limit¹⁷⁰ rather than a 0.60 lb/MMBtu limit, which means that SO2 emission rates as high as 0.64 lb/MMBtu could be rounded down to 0.6 lb/MMBtu and still show compliance with Entergy’s proposed SO2 limit. An emission rate of 0.64 lb/MMBtu would only require a 2% reduction in the maximum 30-boiler operating day SO2 rate of the 2009-2013 period of 0.657 lb/MMBtu, and thus maximum projected daily emissions with LSC could be only 2% lower than the 2009-2013 baseline pound per hour rates. Regardless, for the purpose of this revised projection of maximum daily SO2 rates with LSC, I assume that the White Bluff units would comply with a 0.60 lb/MMBtu 30-boiler operating day average SO2 limit with the use of low sulfur coal.

In its revised modeling included in its August 18, 2017 White Bluff BART Update, Entergy submitted the results of its modeling analysis that included LSC as a BART control option from a 2009-2013 baseline.¹⁷¹ Based on the changes in Entergy’s modeled hourly SO2 emission rates (shown in the second and third columns of Table 7 above), Entergy found that LSC at each White Bluff unit would provide visibility improvements from Entergy’s 2009-2013 baseline of ranging from 0.097 dv to 0.143 dv per unit.¹⁷² However, as shown in Table 7 above, Entergy did not properly project maximum daily pound per hour SO2 rates with LSC and greatly understated the maximum daily pound per hour SO2 rates that could occur with LSC, which means the visibility benefits of LSC were overstated in Entergy’s revised modeling analysis. Since each unit was modeled by itself, one can scale Entergy’s modeled visibility improvement with LSC to adjust Entergy’s projected visibility benefit with LSC to reflect the revised maximum daily emission rate show in Table 7 above by multiplying Entergy’s modeled delta deciview improvement with LSC by the ratio of the reduction from baseline emissions using the more properly projected maximum daily emission rate to Entergy’s projected reduction in maximum daily emission rates with LSC. The results of this scaling of Entergy’s modeled visibility benefits with LSC are shown in Table 8 below.

¹⁶⁹ See Ex. 34, spreadsheet with White Bluff LSC Calculations, at tabs “WB 1” and “WB 2,” cell T13.

¹⁷⁰ See August 18, 2017 White Bluff BART Update at 1-2.

¹⁷¹ *Id.* at 3-2, 4-7 to 4-8

¹⁷² *Id.* at 4-7 to 4-8.

Table 8. Adjusted Visibility Improvement over Baseline with LSC at White Bluff Units 1 and 2 Based on Entergy’s Modeling¹⁷³ and Updated Projections¹⁷⁴ of Maximum Daily lb/hr SO2 Rate with LSC.¹⁷⁵

White Bluff Unit	Entergy’s Projected Change in Max Daily SO2 Rate with LSC, lb/hr	Revised Projected Change in Max Daily SO2 Rate with LSC, lb/hr	Ratio of Revised Change in Max Daily SO2 Rate to Entergy’s Projected Change in Max Daily SO2 Rate	Scaled Visibility Improvement over Baseline, Δ dv			
				CACR	UPBU	HERC	MING
1	1,409.1	594.7	0.422	0.054	0.060	0.070	0.049
2	1,252.3	574.6	0.459	0.045	0.058	0.063	0.056

Based on this scaling analysis and the projection that the White Bluff units can emit at a maximum daily SO2 rate much higher than projected by Entergy and still comply with the 0.6 lb/MMBtu 30-boiler operating day average limit, it appears that Entergy greatly overstated the visibility benefits with low sulfur coal compared to visibility impacts using a 2009-2013 baseline.

G. Summary of Revised Cost Effectiveness Analysis Presented Herein and Projected Visibility Benefits with the BART Controls Evaluated for White Bluff Units 1 and 2 Assuming ADEQ Adopts an Enforceable Limit Requiring Cessation of Coal Burning at White Bluff by December 31, 2028.

The following presents a summary of the revised cost effectiveness analyses presented in this report assuming that ADEQ adopts an enforceable requirement that Entergy cease firing coal in White Bluff Units 1 and 2 by December 31, 2028, which is the date Entergy has most recently stated it is willing to commit to for a cessation of coal-firing at White Bluff.¹⁷⁶ Assuming, consistent with the current FIP, that compliance with a BART limit reflective of dry FGD continues to be required no later than October 27, 2021 (as required by 40 C.F.R. §52.173(c)(7)) and assuming that, consistent with Entergy’s revised BART analysis, installation of DSI would be done two years earlier in 2019¹⁷⁷, the cost effectiveness analysis for dry FGD should be based on a 7.17 year life and the cost effectiveness for DSI should be based on a 9.17 year life given that Entergy’s consultant has indicated DSI can be implemented two years earlier than dry FGD.¹⁷⁸ Table 9 below summarizes the cost effectiveness values calculated in this report for dry FGD and a 7.17 year life, DSI (including DSI plus a baghouse) for a 9.17 year life, and low

¹⁷³ *Id.* at 3-2, 4-7 to 4-8.

¹⁷⁴ Provided in Table 7 above.

¹⁷⁵ See Ex. 34, spreadsheet with White Bluff LSC Calculations, at tab “Scaled dv benefit LSC.”

¹⁷⁶ August 18, 2017 White Bluff BART Update at 4-4.

¹⁷⁷ *Id.*

¹⁷⁸ See Entergy’s August 18, 2017 BART Update at 4-4.

sulfur coal. Table 9 also includes Entergy’s modeled visibility benefits for all of the BART controls evaluated with the exception of LSC, for which Entergy’s modeled visibility benefits were scaled as shown in Table 8 above to reflect maximum daily emission rate that could occur with LSC and still comply with Entergy’s proposed 0.6 lb/MMBtu emission limit on a 30-boiler operating day average basis.

Table 9. Summary of Revised BART Control Cost Effectiveness Projections Presented Herein Assuming ADEQ’s Adoption of an Enforceable Requirement to Cease Coal-Firing at White Bluff by December 31, 2028 and Expected Visibility Benefits with Controls at White Bluff Units 1 and 2.

