

**Appendix H**  
**Public Comments and Responses**

## **The Department of Natural Resources' Air Pollution Control Program's (Air Pollution's) summaries and responses to comments on the Missouri Regional Haze Plan for the Second Planning Period**

The Air Program received comments from Justin Reiling – Washington University Interdisciplinary Environmental Clinic, Daniel S. Hedrick, Director - Environmental Affairs of City Utilities, the U.S. Department of the Interior, the National Park Service (NPS), Patricia Schuba, Labadie MO, Rajiv Ravulapati, Organizing Representative - Sierra Club, St. Louis, MO, The National Parks Conservation Association (NPCA) and Sierra Club, the Interdisciplinary Environmental Clinic at Washington University School of Law, Christine Goepfert, Associate Director for the Midwest Region at NPCA, Mid-Atlantic/Northeast Visibility Union (MANE-VU), U.S. Environmental Protection Agency (EPA) Region 7, Coalition to Protect America's National Parks, NPCA, Sierra Club and the other ten undersigned organizations, the U.S. Department of Agriculture – the U.S. Forest Service (USFS), Sierra Club and NPCA, and D. Howard Gebhart.

### **Justin Reiling – Washington University Interdisciplinary Environmental Clinic**

- When St. Louis residents cried out about asthma and bronchitis rates at four-times the national average, Ameren built a million-dollar Bitcoin mining facility to increase coal burn at their un-scrubbed Sioux facility.

(Response) – The Air Program is committed to its responsibility to implement the Missouri Air Conservation Law to protect the health and well-being of all Missourians. One of the Air Program's core functions is to design plans to ensure that the outdoor air in every location in Missouri complies with the National Ambient Air Quality Standards (NAAQS) that EPA sets at a level to ensure they are protective of public health with an adequate margin of safety. The Air Program has worked and continues to work with citizens, industry, and other stakeholders to bring areas that were not meeting these standards back into attainment for the benefit of all Missouri citizens.

Ameren Sioux Energy Center is operating installed flue gas desulfurization (FGD) controls to meet requirements of the Mercury and Air Toxics Standards (MATS). Specifically, Sioux complies with MATS by meeting the 0.2 lbs./mmBtu sulfur dioxide (SO<sub>2</sub>) limit. Moreover, the Air Program has recently executed Consent Agreement No. APCP-2021-018 in which the Air Program and Sioux agreed to establish an enforceable mechanism for new sulfur dioxide (SO<sub>2</sub>) emission limits at Sioux.

- Missouri cherry-picked cost effectiveness threshold of \$3,658 for SO<sub>2</sub> to conveniently set it just below the cost to install numerous, necessary control technologies; at the Sikeston coal plant, for instance, two proposed control technologies are less than ten percent more expensive than the Missouri-set threshold. For comparison, Texas, the only state to burn more coal than Missouri, set a threshold of \$5,000. Oregon set two thresholds: technology with an estimated cost of under \$10,000 per ton would be subject to automatic controls; technology over \$10,000 but under \$30,000 would receive further consideration.

(Response) – The Regional Haze Rule requires states to consider cost when determining controls necessary to make reasonable progress. However, neither the rule nor EPA’s Regional Haze guidance document include any bright-line cost effectiveness threshold for states to use in making this consideration. Nor does the rule or guidance provide a prescriptive process for establishing cost effectiveness thresholds when considering control costs to organize and guide its decision-making. Therefore, states must develop their cost effectiveness thresholds and must provide a reasoned basis the threshold selected. Rather than selecting an arbitrary threshold such as \$5,000/ton, the Air Program evaluated control costs implemented in several other similar regulatory undertakings including the Cross-State Air Pollution Rule and the Best Available Retrofit Technology requirements from the first Regional Haze SIPs. The purpose was to ensure the Air Program could show a reasoned basis for the threshold used in the plan. Through this analysis, the Air Program established cost thresholds of \$3,658 for SO<sub>2</sub> and \$5,370 for NO<sub>x</sub>.

The Air Program also points out that the four statutory factors in the Clean Air Act and the Regional Haze Rule are all designed to balance the economic and non-air quality impacts that may be imposed on society when determining the requisite control requirements to make reasonable progress. Cost, time needed to install controls, non-air quality environmental impacts, and remaining useful life are the four factors the Clean Air Act mandates states to consider when determining which controls are necessary to make reasonable progress with respect to Regional Haze. Each of these factors are designed to ensure that states do not impose controls that will have significant economic impacts or result in other environmental harms that are not justifiable tradeoffs when considering the goal of improved visibility in federal Class I areas.

The Air Program carefully considered all of these factors in determining the new enforceable requirements included with this plan. In light of the analysis, no new control technology installations were required. However, the Air Program did include new enforceable requirements for the six of the facilities to prevent against backsliding and secure the emission reductions that the facilities have already achieved in practice. Further, for two of the facilities, the new requirements will ensure the continuous operation of their state-of-the-art NO<sub>x</sub> control equipment year-round. This is at a cost of tens of millions of dollars per year and will achieve approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to actual emissions from these facilities in 2021. This will ensure that reasonable progress will continue to be made to the 2064 goal of natural visibility in all Federal Class I areas.

With regard to the analysis used to determine the appropriate cost effectiveness threshold for use in the plan, the figures the Air Program notes the following cost thresholds used in previous regulatory actions. In Missouri’s original Regional Haze SIP, CenSARA states established a cost threshold of \$2,000/ton (approximately \$3,220 in 2021 dollars for both NO<sub>x</sub> and SO<sub>2</sub>). Under the original CSAPR, which EPA determined was better than BART, EPA established a cost effectiveness threshold of \$500 per ton NO<sub>x</sub><sup>1</sup>

<sup>1</sup> 76 FR 48250, August 8, 2011

(approximately \$644 per ton 2021\$) for the annual and ozone season programs. In 2017, under the CSAPR Update Rule, EPA updated this number to \$1,400 per ton of NO<sub>x</sub><sup>2</sup> (about \$1,860 per tons 2021\$). The CSAPR annual SO<sub>2</sub> program cost effectiveness thresholds were \$2,300 per ton for Group 1 states, and \$500 per ton for Group 2 states (about \$3,056 and \$664 per ton 2021\$). Based on these figures, the values that Missouri selected are all higher than these values that have been approved and used in other regulatory programs, including CSAPR which is designed to protect for the NAAQS, as opposed to visibility in Class I areas.

There is no criteria set by EPA on the appropriateness of a lower range or upper range of the thresholds that states determine appropriate for use in their Regional Haze SIPs. Without a sound methodology or a universally accepted and applied methodology, states like Missouri, which are prohibited by statute from imposing requirements that are stricter than what the Clean Air Act requires, cannot just pick a higher threshold simply because it will result in the imposition of new controls. The cost effectiveness thresholds included in the proposed plan are both reasonable and consistent with the requirement to make reasonable progress. It would be helpful if EPA were to prescribe in regulation a pre-determined cost effectiveness threshold or a prescribed methodology for states to use when determining cost thresholds in future regional haze planning periods.

- Missouri failed to consider Environmental Justice (EJ). EPA recommends that states consider issues of EJ when creating their states implementation plans (SIPs).

(Response) – EPA introduced the EJ issue for Regional Haze to states in their memorandum titled Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period on July 8, 2021. By that time, most states including Missouri were in the final stages of completing their four-factor analyses. The EJ issue involves considering the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the proposed action. If so, the state should consider whether there may be disproportionately high and adverse human health or environmental effects on them. It also involves considering relevant public health data and industry data concerning the potential for multiple or cumulative exposure to human health or environmental hazards and recognizing the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action. Public and community participations in the process are also core parts of the EJ consideration.

The Air Program acknowledges that EJ is an important emerging regulatory initiative, and EPA is currently reviewing policies and procedures on how EJ will be incorporated into various regulatory programs and how that may impact states' activities. At this time, there is no direct requirement to incorporate an EJ analysis in the Regional Haze SIP for the second implementation period. Future Regional Haze submittals may take into account any future requirements established by EPA. Moreover, to the Air Program notes that the consideration of EJ in this Regional Haze plan would likely place even more

<sup>2</sup> 81 FR 74551, October 26, 2016

weight on non-air quality environmental impacts that may result from the new control technologies considered. For instance, dry-sorbent injection, which was among the most cost-effective control strategy for SO<sub>2</sub> at many of the sources analyzed will prevent the recycling of fly ash for productive purposes. In addition it significantly increases the amount of coal-ash produced and will likely necessitate the landfilling of all of it. This carries with it higher risk for land and drinking water contamination that could potentially be even more detrimental to communities struggling with EJ issues. The analysis needed to thoroughly and properly consider EJ issues in plans like this necessitates clearer requirements and guidance. The Air Program encourages EPA in its efforts to help provide the necessary regulatory certainty and guidance to properly address EJ issues in future plans. However, at this late stage in the development of the plan, and with the absence of any regulatory requirement or clear guidance from EPA, the Air Program is unequipped to provide a thorough EJ analysis in Missouri's Regional Haze SIP for the second planning period.

- Missouri denied his request for comment time extension; therefore, he did not have time to raise all of his concerns.

(Response) – The Air Program received a request for extension letter from Washington University School of Law on March 30, 2022. The Air Program sent a response letter explaining the rationale behind not granting the extension request. There was too narrow of a timeframe between receiving comments, replying to comments, and preparing Regional Haze SIP documents for adoption and submitting the Regional Haze to EPA by August 15, 2022. As explained in the response, EPA announced on April 22, 2022, its intent to make findings of failure to submit Regional Haze Second Planning Period SIPs for states that have not yet submitted a plan by August 31, 2022.

In response to this comment and to ensure transparency of the request for and the denial of the extension of the public comment period, the Air Program is providing the response letter in Appendix H of the final plan document.

- Missouri clearly devised the plan with an end goal in mind to not require Missouri's polluters to be held accountable, to clean up after themselves, or to reduce haze in our valuable natural spaces.

(Response) – The Air Program followed EPA's Regional Haze Rule and the agency's guidance to develop the Regional Haze SIP for the second planning period. The Air Program selected sources for the four-factor analysis process based on a selection methodology that was generally endorsed by EPA and the Federal Land Managers (FLMs) during both the pre-consultation period and the formal consultation period. Based on the four-factor analyses, The Air Program determined that no new control technology installations were needed to make reasonable progress during the Regional Haze second planning period.

Although the analyses determined that no new control technology installations were needed, the Air Program did determine that new enforceable requirements were necessary

to ensure that reasonable progress will be achieved during the second planning period. The six new Consent Agreements included in the long term strategy for this plan secure reductions that some of the largest emitters in the state have already achieved. In addition, the new requirement for sources to run their existing control equipment continuously whenever they burn coal will result in true emission reductions. The Air Program anticipates that the requirement for two of the facilities to run their Selective Catalytic Reduction (SCR) continuously will result in approximately 17,000 tons of NO<sub>x</sub> reductions annually compared to actual emission levels in 2021. This will be at a projected cost of tens of millions of dollars per year. Therefore, while the plan does not require new control installations, the claim that this plan requires no new emission reductions is blatantly false. The emission reductions secured by this plan ensure that visibility in Class I areas in and outside Missouri will maintain or outpace the uniform rate of progress predicted by EPA's updated 2028 Regional Haze modeling.

The trend analysis included in this plan shows significant anticipated reductions in both NO<sub>x</sub> and SO<sub>2</sub> emissions. Additional emissions reductions will continue without additional new requirements due to the energy transition that is already underway. Further, while not enforceable, coal retirements are continuing at record pace due to economic and market forces. A newly announced retirement at the Rush Island Energy Center will secure thousands of additional tons of NO<sub>x</sub> and SO<sub>2</sub> emission reductions. In light of all of this, the Air Program is concluding in this plan, with a high degree of certainty, that the visibility goals in the second planning period will be achieved at all the Class I areas that are impacted by emissions from Missouri.

**Daniel S. Hedrick, Director - Environmental Affairs, of City Utilities**

- City Utilities supports the revised plan for the second planning period as written.
- City Utilities has voluntarily agreed to federally enforceable work practice standards, record keeping, and reporting requirements.
- City Utilities' four-factor analysis shows no additional control measures are necessary to ensure Missouri reaches or exceeds its reasonable progress goals.
- City Utilities believes that regulatory certainty is always necessary in order to allow affected sources to make prudent business decisions and plan for future control measures.

(Response) – The Air Program appreciates your comments and support of our plan.

**U.S. Department of the Interior, National Park Service (NPS)**

- Missouri did not include in the public notice announcement a summary of the conclusions and recommendations of the Federal Land Managers (FLMs) as required by statute (42 U.S.C. §7491).

(Response) – The Air Program's intention to meet this requirement was provided in Appendix G of the proposed plan. This appendix included all of the comments from the FLMs along with Air Program response letters to each FLM. The response letters summarized the issues the agencies raised in their comments and the Air Program

responses and changes to the draft SIP that resulted from the FLM comments during the formal consultation period for the plan. However, in response to this comment, and to ensure the FLM consultation period documentation is comprehensive and transparent, the Air Program has updated Appendix G. The updated appendix now provides a more formal summary of the FLM comments and the Air Program responses that occurred during the formal consultation period for the proposed plan.

- NPS recommends the Air Program correct cost estimates to reflect EPA guidance and use the recommended lifetime of the control under consideration to estimate annualized costs or establish enforceable shutdown dates.

(Response) – The Air Program updated the Regional Haze SIP following the formal consultation period for the proposed plan to address this comment and reflect EPA’s guidance regarding how states should consider remaining useful life in their analyses. The proposed plan included cost estimates assuming a 25-year useful life of the control equipment for the sources analyzed if no enforceable shutdown date was available. However, the Air Program also included cost analyses assuming more realistic remaining life assumptions for the sources analyzed. It would be indefensible to only include the 25-year control equipment life projections in the plan when in reality the Air Program knows that publicly available integrated resource plans show projected retirement dates only 5-15 years in the future. The Air Program notes that both the Clean Air Act statutory text and the EPA’s Regional Haze regulation mandate states to consider remaining useful life in four-factor analyses for reasonable progress. EPA’s guidance contradicts this mandate and injects new language that prevents consideration of remaining useful life unless there is an enforceable shutdown date for the source being analyzed. The Air Program has serious concerns about EPA’s use of unenforceable guidance and formal comments that direct states to contradict mandates in established laws and regulations. However, as a compromise to this issue, the proposed plan included both cost estimates for remaining life. Further, the Air Program notes that even with the unrealistic prolonged assumption of remaining life, none of the new control technology installations met the cost effectiveness thresholds established in the proposed plan.

The equipment life for SO<sub>2</sub> scrubbers is between 20 and 30 years as stated in EPA’s control cost manual. The manual also stated that 50 percent of the scrubbers at power plants were over 20 years old. The manual concluded based on estimation, an equipment life of 30 years is appropriate for wet FGD systems. The Air Program finds it inappropriate to conclude that 30 years of equipment life is appropriate based on the fact that 50 percent of the scrubbers at power plants were over 20 years old. As a compromise in the proposed plan, the Air Program calculated an average of 25 years of equipment life based on the control cost manual statement that stated the equipment life for SO<sub>2</sub> scrubbers is between 20 and 30 years.

The control cost manual states that the equipment life for SCR is 30 years. In the proposed plan, the Air Program previously used 20 years in the second method to calculate annual cost. Therefore, in response to this comment, the Air Program updated the proposed Regional Haze SIP to include 30 years for SCR equipment life.

- NPS asked the Air Program to apply numeric emission limits or rates in the Consent Agreements.

(Response) – The Air Program carefully crafted the Consent Agreements in the proposed plan to ensure the enforceability of the intention of the control requirements. The Consent Agreements include enforceable requirements that will help prevent backsliding at all sources that entered into them. Further, the requirements for some sources will mandate continuous operation of effective control equipment, where this has not consistently been the case, and will result in approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to 2021 actual emission levels. While the Air Program acknowledges that there will always be some degree of variability with sulfur content of coal and the efficiency of any control device, the goal for the requirements is to secure the already-achieved emission reductions for facilities that have continuously operated their control technology and to compel the achievement of new emission reductions where operation of control technologies has not been as consistent. With the monitoring, record keeping, and reporting requirements included in the Consent Agreements, the Air Program will have the data necessary to determine whether violations of the new requirements are occurring. The sulfur content of the coal purchases and the type of coal purchased must be made readily available to Air Program inspectors. Further, the SCR operating hours must not only be reported under strong penalty for false certification. The Air Program is confident that the NO<sub>x</sub> emission rates will provide the evidence needed to determine whether the facilities are complying the requirement to continuously run their controls as this control technology typically achieves approximately 85-90 percent control efficiency. Therefore, a simple review of the emission rates from the facility's continuous emission monitoring systems measurements will provide the data necessary to determine compliance with the new requirements.

- The Air Program needs to increase the cost-effectiveness threshold, which are low compared to a range of \$4,000 to \$10,000 per ton selected by other states, and require all technically feasible cost-effective controls to reduce haze causing emissions.

(Response) – The Regional Haze Rule requires states to consider cost when determining controls necessary to make reasonable progress. However, neither the rule nor EPA's Regional Haze guidance document include any bright-line cost effectiveness threshold for states to use in making this consideration. Nor does the rule or guidance provide a prescriptive process for establishing cost effectiveness thresholds when considering control costs to organize and guide its decision-making. Therefore, states must develop their cost effectiveness thresholds and must provide a reasoned basis the threshold selected. Rather than selecting an arbitrary threshold such as \$5,000/ton, the Air Program evaluated control costs implemented in several other similar regulatory undertakings including the Cross-State Air Pollution Rule and the Best Available Retrofit Technology requirements from the first Regional Haze SIPs. The purpose was to ensure the Air Program could show a reasoned basis for the threshold used in the plan. Through this analysis, the Air Program established cost thresholds of \$3,658 for SO<sub>2</sub> and \$5,370 for NO<sub>x</sub>.



