July 11, 2024

Leslie Poff
Division for Air Quality
Kentucky Energy & Environment Cabinet
300 Sower Boulevard,
Frankfort, KY 40601

Electronic Filing via lesliem.poff@ky.gov

Re: Comments on Revision to Kentucky Regional Haze SIP for the Second Planning Period

Dear Ms. Poff,

The National Parks Conservation Association, Sierra Club, the Coalition to Protect America's National Parks, Kentucky Resources Council, Earthjustice and Kentucky Conservation Committee (collectively, the Conservation Groups) submit the following comments on the Kentucky Division for Air Quality's (Kentucky DAQ) draft revisions to the Kentucky Regional Haze State Implementation Plan (SIP) for the Second Planning Period (Draft SIP Revision).[1]

National Parks Conservation Association (NPCA) is a national organization whose mission is to protect and enhance America's national parks for present and future generations. NPCA performs its work through advocacy and education. NPCA has over 1.5 million members and supporters nationwide, including more than 18,000 in Kentucky, with its main office in Washington, D.C. and 24 regional and field offices. NPCA is active nationwide in advocating for strong air quality requirements to protect our parks, including submission of petitions and comments relating to visibility issues, Regional Haze SIPs, climate change and mercury impacts on parks, and emissions from individual power plants and other sources of pollution affecting

[1] Ky. Div. Air Quality, Energy & Env't Cabinet, Proposed Regional Haze State Implementation Plan (June 2024) [hereinafter "Draft SIP Revision"].

national parks and communities. NPCA's members live near, work at, and recreate in all the national parks, including those directly affected by emissions from Kentucky's sources.

Sierra Club is a national nonprofit organization with 67 chapters and approximately 628,400 members—including over 5,100 in Kentucky—dedicated to exploring, enjoying, and protecting the wild places of the earth; to practicing and promoting the responsible use of the earth's ecosystems and resources; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. The Sierra Club has long participated in Regional Haze rulemakings and litigation across the country to advocate for public health and our nation's national parks.

The Coalition to Protect America's National Parks (Coalition) represents over 2,500 current, former, and retired employees and volunteers of the National Park Service, with over 45,000 collective years of stewardship of America's most precious natural and cultural resources. We are protection rangers and interpreters, scientists and maintenance workers, managers and administrators, and specialists in the full spectrum of the parks' resources. Our membership also includes former National Park Service directors, deputy directors, regional directors, and park superintendents. Recognized as the Voices of Experience, the Coalition educates, speaks, and acts for the preservation and protection of the National Park System, and mission-related programs of the National Park Service.

Kentucky Resources Council (KRC) is a statewide public-interest environmental law and advocacy organization. We work to protect Kentucky's natural resources, promote policies for healthy communities, and assure that those who pollute our land, air, or water are held to account. Our members and constituents live, work, and recreate —and their children play and attend school—in areas potentially impacted by the Draft SIP Revision.

Earthjustice is a nonprofit environmental law organization that wields the power of law and the strength of partnership to protect people's health, to preserve magnificent places and wildlife, to advance clean energy, and to combat climate change. Earthjustice has made safeguarding the air quality in our national parks and public lands one of its top priorities and has brought numerous lawsuits to enforce the Clean Air Act in the public interest.

Kentucky Conservation Committee is a state-based conservation non-profit dedicated to providing a trusted voice of the public in Kentucky's capitol and throughout Kentucky, effectively advocating for protection, restoration and sustainable use of natural resources for the equitable benefit of all citizens in our Commonwealth.

In its Draft SIP Revision, Kentucky DAQ selects just two sources in the entire state for Four-Factor Analyses—Big Rivers Electric Corp.-D.B. Wilson coal plant (Big Rivers Wilson) and Tennessee Valley Authority (TVA) Shawnee Fossil coal plant (TVA Shawnee).[2] The Agency concludes that neither source needed to conduct a Four-Factor Analysis, claiming that Big Rivers Wilson is "effectively controlled" and TVA Shawnee no longer "significantly

[2] *Id*. at 167.