White Bluff Unit	SO2 BART Control	Cost Effectiveness of Controls (2001-03 Baseline), \$/ton ¹⁷⁹	Entergy’s Projected Visibility Improvement (Except for LSC, Adjusted Visibility ¹⁸⁰ Improvement from Table 8 above) from 2009-2013 Baseline ¹⁸¹ , 98 Percentile Impact Δ dv			
			CACR	UPBU	HERC	MING
1	Dry FGD	\$3,761	0.603	0.642	0.525	0.504
	Enhanced DSI (with BH at 80%)	\$3,419	0.492	0.555	0.467	0.436
	DSI (at 50%)	\$2,597	0.308	0.375	0.341	0.333
	LSC	\$664	0.054	0.060	0.070	0.049
2	Dry FGD	\$4,390	0.574	0.632	0.486	0.501
	Enhanced DSI (with BH at 80%)	\$3,473	0.460	0.531	0.429	0.435
	DSI (at 50%)	\$2,673	0.274	0.359	0.303	0.333
	LSC	\$983	0.045	0.058	0.063	0.056

As discussed previously in this report, all of the add-on SO2 BART controls evaluated, even with a shortened remaining useful life, are cost effective in that the costs of control are not outside the range that other similar sources have had to incur to meet BART, with only SDA at White Bluff Unit 2 being on the higher end of the range of costs that EPA and states have required to meet BART. If ADEQ ultimately adopts an enforceable requirement for the White Bluff units to cease firing coal by December 31, 2030 as currently listed in ADEQ’s draft Administrative Order, dry FGD will be even more cost effective as shown in Table 2 at a cost effectiveness of \$3,244 to \$3,770 per ton. Dry FGD is also the most effective SO2 BART option in terms of ensuring the greatest SO2 emission reductions and the most visibility improvement. Yet, ADEQ has only proposed the use of low sulfur coal to meet BART at the White Bluff units

¹⁷⁹ See Table 3 above for dry FGD cost effectiveness, Table 2 above for DSI cost effectiveness with baghouse at 80% control and at 50% control, and Table 6 for LSC cost effectiveness.

¹⁸⁰ *Id.* at 4-7 to 4-7. Note that SDA in Entergy’s modeling results refers to a spray dryer absorber, which is the same as a dry FGD system.

¹⁸¹ See August 18, 2017 White Bluff BART Update at 4-7 to 4-8.

with a shortened remaining useful life (which ADEQ has not even proposed as a clearly enforceable limit on the life of the units). Based on the analyses summarized in the above table, even assuming ADEQ adopts an enforceable deadline to cease firing coal by December 31, 2028 at the White Bluff units, LSC alone does not satisfy BART. At the very minimum, DSI should be considered as BART if ADEQ adopts an enforceable limit requiring White Bluff Units 1 and 2 to cease firing coal by December 31, 2028, because DSI can be readily implemented, it is cost effective, and it would result in significant visibility improvement at four Class I areas.

ADEQ's proposed BART determination for the White Bluff units is inconsistent with its BART finding at Flint Creek. Specifically, ADEQ indicates the installation of a NID™ dry scrubber at Flint Creek to meet an SO₂ limit of 0.06 lb/MMBtu, at a cost effectiveness of \$3,845 per ton and an expected visibility improvement of up to 0.647 dv, is justified to meet SO₂ BART.¹⁸² Yet, a dry FGD at White Bluff Unit 1 and Enhanced DSI (with a baghouse at 80% control) at White Bluff Unit 2 have similar or lower costs on a dollar per ton basis compared to the SO₂ BART requirement for Flint Creek, and would achieve similar visibility benefits as ADEQ's proposed SO₂ BART finding for Flint Creek. It is not clear how ADEQ can justify requiring a NID™ scrubber at Flint Creek and yet not require any add-on SO₂ controls at White Bluff, even if ADEQ adopts an enforceable restriction on the remaining useful life of coal-firing at the White Bluff units. If ADEQ does not adopt a clearly enforceable deadline for the White Bluff units to cease firing coal by December 31, 2028, then installation of a dry FGD system at each unit is warranted to meet BART consistent with EPA's FIP requirements promulgated on September 27, 2016 (81 Fed. Reg. 66,332-66,421). Even if ADEQ adopts an enforceable requirement for the units to cease firing coal by December 31, 2030, the cost effectiveness of dry FGD systems assuming a 9.17 year life as shown in Table 2 above is less than the \$3,845/ton cost effectiveness of SO₂ controls to meet BART at Flint Creek. Further, the visibility improvements expected with a dry FGD system at just one White Bluff unit is similar to the visibility improvement expected with SO₂ BART at Flint Creek.¹⁸³

¹⁸² October 2017 Public Review Draft at 26-27.

¹⁸³ ADEQ indicates the operating of a NID™ dry scrubber at Flint Creek is expected to result in up to a 0.647 dv improvement to existing visibility impairment. October 2017 Public Review Draft at 26. Entergy's 2013 modeling based on a 2001-2003 baseline predicted visibility improvements with dry FGD at each White Bluff units ranging from 0.593 to 0.813 dvs. 80 Fed. Reg. 18,972 (Apr. 8, 2015). Even using a more recent baseline of 2009-2013, Entergy's revised modeling shows that dry FGD systems at each White Bluff unit would result in visibility improvements ranging from 0.486 to 0.642 dv as shown in Table 9 above. See December 18, 2017 White Bluff BART Update at 4-7 to 4-8.

II. Evaluation of ADEQ’s Proposed Sulfur Dioxide Reasonable Progress Determination for Independence Units 1 and 2.

On September 27, 2016, EPA finalized a regional haze Federal Implementation Plan (FIP) to address those portions of the Arkansas Regional Haze SIP that EPA disapproved on March 12, 2012.¹⁸⁴ In the FIP, EPA required sulfur dioxide (SO₂) emission limits at Independence Units 1 and 2 of 0.06 lb/MMBtu on a 30-boiler operating day average basis, based on installation of a dry flue gas desulfurization system (dry FGD) or other technology that achieves that same level of control.¹⁸⁵ Compliance is required no later than 5 years from the effective date of EPA’s rule, or by October 27, 2021.¹⁸⁶ On April 25, 2017, in response to a petition for reconsideration submitted to EPA by ADEQ and other parties, EPA issued a partial administrative stay for 90 days of that FIP.¹⁸⁷ Among other things, EPA granted reconsideration of the compliance dates for the SO₂ emission limits for Independence Units 1 and 2.¹⁸⁸ However, there has been no stay of the FIP requirements. Entergy is still required to meet an SO₂ limit of 0.06 lb/MMBtu on a 30-boiler operating day average basis at the Independence Units 1 and 2 by October 27, 2021.¹⁸⁹