The Air Program also points out that the four statutory factors in the Clean Air Act and the Regional Haze Rule are all designed to balance the economic and non-air quality impacts that may be imposed on society when determining the requisite control requirements to make reasonable progress. Cost, time needed to install controls, non-air quality environmental impacts, and remaining useful life are the four factors the Clean Air Act mandates states to consider when determining which controls are necessary to make reasonable progress with respect to Regional Haze. Each of these factors are designed to ensure that states do not impose controls that will have significant economic impacts or result in other environmental harms that are not justifiable tradeoffs when considering the goal of improved visibility in federal Class I areas.

The Air Program carefully considered all of these factors in determining the new enforceable requirements included with this plan. In light of the analysis, no new control technology installations were required. However, the Air Program did include new enforceable requirements for the six of the facilities to prevent against backsliding and secure the emission reductions that the facilities have already achieved in practice. Further, for two of the facilities, the new requirements will ensure the continuous operation of their state-of-the-art NO<sub>x</sub> control equipment year-round. This is at a cost of tens of millions of dollars per year and will achieve approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to actual emissions from these facilities in 2021. This will ensure that reasonable progress will continue to be made to the 2064 goal of natural visibility in all Federal Class I areas.

With regard to the analysis used to determine the appropriate cost effectiveness threshold for use in the plan, the figures the Air Program notes the following cost thresholds used in previous regulatory actions. In Missouri's original Regional Haze SIP, CenSARA states established a cost threshold of \$2,000/ton (approximately \$3,220 in 2021 dollars for both NO<sub>x</sub> and SO<sub>2</sub>). Under the original CSAPR, which EPA determined was better than BART, EPA established a cost effectiveness threshold of \$500 per ton NO<sub>x</sub><sup>3</sup> (approximately \$644 per ton 2021\$) for the annual and ozone season programs. In 2017, under the CSAPR Update Rule, EPA updated this number to \$1,400 per ton of NO<sub>x</sub><sup>4</sup> (about \$1,860 per tons 2021\$). The CSAPR annual SO<sub>2</sub> program cost effectiveness thresholds were \$2,300 per ton for Group 1 states, and \$500 per ton for Group 2 states (about \$3,056 and \$664 per ton 2021\$). Based on these figures, the values that Missouri selected are all higher than these values that have been approved and used in other regulatory programs, including CSAPR which is designed to protect for the NAAQS, as opposed to visibility in Class I areas.

There is no criteria set by EPA on the appropriateness of a lower range or upper range of the thresholds that states determine appropriate for use in their Regional Haze SIPs. Without a sound methodology or a universally accepted and applied methodology, states like Missouri, which are prohibited by statute from imposing requirements that are stricter than what the Clean Air Act requires, cannot just pick a higher threshold simply

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because it will result in the imposition of new controls. The cost effectiveness thresholds included in the proposed plan are both reasonable and consistent with the requirement to make reasonable progress. It would be helpful if EPA were to prescribe in regulation a pre-determined cost effectiveness threshold or a prescribed methodology for states to use when determining cost thresholds in future regional haze planning periods.

- NPS commented that Missouri's total SO<sub>2</sub> and NO<sub>x</sub> emissions from power plants in 2020 were second in the nation, behind only Texas. They encourage Missouri to take advantage of the opportunity this SIP provides to obtain substantial emission reductions.

(Response) - The Air Program followed EPA's Regional Haze Rule and the agency's guidance to develop the Regional Haze SIP for the second planning period. The Air Program selected sources for the four-factor analysis process based on a selection methodology that was generally endorsed by EPA and the Federal Land Managers (FLMs) during both the pre-consultation period and the formal consultation period. Based on the four-factor analyses, The Air Program determined that no new control technology installations were needed to make reasonable progress during the Regional Haze second planning period.

Although the analyses determined that no new control technology installations were needed, the Air Program did determine that new enforceable requirements were necessary to ensure that reasonable progress will be achieved during the second planning period. The six new Consent Agreements included in the long term strategy for this plan secure reductions that some of the largest emitters in the state have already achieved. In addition, the new requirement for sources to run their existing control equipment continuously whenever they burn coal will result in true emission reductions. The Air Program anticipates that the requirement for two of the facilities to run their Selective Catalytic Reduction (SCR) continuously will result in approximately 17,000 tons of NO<sub>x</sub> reductions annually compared to actual emission levels in 2021. This will be at a projected cost of tens of millions of dollars per year. Therefore, while the plan does not require new control installations, the claim that this plan requires no new emission reductions is blatantly false. The emission reductions secured by this plan ensure that visibility in Class I areas in and outside Missouri will maintain or outpace the uniform rate of progress predicted by EPA's updated 2028 Regional Haze modeling.

The trend analysis included in this plan shows significant anticipated reductions in both NO<sub>x</sub> and SO<sub>2</sub> emissions. Additional emissions reductions will continue without additional new requirements due to the energy transition that is already underway. Further, while not enforceable, coal retirements are continuing at record pace due to economic and market forces. A newly announced retirement at the Rush Island Energy Center will secure thousands of additional tons of NO<sub>x</sub> and SO<sub>2</sub> emission reductions. In light of all of this, the Air Program is concluding in this plan, with a high degree of certainty, that the visibility goals in the second planning period will be achieved at all the Class I areas that are impacted by emissions from Missouri.

**Patricia Schuba, Labadie MO**

- Missouri's fossil fuel electric power generation causes 87% of the dangerous smog and air pollution impacting overburdened communities and Class 1 Areas. The Labadie Plant alone contributes approximately 28% of the state's air pollutants. Missouri's plan neglected to identify and target fossil fuel electric power generation plants for pollution reductions. The Missouri Air Commission Committee (MACC) needs to deny Missouri's plan, require emissions controls on all Missouri power plants, and require the finalized plan to establish federally enforceable retirements of the units at Labadie, New Madrid, Thomas Hill, Rush Island, Sikeston, and John Twitty coal fired power plants.

(Response) – The Air Program followed EPA's Regional Haze Rule and the agency's guidance to develop the Regional Haze SIP for the second planning period. The Air Program selected sources for the four-factor analysis process based on a selection methodology that was generally endorsed by EPA and the Federal Land Managers (FLMs) during both the pre-consultation period and the formal consultation period. Based on the four-factor analyses, The Air Program determined that no new control technology installations were needed to make reasonable progress during the Regional Haze second planning period.

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**Rajiv Ravulapati, Organizing Representative - Sierra Club, St. Louis, MO**

- The state of Missouri has proposed a regional haze plan that fails to reduce pollution, falling short on the state's obligation to improve air quality for our parks and communities.
- The Air Program only selected 7 sources for review of emission-reducing measures in its implementation plan. However, despite the many opportunities for cost-effective controls, the Air Program improperly concluded that no new reductions in pollution are warranted.
- He asks Missouri to require emission controls for the power plants the state selected, which are among the state's largest sources of visibility-impairing emissions. Many of these power plants lack the ideal NO<sub>x</sub> and SO<sub>2</sub> pollution reducing measures.
- He asks Missouri to correct the inflated cost of controls calculations.
- He asks Missouri to make federally enforceable the retirement of units at New Madrid, Labadie, Thomas Hill, Rush Island, Sikeston, and John Twitty coal power plants as part of this implementation plan.

(Response) – The Air Program followed EPA's Regional Haze Rule and the agency's guidance to develop the Regional Haze SIP for the second planning period. The Air Program selected sources for the four-factor analysis process based on a selection methodology that was generally endorsed by EPA and the Federal Land Managers (FLMs) during both the pre-consultation period and the formal consultation period. Based on the four-factor analyses, The Air Program determined that no new control technology installations were needed to make reasonable progress during the Regional Haze second planning period.

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secure thousands of additional tons of NO<sub>x</sub> and SO<sub>2</sub> emission reductions. In light of all of this, the Air Program is concluding in this plan, with a high degree of certainty, that the visibility goals in the second planning period will be achieved at all the Class I areas that are impacted by emissions from Missouri.

- He asks Missouri to ensure that all existing air pollution controls at Iatan and Sioux are running fully and efficiently, until retirement specifically for Sioux.

(Response) – Neither of these sources met the selection criteria for the four-factor analysis in Missouri’s plan. As such, the Air Program did not perform a four-factor analysis for either of these facilities in the proposed plan. The Air Program further notes that enforceable permit limits already exist for the Iatan facility to ensure the efficient operation of their existing control technology. In addition, the Sioux facility is operating FGD controls to meet requirements in MATS. Specifically, Sioux complies with MATS by meeting the 0.2 lbs/mmBtu SO<sub>2</sub> limit. Moreover, the Air Program has recently executed Consent Agreement No. APCP-2021-018 in which the Air Program and Sioux agreed to establish an enforceable mechanism for new SO<sub>2</sub> emission limits at Sioux. Finally, Ameren recently announced its intention to retire the Sioux facility by 2028 as part of the company’s long range plan to transition away from coal at their company. In light of all these facts, it is highly unlikely that new requirements would be needed for the Regional Haze Second Planning Period at either of facilities even if these facilities had met the selection criteria and the Air Program had performed analyses at these facilities.

- He asks Missouri to require pollution reductions for the lime facility the Air Program selected as well as the five additional cement and smelting facilities the Air Program failed to review.

(Response) – The Air Program conducted four-factor analysis for one lime source and concluded that additional control equipment is either not cost effective or not feasible. No other lime or cement manufacturing facilities met the Air Program’s selection criteria for the four-factor analysis. The selection criteria was generally endorsed by both EPA and the all of the FLMs as capturing a sufficient number of sources for this planning period in consideration of technical and staffing resources. The Air Programs intends to evaluate additional sources using the four-factor analysis in future Regional Haze Planning periods.

- The Air Program needs to reconsider its cost effectiveness thresholds and select higher thresholds that are more in line with those selected by other states for reasonable progress.

(Response) – The Regional Haze Rule requires states to consider cost when determining controls necessary to make reasonable progress. However, neither the rule nor EPA’s Regional Haze guidance document include any bright-line cost effectiveness threshold for states to use in making this consideration. Nor does the rule or guidance provide a prescriptive process for establishing cost effectiveness thresholds when considering control costs to organize and guide its decision-making. Therefore, states must develop

their cost effectiveness thresholds and must provide a reasoned basis the threshold selected. Rather than selecting an arbitrary threshold such as \$5,000/ton, the Air Program evaluated control costs implemented in several other similar regulatory undertakings including the Cross-State Air Pollution Rule and the Best Available Retrofit Technology requirements from the first Regional Haze SIPs. The purpose was to ensure the Air Program could show a reasoned basis for the threshold used in the plan. Through this analysis, the Air Program established cost thresholds of \$3,658 for SO<sub>2</sub> and \$5,370 for NO<sub>x</sub>.

The Air Program also points out that the four statutory factors in the Clean Air Act and the Regional Haze Rule are all designed to balance the economic and non-air quality impacts that may be imposed on society when determining the requisite control requirements to make reasonable progress. Cost, time needed to install controls, non-air quality environmental impacts, and remaining useful life are the four factors the Clean Air Act mandates states to consider when determining which controls are necessary to make reasonable progress with respect to Regional Haze. Each of these factors are designed to ensure that states do not impose controls that will have significant economic impacts or result in other environmental harms that are not justifiable tradeoffs when considering the goal of improved visibility in federal Class I areas.

The Air Program carefully considered all of these factors in determining the new enforceable requirements included with this plan. In light of the analysis, no new control technology installations were required. However, the Air Program did include new enforceable requirements for the six of the facilities to prevent against backsliding and secure the emission reductions that the facilities have already achieved in practice. Further, for two of the facilities, the new requirements will ensure the continuous operation of their state-of-the-art NO<sub>x</sub> control equipment year-round. This is at a cost of tens of millions of dollars per year and will achieve approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to actual emissions from these facilities in 2021. This will ensure that reasonable progress will continue to be made to the 2064 goal of natural visibility in all Federal Class I areas.

With regard to the analysis used to determine the appropriate cost effectiveness threshold for use in the plan, the figures the Air Program notes the following cost thresholds used in previous regulatory actions. In Missouri's original Regional Haze SIP, CenSARA states established a cost threshold of \$2,000/ton (approximately \$3,220 in 2021 dollars for both NO<sub>x</sub> and SO<sub>2</sub>). Under the original CSAPR, which EPA determined was better than BART, EPA established a cost effectiveness threshold of \$500 per ton NO<sub>x</sub><sup>5</sup> (approximately \$644 per ton 2021\$) for the annual and ozone season programs. In 2017, under the CSAPR Update Rule, EPA updated this number to \$1,400 per ton of NO<sub>x</sub><sup>6</sup> (about \$1,860 per tons 2021\$). The CSAPR annual SO<sub>2</sub> program cost effectiveness thresholds were \$2,300 per ton for Group 1 states, and \$500 per ton for Group 2 states (about \$3,056 and \$664 per ton 2021\$). Based on these figures, the values that Missouri selected are all higher than these values that have been approved and used in other

<sup>5</sup> 76 FR 48250, August 8, 2011

<sup>6</sup> 81 FR 74551, October 26, 2016

regulatory programs, including CSAPR which is designed to protect for the NAAQS, as opposed to visibility in Class I areas.

There is no criteria set by EPA on the appropriateness of a lower range or upper range of the thresholds that states determine appropriate for use in their Regional Haze SIPs. Without a sound methodology or a universally accepted and applied methodology, states like Missouri, which are prohibited by statute from imposing requirements that are stricter than what the Clean Air Act requires, cannot just pick a higher threshold simply because it will result in the imposition of new controls. The cost effectiveness thresholds included in the proposed plan are both reasonable and consistent with the requirement to make reasonable progress. It would be helpful if EPA were to prescribe in regulation a pre-determined cost effectiveness threshold or a prescribed methodology for states to use when determining cost thresholds in future regional haze planning periods.

- He asks Missouri to thoroughly assess EJ impacts (as EPA recommended).

(Response) – EPA introduced the EJ issue for Regional Haze to states in their memorandum titled Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period on July 8, 2021. By that time, most states including Missouri were in the final stages of completing their four-factor analyses. The EJ issue involves considering the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the proposed action. If so, the state should consider whether there may be disproportionately high and adverse human health or environmental effects on them. It also involves considering relevant public health data and industry data concerning the potential for multiple or cumulative exposure to human health or environmental hazards and recognizing the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action. Public and community participations in the process are also core parts of the EJ consideration.

The Air Program acknowledges that EJ is an important emerging regulatory initiative, and EPA is currently reviewing policies and procedures on how EJ will be incorporated into various regulatory programs and how that may impact states' activities. At this time, there is no direct requirement to incorporate an EJ analysis in the Regional Haze SIP for the second implementation period. Future Regional Haze submittals may take into account any future requirements established by EPA. Moreover, the Air Program notes that the consideration of EJ in this Regional Haze plan would likely place even more weight on non-air quality environmental impacts that may result from the new control technologies considered. For instance, dry-sorbent injection, which was among the most cost-effective control strategy for SO<sub>2</sub> at many of the sources analyzed will prevent the recycling of fly ash for productive purposes. In addition it significantly increases the amount of coal-ash produced and will likely necessitate the landfilling of all of it. This carries with it higher risk for land and drinking water contamination that could potentially be even more detrimental to communities struggling with EJ issues. The analysis needed to thoroughly and properly consider EJ issues in plans like this necessitates clearer

requirements and guidance. The Air Program encourages EPA in its efforts to help provide the necessary regulatory certainty and guidance to properly address EJ issues in future plans. However, at this late stage in the development of the plan, and with the absence of any regulatory requirement or clear guidance from EPA, the Air Program is unequipped to provide a thorough EJ analysis in Missouri's Regional Haze SIP for the second planning period.

**The National Parks Conservation Association (NPCA) and Sierra Club, the Interdisciplinary Environmental Clinic at Washington University School of Law**

- The National Parks Conservation Association (NPCA) and Sierra Club, the Interdisciplinary Environmental Clinic at Washington University School of Law requested that Air Program grant an extension on the public comment deadline for Missouri's Regional Haze SIP for the second planning period. Specifically, they asked that the deadline for comments, Thursday, May 5, 2022, be extended 45 days to Wednesday, June 19, 2022.

(Response) – The Air Program received a request for extension letter from Washington University School of Law on March 30, 2022. The Air Program sent a response letter explaining the rationale behind not granting the extension request. There was too narrow of a timeframe between receiving comments, replying to comments, and preparing Regional Haze SIP documents for adoption and submitting the Regional Haze to EPA by August 15, 2022. As explained in the response, EPA announced on April 22, 2022, its intent to make findings of failure to submit Regional Haze Second Planning Period SIPs for states that have not yet submitted a plan by August 31, 2022.

In response to this comment and to ensure transparency of the request for and the denial of the extension of the public comment period, the Air Program is providing the response letter in Appendix H of the final plan document.

**Christine Goepfert, Associate Director for the Midwest Region at National Parks Conservation Association (NPCA)**

- The State Implementation Plan currently proposed by the Air Program falls short of the state's obligation to restore clean air in our national parks.
- The proposed plan currently does nothing to reduce pollution in the coming years, essentially approving more than 50,000 tons of NO<sub>x</sub> and 90,000 tons of SO<sub>2</sub> to be spewed into the air over the next decade. If the Air Program submits the current plan as-is to EPA, it will not comply with the Clean Air Act and the Regional Haze Rule.
- The state did not even review all the power plants in the state for new pollution control measures. NPCA strongly recommends not only reviewing all nine power plants but also requiring pollution reductions from all of them and making federally enforceable the retirement of units at many of these plants.
- The state also ignored other industrial sources like cement manufacturers, many of which send pollution across state lines.