impact[s]" any Class I areas based on a forthcoming Title V permit revision.[3] In fact, the Agency misleadingly claims throughout the SIP Revision that TVA Shawnee did not conduct any Four-Factor Analyses of controls. However, as discussed below, documents obtained through an open records request show that TVA conducted multiple analyses for Shawnee and identified readily available and cost-effective controls for that facility. Still, Kentucky DAQ declines to require either TVA Shawnee or Big Rivers Wilson to install new (i.e., additional) controls to reduce their haze-forming emissions that could greatly benefit surrounding Class I areas and communities. As discussed in these comments and in the attached expert report from Victoria R. Stamper (Stamper Report),[4] which is incorporated in its entirety into these comments, Kentucky DAQ's Draft SIP Revision violates the Clean Air Act and the Regional Haze Rule (RHR):

- Kentucky DAQ does not clearly identify the emissions inventory used for its 2028 future year projections for in-state electric generating units (EGUs).
- Kentucky relies on highly flawed visibility modeling conducted by the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) for its source selection process. The VISTAS modeling did not accurately reflect the likely contribution of sources in Kentucky and other states to visibility impairment at Class I Areas in the Southeast, causing Kentucky DAQ to improperly exclude major sources of haze-forming pollution from Four-Factor Analyses.
- Based on VISTAS' multi-step source selection process, Kentucky DAQ inappropriately uses unreasonably high selection thresholds, leading the Agency to select an inappropriately small set of sources for Four-Factor Analyses. Kentucky DAQ must analyze additional sources of visibility impairing pollution that likely contribute to impairment at in-state and out-of-state Class I Areas, namely five additional coal-fired EGUs (Mill Creek Generating Station, Trimble County Generating Station, H.L. Spurlock Generating Station, Ghent Generating Station, and East Bend Generating Station) and eight non-EGU industrial facilities (Century Aluminum Sebree, Carmeuse Lime & Stone Black River Operation, Tennessee Gas Pipeline Stations 106 & 200, Kosmos Cement Company, CC Metals and Alloys, Marathon Petroleum Catlettsburg Refinery, and Domtar Paper Company – Hawesville), as well as 10 additional sources in the state with emissions that likely contribute to impairment at Class I areas in the region.
- Kentucky DAQ refuses to consider NOx pollution or controls, incorrectly claiming that nitrate is not a significant contributor to visibility impairment at Class I Areas in the Southeast. Kentucky DAQ bases its decision to ignore NOx controls on VISTAS' flawed and inaccurate modeling that did not accurately reflect the contribution of nitrate to visibility impairment at VISTAS region Class I Areas, including Mammoth Cave National Park.
- Rather than include Four-Factor Analyses for any sources in the state, including for the two sources that Kentucky DAQ selects based on its source selection criteria, the Agency

[3] *Id.* at 172-76.

[4] Victoria R. Stamper, Review and Comments on Reasonable Progress Controls for the Kentucky Regional Haze Plan for the Second Implementation Period (July 10, 2024) [hereinafter "Stamper Report"] and attachments (attached as Ex. 1).

fails to produce any analysis of feasible, available, and cost-effective controls to reduce haze pollution from in-state sources.

- For TVA Shawnee, the Agency misleadingly and incorrectly claims that TVA did not conduct any Four-Factor Analyses for the facility. However, documents obtained through an open records request reveals that TVA conducted multiple Four-Factor Analyses Shawnee and those analyses identified available and cost-effective controls for the facility. Deceiving the public about the existence of these analysis, Kentucky DAQ entirely omits the TVA Four-Factor Analyses from the available public record for the Draft SIP Revision. *For this reason alone, Kentucky DAQ must correct the record, re-notice its Draft SIP Revision with the Shawnee Four-Factor Analyses.* It must also require the facility to install identified controls that are feasible and cost-effective.
- For Big Rivers Wilson, Kentucky DAQ fails to demonstrate the facility is "effectively controlled" by its existing measures. Rather, the Agency must conduct Four-Factor Analyses for controls that would cost-effectively reduce the facility's haze-forming pollution.
- Kentucky DAQ further fails to identify the enforceable emission limits, compliance schedules, or other measures that it proposes to include in its long-term strategy for the second planning period. Instead, the Agency claims that it will propose to include a not yet finalized or enforceable emission limit for TVA Shawnee into the SIP in the future and provides a vague discussion of multiple federal and state programs without explaining how those programs affect in-state sources or emissions.
- Kentucky DAQ's reasonable progress goals for Mammoth Cave National Park do not reflect the visibility conditions that will be achieved as a result of controls that are necessary for reasonable progress.
- Kentucky DAQ does not adequately document its consultations with other states and Regional Planning Organizations. The Draft SIP Revision and appendices provide incomplete records that fail to show whether Kentucky DAQ disagreed with other states during the consultation process or whether any disagreements were resolved and how.
- Kentucky DAQ fails to acknowledge or meaningfully respond to Federal Land Manager (FLM) recommendations in the Draft SIP Revision. Instead, the Agency treats formal FLM consultation as a mere box checking exercise, providing only terse, perfunctory responses to the FLMs' detailed and technical comments.
- Kentucky DAQ entirely fails to consider or advance environmental justice and civil rights through its SIP Revision. The Agency should use readily available information and tools to analyze the environmental justice and civil rights impacts of in-state sources of haze-forming pollution and its SIP Revision.