ADEQ has proposed a SIP revision that would replace the SO₂ requirements of the FIP with a 0.6 lb/MMBtu limit on a 30-boiler operating day average basis within three years of ADEQ’s adoption of its proposed Administrative Order, based on the use of low sulfur coal at Independence Units 1 and 2.¹⁹⁰

On December 18, 2017, ADEQ issued a Notice of Data Availability to make publicly available information previously submitted by Entergy to ADEQ which Entergy had claimed to be a Trade Secret.¹⁹¹ Included in the information made publicly available by ADEQ is a September 27, 2017 Entergy submittal analyzing reasonable progress for the first planning period.¹⁹² ADEQ claims that it did not rely on this submittal for its proposed SIP.¹⁹³ Regardless, ADEQ provided notice of this additional information from Entergy “due to its potential relevance to the public as they develop comments on the Proposed SIP.”¹⁹⁴

ADEQ focused on the following three control options for its evaluation of reasonable progress measures at Independence Units 1 and 2: (1) wet FGD, (2) dry FGD, and (3) low sulfur coal. For dry FGD systems, it appears that ADEQ is relying on cost effectiveness analyses prepared by EPA and by Entergy.¹⁹⁵ For low sulfur coal, ADEQ relies on cost data provided by

¹⁸⁴ 81 Fed. Reg. 66,332-421.

¹⁸⁵ 81 Fed. Reg. 66,332 at 66,413-4, and 66,420.

¹⁸⁶ 81 Fed. Reg. 66,416.

¹⁸⁷ 82 Fed. Reg. 18,994.

¹⁸⁸ 82 Fed. Reg. 18,995.

¹⁸⁹ 40 C.F.R. 52.173(c)(6) and (7).

¹⁹⁰ October 2017 Public Review Draft at 42-47, and Tab C, Draft Administrative Order for Entergy at 4 (pdf page 1777 of October 2017 Public Review Draft).

¹⁹¹ December 18, 2017 Notice of Data Availability at 1.

¹⁹² *Id.* at 3.

¹⁹³ *Id.*

¹⁹⁴ *Id.*

¹⁹⁵ October 2017 Public Review Draft at 45 and 47.

Entergy for the cost per ton of low sulfur coal at the White Bluff plant, and ADEQ provides its own cost effectiveness analyses.¹⁹⁶

In Entergy's September 27, 2017 Reasonable Progress Analysis made available in ADEQ's December 18, 2017 Notice of Data Availability, Entergy proposes to cease firing coal at the Independence Units 1 and 2 by the end of 2030.¹⁹⁷ Entergy provided revisions to EPA's cost effectiveness analyses conducted for its FIP to reflect a 9 year remaining useful life, and determined the costs for compliance with the SO₂ limits of the EPA FIP would be approximately \$4,000/ton using EPA's cost estimates and a 9 year life.¹⁹⁸ It must be noted that Entergy's revised cost effectiveness for dry scrubbers based on a 9 year life shows that the cost of controls are still reasonable, because other similar sources have had to incur similar costs of control to meet reasonable progress requirements as discussed in Section I.C. of this report. However, notably, Entergy's September 27, 2017 submittal does not clearly state that Entergy is willing to take an enforceable restriction on the remaining useful life of Independence Units 1 or 2, which contrasts with Entergy's August 18, 2017 White Bluff BART Update in which Entergy states it is willing to take enforceable requirements to cease firing coal at White Bluff Units 1 and 2 by December 31, 2028.¹⁹⁹ Similarly, ADEQ's October 2017 proposed SIP revision states that "there are no State or federally enforceable limitations on continued operations at Entergy Independence" and thus assumes a 30-year amortization period.²⁰⁰ ADEQ's October 2017 proposed SIP revision also does not include any draft Administrative Order requirements pertaining to the cessation of burning coal or otherwise shutting down at Independence Units 1 or 2. However, ADEQ does state that "[m]arket trends for coal and natural gas have resulted in decreased dispatch of Entergy Independence," and ADEQ cited to the Energy Information Administration in stating that "the economic pressure on coal units due to low natural gas prices is expected to continue" through 2018 and beyond.²⁰¹ ADEQ also states in its finding that low sulfur coal is sufficient to achieve reasonable progress that "the significant capital investment costs of Dry FGD would lock Entergy into continued operation of the aging Entergy Independence for thirty years in order to avoid stranded costs associated with the installation of the Dry FGD."²⁰² Thus, it appears ADEQ may be taking into account a shortened remaining useful life of the Independence units into account in its proposed SIP revision, at least to some extent. However, given that ADEQ has not proposed any enforceable limitation on the remaining useful life of the Independence units, I did not evaluate any such limitation for the Independence units in a revised cost analysis.

Below I provide comments on ADEQ's proposed SO₂ reasonable progress determination for the Independence Units 1 and 2.

¹⁹⁶ *Id.* at 44-45.

¹⁹⁷ September 27, 2017 Entergy Reasonable Progress Analysis at 1-2.

¹⁹⁸ *Id.* at 6-2 to 6-3.

¹⁹⁹ August 18, 2017 White Bluff BART Update at 4-4.

²⁰⁰ October 2017 Public Review Draft at 46.

²⁰¹ *Id.* at 43.

²⁰² *Id.* at 47.