(Response for all above bullets) – The Air Program followed EPA’s Regional Haze Rule and the agency’s guidance to develop the Regional Haze SIP for the second planning period. The Air Program selected sources for the four-factor analysis process based on a selection methodology that was generally endorsed by EPA and the Federal Land Managers (FLMs) during both the pre-consultation period and the formal consultation period. Based on the four-factor analyses, The Air Program determined that no new control technology installations were needed to make reasonable progress during the Regional Haze second planning period.

Although the analyses determined that no new control technology installations were needed, the Air Program did determine that new enforceable requirements were necessary to ensure that reasonable progress will be achieved during the second planning period. The six new Consent Agreements included in the long term strategy for this plan secure reductions that some of the largest emitters in the state have already achieved. In addition, the new requirement for sources to run their existing control equipment continuously whenever they burn coal will result in true emission reductions. The Air Program anticipates that the requirement for two of the facilities to run their Selective Catalytic Reduction (SCR) continuously will result in approximately 17,000 tons of NO<sub>x</sub> reductions annually compared to actual emission levels in 2021. This will be at a projected cost of tens of millions of dollars per year. Therefore, while the plan does not require new control installations, the claim that this plan requires no new emission reductions is blatantly false. The emission reductions secured by this plan ensure that visibility in Class I areas in and outside Missouri will maintain or outpace the uniform rate of progress predicted by EPA’s updated 2028 Regional Haze modeling.

The trend analysis included in this plan shows significant anticipated reductions in both NO<sub>x</sub> and SO<sub>2</sub> emissions. Additional emissions reductions will continue without additional new requirements due to the energy transition that is already underway. Further, while not enforceable, coal retirements are continuing at record pace due to economic and market forces. A newly announced retirement at the Rush Island Energy Center will secure thousands of additional tons of NO<sub>x</sub> and SO<sub>2</sub> emission reductions. In light of all of this, the Air Program is concluding in this plan, with a high degree of certainty, that the visibility goals in the second planning period will be achieved at all the Class I areas that are impacted by emissions from Missouri.

#### **Mid-Atlantic/Northeast Visibility Union (MANE-VU)**

- MANE-VU acknowledges and appreciates the Air Program’s response to their comment requiring Electric Generating Units with installed controls to ensure that controls are run year-round. In the 4-factor discussions for each affected facility in Section 4.1.3.3, the proposed plan cites Missouri’s Title V operating permits and the new Consent Agreements to require the control technology to be run at all times when coal is burned.
- MANE-VU recognizes that the Ask for emissions sources having a 3.0 Mm-1 impact or greater at MANE-VU Class I areas, perform a four-factor analysis was not applicable to Missouri.

- MANE-VU acknowledges and appreciates the enforceable consent agreements described in the pre-proposal and proposal that support the Ask to have Missouri's regulated sources that burn coal to enter into enforceable consent agreements to burn low sulfur.
- MANE-VU acknowledges and appreciates the discussion of MO-specific renewable energy efforts that the Air Program added to page 114 of the proposal.
- MANE-VU acknowledges and appreciates that the Air Program added the following wording related to the fuel switch to the proposal, which was not present in the pre-proposal: "This voluntary switch is enforced by their operating permit." This enforceability was also clarified in the Air Program's March 15, 2022 response letter.

(Response to above bullets) – The Air Program appreciates this comment acknowledging the response from Missouri with respect to consultation with other states as required by the Regional Haze rule.

- Missouri did not address the MANE-VU ultra-low sulfur fuel oil Ask. MANE-VU still respectfully requests that Missouri (and all other upwind states that are reasonably anticipated to contribute to regional haze at MANE-VU Class I areas) adopt a low-sulfur fuel standard so that the use of ultra-low sulfur fuel is maintained in the event market forces influence a shift back to fuels with higher sulfur content. They acknowledge the extremely low emission impact of residential fuel oil.

(Response) – While the Air Program acknowledges this request, the Air Program is unaware of any permitted sources within the state that burn any fuel oil other than ultra-low sulfur fuel oil. Therefore, it is unlikely such a requirement will actually result in any emission reductions. Therefore, the Air Program determines this requirement as unnecessary. To pursue it would be no more than an administrative exercise, and would not be an efficient use of state resources.

- MANE-VU acknowledges and appreciates that the Air Program added the word "enforceable" to the proposal when describing the facilities that have already shut down. However, the Air Program describes that the planned retirements for Meramec, Lake Road, Sioux, and Empire are not yet enforceable and that an enforceable commitment is not necessary at this time because Sioux and Empire were included in EPA's 2028 modeling, upon which the Air Program relied. MANE-VU asked that the retirements for Meramec, Lake Road, Sioux, and Empire be made permanent and enforceable as soon as is practicable.

(Response) – The Air Program has elected not to include enforceable requirements for any facility shutdowns that have not yet occurred in the proposed plan. The purpose of mentioning these retirements is to show a margin of safety with regard to the visibility goals the state is setting for the second planning period. While these announced retirements are expected, they are not needed to ensure reasonable progress. Further, including enforceable shutdowns has the potential to cause unnecessary risk to electricity grid planning and reliability without benefit towards the 2064 goal for Regional Haze.

- Missouri reevaluated the basis for the cost threshold for SO<sub>2</sub> control and revised the threshold from \$3,528/ton to \$3,658/ton. However, EPA still has concerns that this threshold is not adequately justified as being consistent with the requirement to make reasonable progress. Missouri does not address why it is reasonable for them to use this analysis and threshold to exclude controls above this number when many sources in their analysis of control costs are above this number.

(Response) – The Regional Haze Rule requires states to consider cost when determining controls necessary to make reasonable progress. However, neither the rule nor EPA’s Regional Haze guidance document include any bright-line cost effectiveness threshold for states to use in making this consideration. Nor does the rule or guidance provide a prescriptive process for establishing cost effectiveness thresholds when considering control costs to organize and guide its decision-making. Therefore, states must develop their cost effectiveness thresholds and must provide a reasoned basis the threshold selected. Rather than selecting an arbitrary threshold such as \$5,000/ton, the Air Program evaluated control costs implemented in several other similar regulatory undertakings including the Cross-State Air Pollution Rule and the Best Available Retrofit Technology requirements from the first Regional Haze SIPs. The purpose was to ensure the Air Program could show a reasoned basis for the threshold used in the plan. Through this analysis, the Air Program established cost thresholds of \$3,658 for SO<sub>2</sub> and \$5,370 for NO<sub>x</sub>.

The Air Program also points out that the four statutory factors in the Clean Air Act and the Regional Haze Rule are all designed to balance the economic and non-air quality impacts that may be imposed on society when determining the requisite control requirements to make reasonable progress. Cost, time needed to install controls, non-air quality environmental impacts, and remaining useful life are the four factors the Clean Air Act mandates states to consider when determining which controls are necessary to make reasonable progress with respect to Regional Haze. Each of these factors are designed to ensure that states do not impose controls that will have significant economic impacts or result in other environmental harms that are not justifiable tradeoffs when considering the goal of improved visibility in federal Class I areas.

The Air Program carefully considered all of these factors in determining the new enforceable requirements included with this plan. In light of the analysis, no new control technology installations were required. However, the Air Program did include new enforceable requirements for the six of the facilities to prevent against backsliding and secure the emission reductions that the facilities have already achieved in practice. Further, for two of the facilities, the new requirements will ensure the continuous operation of their state-of-the-art NO<sub>x</sub> control equipment year-round. This is at a cost of tens of millions of dollars per year and will achieve approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to actual emissions from these facilities in 2021. This will ensure that reasonable progress will continue to be made to the 2064 goal of natural visibility in all Federal Class I areas.

With regard to the analysis used to determine the appropriate cost effectiveness threshold for use in the plan, the figures the Air Program notes the following cost thresholds used in previous regulatory actions. In Missouri's original Regional Haze SIP, CenSARA states established a cost threshold of \$2,000/ton (approximately \$3,220 in 2021 dollars for both NO<sub>x</sub> and SO<sub>2</sub>). Under the original CSAPR, which EPA determined was better than BART, EPA established a cost effectiveness threshold of \$500 per ton NO<sub>x</sub><sup>7</sup> (approximately \$644 per ton 2021\$) for the annual and ozone season programs. In 2017, under the CSAPR Update Rule, EPA updated this number to \$1,400 per ton of NO<sub>x</sub><sup>8</sup> (about \$1,860 per tons 2021\$). The CSAPR annual SO<sub>2</sub> program cost effectiveness thresholds were \$2,300 per ton for Group 1 states, and \$500 per ton for Group 2 states (about \$3,056 and \$664 per ton 2021\$). Based on these figures, the values that Missouri selected are all higher than these values that have been approved and used in other regulatory programs, including CSAPR which is designed to protect for the NAAQS, as opposed to visibility in Class I areas.

There is no criteria set by EPA on the appropriateness of a lower range or upper range of the thresholds that states determine appropriate for use in their Regional Haze SIPs. Without a sound methodology or a universally accepted and applied methodology, states like Missouri, which are prohibited by statute from imposing requirements that are stricter than what the Clean Air Act requires, cannot just pick a higher threshold simply because it will result in the imposition of new controls. The cost effectiveness thresholds included in the proposed plan are both reasonable and consistent with the requirement to make reasonable progress. It would be helpful if EPA were to prescribe in regulation a pre-determined cost effectiveness threshold or a prescribed methodology for states to use when determining cost thresholds in future regional haze planning periods.

- Missouri revised the four-factor analyses to reflect two different approaches to calculating remaining useful life. Missouri has now included cost estimates based on a longer remaining useful life. However, EPA still has concerns with including cost assumptions based on the shorter remaining useful life. Missouri should include enforceable shutdowns for the second approach or use 30 years for the equipment life of scrubbers and Dry Sorbent Injection (DSI), 30 years for SCR, and 20 years for Selective Non-Catalytic Reduction (SNCR) for electric generating units are reasonable and consistent with the control cost manual and should be used unless there is a reasonable justification for deviating from the typical equipment life.
- New Madrid Power Plant, Missouri assumes the remaining useful life of 8 years for Unit 1 based on an assumed average utility useful life and on the end of the second planning period (2028). If the utility is going to retire unit 1 in 2028, an enforceable timeline codifying the shutdown should be in the SIP. Otherwise, Missouri should use the standard useful life of the control technology.
- Thomas Hill, Missouri assumes a remaining useful life of 8 years for Unit 1 and Unit 2 based on an assumed average utility useful life and on the end of the second planning

<sup>7</sup> 76 FR 48250, August 8, 2011

<sup>8</sup> 81 FR 74551, October 26, 2016

period (2028). Missouri has not provided a justifiable reason to base the control or boiler remaining useful life on the end of the second planning period. Missouri assumes the remaining useful life of seventeen years for Unit 3 based on an assumed average utility useful life. If the utility is going to retire Units 1 and 2 in 2028 and Unit 3 in 2037, Unit 1 and 2 are telling examples of why using an “average utility life” to determine a specific unit’s remaining useful life is invalid. Based on the information presented in the proposed SIP, these shutdowns are not occurring on that timeline. Missouri should include a permanent and federally enforceable limit codifying the shutdowns in its SIP or base the review on continued operation using the standard useful life of the control equipment.

(Response to above comments) – The Air Program updated the Regional Haze SIP following the formal consultation period for the proposed plan to address this comment and reflect EPA’s guidance regarding how states should consider remaining useful life in their analyses. The proposed plan included cost estimates assuming a 25-year useful life of the control equipment for the sources analyzed if no enforceable shutdown date was available. However, the Air Program also included cost analyses assuming more realistic remaining life assumptions for the sources analyzed. It would be indefensible to only include the 25-year control equipment life projections in the plan when in reality the Air Program knows that publicly available integrated resource plans show projected retirement dates only 5-15 years in the future. The Air Program notes that both the Clean Air Act statutory text and the EPA’s Regional Haze regulation mandate states to consider remaining useful life in four-factor analyses for reasonable progress. EPA’s guidance contradicts this mandate and injects new language that prevents consideration of remaining useful life unless there is an enforceable shutdown date for the source being analyzed. The Air Program has serious concerns about EPA’s use of unenforceable guidance and formal comments that direct states to contradict mandates in established laws and regulations. However, as a compromise to this issue, the proposed plan included both cost estimates for remaining life. Further, the Air Program notes that even with the unrealistic prolonged assumption of remaining life, none of the new control technology installations met the cost effectiveness thresholds established in the proposed plan.

The equipment life for SO<sub>2</sub> scrubbers is between 20 and 30 years as stated in EPA’s control cost manual. The manual also stated that 50 percent of the scrubbers at power plants were over 20 years old. The manual concluded based on estimation, an equipment life of 30 years is appropriate for wet FGD systems. The Air Program finds it inappropriate to conclude that 30 years of equipment life is appropriate based on the fact that 50 percent of the scrubbers at power plants were over 20 years old. As a compromise in the proposed plan, the Air Program calculated an average of 25 years of equipment life based on the control cost manual statement that stated the equipment life for SO<sub>2</sub> scrubbers is between 20 and 30 years.

The control cost manual states that the equipment life for SCR is 30 years. In the proposed plan, the Air Program previously used 20 years in the second method to calculate annual cost. Therefore, in response to this comment, the Air Program updated the proposed Regional Haze SIP to include 30 years for SCR equipment life.

- Missouri revised the cost calculations to remove certain disallowed costs, such as allowance for funds used during construction (AFUDC); however, it appears that other disallowed costs, such as owner's costs, may still be included. Missouri should clarify whether the cost calculations include costs that are disallowed by the control cost manual. EPA believes the inclusion of opportunity costs or other owner's costs may be contributing to artificially higher capital costs and resulting cost effectiveness of control measures. A further explanation of what the opportunity costs entail and how they're factored into the cost assumptions, such as costs for duct work design at Labadie, would strengthen the SIP. If opportunity costs are included in the cost effectiveness calculations, Missouri should also include an explanation of how the opportunity costs are allowable under the control cost manual.

(Response) – All DSI cost estimates excluded disallowed costs, such as owner's cost. All other control estimates did not include owner's and AFUDC costs except for the control cost estimates at different efficiencies scenarios for the existing SCRs at New Madrid Power Plant and Thomas Hill Energy Center. In response to this comment, the Air Program removed these costs and updated the Regional Haze SIP documents.

According to the control cost manual, the capital recovery cost factor (CRF) is a function of the equipment life and the opportunity cost of the capital (i.e., interest rate); therefore, it is allowed. With regard to the opportunity cost associated with the retrofit cost factor, Ameren Missouri – Labadie Energy Center or Labadie provided additional information to substantiate their cost estimate for wet FGD. Labadie confirmed that the cost estimates they provided to the Air Program for wet FGD installation do not include opportunity costs. Labadie also provided more explanation on using a higher retrofit factor value. The Air Program included Labadie's response in Appendix H.

- Have unit costs for consumables, waste disposal costs, etc. been substantiated by review of contracts for the various plants?

(Response) – The Air Program used the control cost manual and spreadsheets to estimate control cost. According to the control cost manual, it is allowable to use the default values for unit costs for consumables, waste disposal costs, etc. when specific costs for these values are not available.

- Auxiliary power costs have been set at \$0.06/kWh for many units. Note that this is substantially higher (almost double) than those estimated by Ameren costs estimates. Can Missouri explain why it selected this cost number?

(Response) – The \$0.06/kWh auxiliary cost is based on EPA's Integrated Planning Model (IPM) default value provided in the DSI control cost spreadsheet. The other spreadsheets for other control equipment provided two default values \$0.0361/kWh and \$0.0676/kWh. The latest auxiliary power cost in \$/kWh unit for industrial customers is \$0.0681/kWh based on U.S. Energy Information Administration's 2020 Electric Power Annual report, which was revised in March 2022 .

Upon further review, and in response to this comment, the Air Program updated the proposed Regional Haze SIP control cost estimation to include a default value of auxiliary power cost of \$0.681/kWh for sources that did not provide source specific data.

- Labor costs are set at \$60/hr. Can Missouri provide additional justification for selecting this number?

(Response) – The labor costs are based on the default value in all spreadsheets and the control cost manual.

- For a number of control units, it is unclear if costs associated with ancillary equipment, such as ID Fans, have been evaluated on a plant-by-plant basis. For example, does pressure drop associated with evaluated controls justify addition of booster fan or ID Fan replacement? Was existing ID Fan capacity evaluated against evaluated control draft requirements?

(Response) – EPA’s control cost manual and all other spreadsheets used to estimate control cost do not provide detail on how to incorporate costs associated with ancillary equipment, such as ID Fans, into the final cost estimate. Adding what EPA is suggesting would require actual design parameters which goes beyond the purpose of the control cost manual that EPA directs states to use in performing cost analyses in Regional Haze SIPs.

- Missouri included an analysis for DSI at several units. Missouri then rejected DSI partially on the basis that DSI would make the power plant’s fly ash unsellable. While DSI sorbents would change the nature of the fly ash, the modified fly ash may still meet the requirements of potential buyers. Furthermore, there are several uses of fly ash that are not based on the fly ash chemistry. EPA recommends Missouri substantiate what revenue loss, if any, will occur and what amount, including less revenue for a different use. EPA recommends Missouri explain how these costs would impact the overall cost-effectiveness of DSI and its decision to find DSI unreasonable to make reasonable progress.

(Response) – The Air Program held conference calls with all facilities that were asked to provide information to conduct control cost estimate for DSI. All facilities indicated that the change of the fly ash chemistry would result in not being able to sell the fly ash and that it must be landfilled. Only one facility (John Twitty) provided the lost revenue from not being able to sell fly ash. The Air Program estimated loss of revenue based on fly ash sale from 2016 to 2021 for this facility. The Air Program took the average of the sale and added one standard deviation to it. The Air Program added the resulting value to the total annual cost.