To satisfy the requirements of the Clean Air Act and RHR, Kentucky DAQ must correct the flaws identified in these comments and the attached Stamper Report before submitting its final SIP Revision to the U.S. Environmental Protection Agency (EPA).

TABLE OF CONTENTS

I. Improving Visibility in Class I Areas Will Result in Economic, Public Health, and Environmental Benefits. 8

II. The Clean Air Act's Regional Haze Program 10

A. EPA's 2017 Revisions to the Regional Haze Rule 12

B. EPA's 2021 Clarification Memorandum 13

C. States Must Ensure Their SIPs Satisfy the Requirements of the Clean Air Act and Regional Haze Rule. 14

D. SIPs Must Include Enforceable Emission Reductions to Make Reasonable Progress. . 15

III. Kentucky DAQ Fails to Include Emissions for the Most Recent Year for Which Data Are Available or to Clearly Identify Estimates of Future Projected Emissions 15

IV. Kentucky DAQ's Source Selection Method Is Flawed. 17

A. Kentucky DAQ Ignores Significant Flaws in VISTAS' Visibility Modeling 17

B. Kentucky DAQ Cannot Reasonably Ignore Nox Pollution or Controls in the Draft SIP Revision. 20

C. Kentucky DAQ Relies on Unreasonably High Source Selection Thresholds. 22

D. The Uniform Rate of Progress Is Not a Safe Harbor. 25

V. Kentucky DAQ Does Not Adequately Reduce Visibility-Impairing Pollution from the Two Sources Selected for Further Analysis. 27

A. Kentucky Must Require Big Rivers Wilson to Improve Its SO2 and NOx Emissions and Remove Unlawful SSM Provisions from the Facility Permit. 28

1. Kentucky DAQ Must Require Big Rivers Wilson to Improve Its SO2 Removal Efficiency. 29

2. There Are Cost-Effective NOx Control Improvements for Wilson. 31

3. Kentucky Must Remove the Unlawful Emergency Affirmative Defense Provisions from the Wilson Title V Permit. 31

B. TVA Shawnee Fossil Plant 34

1. Kentucky DAQ Has Violated the Public Participation Requirements of the Clean Air Act and Must Redevelop and Re-propose the Draft SIP Revision Transparently. 34

2. Kentucky DAQ Cannot Forego a Four-Factor Analysis for Shawnee Based on an Emission Limit That Is Not Determined Through the Four Statutory Factors. 37

3. Additional Enforceable Limits Are Required for TVA Shawnee. 39

i. Control Options at Units 1 & 4 39

ii. Control Options at Units 2-3 and 5-9 40

VI. Kentucky DAQ Does Not Identify the Measures It Proposes to Include in its Long-Term Strategy for the Second Planning Period 42