A. Dry FGD Systems at Independence Units 1 and 2 Are Cost Effective As Reasonable Progress Measures.

ADEQ appears to claim that EPA's estimates of cost effectiveness for dry FGD at Independence Units 1 and 2 of \$2,853 per ton SO₂ reduced at Unit 1 and of \$2,634 per ton of SO₂ reduced²⁰³ were not reasonable costs of control, because ADEQ claims the costs exceed "screening thresholds used for cost-effectiveness in other approved reasonable progress analyses."²⁰⁴ For this claim, ADEQ cites to EPA's proposed rulemaking in the Kentucky regional haze SIP, claiming "EPA approved [reasonable progress goals] in Kentucky based on [the Clean Air Interstate Rule or CAIR] which had a \$2,000/ton SO₂ cost effectiveness screening threshold."²⁰⁵ However, in its proposed approval of the Kentucky regional haze plan, EPA states that the \$2,000 per ton of SO₂ controlled threshold was used "[f]or the limited purpose of evaluating the cost of compliance for the reasonable progress assessment in this first regional haze SIP for the *non-EGUs*...."²⁰⁶

In any event, there are numerous examples of states and EPA requiring controls to meet reasonable progress toward the national visibility goal at costs greater than \$2,000 per ton. For example, EPA approved installation of a dry FGD at the Colorado Springs Nixon Unit 1 as a reasonable progress measure at a cost effective of \$3,744/ton.²⁰⁷ In addition, EPA proposed a FIP of reasonable progress measures based on switching to a lower sulfur fuel oil at the fuel oil-fired boilers at the Kanoelehua Hill Power Plant, the Puna Power Plant, and the Shipman Power Plant at a cost effectiveness of approximately \$5,600/ton.²⁰⁸ EPA also approved Wyoming's adoption of reasonable progress requirements for each of the Jim Bridger units to install SCR at a cost effectiveness ranging from \$2,743/ton to \$3,403/ton in 2013 dollars, or \$2,619/ton to \$3,249/ton in 2016 dollars.²⁰⁹ In Texas, EPA required numerous scrubber retrofits at coal-fired power plants to meet reasonable progress requirements at costs up to \$3,221 per ton.²¹⁰ Further, these costs are within the range of cost effectiveness for controls EPA has required at EGUs to meet BART, as discussed at length in Section I.C. of this report. I incorporate those examples by reference here into the discussion of costs of dry FGD at Independence Units 1 and 2.

In the August 5, 2015 Technical Support Document of Conservation Organizations submitted to EPA in comments on its proposed FIP, I provided cost analyses for dry FGD systems at Independence Units 1 and 2 using the Sargent & Lundy IPM cost modules discussed in Section I above that also showed these controls were very reasonable at \$2,916/ton to \$2,772/ton (2012 \$) at Independence Units 1 and 2 respectively, which were based on 2012-2014 baseline and a 30-year life of controls.²¹¹ These costs would be \$2,702/ton and \$2,569/ton in 2016\$, based on changes in the CECPI index from 2012 to 2016.²¹² These cost numbers are

²⁰³ See 81 Fed. Reg. 66,352 (Sept. 27, 2016).

²⁰⁴ October 2017 Public Review Draft at 47.

²⁰⁵ *Id.* at fn 48.

²⁰⁶ 76 Fed. Reg. 78,194 at 78,206 (Dec. 16, 2011). [Emphasis added.]

²⁰⁷ 77 Fed. Reg. 18052, 18082 (March 26, 2012).

²⁰⁸ 77 Fed. Reg. 61478, 61490 (October 9, 2012; see also 77 Fed. Reg. 31692, 31711-2 (May 29, 2012).

²⁰⁹ See 79 Fed. Reg. 5032, 5040-41, 5046 (January 30, 2014).

²¹⁰ 81 Fed. Reg. 296 at 304, 347 (Jan. 5, 2016).

²¹¹ August 5, 2015 Technical Support Document to Comments of Conservation Organizations, EPA's Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas, at 30-32 (Ex. 1).

²¹² *I.e.*, multiplied by (541.7/584.6).

somewhat higher than EPA’s estimates, because I used a more recent baseline emissions period of 2012-2014 to reflect the higher sulfur coal being used during that timeframe.²¹³ I incorporate by reference and attach my August 5, 2015 report and relevant exhibits into these comments on ADEQ’s proposed regional haze SIP rulemaking.²¹⁴

ADEQ stated that there has been decreased dispatch of the Independence units due to low natural gas prices.²¹⁵ To address ADEQ’s statements that the Independence units have been and may be continued to be dispatched less frequently, I conducted an additional cost effectiveness analyses using the Sargent & Lundy dry FGD IPM cost module discussed in Section I.C. of this report, using the most recent three years of 2014-2016 as baseline emission to reflect the current level of operation of the Independence units. The Independence units operated at approximately a 52-54% capacity factor on average over 2014-2016.²¹⁶ Because ADEQ has not proposed an enforceable limit on the remaining useful life of the coal-fired units, I assumed a remaining useful life of 30 years. With the exception of the timeframe for SO2 and operational baseline data and converting to 2016 dollars, all other parameters were held the same as assumed in my 2015 cost analysis. The results are shown in Table 10 below.

Table 10. Cost Effectiveness of Dry FGD Systems at Independence Units 1 and 2 based on a 2014-2016 Baseline and a 30 Year Life of Controls.²¹⁷

Independence Unit	Annualized Cost of Controls (2016 \$)	SO2 Reduced, tpy	Cost Effectiveness, \$/ton (2016 \$)
1	\$32,503,040	10,005	\$3,249
2	\$33,242,064	10,118	\$3,285

Thus, even if the Independence units are operated at lower capacity factors in the future, dry FGDs are still cost effective compared to previous reasonable progress determinations finalized by other states or EPA.

ADEQ’s October 2017 draft rulemaking also cites to Entergy’s revised cost effectiveness analysis for the Independence units submitted to EPA in August of 2015.²¹⁸ Specifically, Entergy’s cost effectiveness estimates for dry FGD at Independence Units 1 and 2 are based on a 2015 cost estimate for dry FGD at White Bluff Units 1 and 2, provided in Exhibit B of Entergy’s August 7, 2015 comments to EPA, which Entergy used to determine cost effectiveness of dry

²¹³ *Id.* at 61.

²¹⁴ See August 5, 2015 Technical Support Document to Comments of Conservation Organizations (Ex. 1) at 60-61 and related exhibits, which are included with Ex. 1.

²¹⁵ October 2017 Public Review Draft at 43.

²¹⁶ See calculations in Spreadsheet with IPM Cost Models Dry FGD Cost Analyses, Ex. 32, at “Ind 1 Baseline” and “Ind 2 Baseline” tabs, cell S14. Note that the capacity factors were calculated based on annual gross megawatt-hours generated, divided by the maximum megawatt-hours that could be produced in a year (assuming no outages and based on ADEQ’s stated 900 MW size of each Independence unit).

²¹⁷ See calculations in Spreadsheet with IPM Cost Models Dry FGD Cost Analyses, Ex. 32, at “Ind 1 2014-16 BL” and “Ind 2 2014-16 BL” tabs.