- EPA recommends Missouri bolster the responses to comments received from the Federal Land Managers (FLMs) during the required FLM review period and include in the SIP narrative as their current location in Appendix G may be difficult to find for some readers. Clean Air Act (CAA) Section 168(d) states, states “shall include a summary of

the conclusions and recommendation of the Federal land managers in the notice to the public.” 40 CFR 51.308(i)(3) requires states to “include a description of how it addressed any comments.”

(Response) – The Air Program’s intention to meet this requirement was provided in Appendix G of the proposed plan. This appendix included all of the comments from the FLMs along with Air Program response letters to each FLM. The response letters summarized the issues the agencies raised in their comments and the Air Program responses and changes to the draft SIP that resulted from the FLM comments during the formal consultation period for the plan. However, in response to this comment, and to ensure the FLM consultation period documentation is comprehensive and transparent, the Air Program has updated Appendix G. The updated appendix now provides a more formal summary of the FLM comments and the Air Program responses that occurred during the formal consultation period for the proposed plan.

- In Sections 2.2.3.2 and 2.2.3.3, EPA believes Missouri transposed the state and source names for Indiana and Illinois. Also please clarify whether Illinois responded to Missouri’s requests for state consultation.

(Response) – In response to this comment, the Air Program corrected both sections to identify which sources are located in Indiana and Illinois. Further, the Air Program notes that at the time of finalizing this response, Illinois had not provided responses to the Air Program’s request regarding the development of four-factor analyses for sources in Illinois.

- Missouri’s stipulated penalties, as outlined in the source agreements, allow the source owners to pay as little as one hundred dollars (\$100) a day for not meeting the limits. In many cases, the stipulated penalty will be much less than the cost of meeting the limit. These penalties are not an effective deterrent to noncompliance. EPA suggests either removing the stipulated penalties or setting them at a realistic deterrence level up to the maximum allowed by the Clean Air Act (CAA), \$51,796 per violation per day. The agreements also seem to limit federal enforcement of the stipulated penalties if the state grants an exemption pursuant to "unreviewable discretion." This appears to be an improper limit on federal enforcement of the consent agreements.

(Response) – The purpose of the Consent Agreements is establish the enforceable requirements. While the stipulated penalties are the starting point before which any negotiation takes place, the Air Program may also impose higher penalties for SIP violations and impose new corrective actions with higher and punitive penalties as a result of any future violation that occurs. Violation of any of the requirements included in the Consent Agreements will be a violation of the Missouri Air Conservation Law and the SIP should EPA approve the plan. Enforcement initiatives can be stepped up, if necessary, to ensure the facility complies with the requirements in the agreement and the SIP. Neither EPA, nor the facilities, should view the stipulated penalties in the Consent Agreements as a simple fine in lieu of compliance, as this is not the case.



- Missouri includes an exemption in the consent agreements in case the source owner installs controls getting equivalent or better control. While EPA understands the desire for this flexibility, such a change to the emission limitation once approved in the SIP will need to be reviewed and approved by EPA after the source owner decides what new limit or control will be agreed upon. EPA is not opposed to source owners adding controls, but EPA wants to ensure the state and source owners are aware that before any changes to the source agreements could be effective, the state must submit the revised agreements to EPA for EPA to approve into the SIP.

(Response) – The proposed plan and Consent Agreements envision that in cases where facilities may want to install controls that are equal or more stringent than required by the Consent Agreement, this should be encouraged and not stifled by the timely process needed to achieve EPA approval of a SIP revision. The Air Program does not intend to grant any such requests where the alternative control would result in less stringent emission control requirements. Where such a request is questionable as to whether it would achieve equivalent or better emission control, the Air Program would intend to consult with EPA before granting approval for the alternative control technology. In the highly unlikely event that the Air Program were to approve an alternative control technology that was not as stringent as the control requirements in the SIP-approved Consent Agreements, EPA has the authority under Clean Air Act Section 110 to issue a SIP call to address the issue.

- Missouri includes a potential exemption in the source agreements should the price of low sulfur coal increase. This exemption is not consistent with the Regional Haze Rule. Specifically, allowing the source owner to emit higher amounts of SO<sub>2</sub> for any reason is contrary to the requirement that the state develop enforceable limitations to ensure reasonable progress toward the goal of natural visibility. 40 CFR 51.308(f)(2) states “the long-term strategy must include the enforceable emissions limitations...that are necessary to make reasonable progress”.

(Response) – The Air Program included this stipulation in the agreement to ensure that coal providers do not unfairly increase the price of fuel, due solely to this new requirement. All of the power plants with Consent Agreements in the proposed plan are already complying with numerous other Clean Air Act requirements with compliance strategies that include the use of low sulfur coal. Therefore, this exemption is no different than the status quo that all of these facilities are already complying with. However, since no other requirements stipulate the use of a specific type of coal, this exemption is necessary to ensure that electricity providers in Missouri cannot be subjected to unfair fuel contract negotiations in the future. In the highly unlikely event that a facility takes advantage of this provision and it results in increased SO<sub>2</sub> emissions, EPA has the authority under Clean Air Act Section 110 to issue a SIP call to address the issue.

- EPA continues to strongly recommend Missouri include numerical emissions limits in the source agreements to ensure the agreements are practically enforceable. Specifically, Missouri should explain how the agreements without numerical limits can be practically enforced considering the variability in operations of SCR, and variability in sulfur

content of coal, as demonstrated in EPA's September 2021 comment letter. If a state determines that an in-place emission control at a source is a measure that is necessary to make reasonable progress and there is not already an enforceable emission limit corresponding to that control in the SIP, the state is required to adopt emission limits based on those controls as part of its long term strategy in the SIP via the regional haze second implementation period plan submission. The long term strategy can be said to include those controls only if the SIP includes emission limits or other measures (with associated averaging periods and other compliance program elements) that effectively require the use of the controls. See "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period" at p. 43.1. To that end, Missouri should also clarify the enforceability of existing controls determined to be necessary for reasonable progress.

(Response) – The Air Program carefully crafted the Consent Agreements in the proposed plan to ensure the enforceability of the intention of the control requirements. The Consent Agreements include enforceable requirements that will help prevent backsliding at all sources that entered into them. Further, the requirements for some sources will mandate continuous operation of effective control equipment, where this has not consistently been the case, and will result in approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to 2021 actual emission levels. While the Air Program acknowledges that there will always be some degree of variability with sulfur content of coal and the efficiency of any control device, the goal for the requirements is to secure the already-achieved emission reductions for facilities that have continuously operated their control technology and to compel the achievement of new emission reductions where operation of control technologies has not been as consistent. With the monitoring, record keeping, and reporting requirements included in the Consent Agreements, the Air Program will have the data necessary to determine whether violations of the new requirements are occurring. The sulfur content of the coal purchases and the type of coal purchased must be made readily available to Air Program inspectors. Further, the SCR operating hours must not only be reported under strong penalty for false certification. The Air Program is confident that the NO<sub>x</sub> emission rates will provide the evidence needed to determine whether the facilities are complying the requirement to continuously run their controls as this control technology typically achieves approximately 85-90 percent control efficiency. Therefore, a simple review of the emission rates from the facility's continuous emission monitoring systems measurements will provide the data necessary to determine compliance with the new requirements.

- Missouri exempts periods of start-up, shutdown, and malfunction from the source agreements. This exemption is not consistent with EPA's policy on SSM exemptions for emissions limits in the SIP. The emission limitation in the SIP must cover all periods. Please see 80 FR 33840, June 12, 2015.

(Response) – Since the newly established Consent Agreement do include numeric emission rates, but rather technology or work practice standards, EPA's policy on SSM exemptions for emissions limits in the SIP is not applicable. The Air Program also notes that other Clean Air Act requirements at the facilities such as the MATS, CSPAR, and

others do not provide exemptions during periods of the SSM. Therefore, all of the units are indeed controlled during SSM events even if the new technology-based requirements are not required during these times. This means that SSM events are still adequately controlled pursuant to Missouri's SIP.

- EPA recommends that Missouri describe what portions of the Title V permits are being relied upon to meet the proposed requirements. If parts of the Title V permits are necessary for reasonable progress, they must be incorporated into the SIP. Alternatively, Missouri could replicate the necessary language into an agreement submitted for inclusion into the SIP.

(Response) – The purpose of referencing the Title V permits in the SIP is simply to reference the cumulative enforceable requirements already applicable to the facility. The purpose of Title V permits is to incorporate every air-related requirement into a facility's operating permit. The Air Program understands that operating permits are renewed every five (5) years; however, any reference in the proposed plan that does not specify a specific requirement (such as the natural gas requirement for Meramec) is not intended to imply reliance on the operating permit requirement. Instead the statement is intended to say that cumulatively, all of the applicable requirements for the facility help to ensure that reasonable progress for Regional Haze will be achieved during the second planning period.

- Missouri has removed Ameren Meramec Energy Center from four factor analysis due to a voluntary switch away from coal and an integrated resource plan (IRP) indicating this facility will be shutting down in 2022. While EPA agrees this facility has made substantial emission reductions on an annual basis, these reductions are not yet permanent or enforceable and the potential remains for high daily emissions to impact certain Class I areas. Missouri should determine whether this fuel switch and shutdown is necessary for reasonable progress, and if so, there must be an enforceable measure in the SIP for the fuel switch and shutdown. Missouri should include in the SIP a reference to the enforceable requirements for Ameren to shutdown to avoid a Four Factor. See "Clarification Memo" at p. 10.

(Response) – Initially, the Air Program selected Ameren – Meramec Energy Center for the four-factor analysis based on their 2016 emission data. Regardless of the fact that the facility voluntarily switched from burning coal to natural gas in two of its boilers, emissions data from 2017 to 2021 do not qualify it to undergo a four-factor analysis. In order to conduct a four-factor analysis, there is a need to obtain representative emissions data. The Air Program believes that emissions from 2017 to 2021 are now more representative than 2016 emissions data. Therefore, the Air Program is not requiring a four-factor analysis for the Meramec Energy Center. There has been no indication that the shutdown of this facility will not occur as planned in the company's integrated resource plan, and no emissions are expected from this facility following its planned retirement at the end of 2022. It would be an extreme waste of resources to create an enforceable mechanism for this shutdown that has already been planned for years, and is fully expected to occur in the very near future.

- EPA suggests that Missouri mention that the Ameren Sioux Energy Center is operating the installed flue gas desulfurization (FGD) controls to meet requirements of the Mercury and Air Toxics Standard (MATS). Specifically, Sioux complies with MATS by meeting the 0.2 lbs/mmBtu SO<sub>2</sub> limit.

(Response) – The Air Program did mention the information about Sioux Energy Center’s FGD.

- Missouri discusses existing NO<sub>x</sub> controls at Ameren Labadie but does not explain what enforceable mechanism requires the operation of those controls or if they are necessary for reasonable progress. Specifically, Missouri should include in the SIP a reference to the enforceable requirements for Ameren to perform neural network optimization including how Missouri would know this system is being continuously operated. See “Clarification Memo” at p. 11-12; “Second Round Guidance” at p. 42. Additionally, Missouri should explain the monitoring, recordkeeping and reporting requirements for this control technology which ensure the requirement to operate the control is practically enforceable.

(Response) – This facility has continuously operated its NO<sub>x</sub> control equipment since its installation, and has continued to ensure its efficient optimization. The requirement in the Consent Agreement, while potentially redundant, provides an additional layer of certainty to ensure this practice continues. The Missouri Air Conservation Law provides not only civil but also criminal penalties where facility representative knowingly make false statements in compliance certification statements. Therefore, adding this requirement to the annual compliance certification as stipulated in the Consent Agreement provides even greater assurance that backsliding for this practice that has resulted in significant emission reductions at the facility will not occur.

- EPA is aware that Magnitude 7 Metals in New Madrid County was not selected due to limited operations and emissions during the baseline period used for source selection. Due to the recent increasing SO<sub>2</sub> emissions from Magnitude 7 Metals, EPA suggests Missouri consider analyzing Magnitude 7 Metals and whether the control strategy necessary for implementation of the 1-hour SO<sub>2</sub> national ambient air quality standard could also support the state’s regional haze SIP.

(Response) – As EPA alluded that during the source selection process for the four-factor analysis, Magnitude 7 Metals 2016 base year SO<sub>2</sub> emissions were 515 tons due to the closing of the facility. This amount of emissions did not make the facility’s contribution above the selection criteria for four-factor analysis. The facility resumed operations in the summer of 2018 with much higher SO<sub>2</sub> emissions, which violated the 2010 SO<sub>2</sub> NAAQS. The Air Program is now working with the facility to bring it into compliance with the NAAQS through a control strategy. Since the Air Program is still working with Magnitude 7 Metals to finalize their control strategy, it is unknown and premature to include the facility for a four-factor analysis in the second round Regional Haze SIP. Depending on the facility’s future emissions after implementation of the nonattainment

area SIP, the Air Program may include this facility for analysis in a future Regional Haze planning period.

- EPA encourages states to consider whether there may be impacts or additional benefits associated with control measures on areas with equity and environmental justice concerns when developing regional haze strategies for the second period.

(Response) – EPA introduced the EJ issue for Regional Haze to states in their memorandum titled Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period on July 8, 2021. By that time, most states including Missouri were in the final stages of completing their four-factor analyses. The EJ issue involves considering the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the proposed action. If so, the state should consider whether there may be disproportionately high and adverse human health or environmental effects on them. It also involves considering relevant public health data and industry data concerning the potential for multiple or cumulative exposure to human health or environmental hazards and recognizing the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action. Public and community participations in the process are also core parts of the EJ consideration.

The Air Program acknowledges that EJ is an important emerging regulatory initiative, and EPA is currently reviewing policies and procedures on how EJ will be incorporated into various regulatory programs and how that may impact states' activities. At this time, there is no direct requirement to incorporate an EJ analysis in the Regional Haze SIP for the second implementation period. Future Regional Haze submittals may take into account any future requirements established by EPA. Moreover, the Air Program notes that the consideration of EJ in this Regional Haze plan would likely place even more weight on non-air quality environmental impacts that may result from the new control technologies considered. For instance, dry-sorbent injection, which was among the most cost-effective control strategy for SO<sub>2</sub> at many of the sources analyzed will prevent the recycling of fly ash for productive purposes. In addition it significantly increases the amount of coal-ash produced and will likely necessitate the landfilling of all of it. This carries with it higher risk for land and drinking water contamination that could potentially be even more detrimental to communities struggling with EJ issues. The analysis needed to thoroughly and properly consider EJ issues in plans like this necessitates clearer requirements and guidance. The Air Program encourages EPA in its efforts to help provide the necessary regulatory certainty and guidance to properly address EJ issues in future plans. However, at this late stage in the development of the plan, and with the absence of any regulatory requirement or clear guidance from EPA, the Air Program is unequipped to provide a thorough EJ analysis in Missouri's Regional Haze SIP for the second planning period.

**Coalition to Protect America's National Parks, National Parks Conservation Association (NPCA), Sierra Club and the other ten undersigned organizations**

- The Air Program has proposed a Regional Haze Plan for the Second Planning Period that is significantly inadequate to decrease hundreds of thousands of tons of air pollution from Missouri's industrial sources, doing nothing to clear the air in our national parks, wilderness areas, and communities. The Air Program requires no new pollution reductions of major industrial pollution sources.
- They believe that if the Air Program was to make no changes to the Proposed RH SIP, it will not comply with the Federal Clean Air Act and EPA's Regional Haze Rule as it does nothing to limit haze-causing air pollution and fails to help restore naturally clean air.
- The pollutants at issue for the regional haze program are also harmful to public health. An analysis<sup>1</sup> by the Clean Air Task Force, using US EPA methodology, found that Ameren's four St. Louis-area coal plants were responsible for 300 premature deaths, 130 heart attacks and 3,207 asthma attacks; analysis from the same report found that the New Madrid power plant was responsible for 90 deaths and 939 asthma attacks per year.
- It is outrageous that the Air Program did not propose requiring emissions reductions from two plants that are at the NPCA's list of top 20 polluters in the country. The Air Program needs to review the nine power plants in Missouri for emission reductions and federally enforceable retirements of units at New Madrid, Labadie, Thomas Hill, Rush Island, Sikeston, and John Twitty plants.
- The Air Program needs to require emission controls for the power plants the state selected, as well as Sioux, Iatan, and the Meramec plants.
- The Air Program needs to require pollution reductions for the lime facility the Air Program selected as well as the five additional cement and smelting facilities the Air Program failed to review.
- The Air Program needs to correct the inflated costs for pollution control measures.

(Response to above bullets) – The Air Program followed EPA's Regional Haze Rule and the agency's guidance to develop the Regional Haze SIP for the second planning period. The Air Program selected sources for the four-factor analysis process based on a selection methodology that was generally endorsed by EPA and the Federal Land Managers (FLMs) during both the pre-consultation period and the formal consultation period. Based on the four-factor analyses, The Air Program determined that no new control technology installations were needed to make reasonable progress during the Regional Haze second planning period.

Although the analyses determined that no new control technology installations were needed, the Air Program did determine that new enforceable requirements were necessary to ensure that reasonable progress will be achieved during the second planning period. The six new Consent Agreements included in the long term strategy for this plan secure reductions that some of the largest emitters in the state have already achieved. In

addition, the new requirement for sources to run their existing control equipment continuously whenever they burn coal will result in true emission reductions. The Air Program anticipates that the requirement for two of the facilities to run their Selective Catalytic Reduction (SCR) continuously will result in approximately 17,000 tons of NO<sub>x</sub> reductions annually compared to actual emission levels in 2021. This will be at a projected cost of tens of millions of dollars per year. Therefore, while the plan does not require new control installations, the claim that this plan requires no new emission reductions is blatantly false. The emission reductions secured by this plan ensure that visibility in Class I areas in and outside Missouri will maintain or outpace the uniform rate of progress predicted by EPA's updated 2028 Regional Haze modeling.