VII. Kentucky DAQ Must Conduct Four-Factor Analyses for Additional Sources of Visibility-Impairing Pollution. 44
A. Electric Generating Units 44
1. Ghent Generating Station 45
2. Mill Creek Generating Station 47
3. Trimble County Generating Station 50
4. H.L. Spurlock Generating Station 50
5. East Bend Generating Station 51
B. Non-Electric Generating Unit Industrial Sources 53
1. Century Aluminum Sebree, LLC 53
2. Carmeuse Lime & Stone Black River Operation 54
3. Tennessee Gas Pipeline Company, LLC – Stations 106 & 200 55
4. Kosmos Cement Company LLC 56
5. CC Metals and Alloys, LLC 56
6. Marathon Petroleum Company, LP – Catlettsburg Refining, LLC/MPLX Terminals, LLC 57
7. Domtar Paper Company, LLC – Hawesville 58
8. Kentucky DAQ Fails to Select Nine Additional Sources That Likely Contribute to Impairment at Class I Areas. 58
VIII. Kentucky DAQ Did Not Follow the Required Planning Sequence in Setting Its Reasonable Progress Goals. 59
IX. Kentucky DAQ's State-to-State Consultations Violate the Clean Air Act and the RHR. 60
A. Kentucky DAQ's State-to-State Consultation Process Is Inadequate. 61
B. Kentucky DAQ's Interstate Consultations with Indiana and Missouri Are Flawed and Incomplete. 63
1. Indiana 63
2. Missouri 64
C. Kentucky DAQ Fails to Adequately Consult with Arkansas, Tennessee, Georgia, Florida, and North Carolina as Requested 66
D. Kentucky DAQ Fails to Adequately Consult with MANE-VU States. 66
X. Kentucky DAQ Did Not Meaningfully Respond to FLM Consultation Comments. 67
XI. Kentucky DAQ Fails to Incorporate Environmental Justice and Civil Rights Considerations into its Draft SIP Revision. 69
A. EPA Regional Haze Memorandum and Guidance Directs States to Consider Environmental Justice. 70
B. Kentucky DAQ Must Consider Title VI of the Civil Rights Act. 70

C. EPA Itself Must Consider Environmental Justice. 71
D. Properly Addressing Haze Pollution from Kentucky Sources Would Likely Result in Significant Environmental Justice and Civil Rights Benefits. 72
XII. Conclusion 73
XIII. List of Exhibits 76

I. Improving Visibility in Class I Areas Will Result in Economic, Public Health, and Environmental Benefits.

Kentucky is home to one of the Southeast's most iconic Class I Areas: Mammoth Cave National Park. The Park is home to thousands of years of human history and a rich diversity of plant and animal life. The Park's unique resources have earned it designations as a UNESCO World Heritage Site and International Biosphere Reserve.[5] In addition to hosting the longest cave system in the world, Mammoth Cave's 52,000 acres are a go-to destination in the region for outdoor recreation, including hiking, biking, horseback riding, canoeing, and camping.[6] While Mammoth Cave may be more well known for its underground cave system than its viewsheds, anecdotal evidence from park rangers indicates that visitors frequently hiking to the river overlooks and highest places in this heavily forested landscape to access scenic views across the distances. In some instances, park rangers are even establishing new official trails to accommodate visitors' desires to experience the vistas.

Because Mammoth Cave National Park is designated as "Class I" under the Clean Air Act, its air quality is entitled to the highest level of protection. Yet, Class I areas like Mammoth Cave are still affected by hundreds of sources of pollution in Kentucky and other states that negatively impact its air quality and viewsheds.[7] Today, many iconic wilderness areas and national parks are marred by air pollution that diminishes long-range scenic views and robs visitors of their connection to and appreciation of large landscapes. Much of the air pollution in Kentucky and these Class I areas comes from power plant and other industrial facility emissions of sulfur dioxide (SO_2) and nitrogen oxides (NOx), which react in the atmosphere to form "haze" pollution many miles downwind of the sources. In fact, based on NPCA's 2024 Polluted Parks Report, Mammoth Cave National Park is the third most polluted park for regional haze in the country.[8] The Park is also the most heavily impacted Class I area in the country by sources of haze-forming pollution. The Mammoth Cave's high levels of NOx and SO_2 pollution also leads to severe nitrogen and sulfur deposition, with significant adverse impacts on native ecosystems.[9]

Beyond Kentucky's own Class I area, in-state pollution sources impact Class I areas in other nearby states, including other treasured national parks like Great Smoky Mountains National Park in Tennessee and North Carolina, Shenandoah National Park in Virginia, and

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[5] Nat'l Park Serv., Mammoth Cave National Park Kentucky: More Than A Cave (last visited July 1, 2024), https://www.nps.gov/maca/index.htm.

[6] *Id.*

[7] Nat'l Parks Conservation Ass'n, Analysis of Kentucky Sources (2024) [hereinafter "NPCA Kentucky Source Analysis"] (attached as Ex. 2). NPCA explains its methodology for determining source Q/d (emission over distance) values using EPA's updated 2020 National Emissions Inventory (NEI) and 2023 Clean Air Markets Program Data (CAMPD); *see also* Nat'l Parks Conservation Ass'n, Regional Haze Rule: Details of Analysis and Data Sources (2024) [hereinafter "NPCA Source Analysis Method"] (attached as Ex. 3).