²¹⁸ October 2017 Public Review Draft at 45 and fn 45. See also Entergy’s August 7, 2015 comments on EPA’s Proposed Regional Haze FIP, in October 2017 Public Review Draft beginning at pdf page 1237.

FGD at Independence Units 1 and 2.²¹⁹ According to ADEQ, Entergy calculated cost effectiveness of dry FGD at Independence Units 1 and 2 to be \$4,234/ton at Unit 1 and \$3,909/ton at Unit 2.²²⁰ It must first be noted that these costs are still within the range that other similar sources have had to incur to meet reasonable progress requirements, as discussed above and in Section I.C. of this report. However, as EPA stated in its September 2016 final FIP for Arkansas Regional Haze, Entergy's 2015 revised cost analyses relies on updated 2013 pricing from Alstom which Entergy did not attach to its August 2015 comments, and, therefore, EPA found Entergy's 2015 cost update to be undocumented.²²¹ Further, Entergy's 2015 cost numbers do not appear to comport with EPA's Control Cost Manual and are also based on an unrealistically high uncontrolled SO₂ rate for the coal used at Independence Units 1 and 2.

Specifically, a review of that 2015 Sargent & Lundy Cost Estimate for White Bluff Dry FGD shows that it includes costs that are not consistent with the overnight costing method of EPA's Control Cost Manual, including "Interest During Construction" (also known as AFUDC), owner's costs, and escalation of costs during construction.²²² Section I.B.4. of these comments explains how the methodology of the Control Cost Manual is based on the overnight costing methodology, and demonstrates that Entergy's cost analysis is not consistent with that methodology. I incorporate that section of my above comments by reference here with respect to Entergy's 2015 White Bluff cost analyses. EPA also raised the same issues with Entergy's 2015 cost analysis in its response to comments on its September 2016 final Arkansas Regional Haze FIP.²²³

Entergy's 2015 cost analysis also based the capital cost of the FGD equipment on an uncontrolled SO₂ rate of 1.2 lb/MMBtu, but the Independence units emit at half of that rate or lower.²²⁴ Assuming such a high uncontrolled SO₂ rate for the design and cost determination of the dry FGD systems overestimates the control costs associated with dry FGD. Instead, the control costs should have been based on the coal sulfur content that is currently used at the Independence units.

Thus, Entergy's 2015 cost estimates do not comport with the EPA's Control Cost Manual, and are improperly inflated. Because of the lack of conformance with EPA's Control Cost Manual and because the costs are not properly documented, ADEQ must not rely on Entergy's 2015 revised cost estimates.

²¹⁹ See Entergy's August 7, 2015 comments on EPA's Proposed Regional Haze FIP at 44, in October 2017 Public Review Draft at pdf page 1284, and Exhibit B to those comments, in October 2017 Public Review Draft beginning at pdf page 1326.

²²⁰ October 2017 Public Review Draft at 45. See also Entergy August 7, 2015 Comments to EPA at 43 (pdf page 1283 of ADEQ's October 2017 Public Review Draft).

²²¹ 81 Fed. Reg. 66,332 at 66,383 (Sept. 27, 2016). See also EPA's Response to Comments on its FIP at 336, 338, and pdf page 341-343 attached as Ex. 11.

²²² *Id.*, Exhibit B at ES-1, 3, 18-20, and 22 (in October 2017 Public Review Draft at pdf pages 1329, 1332, 1347-49, 1351).

²²³ 8/31/2016 EPA Response to Comments for the Federal Register Notice for the State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan at 338 (fn 646), 341-2. See also 81 Fed. Reg. 66383-4 (Sept. 27, 2016).

²²⁴ *Id.* at 10, 24-26 (in October 2017 Public Review Draft at pdf pages 1339, 1353-55). See also October 2017 Public Review Package at 43, indicating that the Independence Units 1 and 2 emit SO₂ on a 30-boiler operating day average basis in the range of 0.48-0.63 lb/MMBtu.

In summary, assuming no enforceable limitations are imposed on the remaining useful life of the Independence units, dry FGD systems are cost effective for the Independence units and are consistent with costs that other similar sources have had to bear to meet regional haze requirements. Further, ADEQ is not justified in applying a \$2,000/ton screening threshold in determining reasonableness of costs for reasonable progress measures.

B. ADEQ's Cost Effectiveness Determination of Low Sulfur Coal is Flawed.

In its reasonable progress control evaluation for Independence Units 1 and 2, ADEQ estimates costs for low sulfur coal by assuming the same low sulfur cost premium for low sulfur coal that Entergy provided for White Bluff of \$0.50/ton and multiplying that by annual fuel consumption data reported to the Energy Information Administration in Form EIA-923 for 2009-2013.²²⁵ ADEQ calculated an average cost effectiveness for low sulfur coal of \$2,284/ton at Independence Unit 1 and \$2,173/ton at Independence Unit 2, which ADEQ determined were reasonable costs of control. Notably, these costs are virtually identical to the cost effectiveness of dry FGD at each unit.²²⁶ ADEQ's analysis is flawed for several reasons.

First, ADEQ's cost effectiveness analysis is based on the incorrect assumption that the Independence units have actual annual SO₂ emission rates that exceed ADEQ's proposed low sulfur coal limit of 0.6 lb/MMBtu. A review of the annual average SO₂ emission rates at each Independence unit, calculated from actual tons of SO₂ and MMBtu heat input per year reported to EPA's Clean Air Markets Database, shows that neither unit has an annual average SO₂ emission rate that exceeds 0.6 lb/MMBtu. Because cost effectiveness of a pollution control is based on annual average emission reductions, and because actual annual average SO₂ rates are lower than 0.6 lb/MMBtu at both Independence Units 1 and 2 (and have been for at least the last 16 years), *no* annual SO₂ emissions reductions will be realized with ADEQ's low sulfur coal control. Thus, the cost effectiveness of low sulfur coal must be considered to be zero. Table 11 below shows the actual SO₂ emission rates and Independence Unit 1 and 2 and shows that the annual average SO₂ emission rate has actually been increasing over time.

²²⁵ October 2017 Public Review Package at 44. *See also* ADEQ spreadsheet "independence-lsc-costs.xlsx."