The trend analysis included in this plan shows significant anticipated reductions in both NO<sub>x</sub> and SO<sub>2</sub> emissions. Additional emissions reductions will continue without additional new requirements due to the energy transition that is already underway. Further, while not enforceable, coal retirements are continuing at record pace due to economic and market forces. A newly announced retirement at the Rush Island Energy Center will secure thousands of additional tons of NO<sub>x</sub> and SO<sub>2</sub> emission reductions. In light of all of this, the Air Program is concluding in this plan, with a high degree of certainty, that the visibility goals in the second planning period will be achieved at all the Class I areas that are impacted by emissions from Missouri.

- Reconsider and establish a cost-effective monetary threshold for each ton of pollution reduction that is more in line with those selected by other states for reasonable progress.

(Response) – The Regional Haze Rule requires states to consider cost when determining controls necessary to make reasonable progress. However, neither the rule nor EPA's Regional Haze guidance document include any bright-line cost effectiveness threshold for states to use in making this consideration. Nor does the rule or guidance provide a prescriptive process for establishing cost effectiveness thresholds when considering control costs to organize and guide its decision-making. Therefore, states must develop their cost effectiveness thresholds and must provide a reasoned basis the threshold selected. Rather than selecting an arbitrary threshold such as \$5,000/ton, the Air Program evaluated control costs implemented in several other similar regulatory undertakings including the Cross-State Air Pollution Rule and the Best Available Retrofit Technology requirements from the first Regional Haze SIPs. The purpose was to ensure the Air Program could show a reasoned basis for the threshold used in the plan. Through this analysis, the Air Program established cost thresholds of \$3,658 for SO<sub>2</sub> and \$5,370 for NO<sub>x</sub>.

The Air Program also points out that the four statutory factors in the Clean Air Act and the Regional Haze Rule are all designed to balance the economic and non-air quality impacts that may be imposed on society when determining the requisite control requirements to make reasonable progress. Cost, time needed to install controls, non-air quality environmental impacts, and remaining useful life are the four factors the Clean Air Act mandates states to consider when determining which controls are necessary to make reasonable progress with respect to Regional Haze. Each of these factors are

designed to ensure that states do not impose controls that will have significant economic impacts or result in other environmental harms that are not justifiable tradeoffs when considering the goal of improved visibility in federal Class I areas.

The Air Program carefully considered all of these factors in determining the new enforceable requirements included with this plan. In light of the analysis, no new control technology installations were required. However, the Air Program did include new enforceable requirements for the six of the facilities to prevent against backsliding and secure the emission reductions that the facilities have already achieved in practice. Further, for two of the facilities, the new requirements will ensure the continuous operation of their state-of-the-art NO<sub>x</sub> control equipment year-round. This is at a cost of tens of millions of dollars per year and will achieve approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to actual emissions from these facilities in 2021. This will ensure that reasonable progress will continue to be made to the 2064 goal of natural visibility in all Federal Class I areas.

With regard to the analysis used to determine the appropriate cost effectiveness threshold for use in the plan, the figures the Air Program notes the following cost thresholds used in previous regulatory actions. In Missouri's original Regional Haze SIP, CenSARA states established a cost threshold of \$2,000/ton (approximately \$3,220 in 2021 dollars for both NO<sub>x</sub> and SO<sub>2</sub>). Under the original CSAPR, which EPA determined was better than BART, EPA established a cost effectiveness threshold of \$500 per ton NO<sub>x</sub><sup>9</sup> (approximately \$644 per ton 2021\$) for the annual and ozone season programs. In 2017, under the CSAPR Update Rule, EPA updated this number to \$1,400 per ton of NO<sub>x</sub><sup>10</sup> (about \$1,860 per tons 2021\$). The CSAPR annual SO<sub>2</sub> program cost effectiveness thresholds were \$2,300 per ton for Group 1 states, and \$500 per ton for Group 2 states (about \$3,056 and \$664 per ton 2021\$). Based on these figures, the values that Missouri selected are all higher than these values that have been approved and used in other regulatory programs, including CSAPR which is designed to protect for the NAAQS, as opposed to visibility in Class I areas.

There is no criteria set by EPA on the appropriateness of a lower range or upper range of the thresholds that states determine appropriate for use in their Regional Haze SIPs. Without a sound methodology or a universally accepted and applied methodology, states like Missouri, which are prohibited by statute from imposing requirements that are stricter than what the Clean Air Act requires, cannot just pick a higher threshold simply because it will result in the imposition of new controls. The cost effectiveness thresholds included in the proposed plan are both reasonable and consistent with the requirement to make reasonable progress. It would be helpful if EPA were to prescribe in regulation a pre-determined cost effectiveness threshold or a prescribed methodology for states to use when determining cost thresholds in future regional haze planning periods.

- Thoroughly assess the environmental justice impacts of the Proposed RH SIP.

<sup>9</sup> 76 FR 48250, August 8, 2011

<sup>10</sup> 81 FR 74551, October 26, 2016



(Response) – EPA introduced the EJ issue for Regional Haze to states in their memorandum titled Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period on July 8, 2021. By that time, most states including Missouri were in the final stages of completing their four-factor analyses. The EJ issue involves considering the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the proposed action. If so, the state should consider whether there may be disproportionately high and adverse human health or environmental effects on them. It also involves considering relevant public health data and industry data concerning the potential for multiple or cumulative exposure to human health or environmental hazards and recognizing the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action. Public and community participations in the process are also core parts of the EJ consideration.

The Air Program acknowledges that EJ is an important emerging regulatory initiative, and EPA is currently reviewing policies and procedures on how EJ will be incorporated into various regulatory programs and how that may impact states' activities. At this time, there is no direct requirement to incorporate an EJ analysis in the Regional Haze SIP for the second implementation period. Future Regional Haze submittals may take into account any future requirements established by EPA. Moreover, the Air Program notes that the consideration of EJ in this Regional Haze plan would likely place even more weight on non-air quality environmental impacts that may result from the new control technologies considered. For instance, dry-sorbent injection, which was among the most cost-effective control strategy for SO<sub>2</sub> at many of the sources analyzed will prevent the recycling of fly ash for productive purposes. In addition it significantly increases the amount of coal-ash produced and will likely necessitate the landfilling of all of it. This carries with it higher risk for land and drinking water contamination that could potentially be even more detrimental to communities struggling with EJ issues. The analysis needed to thoroughly and properly consider EJ issues in plans like this necessitates clearer requirements and guidance. The Air Program encourages EPA in its efforts to help provide the necessary regulatory certainty and guidance to properly address EJ issues in future plans. However, at this late stage in the development of the plan, and with the absence of any regulatory requirement or clear guidance from EPA, the Air Program is unequipped to provide a thorough EJ analysis in Missouri's Regional Haze SIP for the second planning period.

#### **U.S. Department of Agriculture – U.S. Forest service**

- The selection of low cost-effectiveness thresholds for control technologies.

(Response) – The Regional Haze Rule requires states to consider cost when determining controls necessary to make reasonable progress. However, neither the rule nor EPA's Regional Haze guidance document include any bright-line cost effectiveness threshold for states to use in making this consideration. Nor does the rule or guidance provide a prescriptive process for establishing cost effectiveness thresholds when considering

control costs to organize and guide its decision-making. Therefore, states must develop their cost effectiveness thresholds and must provide a reasoned basis the threshold selected. Rather than selecting an arbitrary threshold such as \$5,000/ton, the Air Program evaluated control costs implemented in several other similar regulatory undertakings including the Cross-State Air Pollution Rule and the Best Available Retrofit Technology requirements from the first Regional Haze SIPs. The purpose was to ensure the Air Program could show a reasoned basis for the threshold used in the plan. Through this analysis, the Air Program established cost thresholds of \$3,658 for SO<sub>2</sub> and \$5,370 for NO<sub>x</sub>.

The Air Program also points out that the four statutory factors in the Clean Air Act and the Regional Haze Rule are all designed to balance the economic and non-air quality impacts that may be imposed on society when determining the requisite control requirements to make reasonable progress. Cost, time needed to install controls, non-air quality environmental impacts, and remaining useful life are the four factors the Clean Air Act mandates states to consider when determining which controls are necessary to make reasonable progress with respect to Regional Haze. Each of these factors are designed to ensure that states do not impose controls that will have significant economic impacts or result in other environmental harms that are not justifiable tradeoffs when considering the goal of improved visibility in federal Class I areas.

The Air Program carefully considered all of these factors in determining the new enforceable requirements included with this plan. In light of the analysis, no new control technology installations were required. However, the Air Program did include new enforceable requirements for the six of the facilities to prevent against backsliding and secure the emission reductions that the facilities have already achieved in practice. Further, for two of the facilities, the new requirements will ensure the continuous operation of their state-of-the-art NO<sub>x</sub> control equipment year-round. This is at a cost of tens of millions of dollars per year and will achieve approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to actual emissions from these facilities in 2021. This will ensure that reasonable progress will continue to be made to the 2064 goal of natural visibility in all Federal Class I areas.

With regard to the analysis used to determine the appropriate cost effectiveness threshold for use in the plan, the figures the Air Program notes the following cost thresholds used in previous regulatory actions. In Missouri's original Regional Haze SIP, CenSARA states established a cost threshold of \$2,000/ton (approximately \$3,220 in 2021 dollars for both NO<sub>x</sub> and SO<sub>2</sub>). Under the original CSAPR, which EPA determined was better than BART, EPA established a cost effectiveness threshold of \$500 per ton NO<sub>x</sub><sup>11</sup> (approximately \$644 per ton 2021\$) for the annual and ozone season programs. In 2017, under the CSAPR Update Rule, EPA updated this number to \$1,400 per ton of NO<sub>x</sub><sup>12</sup> (about \$1,860 per tons 2021\$). The CSAPR annual SO<sub>2</sub> program cost effectiveness thresholds were \$2,300 per ton for Group 1 states, and \$500 per ton for Group 2 states (about \$3,056 and \$664 per ton 2021\$). Based on these figures, the values that Missouri

<sup>11</sup> 76 FR 48250, August 8, 2011

<sup>12</sup> 81 FR 74551, October 26, 2016

selected are all higher than these values that have been approved and used in other regulatory programs, including CSAPR which is designed to protect for the NAAQS, as opposed to visibility in Class I areas.

There is no criteria set by EPA on the appropriateness of a lower range or upper range of the thresholds that states determine appropriate for use in their Regional Haze SIPs. Without a sound methodology or a universally accepted and applied methodology, states like Missouri, which are prohibited by statute from imposing requirements that are stricter than what the Clean Air Act requires, cannot just pick a higher threshold simply because it will result in the imposition of new controls. The cost effectiveness thresholds included in the proposed plan are both reasonable and consistent with the requirement to make reasonable progress. It would be helpful if EPA were to prescribe in regulation a pre-determined cost effectiveness threshold or a prescribed methodology for states to use when determining cost thresholds in future regional haze planning periods.

- Unenforceable shutdown dates leaves many of these sources inefficiently controlled (this is related to remaining useful life).

(Response) – The Air Program updated the Regional Haze SIP following the formal consultation period for the proposed plan to address this comment and reflect EPA’s guidance regarding how states should consider remaining useful life in their analyses. The proposed plan included cost estimates assuming a 25-year useful life of the control equipment for the sources analyzed if no enforceable shutdown date was available. However, the Air Program also included cost analyses assuming more realistic remaining life assumptions for the sources analyzed. It would be indefensible to only include the 25-year control equipment life projections in the plan when in reality the Air Program knows that publicly available integrated resource plans show projected retirement dates only 5-15 years in the future. The Air Program notes that both the Clean Air Act statutory text and the EPA’s Regional Haze regulation mandate states to consider remaining useful life in four-factor analyses for reasonable progress. EPA’s guidance contradicts this mandate and injects new language that prevents consideration of remaining useful life unless there is an enforceable shutdown date for the source being analyzed. The Air Program has serious concerns about EPA’s use of unenforceable guidance and formal comments that direct states to contradict mandates in established laws and regulations. However, as a compromise to this issue, the proposed plan included both cost estimates for remaining life. Further, the Air Program notes that even with the unrealistic prolonged assumption of remaining life, none of the new control technology installations met the cost effectiveness thresholds established in the proposed plan.

- Power plants in the State of Missouri are among the highest emitters of SO<sub>2</sub> in the country and continued visibility progress at Hercules-Glades Wilderness Area and other nearby Class I areas is contingent on emission reductions and other efforts by the state.

(Response) – The Air Program followed EPA’s Regional Haze Rule and the agency’s guidance to develop the Regional Haze SIP for the second planning period. The Air Program selected sources for the four-factor analysis process based on a selection

methodology that was generally endorsed by EPA and the Federal Land Managers (FLMs) during both the pre-consultation period and the formal consultation period. Based on the four-factor analyses, The Air Program determined that no new control technology installations were needed to make reasonable progress during the Regional Haze second planning period.

Although the analyses determined that no new control technology installations were needed, the Air Program did determine that new enforceable requirements were necessary to ensure that reasonable progress will be achieved during the second planning period. The six new Consent Agreements included in the long term strategy for this plan secure reductions that some of the largest emitters in the state have already achieved. In addition, the new requirement for sources to run their existing control equipment continuously whenever they burn coal will result in true emission reductions. The Air Program anticipates that the requirement for two of the facilities to run their Selective Catalytic Reduction (SCR) continuously will result in approximately 17,000 tons of NO<sub>x</sub> reductions annually compared to actual emission levels in 2021. This will be at a projected cost of tens of millions of dollars per year. Therefore, while the plan does not require new control installations, the claim that this plan requires no new emission reductions is blatantly false. The emission reductions secured by this plan ensure that visibility in Class I areas in and outside Missouri will maintain or outpace the uniform rate of progress predicted by EPA's updated 2028 Regional Haze modeling.

The trend analysis included in this plan shows significant anticipated reductions in both NO<sub>x</sub> and SO<sub>2</sub> emissions. Additional emissions reductions will continue without additional new requirements due to the energy transition that is already underway. Further, while not enforceable, coal retirements are continuing at record pace due to economic and market forces. A newly announced retirement at the Rush Island Energy Center will secure thousands of additional tons of NO<sub>x</sub> and SO<sub>2</sub> emission reductions. In light of all of this, the Air Program is concluding in this plan, with a high degree of certainty, that the visibility goals in the second planning period will be achieved at all the Class I areas that are impacted by emissions from Missouri.

#### **Sierra Club and National Parks Conservation Association (Final Comment Letter)**

- Sierra Club and NPCA commented that the Air Program's proposed SIP is inconsistent with the Clean Air Act and the Regional Haze Rule. The SIP fails to meet the requirements of the Clean Air Act, the Regional Haze Rule, and EPA's guidance documents and other materials designed to aid states in complying with the law.

(Response) – The Air Program followed EPA's guidance to develop the Regional Haze SIP for the second planning period.

- Sierra Club and NPCA commented that the Air Program's source-screening method was under inclusive. The Regional Haze rule requires Missouri to conduct a comprehensive analysis of in-state and out-of-state pollution sources so that they can be evaluated for appropriate control measures to achieve visibility impairment goals. Missouri can

accomplish this by creating contribution thresholds capturing a broader array of sources that contribute to a meaningful portion of visibility impairment.

- Sierra Club and NPCA commented that Missouri should use the ensemble mode with its back-trajectory modeling analysis. The Air Program's SIP visibility modeling relied on an "area of influence" analysis by computing back-trajectories developed by Ramboll on behalf of Central States Air Resource Agencies (CENSARA) using the Hybrid-Single Particle Lagrangian Integrated Trajectory ("HYSPLIT") model. The Air Program inappropriately relied upon the inputs and settings used in creating HYSPLIT modeling results when undertaking the analysis for its Regional Haze SIP. A better approach often used by other researchers who apply HYSPLIT would be to compute back-trajectories using the "ensemble mode," which calculates back-trajectories using a 3x3x3 array of grid cells surrounding the IMPROVE monitor location. Additionally, the ensemble mode better accounts for Class I areas that are larger than the size of an individual grid cell as is the case with Mingo and Hercules Glades.
- Sierra Club and NPCA commented that the use of extinction-weighted residence time does not account for sources with infrequent but severe impacts. Residence time is the time that a particular back-trajectory from a Class I area spent in the grid cell containing the individual emission source of interest. The Air Program's area of influence analysis used a residence time weighted by the extinction coefficient of sulfate and nitrate. This is an inappropriate way to identify whether a source contributes to visibility impairment. Sources that affect a Class I area on only a few of the 20% most-impaired days, but have a serious impact on those days, can be overlooked when using this method.
- Sierra Club and NPCA commented that Missouri's emissions inventory does not account for yearly variability. Haze-causing pollutant emissions vary from year to year. Relying on data from one year, as the Air Program did by selecting 2016, runs the risk of distorting the data based on an unusual yearly situation. By using annual average emissions, the Air Program likely underestimated the visibility impairment from one or more sources. The Air Program must account for the day-to-day emissions variability.
- Sierra Club and NPCA commented that Missouri's high NO<sub>x</sub> and low SO<sub>2</sub> sources were overlooked and omitted from consideration. The Air Program's visibility analysis was under-inclusive because it only considered the cumulative effect of NO<sub>x</sub> and SO<sub>2</sub> emissions from each source. This approach is improper because any individual source most likely contributes to visibility impairment through NO<sub>x</sub> or SO<sub>2</sub> effects, not both. Missouri must consider these large NO<sub>x</sub> sources for inclusion in the four-factor analysis.
- Sierra Club and NPCA commented that the Air Program's use of the 1% threshold is flawed. To select sources for Four-Factor analysis, Missouri used extinction-weighted residence times (EWRT) values weighted by emissions directly (Q) and the emissions over distance ratio (Q/D) to select sources contributing at least 1% of the total point source contribution. This flawed approach is under-inclusive and completely arbitrary. The Air Program's threshold being based on a weighted percent contribution necessarily understates the impact sources have on hazier Class I areas and potentially overstates

Class I areas that are less hazy. If Missouri insists on a percentage threshold, 0.3% is more inclusive and consistent with the practices of other CENSARA states.