[8] Nat'l Parks Conservation Ass'n, Polluted Parks: How Air Pollution and Climate Change Continue to Harm America's National Parks at 7 (2024), https://www.npca.org/reports/air-climate-report [hereinafter "Polluted Parks 2024"] (attached as Ex. 4); *see also* Nat'l Parks Conservation Ass'n, Case Study: Mammoth Cave National Park (last visited June 12, 2024), https://www.npca.org/case-studies/case-study-mammoth-cave-national-park [hereinafter "Mammoth Cave Case Study"].

[9] Mammoth Cave Case Study.

Hercules-Glades Wilderness Area in Missouri.[10] Air quality and visibility conditions at Great Smoky Mountains National Park have improved considerably since the 1990s.[11] Yet, pollution from sources across the Southeast still threatens the Park. To effectively address air pollution in these Class I Areas, downwind states like Kentucky must take steps to reduce their share of pollution that travels hundreds of miles, negatively affecting air quality at our most treasured landscapes.

Mammoth Cave National Park is also an important resource driving Kentucky's tourism economy. Class I parks and wilderness areas draw hundreds of thousands of visitors from around the world each year, providing a boon to gateway communities and local recreation businesses. Mammoth Cave drew 663,147 recreation visits in 2022, 98.4% of which were from non-local visitors.[12] The Park also supported 828 jobs and approximately $90 million in economic benefit for Kentucky.[13] However, when the air at a Class I area is polluted, visitation can drop by eight percent, harming local economies.[14] Air quality directly affects public use and enjoyment of our national parks and wilderness areas. As a result, a strong Regional Haze SIP for Kentucky is necessary to improve visibility at Mammoth Cave National Park, as well as other Class I Areas in the region, to protect this critical contributor to local and state economies.

Reducing air pollution through Kentucky's Regional Haze SIP would also improve public health, particularly for communities surrounding the State's various sources of air pollution. The same pollutants that mar scenic views at national parks and wilderness areas also cause adverse public health impacts. For example, NOx pollution is a precursor to ground-level ozone, which is associated with respiratory diseases, asthma attacks, and decreased lung function.[15] NOx reacts with ammonia, moisture, and other compounds to form particulates that can cause and worsen respiratory diseases, aggravate heart disease, and lead to premature death.[16] Similarly, SO_2 worsens asthma symptoms, leads to increased hospital visits, and can form particulates that aggravate respiratory and heart diseases and cause premature death.[17]

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[10] NPCA Kentucky Source Analysis (see "KYSourcesImpactNonKYCIA" tab).

[11] Kelsey Barnett-Fischels, Clearing the Air in the Smokies, Nat'l Parks Conservation Ass'n (May 1, 2024), https://www.npca.org/articles/3777-clearing-the-air-in-the-smokies.

[12] Nat'l Park Serv., 2022 National Park Visitor Spending Effects at 33, 51 (last updated Aug. 21, 2023), https://www.nps.gov/subjects/socialscience/vse.htm#:~:text=Economic%20Contributions%20to%20the%20National,Service%20lands%20across%20the%20country (attached as Ex. 5).

[13] *Id.* at 33.

[14] *See* David Keiser et al., Air Pollution and Visitation at U.S. National Parks, 4 Sci. Advances 3-6 (July 18, 2018), https://www.science.org/doi/10.1126/sciadv.aat1613 (attached as Ex. 6).

[15] Env't Prot. Agency, Health Effects of Ozone Pollution (last updated Apr. 9, 2024), https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution.

[16] Env't Prot. Agency, Basic Information About NO_2 (last updated July 25, 2023), https://www.epa.gov/no2-pollution/basic-information-about-no2#:~:text=Nitrogen%20Dioxide%20(NO2)%20is,larger%20group%20of%20nitrogen%20oxides; Env't Prot. Agency, Health and Environmental Effects of Particulate Matter (PM) (last updated Aug. 23, 2023), https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm.

[17] Env't Prot. Agency, Sulfur Dioxide Basics (last updated Jan. 31, 2024), https://www.epa.gov/so2-pollution/sulfur-dioxide-basics.