²²⁶ *Id.* at 43-44, and 47.

Table 11. Annual Average SO2 Emission Rates at Independence Units 1 and 2, 2001-2016²²⁷

Year	Independence Unit 1 Annual Average SO2, lb/MMBtu	Independence Unit 2 Annual Average SO2, lb/MMBtu
2001	0.36	0.36
2002	0.41	0.42
2003	0.37	0.38
2004	0.39	0.40
2005	0.39	0.40
2006	0.42	0.44
2007	0.44	0.44
2008	0.45	0.44
2009	0.46	0.47
2010	0.47	0.47
2011	0.54	0.54
2012	0.59	0.59
2013	0.55	0.55
2014	0.56	0.54
2015	0.57	0.55
2016	0.57	0.58

Thus, ADEQ’s proposed low sulfur coal limit of 0.6 lb/MMBtu should not be viewed as a limitation or control measures necessary to *achieve reasonable progress* towards natural visibility, but rather as a perpetuation of the status quo emissions at Independence Units 1 and 2.

Second, it must be noted that ADEQ’s proposed 0.6 lb/MMBtu SO2 limit does not even require much if any reduction in SO2 emissions on a 30-boiler operating day average basis as ADEQ’s proposed limit would apply. A review of the Independence units’ 30-boiler operating day average SO2 rates shows that the maximum 30-boiler operating day average SO2 rates over 2009-2016 at Independence Units 1 and 2 were 0.63 lb/MMBtu at Unit 1 and 0.61 lb/MMBtu at Unit 2.²²⁸ Given that ADEQ appears to be proposing a 0.6 lb/MMBtu 30-boiler operating day average limit²²⁹, these actual 30-boiler operating day averages could be rounded to the nearest one-tenth lb/MMBtu rate and thus still show compliance with a 0.6 lb/MMBtu.

There are other problems with ADEQ’s cost effectiveness analysis as well. For calculating the tons per year removed, ADEQ used EPA’s baseline emissions from its cost effectiveness analysis of dry FGD for its 2016 FIP, which was in turn based on the annual average SO2 emissions over 2009 to 2013 minus the maximum and minimum year. A review of the annual emissions data shows that EPA excluded years 2009 (minimum year) and 2012

²²⁷ See Ex. 35, Spreadsheet with Annual Independence Emissions, 2001 to 2016.

²²⁸ See Spreadsheet with Actual 30-Boiler Operating Day Average SO2 Rates at Independence, 2009 to 2016. Ex. 36, at tabs “Ind 1” and “Ind 2,” cell T7.

²²⁹ ADEQ’s draft Administrative Order confusingly lists the SO2 emission limit for Units 1 and 2 as follows: “0.6 pounds of sulfur dioxide per million British thermal units (0.60 lb/MMBtu)....” In the discussion of the reasonable progress requirement, ADEQ only refers to a 0.6 lb/MMBtu emission limit. October 2017 Public Review Draft at 47, and Draft Administrative Order at 4 (pdf page 1777). It appears that ADEQ is intending to impose a 0.6 lb/MMBtu limit rather than a 0.60 lb/MMBtu limit.

(maximum year) from its annual average SO₂ baseline emission calculation for Unit 1, and EPA excluded 2010 (minimum year) and 2012 (maximum year) from its annual average SO₂ baseline emission calculation for Unit 2.²³⁰ Importantly, for the years incorporated into EPA’s baseline emissions, the 30-boiler operating day average SO₂ rates at each Independence unit were at or below 0.60 lb/MMBtu. This is demonstrated in Table 12 below. Thus, the requirement to use low sulfur coal to achieve a 0.6 lb/MMBtu 30-boiler operating day average limit would not have required any changes in coal and would not result in any SO₂ reductions from those baseline emissions. Yet, in its low sulfur coal cost effectiveness analysis, ADEQ assumed SO₂ emissions reduction based on a 4.66% reduction from EPA’s baseline emissions and assuming a \$0.50 per ton premium for use of low sulfur coal that would not be necessary to comply with ADEQ’s proposed 0.6 lb/MMBtu SO₂ limit based on the baseline used in EPA’s cost analysis.

Table 12. Maximum 30-Boiler Operating Day Average lb/MMBtu SO₂ Emissions Rate at Independence Units 1 and 2, Based on Emissions and Heat Input Data Reported to EPA’s Air Markets Program Database, for 2009-2013.²³¹

Year	Independence Unit 1, Maximum 30-Boiler Operating Day SO ₂ Rate, lb/MMBtu	Independence Unit 2, Maximum 30-Boiler Operating Day SO ₂ Rate, lb/MMBtu
2009	0.49	0.49
2010	0.52	0.51
2011	0.58	0.57
2012	0.63	0.62
2013	0.60	0.60

ADEQ also claimed to use tons of coal used at each unit (as reported to the Energy Information Administration) for years 2009-2013 excluding the maximum and minimum year, but a review of ADEQ’s spreadsheet shows that ADEQ used the period of 2009 to 2016 and excluded the maximum and minimum years.²³² It is not clear why ADEQ used a longer period of data on tons of fuel burned at each unit compared to the 2009-2013 period used for baseline emissions.

In summary, ADEQ’s cost effectiveness calculations for low sulfur coal at Independence Units 1 and 2 are flawed. ADEQ’s proposed low sulfur coal requirement and 0.6 lb/MMBtu emission limit should be considered not as a control scheme that would reduce current emissions but instead be viewed as a perpetuation of the status quo emissions from the Independence units. Accordingly, the cost effectiveness of such controls is zero, because the Independence units are already complying with this requirement on an annual basis, as shown in Tables 11 and 12 above.

²³⁰ Based on a review of the actual annual emissions data for 2009 – 2013 in the spreadsheet “independence-sda-costs.xlsx” in ADEQ’s files for its October 2017 rulemaking, at tab “Annual Emissions.”

²³¹ See Spreadsheet with Actual 30-Boiler Operating Day Average SO₂ Rates at Independence, 2009 to 2016. Ex. 36, at tabs “Ind 1” and “Ind 2,” cells T13, T16, T19, T22, and T25..

²³² Based on a review of ADEQ spreadsheet “independence-lsc-costs.xlsx,” at “Calcs” tab, cells G9 and G10.