(Response to above bullets) – Our source selection methodology, which utilized Ramboll’s EWRT database, was reviewed by EPA and FLMs during the 60-day formal consultation. Before that, during the informal consultation period, the Air Program demonstrated the source selection methodology using 2016 annual emissions to both EPA and the FLMs. EPA was supportive of the methodology and the number of Missouri sources selected; however the agency encouraged the Air Program to consider one additional source identified by the FLMs (Ameren Sioux). The USFS stated “Our overriding concern is that a sufficient number of sources is selected. In this case, Missouri has selected an appropriate number of sources that account for a large portion of the impacts at USFS Class I areas.” Though the National Park Service were critical about the one percent contribution approach to source selection, they stated that they were mostly satisfied with the resulting list of sources selected for four-factor analysis in the plan.

The Air Program understands the points raised by the commenter; however, it is important to note the resource constraint to select a higher number of sources for analysis. The Air Program evaluated numerous different selection methods for use in the proposed plan, and conferred with EPA and the FLMs to determine the appropriateness of the selection method, and the group of sources to be analyzed in the proposed plan. The Air Program acknowledges that this process could be improved and sees benefit in analyzing the maximum number of sources as practicable. The Air Program notes that Missouri and many other states spent significant effort on determining the appropriate selection method due to the lack of EPA guidance and regulatory criteria on this important consideration. In future Regional Haze planning periods, the Air Program recommends that EPA provide guidance or prescribed regulatory processes on how the selection criteria be applied. This will help ensure that states are operating under a consistent requirement when making this important determination.

- Sierra Club and NPCA commented that specific sources must be subject to four-factor analysis. More than six Missouri sources were wrongly excluded from four-factor analysis: Sioux Energy Center, Buzzi Unicem USA – Cape Girardeau, Meramec Energy Center, Iatan Power Plant, Magnitude 7 Metals Aluminum Smelter, and multiple high NO<sub>x</sub> gas pipeline compressors. Missouri excluded these sources for reasons such as planned retirements and consent decrees that are not included in the SIP. References to two specific documents that provide applicable information that the Air Program can use to review and consider in preparing four-factor analysis were provided: “Oil and Gas Sector Reasonable Progress Four-Factor Analysis of Controls for Five Source Categories: Natural Gas-Fired Turbines, Diesel-Fired Engines, Natural Gas-Fired Heaters and Boilers, Flaring and Incineration” (March 6, 2020) and “Assessment of Cost Effectiveness Analyses for Controls Evaluated Four – Factor Analyses for Oil and Gas Facilities For the New Mexico Environment Department’s Regional Haze Plan for the Second Implementation Period”, (July 2, 2020). Missouri must reevaluate these sources.

(Response) – As stated in previous responses, the Air Program presented the source selection methodology to both EPA and the FLMs during the informal consultation period. Both EPA and the FLMs mostly agreed with the sources the Air Program selected for the four-factor analysis. Sioux Energy Center, Buzzi Unicem USA, Iatan Power Plant, Magnitude 7 Metals Aluminum Smelter, and multiple high NO<sub>x</sub> gas pipeline compressors did not meet the selection criteria to be included in the four-factor analysis.

Initially, the Air Program selected Ameren – Meramec Energy Center for the four-factor analysis based on their 2016 emission data. Regardless of the fact that the facility voluntarily switched from burning coal to natural gas in two of its boilers, emissions data from 2017 to 2021 do not qualify it to undergo a four-factor analysis. In order to conduct a four-factor analysis, there is a need to obtain representative emissions data. The Air Program believes that emissions from 2017 to 2021 are now more representative than 2016 emissions data. Therefore, the Air Program is not requiring a four-factor analysis for the Meramec Energy Center. There has been no indication that the shutdown of this facility will not occur as planned in the company's integrated resource plan, and no emissions are expected from this facility following its planned retirement at the end of 2022. It would be an extreme waste of resources to create an enforceable mechanism for this shutdown that has already been planned for years, and is fully expected to occur in the very near future.

Buzzi Unicem provided updated 2018 and 2019 emissions that were well below their 2016 emissions. They also demonstrated that the reductions were due to an enforceable consent decree that they entered into in 2017. The Air Program reevaluated Buzzi's percent contribution to visibility impairment at Hercules-Glades and Mingo and found it to be less than one percent. Therefore, the Air Program removed Buzzi from the list of facilities to evaluate using the four-factor analysis.

During the source selection process for the four-factor analysis, Magnitude 7 Metals' 2016 base year SO<sub>2</sub> emissions were 515 tons due to the closing of the facility. The facility's emissions did not warrant inclusion for a four-factor analysis based on the source selection criteria included in the plan. The facility resumed operation in the summer of 2018 with much higher SO<sub>2</sub> emissions, which violated the NAAQS. The Air Program is now working with the facility to bring it into compliance with the NAAQS through a control strategy. Since the Air Program is still working with Magnitude 7 Metals to finalize their control strategy, it is unknown and premature to include the facility for a four-factor analysis in the second round Regional Haze SIP. Depending on the facility's future emissions after implementation of the nonattainment area SIP, the Air Program may include this facility for analysis in a future Regional Haze planning period.

- Sierra Club and NPCA commented that the Air Program's four-factor analysis excluded controls from some of the nation's largest haze pollution sources citing cost effectiveness. These sources include: Labadie Energy Center, Rush Island Energy Center, New Madrid, Thomas Hill, Sikeston, John Twitty, and Mississippi Lime. Missouri is second only to Texas in its SO<sub>2</sub> and NO<sub>x</sub> emissions, emitting approximately 90,000 and 50,000 tons per year respectively. The Air Program's methodology was flawed and must

be reconsidered.

(Response) – The Air Program followed EPA’s Regional Haze Rule and the agency’s guidance to develop the Regional Haze SIP for the second planning period. The Air Program selected sources for the four-factor analysis process based on a selection methodology that was generally endorsed by EPA and the Federal Land Managers (FLMs) during both the pre-consultation period and the formal consultation period. Based on the four-factor analyses, The Air Program determined that no new control technology installations were needed to make reasonable progress during the Regional Haze second planning period.

Although the analyses determined that no new control technology installations were needed, the Air Program did determine that new enforceable requirements were necessary to ensure that reasonable progress will be achieved during the second planning period. The six new Consent Agreements included in the long term strategy for this plan secure reductions that some of the largest emitters in the state have already achieved. In addition, the new requirement for sources to run their existing control equipment continuously whenever they burn coal will result in true emission reductions. The Air Program anticipates that the requirement for two of the facilities to run their Selective Catalytic Reduction (SCR) continuously will result in approximately 17,000 tons of NO<sub>x</sub> reductions annually compared to actual emission levels in 2021. This will be at a projected cost of tens of millions of dollars per year. Therefore, while the plan does not require new control installations, the claim that this plan requires no new emission reductions is blatantly false. The emission reductions secured by this plan ensure that visibility in Class I areas in and outside Missouri will maintain or outpace the uniform rate of progress predicted by EPA’s updated 2028 Regional Haze modeling.

The trend analysis included in this plan shows significant anticipated reductions in both NO<sub>x</sub> and SO<sub>2</sub> emissions. Additional emissions reductions will continue without additional new requirements due to the energy transition that is already underway. Further, while not enforceable, coal retirements are continuing at record pace due to economic and market forces. A newly announced retirement at the Rush Island Energy Center will secure thousands of additional tons of NO<sub>x</sub> and SO<sub>2</sub> emission reductions. In light of all of this, the Air Program is concluding in this plan, with a high degree of certainty, that the visibility goals in the second planning period will be achieved at all the Class I areas that are impacted by emissions from Missouri.

- Sierra Club and NPCA commented that the Air Program’s cost estimates were unreasonably high. The Air Program chose inputs that would make the installation of controls appear more expensive. The Air Program used inaccurate removal efficiencies, unsupported high retrofit factors, and other values to ensure that no source would have to install add-on controls. The Air Program toggles between default and site-specific inputs to its cost effectiveness calculations without justification, making it appear that the data inputs were selected simply to increase the cost of controls.

(Response) – The Air program utilized and followed the control cost manual to estimate



control costs for all sources selected for the four-factor analysis. The Air Program utilized source specific inputs as the first choice. If there was no source specific inputs, the Air Program used default inputs provided in the control cost manual. The Air program updated some default inputs in the control cost manual based on submitted source-specific data. Specifically, the Air Program updated the chemical engineering plant cost index based on the August and September 2021 value, and notes that this value has continued to increase since this plan was proposed. In addition, upon further review, and in response to this comment, the Air Program updated the proposed Regional Haze SIP control cost estimation to include a default value of auxiliary power cost of \$0.681/kWh for sources that did not provide source specific data, which is based on the U.S. Energy Information Administration's 2020 Electric Power Annual report, which was revised in March 2022. Previously, the Air Program used \$0.06/kWh based on IPM default value provided in the DSI control cost spreadsheet. The Air Program also used \$0.0361/kWh previously, which is a default value in other spreadsheets for other control equipment.

The Air Program used all removal efficiencies based on the control cost manual. All facilities that used retrofit factor greater than one have provided documentations to justify and substantiate its use.

- Sierra Club and NPCA commented that the Air Program's cost effectiveness threshold was too low. The Regional Haze Rule requires Missouri to explain the basis and provide a reasoned explanation for any bright-line thresholds or requirements used to eliminate control measures. Missouri's cost-threshold is too low because it erroneously relied on cost estimates from the first round of Regional Haze State Implementation Plans (SIPs), which were simply converted into 2021 dollars. EPA has stated that it is not appropriate to use first round figures to conduct the second round's cost-effectiveness assessment.

(Response) – The Regional Haze Rule requires states to consider cost when determining controls necessary to make reasonable progress. However, neither the rule nor EPA's Regional Haze guidance document include any bright-line cost effectiveness threshold for states to use in making this consideration. Nor does the rule or guidance provide a prescriptive process for establishing cost effectiveness thresholds when considering control costs to organize and guide its decision-making. Therefore, states must develop their cost effectiveness thresholds and must provide a reasoned basis the threshold selected. Rather than selecting an arbitrary threshold such as \$5,000/ton, the Air Program evaluated control costs implemented in several other similar regulatory undertakings including the Cross-State Air Pollution Rule and the Best Available Retrofit Technology requirements from the first Regional Haze SIPs. The purpose was to ensure the Air Program could show a reasoned basis for the threshold used in the plan. Through this analysis, the Air Program established cost thresholds of \$3,658 for SO<sub>2</sub> and \$5,370 for NO<sub>x</sub>.

The Air Program also points out that the four statutory factors in the Clean Air Act and the Regional Haze Rule are all designed to balance the economic and non-air quality impacts that may be imposed on society when determining the requisite control requirements to make reasonable progress. Cost, time needed to install controls, non-air

quality environmental impacts, and remaining useful life are the four factors the Clean Air Act mandates states to consider when determining which controls are necessary to make reasonable progress with respect to Regional Haze. Each of these factors are designed to ensure that states do not impose controls that will have significant economic impacts or result in other environmental harms that are not justifiable tradeoffs when considering the goal of improved visibility in federal Class I areas.

The Air Program carefully considered all of these factors in determining the new enforceable requirements included with this plan. In light of the analysis, no new control technology installations were required. However, the Air Program did include new enforceable requirements for the six of the facilities to prevent against backsliding and secure the emission reductions that the facilities have already achieved in practice. Further, for two of the facilities, the new requirements will ensure the continuous operation of their state-of-the-art NO<sub>x</sub> control equipment year-round. This is at a cost of tens of millions of dollars per year and will achieve approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to actual emissions from these facilities in 2021. This will ensure that reasonable progress will continue to be made to the 2064 goal of natural visibility in all Federal Class I areas.

With regard to the analysis used to determine the appropriate cost effectiveness threshold for use in the plan, the figures the Air Program notes the following cost thresholds used in previous regulatory actions. In Missouri's original Regional Haze SIP, CenSARA states established a cost threshold of \$2,000/ton (approximately \$3,220 in 2021 dollars for both NO<sub>x</sub> and SO<sub>2</sub>). Under the original CSAPR, which EPA determined was better than BART, EPA established a cost effectiveness threshold of \$500 per ton NO<sub>x</sub><sup>13</sup> (approximately \$644 per ton 2021\$) for the annual and ozone season programs. In 2017, under the CSAPR Update Rule, EPA updated this number to \$1,400 per ton of NO<sub>x</sub><sup>14</sup> (about \$1,860 per tons 2021\$). The CSAPR annual SO<sub>2</sub> program cost effectiveness thresholds were \$2,300 per ton for Group 1 states, and \$500 per ton for Group 2 states (about \$3,056 and \$664 per ton 2021\$). Based on these figures, the values that Missouri selected are all higher than these values that have been approved and used in other regulatory programs, including CSAPR which is designed to protect for the NAAQS, as opposed to visibility in Class I areas.

There is no criteria set by EPA on the appropriateness of a lower range or upper range of the thresholds that states determine appropriate for use in their Regional Haze SIPs. Without a sound methodology or a universally accepted and applied methodology, states like Missouri, which are prohibited by statute from imposing requirements that are stricter than what the Clean Air Act requires, cannot just pick a higher threshold simply because it will result in the imposition of new controls. The cost effectiveness thresholds included in the proposed plan are both reasonable and consistent with the requirement to make reasonable progress. It would be helpful if EPA were to prescribe in regulation a pre-determined cost effectiveness threshold or a prescribed methodology for states to use when determining cost thresholds in future regional haze planning periods.

<sup>13</sup> 76 FR 48250, August 8, 2011

<sup>14</sup> 81 FR 74551, October 26, 2016

- Sierra Club and NPCA commented that the Air Program overlooked cost-effective controls at sources. The Air Program failed to recognize the lower costs for rehabilitating and restarting existing emissions control equipment. Examples include equipment at Sikeston Power Plant, Thomas Hill, New Madrid, and John Twitty.

(Response) – All of New Madrid Power Plant and Thomas Hill Energy Center boilers currently operate SCR systems with a control efficiency up to 90. Both facilities do not operate the SCRs all the time when they burn coal due to economic decisions that dictate whether to run their SCRs or to purchase allowances to comply with the CSAPR requirements. The Air Program conducted control cost estimates at different efficiencies scenarios for these existing SCRs. As part of this SIP revision, the Air Program, New Madrid Power Plant and Thomas Hill Energy Center signed consent agreements (see Appendix E) that require the two facilities to run their SCRs and all other control equipment at all times when burning coal except during periods of start-up, shutdown, or malfunction pursuant to 10 CSR 10-6.050. This is anticipated to cost tens of millions of dollars per year and reduce NO<sub>x</sub> emissions approximately 17,000 tons per year compared to 2021 actual emission levels.

Thomas Hill's Unit 3 has a wet scrubber that has been mothballed for decades. It was added back in 1982 when the plant was constructed to reduce sulfur from the high sulfur Missouri coal the facility was burning at the time. They quit using it when the Acid Rain Program came into effect in 1994-95. To comply with this requirement, the facility switched to low sulfur coal and ceased operation of the scrubber. According to the facility, the existing scrubber is in such a state that restarting it is not an option. For this control technology to be feasible at this unit, the mothballed scrubber would need to be demolished and a new scrubber installed. In addition, the life of the wet scrubber is well passed its estimated useful life of 30 years according to the control cost manual since it started operating in 1982.

Both boilers at John Twitty Energy Center currently operate SCR systems with a control efficiency of 70 to 75 percent for B1 and 80 to 85 percent for B2 and both are considered Best Achievable Control Technology (BACT). Although John Twitty Energy Center boiler 1 has consistently ran their SCR control device, the potential currently exists for them to alter or curtail the operation of the SCR on boiler 1 while remaining in compliance with their regulatory requirements. Therefore, as part of the second round Regional Haze SIP, the Air Program and John Twitty Energy Center have entered into an enforceable consent agreement (see Appendix E) that requires the facility to run boiler 1's SCR at all times when burning coal except during periods of start-up, shutdown, or malfunction pursuant to 10 CSR 10-6.050.

The wet scrubber at Sikeston has also been mothballed for decades. In 2011, Sikeston contracted a consultant on the feasibility of restarting their wet scrubber system and it was estimated to cost of over 22 million dollars to restart 2 of the 3 modules. The feasibility study did not include the possible impacts of the later Coal Combustion Residuals (CCR) and the Effluent Limitation Guidelines rules in evaluating a possible

restart of this system, which with an advanced wastewater treatment system could add an additional 35 million dollars. In addition, the life of the wet scrubber has passed its estimated useful life of 30 years according to the control cost manual since it started operating in 1981.

- Sierra Club and NPCA commented that the Air Program relied on Consent Agreements that do not satisfy the Regional Haze Rule and failed to optimize controls at sources that had them. The Consent Agreements are so vague that they do not satisfy the Regional Haze Rule. The Air Program must incorporate actual emissions limitations in the Consent Agreements, and thus into the SIP. To comply with the federal rule and Clean Air Act, the Air Program must revise the Consent Agreements for these sources to include actual numeric, enforceable emissions limitations that optimize and stabilize the controls' removal efficiencies based on the four-factor analyses. The Air Program's failure to include numerical emission limitations for numerous sources and provide the public an opportunity to comment on enforceable emission limitations does not meet SIP requirements.