Particulate matter (PM) can penetrate deep into the lungs and cause a host of health problems, such as aggravated asthma, chronic bronchitis, and heart attacks.[18] NOx and SO_2 emissions also harm terrestrial and aquatic plants and animals through acid rain and nitrogen deposition, which in turn causes ecosystem changes, like eutrophication of mountain lakes.[19]

II. The Clean Air Act's Regional Haze Program

To improve air quality in our most treasured landscapes, Congress enacted the Clean Air Act's Regional Haze Program, establishing "as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in the mandatory class I Federal areas which impairment results from manmade air pollution."[20] In order to protect the "intrinsic beauty and historical and archeological treasures"[21] found in national parks, wilderness areas, and other "Class I" areas, the Regional Haze Program sets a national regulatory floor and requires states to design and implement programs to curb haze-causing emissions within their jurisdictions. To meet the natural visibility goal, EPA promulgated the RHR, which requires states (or EPA where a state fails to act) to make "reasonable progress" toward eliminating human-caused visibility impairment at each Class I area.[22]

Together, the Clean Air Act and RHR establish an iterative process that requires states to prepare and submit Regional Haze SIPs every ten years to further reduce visibility-impairing pollution at each Class I area.[23] The initial Regional Haze SIPs for the first implementation period focused primarily on installing Best Available Retrofit Technology (BART) controls at certain older, heavily polluting sources.[24] In the second implementation period, which covers the years 2021-2028, and thereafter, reasonable progress measures are the central mechanism for reducing visibility-impairing pollution from sources.[25] A state's reasonable progress analysis must consider the four factors identified in the Clean Air Act and RHR: (1) the cost of compliance, (2) the time necessary for compliance, (3) the energy and non-air quality environmental impacts of compliance, and (4) the remaining useful life of the source.[26]

States must include long-term strategies in their SIPs with "enforceable emissions limitations, compliance schedules, and other measures," as well as reasonable progress goals to

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[18] Env't Prot. Agency, Particulate Matter (PM) Basics (last updated June 20, 2024), https://www.epa.gov/pm-pollution/particulate-matter-pm-basics.

[19] Polluted Parks 2024 at 8-9; Env't Prot. Agency, Health and Environmental Effects of Particulate Matter (PM) (last updated Aug. 23, 2023), https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm; Env't Prot. Agency, Ecosystem Effects of Ozone Pollution (last updated Nov. 1, 2023), https://www.epa.gov/ground-level-ozone-pollution/ecosystem-effects-ozone-pollution.

[20] 42 U.S.C. § 7491(a)(1).

[21] H.R. Rep. No. 95-294, at 203-04 (1977), reprinted in 1977 U.S.C.C.A.N 1077, 1282.

[22] 40 C.F.R. §§ 51.308(f)(2)-(3).

[23] *Id.* § 51.308(f).

[24] *See id.* § 51.308(e).

[25] *Id.* § 51.308(f)(2)(i).

[26] 42 U.S.C. § 7491(g)(1); 40 C.F.R. § 51.308(f)(2)(i).

ensure SIPs "provide for reasonable progress towards achieving natural visibility conditions."[27] In developing its long-term strategy, a state must also consider its anthropogenic sources of visibility impairment and evaluate different emission reduction strategies including and beyond those prescribed by the BART provisions that largely applied during the first implementation period. A state should consider "major and minor stationary sources, mobile sources and area sources."[28] A state must also consider the following five additional factors in developing its long-term strategy:

> (A) Emission reductions due to ongoing air pollution control programs, including measures to address reasonably attributable visibility impairment;
>
> (B) Measures to mitigate the impacts of construction activities;
>
> (C) Source retirement and replacement schedules;
>
> (D) Basic smoke management practices for prescribed fire used for agricultural and wildland vegetation management purposes and smoke management programs; and
>
> (E) The anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the long-term strategy. Enforceability of emission limitations and control measures.[29]

Additionally, a state "must include in its implementation plan a description of the criteria it used to determine which sources or groups of sources it evaluated and how the four factors were taken into consideration in selecting the measures for inclusion in its long-term strategy."[30] States must further document the technical basis for the SIP, including monitoring data, modeling, and emission information, and the baseline emission inventory upon which its strategies are based.[31]

In determining whether each state's haze plan satisfies the statutory mandate to make reasonable progress, EPA must review the plan to ensure that it meets the "applicable requirements" of the Clean AIr Act, including the above-mentioned criteria, *i.e.* the four factors for reasonable progress, as well as the requirements for consultation with other states and FLMs.[32]

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[27] 40 C.F.R. §§ 51.308(f)(2)-(3).

[28] *Id.* § 51.308(f)(2)(i).