C. Summary: Dry FGD Systems at Independence Units 1 and 2 Are Cost Effective Controls to Meet Reasonable Progress.

ADEQ's proposed regional haze revision has not provided any information to show that dry FGD systems are not cost effective controls at Independence Units 1 and 2. Although Entergy has indicated the Independence units will cease firing coal by 2030²³³, Entergy did not indicate a willingness to take an enforceable requirement to this effect, nor did ADEQ propose any limitation on coal-firing at the Independence units. Indeed, ADEQ's October 2017 proposed SIP revision states that "there are no State or federally enforceable limitations on continued operations at Entergy Independence" and thus assumes a 30-year amortization period.²³⁴ Based on these facts, it would not be appropriate to consider any limitations on coal firing at the Independence units in determining whether the costs of controls are reasonable. As shown in EPA's September 2016 FIP as well as my August 2015 Technical Support Document to the Conservation Organizations' comments on EPA's proposed FIP, the costs of dry FGD at Independence Units 1 and 2 are reasonable to justify such controls to meet reasonable progress.²³⁵ Even considering more recent levels of operation at the Independence units, which have been operating at lower capacity factors in recent years, dry FGD systems at the Independence units are still cost effective and will achieve significant SO₂ emission reductions from current emissions as shown in Table 10 above. ADEQ's proposed low sulfur coal control will not achieve any SO₂ emission reductions at the Independence units and thus will not achieve any additional progress towards the national visibility goal.

²³³ September 27, 2017 Entergy Reasonable Progress Analysis at 1-2.

²³⁴ October 2017 Public Review Draft at 46.

²³⁵ See 81 Fed. Reg. 66,352 (Sept. 27, 2016); August 5, 2015 Technical Support Document to Comments of Conservation Organizations, EPA's Proposed Regional Haze and Interstate Visibility Transport Federal Implementation Plan for Arkansas, at 30-32 (Ex. 1).

List of Exhibits

Number	Description
1	August 5, 2015 Technical Support Document to Comments of Conservation Organizations, plus exhibits relevant to SO2 Controls at White Bluff and Independence.
2	March 2011 National Park Service spreadsheet “EGUs with Proposed BART Controls.”
3	May 28, 2009 Wyoming Department of Environmental Quality BART Application Analysis, Dave Johnston Plant.
4	Spreadsheet with IPM Cost Models DSI Cost Analyses.
5	Coal shipments to the White Bluff plant from EIA’s Coal Data Browser.
6	Source Emissions Survey of Entergy Services, Inc. White Bluff Steam Electric Station Unit Number 1 Stack (SN-01), April 2010.
7	Source Emissions Survey of Entergy Services, Inc. White Bluff Steam Electric Station Unit Number 2 Stack (SN-02), April 2010.
8	Response to Technical Comments for Sections E. through H. of the Federal Register Notice for the Oklahoma Regional Haze and Visibility Transport Federal Implementation Plan, 12/13/2011 [Docket ID EPA-R06-OAR-2010-0190-0057 in docket for the Oklahoma FIP].
9	U.S. EPA, Complete Response to Comments for NM Regional Haze/Visibility Transport FIP, 8/5/2011, EPA-R06-OAR-2010-0846-0127.
10	May 10, 2010 Letter from Andrew M. Gaydosh, Assistant Regional Administrator, EPA Region 8, to Terry O'Clair, Director, Division of Air Quality, North Dakota Department of Health, Re: EPA's Comments on the North Dakota Department of Health's April 2010 Draft BACT Determination for NOx for the Milton R. Young Station.
11	EPA’s Response to Comments on Arkansas Regional Haze FIP, 8/31/16.
12	November 3, 2010 letter from Institute of Clean Air Companies to Senator Carper.
13	U.S. EPA, An Assessment of the Feasibility of Retrofits for the Toxics Rule, March 9, 2011.
14	August 3, 2011 “B&W gets contract for dry scrubber project at Karn coal plant.”
15	December 17, 2014 Extension Request for Consumers Energy Company’s D.E. Karn Plant (SRN B2840) Units 1 & 2 for Compliance with the Mercury and Air Toxics Standard (40 CFR 63 Subpart UUUUU) and the Michigan Mercury Rule (R336.2501).
16	July 9, 2014 TVA – Gallatin Fossil Plant (GAF) – Request for Compliance Extension - Mercury and Air Toxics (MATS).
17	November 5, 2013 Request for One-Year Extension of the Compliance Deadline for the Mercury and Air Toxics Standards and of the Expiration Date of the Plan Approval for the Installation of Flue Gas Desulfurization Units at Homer City.
18	October 4, 2012 Construction Extension for Consumers Energy Company’s JH Campbell Facility Pursuant to the Mercury and Air Toxics Standard.
19	“Hitachi Power Systems America Awarded Contract to Supply Pollution Controls Equipment for KCP&L.”
20	June 22, 2012 Request for Extension of the Mercury and Air Toxics Standards

	(MATS) Compliance Deadline KCP&L La Cygne, Source ID No. 1070005.
21	January 30, 2013 NIPSCO – Michigan City and R.M. Schahfer Generation Stations Request for Extension of Time to Comply with the Utility MATS NESHAP.
22	Testimony of Mr. Chad Teply, PacifiCorp, before the Wyoming Public Service Commission.
23	“Shaw to Install Emissions Reduction Equipment at Boardman Station in Oregon,” June 18, 2012.
24	Shellenberger, Jeffrey, “Upgrade Helps Coal Plant Control Particulate and Air Toxic Emissions,” Power Engineering, June 20, 2016.
25	April 11, 2008 Huntington Power Plant Notice of Intent, Submitted to Utah Division of Air Quality.
26	Lugar, Thomas W. et al., The Ultimate ESP Rebuild: Casing Conversion to a Pulse Jet Fabric Filter, a Case Study.
27	Sargent & Lundy, IPM Model – Updates to Cost and Performance for APC Technologies, Dry Sorbent Injection for SO2 Control Cost Development Methodology, Final, March 2013.
28	Sargent & Lundy, IPM Model – Updates to Cost and Performance for APC Technologies, SDA FGD Cost Development Methodology, Final, March 2013.
29	Sargent & Lundy, IPM Model – Updates to Cost and Performance for APC Technologies, Wet FGD Cost Development Methodology, March 2013.
30	Sargent & Lundy IPM Model – Revisions to Cost and Performance for APC Technologies, Particulate Control Cost Development Methodology, March 2013.
31	Spreadsheet with IPM Cost Models Baghouse plus DSI 80 Percent Cost Analyses.
32	Spreadsheet with IPM Cost Models Dry FGD Cost Analyses.
33	Letter from Arizona Department of Environmental Quality to Steve Fry, EPA Region IX, Re: Consultation Regarding Best Available Retrofit Technology Analyses for the Four Corners Power Plant and Navajo Generating Station, May 12, 2008.
34	Spreadsheet with White Bluff LSC Calculations..
35	Spreadsheet with Annual Independence Emissions 2001 to 2016.
36	Spreadsheet with Actual 30-Boiler Operating Day Average SO2 Rates at Independence, 2009 to 2016.