(Response) – The Air Program carefully crafted the Consent Agreements in the proposed plan to ensure the enforceability of the intention of the control requirements. The Consent Agreements include enforceable requirements that will help prevent backsliding at all sources that entered into them. Further, the requirements for some sources will mandate continuous operation of effective control equipment, where this has not consistently been the case, and will result in approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to 2021 actual emission levels. While the Air Program acknowledges that there will always be some degree of variability with sulfur content of coal and the efficiency of any control device, the goal for the requirements is to secure the already-achieved emission reductions for facilities that have continuously operated their control technology and to compel the achievement of new emission reductions where operation of control technologies has not been as consistent. With the monitoring, record keeping, and reporting requirements included in the Consent Agreements, the Air Program will have the data necessary to determine whether violations of the new requirements are occurring. The sulfur content of the coal purchases and the type of coal purchased must be made readily available to Air Program inspectors. Further, the SCR operating hours must not only be reported under strong penalty for false certification. The Air Program is confident that the NO<sub>x</sub> emission rates will provide the evidence needed to determine whether the facilities are complying the requirement to continuously run their controls as this control technology typically achieves approximately 85-90 percent control efficiency. Therefore, a simple review of the emission rates from the facility's continuous emission monitoring systems measurements will provide the data necessary to determine compliance with the new requirements.

- Sierra Club and NPCA commented that the Uniform Rate of Progress is not a safe harbor and is not a metric to be considered when deciding whether cost-effective controls are needed. Yet, the Air Program relied on the Uniform Rate of Progress in considering the Missouri contributions to seven out-of-state Class I areas. The Air Program also uses visibility as an additional factor in its four-factor analysis and uses it as a reason to reject

controls. The Clean Air Act and the Regional Haze Rule specify that only the four factors are to be considered in evaluating the controls necessary for reasonable progress. Because the Air Program's conclusions rest on information outside the bounds of these factors, such as visibility and air quality, they are inconsistent with the legal requirements to consider only the four factors.

(Response) – The Air Program did not rely on the Uniform Rate of Progress in considering the Missouri contributions to seven out-of-state Class I areas. The Air Program understands that the Uniform Rate of Progress is not a safe harbor and the Air Program only listed the information for Class I areas outside of Missouri for informational purposes. Also, the Air Program did not use visibility as an additional factor in its four-factor analysis and did not use it as a reason to reject controls.

- Sierra Club and NPCA commented that Missouri failed to consult meaningfully with other states and Federal Land Managers (FLMs). Missouri's consultations fail to establish adequate coordinated emission management strategies. In multiple instances, Missouri fails to show that, as part of its consultations, the state discussed which sources should or should not be controlled. With the FLMs, the Air Program has admittedly made changes to its proposed SIP based on some of those FLM comments, but there are other comments that it has not fully addressed. Overall, Missouri must provide more substantive information about its consultations and state it clearly in the SIP.

(Response) – States and Regional Planning Organizations (Arkansas, CenSARA, MANE-VU and VISTAS) with Class I areas affected by pollution sources in Missouri have asked the Air Program to conduct four-factor analyses for Ameren Missouri - Labadie, Ameren Missouri -Rush Island, New Madrid Power Plant, City Utilities of Springfield - John Twitty Energy Center, and Thomas Hill Energy Center. In addition, the Air Program requested states (Arkansas, Illinois, Indiana, Kentucky, Oklahoma, Tennessee, and Texas) with sources affecting the two Class I areas in Missouri to conduct four-factor analyses for them. These requests are aimed to ask these states to consider control strategies to control the sources. The responses from most states indicated that they conducted the requested four factor analyses, thus satisfying Missouri's request of these states. For all states, regional planning organizations, and FLMs that submitted requests to Missouri, the Air Program considered and either obliged or documented the reason for not granting the request in Appendix G of the proposed SIP. Therefore, the Air Program fulfilled the Regional Haze requirements with respect to both FLM and state-to-state consultation.

- Sierra Club and NPCA commented that Missouri must analyze the EJ impacts of its Regional Haze SIP. EPA has made it a priority to consider the effects of environmental pollution on minority and low-income communities, and it will consider these issues in its review of the Missouri SIP. The Air Program failed to mention the topic in the proposed SIP, and did not engage with the issues in a serious manner. Missouri must reconsider impacts on Missouri's vulnerable communities. By failing to require any additional controls, the Air Program assures that these communities continue to bear a disproportionate share of harmful pollutants and continue to experience disproportionate

health outcomes.

(Response) – EPA introduced the EJ issue for Regional Haze to states in their memorandum titled Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period on July 8, 2021. By that time, most states including Missouri were in the final stages of completing their four-factor analyses. The EJ issue involves considering the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the proposed action. If so, the state should consider whether there may be disproportionately high and adverse human health or environmental effects on them. It also involves considering relevant public health data and industry data concerning the potential for multiple or cumulative exposure to human health or environmental hazards and recognizing the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action. Public and community participations in the process are also core parts of the EJ consideration.

The Air Program acknowledges that EJ is an important emerging regulatory initiative, and EPA is currently reviewing policies and procedures on how EJ will be incorporated into various regulatory programs and how that may impact states' activities. At this time, there is no direct requirement to incorporate an EJ analysis in the Regional Haze SIP for the second implementation period. Future Regional Haze submittals may take into account any future requirements established by EPA. Moreover, the Air Program notes that the consideration of EJ in this Regional Haze plan would likely place even more weight on non-air quality environmental impacts that may result from the new control technologies considered. For instance, dry-sorbent injection, which was among the most cost-effective control strategy for SO<sub>2</sub> at many of the sources analyzed will prevent the recycling of fly ash for productive purposes. In addition it significantly increases the amount of coal-ash produced and will likely necessitate the landfilling of all of it. This carries with it higher risk for land and drinking water contamination that could potentially be even more detrimental to communities struggling with EJ issues. The analysis needed to thoroughly and properly consider EJ issues in plans like this necessitates clearer requirements and guidance. The Air Program encourages EPA in its efforts to help provide the necessary regulatory certainty and guidance to properly address EJ issues in future plans. However, at this late stage in the development of the plan, and with the absence of any regulatory requirement or clear guidance from EPA, the Air Program is unequipped to provide a thorough EJ analysis in Missouri's Regional Haze SIP for the second planning period.

### **Sierra Club (Residential and Commercial NO<sub>x</sub> Sources)**

- Sierra Club commented that Missouri must address a significant and growing source of NO<sub>x</sub> emissions in its regional haze plan from combustion sources in residential and commercial buildings. In Missouri, residential emissions rose over 25% from 4,000 tons to more than 5,000 tons from 2017 to 2019. Similarly, fuel usage in the commercial sector, and therefore emissions, has also risen between 2017 and 2019, by 17%.

Combined, NO<sub>x</sub> emissions from residential and commercial natural gas combustion in Missouri are over 8,000 tons per year based on 2017 data, making this source category the third largest source of stationary NO<sub>x</sub> emissions in Missouri behind coal-fired EGUs and cement manufacturing. This growth in residential and commercial natural gas combustion presents a need for the state to address emissions from this source of NO<sub>x</sub> emissions.

- Sierra Club commented that state and local regulations and incentive programs offer examples for achieving NO<sub>x</sub> emissions reductions from natural gas combustion sources in buildings. California Air District rules provide several examples of stringent NO<sub>x</sub> emission limitations for units sized for residential and commercial use in buildings. These state and local rules apply to the smallest of boilers and water heaters at the point-of-sale, including, e.g., tank-type and instantaneous water heaters; pool/spa heaters; heaters used for baking/cooking, etc. These air agencies are requiring NO<sub>x</sub> emission rates that would reduce emissions up to 80% from uncontrolled emission rates. Missouri should consider addressing this growing and significant source of NO<sub>x</sub> emissions through rules and programs similar to those discussed.

(Response to the above two comments) – The Air Program followed EPA’s Regional Haze Rule and corresponding guidance in developing a source selection methodology. The area source category of residential and commercial natural gas combustion was not selected for evaluation in this planning period. The Air Program notes that due to the significant number of sources contributing to these emissions, source-by-source four-factor analyses would not be feasible. These emissions would be much more efficiently addressed through national new source performance standards for appliances and other small sources that combust natural gas as their fuel. These types of requirements are beyond the authority of the Air Program and thus not considered in this Regional Haze plan for the second planning period.

**Attachment 1. D. Howard Gebhart, “Technical review of Visibility Modeling for the Second Round of Regional Haze State Implementation Plans: State of Missouri (May 2022).**

- In the draft SIP proposed by Missouri, only seven in-state emission sources were identified for the four-factor emissions control analysis. The Air Program’s intent to limit the number of emission units subject to the four-factor analysis is based on resource constraints. The Air Program would have captured more sources if it had established its contribution thresholds to capture a broader grouping of sources. Missouri’s second-round visibility modeling addressed visibility impacts by only considering the cumulative effect of NO<sub>x</sub> and SO<sub>2</sub> emissions. The thresholds for selecting contributing sources erred by not looking at NO<sub>x</sub> and SO<sub>2</sub> emissions individually in addition to the combined NO<sub>x</sub> and SO<sub>2</sub> effects.
- The HYSPLIT modeling should have used “ensemble mode” that would have provided for more robust back-trajectory statistics, especially for more distant emission sources. By computing back-trajectories only for the IMPROVE monitor location, the CENSARA HYSPLIT modeling missed potential conditions where a source may adversely impact

visibility in Class I grid cells without an IMPROVE monitor.

- The Missouri second-round visibility SIP modeling applied an emissions inventory created for 2016. However, it has not been demonstrated that the 2016 emissions were appropriately representative of normal operating conditions for emission sources across the modeling domain. The 2016 emissions inventory was also faulty in that it used the annual emissions instead of hourly emission from CEMS.
- The Air Program indicated that EWRT with a 0.05 percent selection criteria was used as the initial screen to identify emission sources. One significant issue with this criteria is that only facilities meeting the EWRT threshold for both SO<sub>4</sub> and NO<sub>3</sub> survived the initial cut. However, if a given emissions source had the potential to adversely impact visibility based on either the NO<sub>3</sub> or SO<sub>4</sub> impacts, that source needed to be carried forward for further analysis.
- The screening thresholds should have been set to be more inclusive with the goal of capturing a majority of the emission sources contributing to visibility impairment. For example, the cumulative impact threshold could have been set at 0.3 percent and not one percent.

(Response) – Our source selection methodology, which utilized Ramboll’s EWRT database, was reviewed by EPA and FLMs during the 60-day formal consultation. Before that, during the informal consultation period, the Air Program demonstrated the source selection methodology using 2016 annual emissions to both EPA and the FLMs. EPA was supportive of the methodology and the number of Missouri sources selected; however the agency encouraged the Air Program to consider one additional source identified by the FLMs (Ameren Sioux). The USFS stated “Our overriding concern is that a sufficient number of sources is selected. In this case, Missouri has selected an appropriate number of sources that account for a large portion of the impacts at USFS Class I areas.” Though the National Park Service were critical about the one percent contribution approach to source selection, they stated that they were mostly satisfied with the resulting list of sources selected for four-factor analysis in the plan.

The Air Program understands the points raised by the commenter; however, it is important to note the resource constraint to select a higher number of sources for analysis. The Air Program evaluated numerous different selection methods for use in the proposed plan, and conferred with EPA and the FLMs to determine the appropriateness of the selection method, and the group of sources to be analyzed in the proposed plan. The Air Program acknowledges that this process could be improved and sees benefit in analyzing the maximum number of sources as practicable. The Air Program notes that Missouri and many other states spent significant effort on determining the appropriate selection method due to the lack of EPA guidance and regulatory criteria on this important consideration. In future Regional Haze planning periods, the Air Program recommends that EPA provide guidance or prescribed regulatory processes on how the selection criteria be applied. This will help ensure that states are operating under a consistent requirement when making this important determination.

- The control cost-effectiveness threshold (\$3,528/ton) selected by Missouri was too low and resulted in cost-effective emission controls being excluded from adoption via the



four-factor analysis.

(Response) – The Regional Haze Rule requires states to consider cost when determining controls necessary to make reasonable progress. However, neither the rule nor EPA’s Regional Haze guidance document include any bright-line cost effectiveness threshold for states to use in making this consideration. Nor does the rule or guidance provide a prescriptive process for establishing cost effectiveness thresholds when considering control costs to organize and guide its decision-making. Therefore, states must develop their cost effectiveness thresholds and must provide a reasoned basis the threshold selected. Rather than selecting an arbitrary threshold such as \$5,000/ton, the Air Program evaluated control costs implemented in several other similar regulatory undertakings including the Cross-State Air Pollution Rule and the Best Available Retrofit Technology requirements from the first Regional Haze SIPs. The purpose was to ensure the Air Program could show a reasoned basis for the threshold used in the plan. Through this analysis, the Air Program established cost thresholds of \$3,658 for SO<sub>2</sub> and \$5,370 for NO<sub>x</sub>.

The Air Program also points out that the four statutory factors in the Clean Air Act and the Regional Haze Rule are all designed to balance the economic and non-air quality impacts that may be imposed on society when determining the requisite control requirements to make reasonable progress. Cost, time needed to install controls, non-air quality environmental impacts, and remaining useful life are the four factors the Clean Air Act mandates states to consider when determining which controls are necessary to make reasonable progress with respect to Regional Haze. Each of these factors are designed to ensure that states do not impose controls that will have significant economic impacts or result in other environmental harms that are not justifiable tradeoffs when considering the goal of improved visibility in federal Class I areas.

The Air Program carefully considered all of these factors in determining the new enforceable requirements included with this plan. In light of the analysis, no new control technology installations were required. However, the Air Program did include new enforceable requirements for the six of the facilities to prevent against backsliding and secure the emission reductions that the facilities have already achieved in practice. Further, for two of the facilities, the new requirements will ensure the continuous operation of their state-of-the-art NO<sub>x</sub> control equipment year-round. This is at a cost of tens of millions of dollars per year and will achieve approximately 17,000 tons of NO<sub>x</sub> reductions annually when compared to actual emissions from these facilities in 2021. This will ensure that reasonable progress will continue to be made to the 2064 goal of natural visibility in all Federal Class I areas.

With regard to the analysis used to determine the appropriate cost effectiveness threshold for use in the plan, the figures the Air Program notes the following cost thresholds used in previous regulatory actions. In Missouri’s original Regional Haze SIP, CenSARA states established a cost threshold of \$2,000/ton (approximately \$3,220 in 2021 dollars for both NO<sub>x</sub> and SO<sub>2</sub>). Under the original CSAPR, which EPA determined was better

than BART, EPA established a cost effectiveness threshold of \$500 per ton NO<sub>x</sub><sup>15</sup> (approximately \$644 per ton 2021\$) for the annual and ozone season programs. In 2017, under the CSAPR Update Rule, EPA updated this number to \$1,400 per ton of NO<sub>x</sub><sup>16</sup> (about \$1,860 per tons 2021\$). The CSAPR annual SO<sub>2</sub> program cost effectiveness thresholds were \$2,300 per ton for Group 1 states, and \$500 per ton for Group 2 states (about \$3,056 and \$664 per ton 2021\$). Based on these figures, the values that Missouri selected are all higher than these values that have been approved and used in other regulatory programs, including CSAPR which is designed to protect for the NAAQS, as opposed to visibility in Class I areas.

There is no criteria set by EPA on the appropriateness of a lower range or upper range of the thresholds that states determine appropriate for use in their Regional Haze SIPs. Without a sound methodology or a universally accepted and applied methodology, states like Missouri, which are prohibited by statute from imposing requirements that are stricter than what the Clean Air Act requires, cannot just pick a higher threshold simply because it will result in the imposition of new controls. The cost effectiveness thresholds included in the proposed plan are both reasonable and consistent with the requirement to make reasonable progress. It would be helpful if EPA were to prescribe in regulation a pre-determined cost effectiveness threshold or a prescribed methodology for states to use when determining cost thresholds in future regional haze planning periods.

- The Air Program cost calculations appear to overestimate the actual cost for emissions controls due to under estimating remaining useful life at EGUs, too low SO<sub>2</sub> control efficiencies, not properly supported retrofit cost factors, and too low and not enforceable capacity factors.

(Response) – The Air Program updated the Regional Haze SIP following the formal consultation period for the proposed plan to address this comment and reflect EPA’s guidance regarding how states should consider remaining useful life in their analyses. The proposed plan included cost estimates assuming a 25-year useful life of the control equipment for the sources analyzed if no enforceable shutdown date was available. However, the Air Program also included cost analyses assuming more realistic remaining life assumptions for the sources analyzed. It would be indefensible to only include the 25-year control equipment life projections in the plan when in reality the Air Program knows that publicly available integrated resource plans show projected retirement dates only 5-15 years in the future. The Air Program notes that both the Clean Air Act statutory text and the EPA’s Regional Haze regulation mandate states to consider remaining useful life in four-factor analyses for reasonable progress. EPA’s guidance contradicts this mandate and injects new language that prevents consideration of remaining useful life unless there is an enforceable shutdown date for the source being analyzed. The Air Program has serious concerns about EPA’s use of unenforceable guidance and formal comments that direct states to contradict mandates in established laws and regulations. However, as a compromise to this issue, the proposed plan included both cost estimates for remaining life. Further, the Air Program notes that even with the unrealistic prolonged assumption

<sup>15</sup> 76 FR 48250, August 8, 2011

<sup>16</sup> 81 FR 74551, October 26, 2016

of remaining life, none of the new control technology installations met the cost effectiveness thresholds established in the proposed plan.

The equipment life for SO<sub>2</sub> scrubbers is between 20 and 30 years as stated in EPA's control cost manual. The manual also stated that 50 percent of the scrubbers at power plants were over 20 years old. The manual concluded based on estimation, an equipment life of 30 years is appropriate for wet FGD systems. The Air Program finds it inappropriate to conclude that 30 years of equipment life is appropriate based on the fact that 50 percent of the scrubbers at power plants were over 20 years old. As a compromise in the proposed plan, the Air Program calculated an average of 25 years of equipment life based on the control cost manual statement that stated the equipment life for SO<sub>2</sub> scrubbers is between 20 and 30 years.

The control cost manual states that the equipment life for SCR is 30 years. In the proposed plan, the Air Program previously used 20 years in the second method to calculate annual cost. Therefore, in response to this comment, the Air Program updated the proposed Regional Haze SIP to include 30 years for SCR equipment life.

The comments by D. Howard Gebhart's have been raised by the FLMs and EPA during the 60-day consultation period. The Air Program responded to the issue of under estimating remaining useful life at EGUs in multiple places in this document. The Air Program corrected the low SO<sub>2</sub> control efficiencies to coincide with the control cost manual. Also, the Air Program obtained supporting documents from the facilities for the retrofit factor they used. In addition, the Air Program corrected the capacity factors based on 2016-2020 CAMD data.

- Preliminary comments filed with the Air Program by the National Park Service (NPS) provide additional technical support for the cost information comments summarized above and are incorporated into these comments by reference.

(Response) – The Air Program provided responses to the NPS comment in Appendix G.

- Ameren – Meramec Energy Center and Buzzi Unicem were in the list of sources selected for the four-factor analysis but they were removed due to change in their operation to reduce emissions. Also, it was indicated that Meramec plans to retire in 2022. As such, any associated emission reductions at both plants must be made enforceable through the SIP itself.

(Response) - As stated in previous responses, the Air Program presented the source selection methodology to both EPA and the FLMs during the informal consultation period. Both EPA and the FLMs mostly agreed with the sources the Air Program selected for the four-factor analysis. Sioux Energy Center, Buzzi Unicem USA, Iatan Power Plant, Magnitude 7 Metals Aluminum Smelter, and multiple high NO<sub>x</sub> gas pipeline compressors did not meet the selection criteria to be included in the four-factor analysis.

Initially, the Air Program selected Ameren – Meramec Energy Center for the four-factor

analysis based on their 2016 emission data. Regardless of the fact that the facility voluntarily switched from burning coal to natural gas in two of its boilers, emissions data from 2017 to 2021 do not qualify it to undergo a four-factor analysis. In order to conduct a four-factor analysis, there is a need to obtain representative emissions data. The Air Program believes that emissions from 2017 to 2021 are now more representative than 2016 emissions data. Therefore, the Air Program is not requiring a four-factor analysis for the Meramec Energy Center. There has been no indication that the shutdown of this facility will not occur as planned in the company's integrated resource plan, and no emissions are expected from this facility following its planned retirement at the end of 2022. It would be an extreme waste of resources to create an enforceable mechanism for this shutdown that has already been planned for years, and is fully expected to occur in the very near future.

Buzzi Unicem provided updated 2018 and 2019 emissions that were well below their 2016 emissions. They also demonstrated that the reductions were due to an enforceable consent decree that they entered into in 2017. The Air Program reevaluated Buzzi's percent contribution to visibility impairment at Hercules-Glades and Mingo and found it to be less than one percent. Therefore, the Air Program removed Buzzi from the list of facilities to evaluate using the four-factor analysis.

During the source selection process for the four-factor analysis, Magnitude 7 Metals' 2016 base year SO<sub>2</sub> emissions were 515 tons due to the closing of the facility. The facility's emissions did not warrant inclusion for a four-factor analysis based on the course selection criteria included in the plan. The facility resumed operation in the summer of 2018 with much higher SO<sub>2</sub> emissions, which violated the NAAQS. The Air Program is now working with the facility to bring it into compliance with the NAAQS through a control strategy. Since the Air Program is still working with Magnitude 7 Metals to finalize their control strategy, it is unknown and premature to include the facility for a four-factor analysis in the second round Regional Haze SIP. Depending on the facility's future emissions after implementation of the nonattainment area SIP, the Air Program may include this facility for analysis in a future Regional Haze planning period.

- NPS recommended that the Ameren/Sioux facility be included in the four-factor analysis based on the modeled visibility impacts of that facility at Mammoth Cave National Park in Kentucky. However, the Air Program declined to adopt the NPS recommendation, in part because of announced plans by Ameren to close the Sioux Generating Station by 2028.

(Response) – Neither of these sources met the selection criteria for the four-factor analysis in Missouri's plan. As such, the Air Program did not perform a four-factor analysis for either of these facilities in the proposed plan. The Air Program further notes that enforceable permit limits already exist for the Iatan facility to ensure the efficient operation of their existing control technology. In addition, the Sioux facility is operating FGD controls to meet requirements in MATS. Specifically, Sioux complies with MATS by meeting the 0.2 lbs/mmBtu SO<sub>2</sub> limit. Moreover, the Air Program has recently executed Consent Agreement No. APCP-2021-018 in which the Air Program and Sioux

agreed to establish an enforceable mechanism for new SO<sub>2</sub> emission limits at Sioux. Finally, Ameren recently announced its intention to retire the Sioux facility by 2028 as part of the company's long range plan to transition away from coal at their company. In light of all these facts, it is highly unlikely that new requirements would be needed for the Regional Haze Second Planning Period at either of facilities even if these facilities had met the selection criteria and the Air Program had performed analyses at these facilities.

- The 2016 emissions inventory supporting the CENSARA modeling effort relied upon by Missouri lists several very large NO<sub>x</sub> emission sources within Missouri that are associated with natural gas pipeline compressor stations. These sources were not identified by Missouri for the four-factor emissions control analysis. By missing very large NO<sub>x</sub> sources such as those identified here, the draft Regional Haze SIP has failed to meet the legal obligation to address emission sources that contribute to a significant fraction of the visibility impairment.

(Response) – Our source selection methodology, which utilized Ramboll's EWRT database, was reviewed by EPA and FLMs during the 60-day formal consultation. Before that, during the informal consultation period, the Air Program demonstrated the source selection methodology using 2016 annual emissions to both EPA and the FLMs. EPA was supportive of the methodology and the number of Missouri sources selected; however the agency encouraged the Air Program to consider one additional source identified by the FLMs (Ameren Sioux). The USFS stated "Our overriding concern is that a sufficient number of sources is selected. In this case, Missouri has selected an appropriate number of sources that account for a large portion of the impacts at USFS Class I areas." Though the National Park Service were critical about the one percent contribution approach to source selection, they stated that they were mostly satisfied with the resulting list of sources selected for four-factor analysis in the plan.

The Air Program understands the points raised by the commenter; however, it is important to note the resource constraint to select a higher number of sources for analysis. The Air Program evaluated numerous different selection methods for use in the proposed plan, and conferred with EPA and the FLMs to determine the appropriateness of the selection method, and the group of sources to be analyzed in the proposed plan. The Air Program acknowledges that this process could be improved and sees benefit in analyzing the maximum number of sources as practicable. The Air Program notes that Missouri and many other states spent significant effort on determining the appropriate selection method due to the lack of EPA guidance and regulatory criteria on this important consideration. In future Regional Haze planning periods, the Air Program recommends that EPA provide guidance or prescribed regulatory processes on how the selection criteria be applied. This will help ensure that states are operating under a consistent requirement when making this important determination.

**Ameren Missouri - Labadie Energy Center additional  
information in response to comments**

Ameren Missouri is pleased to provide information and perspective on the engineering cost estimates underlying the four factor analysis and the associated supplement. This is provided in response to comments from the US Environmental Protection Agency (EPA) on the Missouri Department of Natural Resources (MDNR) proposed Regional Haze Plan (Regional Haze SIP). Previously, Ameren Missouri, in response to an MDNR information collection request (ICR), provided data on potential costs of NOx and SO2 controls for the coal fired electric generating units at the Labadie Energy Center. In response to additional questions from MDNR, Ameren Missouri provided a supplement to that data. EPA now requests that MDNR respond to the following:

*EPA believes the inclusion of opportunity costs or other owner's costs may be contributing to artificially higher capital costs and resulting cost effectiveness of control measures. A further explanation of what the opportunity costs entail and how they're factored into the cost assumptions, such as costs for duct work design at Labadie, would strengthen the SIP. If opportunity costs are included in the cost effectiveness calculations, Missouri should also include an explanation of how the opportunity costs are allowable under the control cost manual.*

**The cost estimates Ameren provided to MDNR for wet FGD installation at the Labadie Energy Center do not include opportunity costs.** The estimates that Ameren provided are based on methods included in the USEPA Control Cost Manual. Where appropriate, Ameren utilized actual engineering cost estimates from previous Ameren studies. The Total Capital Installation costs (using the methods within the EPA Control Cost Manual) were compared to Ameren engineering cost estimates and the differences were determined to be a result of site-specific retrofit costs. The Control Cost Manual includes the following information on the Retrofit Cost factor:

Since each retrofit installation is unique, no general factors can be developed. Nonetheless, if necessary, some general information can be given concerning the kinds of system modifications one might expect to be considered in developing a retrofit factor:

1. **Handling and erection.** Because of a "tight fit," special care may need to be taken when unloading, transporting, and placing the equipment. *This cost could increase significantly if special means (e.g., helicopters) are needed to get the equipment on roofs or to other inaccessible places.*
2. **Site Preparation.** Site preparation includes the surveying, clearing, leveling, grading, and other civil engineering tasks involved in preparing the site for construction. Unlike the other categories, this cost may be zero or decreases, since most of this work would have been done when the original facility was built [11]. However, if the site is crowded and the control device is large, the size of the site may need to be increased and then site preparation may prove to be a major source of retrofit related costs. As mentioned earlier in the chapter, if additional land is purchased to accommodate the installation of the control equipment, this cost needs to be added in as well. *If other production related equipment must be relocated to allow for the*

*installation of the control equipment, the cost associated with the relocation needs to be included.*

3. **Off-Site Facilities.** Off-site facilities should not be a major source of retrofit costs, since they are typically used for well-planned activities, such as the delivery of utilities, transportation, or storage.
4. **Limited Space for Staging Equipment.** During construction, materials and equipment are transported, received, and stored on site. These commodities are marked, arranged, and placed in a sequence for retrieval by construction crews prior to final installation. In many ways, the storage yard on a construction site represents a depot with shipments being received from vendors and commodities being constantly repositioned to facilitate retrieval to meet a scheduled installation sequence. For large sites, repositioning becomes less of an issue; however, for small limited area sites, repositioning items in the construction queue becomes a major logistical effort, and in some cases, requires JIT (just-in-time) delivery to allow for direct off-loading from carrier and then straight to installation. To allow schedule flexibility (for the unseen), equipment can be stored off-site (for a fee) or at the fabricator's shop (once again, for a space rental fee).
5. **Transportation.** The delivery of equipment is more than the arrival of commodities at plant site. It is the examination of the destination route from shop to plant site with all special aspects taken into consideration, such as: road bearing limitations, bridge overpass height restrictions, permits for oversized shipments (extra wide loads), required special escorts, time-of-day transit limitations (non-traffic hour, weekends only), railway restrictions, waterway provisions (locks, docking, piloting), tunnel limitations. Depending on the site's location in relationship to the origin point, the typical transit route for normal cargo shipments yields to alternate routes and times for large special shop fabricated assemblies.
6. **Lost Production.** The shut-down for installation of a control device into the system should be a well-planned and anticipated event, and typically occurs during routine, scheduled outages. As such, its cost should be considered a part of the indirect installation cost (start-up). However, unanticipated problems with the installation due to retrofit-related conditions if they happen could impose significant costs on the system. *Retrofit factors should be reserved for those items directly related to the demolition, fabrication, and installation of the control system.* A contingency factor should be reserved (and applied to) only those items that could incur a reasonable but unanticipated increase but are not directly related to the demolition, fabrication, and installation of the system. For example, a hundred year flood may postpone delivery of materials, but their arrival at the job site is not a problem unique to a retrofit situation. *If the shut-downs do not occur in a well planned and routine manner, any additional foregone production of goods and products would need to be included as a private cost attributable to the retrofit cost.*

As described further below, the cost estimate for installation of a wet FGD at Labadie Energy Center uses the retrofit factor to account for several of the site factors described above and in the Control Cost Manual. While Ameren did not include opportunity costs as a result of Energy Generating Unit (EGU) outages for air pollution control device installation, had other design choices been made that would have resulted in non-routine shut-downs, the Control Cost Manual



provides "foregone production of goods and products would need to be included as a private cost attributable to the retrofit cost."<sup>1</sup> The Retrofit Cost Factor identified in Ameren's estimates was chosen based on the additional handling and erection activities, site preparation required, as well as higher raw material and fabrication costs. .

Ameren's estimates are based on engineering estimates of the cost to install controls given the current layout of the Labadie Energy Center and proposed equipment layouts. As described in the original response to the ICR and the supplement, the Labadie Energy Center is a 50-year-old facility with four (4) coal fired boilers, air pollution controls and associated ductwork all in close proximity. Designed and built in the 1960's, Labadie Energy Center units were not designed with space in mind for installation of additional air pollution controls. Instead, the units were designed to minimize the footprint of the facility and thus minimize the cost of construction and the ongoing cost of operation and maintenance.

Labadie Energy Center coal handling, coal combustion residual handling and air pollution controls are all located on the same side of the boilers. Initially designed and constructed with minimal ductwork between the boiler(s), air pre-heater(s), electrostatic precipitators (ESPs) and the stack(s), there is no space between the units for equipment of the size and footprint required for installation of wet flue gas desulfurization equipment. In addition, the coal pile, rail loop, and the associated coal unloading stations are located immediately adjacent to the ESP "C" boxes which are located on the coal pile side of the chimneys/stacks. As a result, the flue gas ductwork, air pollution control equipment, chimneys, rail loop, coal unloading equipment, radial stacker, coal pile, coal reclaim equipment and coal handling conveyors for four units all reside on one side of the boiler house. There is no open unused space which can be used for locating new air pollution control equipment or new stacks/chimneys around or near the existing chimneys.<sup>2</sup>

Making the already tight layout even more congested, updates through the years to accommodate dry handling of coal combustion residuals and upgrades to air pollution controls (e.g. new larger ESPs) have consumed what little open space existed between units previously. In order to install new ESPs to improve PM control on Units 1 & 2, new flue gas ductwork had to be routed up past the stacks and existing "C" boxes to new ESP boxes installed on elevated platforms over

<sup>1</sup> Because Ameren is an integrated utility, any power that it does not generate and provide to its customers, must be purchased. As a result, opportunity costs associated with unit outages are not just the lost revenue associated with the sale of electricity, there is an additional cost for power purchases to make up the shortage in power to customers. As discussed, these costs are not included in the Ameren cost estimates.

<sup>2</sup> Note that the addition of a FGD unit must be positioned on the exit side of the existing ESPs or the ESPs must be redesigned and/or relocated which would increase the cost of any installation project. Because the air pollution control equipment for all four units were positioned between the boiler house and the rail loop with the chimneys in between, the options are to extend the flue gas paths out past the rail loop and into areas of the coal pile and associated coal handling equipment or duct the flue gas from the ESPs into areas with only ancillary buildings.

other existing equipment (i.e. the rail loop and rail unloading equipment). From the new ESP boxes, the flue gas ductwork had to be routed back downward into the existing flue gas stacks.

Reworking the existing layout to extend each unit's flue gas path out into the area of the coal pile is a prohibitively expensive alternative. This would likely require the shutdown of units for extended periods (estimated to be multiple years). The coal rail loop would need to be modified and re-routed and all existing coal handling equipment relocated and extended. This would include a new rail unloading station, new stackers, new coal reclaimers, a new smaller coal pile and extended conveyors. The existing air pollution control equipment would then have to be demolished and new equipment installed in new locations with all new foundations and support equipment. The existing chimneys would have to be demolished either wholly or partially and the flue gas path would have to be extended out into the current coal pile. Had Ameren chosen this option, the costs for modifying the existing air pollution controls and other process equipment would result in an even higher retrofit factor as these additional modification costs would fall under the "**Site Preparation**" activities identified above.<sup>3</sup>

All these changes would require that the units be shutdown during demolition and installation of the new air pollution control equipment and flue gas paths. The construction timeline is likely to be many months and possibly years for each unit, from start of demolition through commissioning of the new rail equipment, coal handling equipment and air pollution control equipment, and chimneys. It is uncertain if Ameren could get permission from both MISO and the Independent Market Monitor to shutdown multiple Labadie Units for several months to years. The lost generation capacity and the impact to grid reliability would be a concern during the lengthy construction periods. And as discussed above, these lengthy shutdowns would be a "legitimate private cost attributable to the retrofit cost" and therefore could legitimately be included in the cost estimates under the control cost manual.

To avoid these negative impacts and the exorbitant cost of reworking the entire flue gas path, Ameren and its contractors have designed an engineering solution (should FGD's be required at some future date) which routes the flue gas from the exit of the existing ESPs over to areas of the facility which can be used for locating the FGD equipment. Ameren's estimates include the installation of new equipment in an area of the facility that does not require wholesale changes to the layout of the existing air pollution control equipment. It minimizes demolition costs and downtime and does not include opportunity costs. It requires less site preparation than other installation options but does require some elevated construction activities in tight spaces and some foundation work in very crowded, active production areas.

<sup>3</sup> From the USEPA's Control Cost Manual, "If other production related equipment must be relocated to allow for the installation of the control equipment, the cost associated with the relocation needs to be included."

## Appendix H - Public Comments and Responses

EPA's cost control manual specifically allows site-specific factors to be taken into account. In fact, a site specific retrofit factor is included to take into account the difficulties with congested sites. Labadie is a good example of a congested site.