Attachment A

Curriculum Vitae

Victoria R. Stamper
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Boise, Idaho 83707
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Areas of Expertise

Comprehensive knowledge of the Clean Air Act - accomplished in the requirements for new source review (NSR) and prevention of significant deterioration (PSD) construction permits, Title V operating permits, Maximum Achievable Control Technology (MACT) Approvals, Class I area protection including regional haze plans and best available retrofit technology (BART) determinations, and state implementation plans for compliance with the national ambient air quality standards.

Extensive experience with the air pollution issues related to coal-fired power plants – have evaluated numerous PSD permit applications, best available control technology determinations, and best available retrofit technology determinations for the fossil fuel-fired electric utility industry.

Professional Experience

Air Quality Consultant
Boise, ID 83707

April 2003 to
Present

I provide consulting services on numerous air quality issues such as:

- Reviewing/preparing comments on all aspects of air quality construction and operating permit applications and permits for industrial sources including coal-fired power plants.
- Providing technical expertise for the appeal of air quality permits that do not comply with federal or state clean air requirements.
- Investigating facility compliance with federal and state air quality regulations.
- Analyzing proposed or available mercury and other hazardous air pollutant controls for coal-fired power plants.
- Reviewing and commenting on Class I regional haze and visibility protection plans.
- Evaluating proposed best available retrofit technology determinations.
- Critiquing prevention of significant deterioration increment analyses.
- Evaluating and commenting on air quality analyses and environmental impact statements for proposed oil and gas development in the West.

Environmental Engineer/Legal Assistant
Reed Zars, Attorney at Law
Laramie, WY82070

May 2001 to
April 2003

Responsibilities included:

- Investigating industrial facilities' compliance with Clean Air Act requirements through review of public documents.
- Researching pollution reduction measures and effectiveness.
- Reviewing and preparing comments on proposed air quality construction and operating permits.
- Reviewing and preparing written comments on proposed EPA state implementation plan approvals regarding topics such as opacity regulations, emission limit exemptions, Class I area visibility plans and permitting regulations.

New Source Review Program Manager
Air and Radiation Program
U.S. Environmental Protection Agency, Region VIII
Denver, Colorado80202

December 1990
to April 2001

Responsibilities included:

- Serving as the Region VIII lead for state rules regarding the new source review and prevention of significant deterioration programs, and industrial source control measures.
- Reviewing all aspects of prevention of significant deterioration increment analyses.
- Reviewing state implementation plans for consistency with requirements of Clean Air Act.
- Preparing documents to justify EPA approval or disapproval of state submittals.
- Educating and assisting tribes in developing regulations for tribal implementation plans.
- Participating in workgroups to ensure national consistency and provide input on rulemakings.
- Reviewing state operating permit programs under Title V of the Clean Air Act.
- Researching and compiling the EPA-approved state implementation plans.
- Developing and reviewing state implementation plans for particulate matter nonattainment areas, as well as assisting in the preparation of requests to redesignate to attainment.
- Reviewing environmental impact statements for consistency with Clean Air Act.
- Serving as primary contact for air quality issues in the state of Wyoming.

Environmental Engineer
Envirometrics, Inc.
Seattle, Washington 98103

August 1989-
July 1990

Responsibilities included:

- Designing components of research projects pertaining to pollution control systems.
- Developing testing criteria and measuring the effectiveness of these control systems.
- Preparing air pollution permit applications and related documentation for industrial sources.
- Compiling input data for modeling of ambient air quality impacts on Class I areas.
- Developing emission inventories.

Selected Reports and Papers

- Stamper, V., Technical Support Document to Comments of Conservation Organizations; EPA's Proposed Regional Haze FIP for Texas, May 3, 2017.
- Stamper, V., Technical Support Document to Comments of Conservation Organizations; Proposed Utah Regional Haze SIP Approval and FIP, March 14, 2016.
- Stamper, V., Technical Support Document to Comments of Conservation Organizations; Proposed Regional Haze FIP for Arkansas, August 5, 2016.
- Stamper, V., Technical Support Document to Comments of Conservation Organizations; EPA's Proposed Reasonable Progress Measures for Texas and Oklahoma, April 27, 2015.
- Stamper, V., Technical Support Document to Comments of Conservation Organizations; Proposed Wyoming Regional Haze Partial SIP Approval and Partial FIP, August 1, 2012.
- Stamper, V., C. Copeland, M. Williams, and T. Spencer (contributing editor), *Poisoning the Great Lakes: Mercury Emissions from Coal-Fired Power Plants in the Great Lakes Region*, Natural Resources Defense Council Publication, June 2012.
- Fox, Phyllis and V. Stamper, Technical Support Document to Comments of Conservation Organizations: Proposed Montana Regional Haze FIP, June 15, 2012.
- Technical Support Attachment to Comments of Conservation Organizations; Minnesota Regional Haze SIP Proposed Approval – February 21, 2012.
- Stamper, V., Review of EPA's Proposed Best Available Control Technology (BART) Requirements for the Four Corners Power Plant on Navajo Nation Land, April 28, 2011.
- Stamper, V. and C. Copeland, *Stop the Rollbacks, Cleaner, Healthier Air for Colorado*, Environmental Defense publication, 2005.
- Banerjee, S. and V. Stamper, *Mercury Air Pollution The Case for Rigorous MACT Standards For Subbituminous Coal*, prepared for Rocky Mountain Office of Environmental Defense and the Land and Water Fund of the Rockies, May 2003.

Education

Bachelor of Science Degree
Civil Engineering, Michigan State University
East Lansing, Michigan