[29] *Id.* § 51.308(f)(2)(iv).

[30] *Id.* § 51.308(f)(2)(i).

[31] *Id.* § 51.308(f)(2)(iii).

[32] 42 U.S.C. § 7410(k)(3); 40 C.F.R. § 51.308(f).

A. EPA's 2017 Revisions to the Regional Haze Rule

On January 10, 2017, EPA revised the RHR to strengthen and clarify the Rule's reasonable progress and consultation requirements.[33] In particular, the Rule revisions clarify that states are to *first* conduct the required Four-Factor Analysis for their sources, and *then* use the results from those Four-Factor Analyses to develop reasonable progress goals.[34] Thus, the 2017 RHR revisions codify EPA's "long-standing interpretation" of the SIP "planning sequence" that states must follow:

- [C]alculate baseline, current and natural visibility conditions, progress to date and the [Uniform Rate of Progress (URP)];
- [D]evelop a long-term strategy for addressing regional haze by evaluating the four factors to determine what emission limits and other measures are necessary to make reasonable progress;
- [C]onduct regional-scale modeling of projected future emissions under the long-term strategies to establish [reasonable progress goals] and then compare those goals to the URP line; and
- [A]dopt a monitoring strategy and other measures to track future progress and ensure compliance.[35]

Moreover, the RHR makes clear that a state must conduct Four-Factor Analyses and States cannot rely on the URP as a "safe harbor" to excuse its failure to select or analyze sources and controls.[36] Rather, the rate of progress that is achieved by the implementation of all reasonable controls as determined by a review of the four statutory factors "is, by definition, a reasonable rate of progress."[37] States cannot reject otherwise available, feasible, and cost-effective controls by claiming those controls "are projected to result in too much or too little progress."[38]

State SIP revisions must also meet certain procedural and consultation requirements.[39] States must consult with FLMs and look to the FLMs' expertise and knowledge of the way pollution harms federal public lands to ensure SIPs do what they must to help restore natural skies. The RHR also requires that in "developing any implementation plan (or plan revision) or

[33] *See generally* 82 Fed. Reg. 3078 (Jan. 10, 2017).

[34] *Id*. at 3090-91.

[35] *Id.* at 3091.

[36] *Id.* at 3093.

[37] *Id.*

[38] *Id*.

[39] For example, in addition to the RHR requirements, states must also follow the SIP processing requirements in 40 C.F.R. §§ 51.104, 51.102.

progress report, the State must include a description of how it addressed any comments provided by the [FLMs]."[40]

B. EPA's 2021 Clarification Memorandum

On July 8, 2021, EPA issued a memorandum (2021 Clarification Memo) that further clarified certain aspects of the revised RHR and provided more information to states and EPA regional offices regarding their planning obligations for the second planning period.[41] Although Kentucky acknowledges the Memo in one passing reference,[42] it otherwise entirely ignores the 2021 Clarification Memo throughout its Draft SIP Revision. Yet, the 2021 Clarification Memo contains critical direction for states on what is necessary to make reasonable progress in the second planning period, as required under the Clean Air Act and RHR.

In particular, EPA made clear that states must secure additional emission reductions that build on progress already achieved, and there is an expectation that reductions are additive to ongoing and upcoming reductions under other Clean Air Act programs.[43] In evaluating sources for emission reductions, EPA emphasized that source selection is a critical step in the SIP development process, as determinations of what reasonable progress measures are necessary for the second planning period flow from states' initial decisions on what sources to review.[44] Thus, it is generally not reasonable to exclude from further evaluation large sources of visibility impairing pollution.

Moreover, the 2021 Clarification Memo reiterates that the URP glidepath is "not a safe harbor," and the fact that Class I areas impacted by in-state sources are meeting the glidepath does not excuse a state from its obligation to consider the statutory reasonable progress factors in evaluating reasonable control options.[45] In addition, the 2021 Clarification Memo makes clear that a state should not reject cost-effective and otherwise reasonable controls merely because there have been emission reductions since the first planning period owing to other ongoing air pollution control programs or merely because visibility is otherwise projected to improve at Class I areas.[46] Ongoing air pollution controls, otherwise improved visibility, and/or air modeling results must not be used to summarily assert that a state has already made sufficient progress and, as a result, no sources need to be selected for further review or no new controls are

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[40] 40 C.F.R. § 51.308(i)(3).

[41] Memorandum from Peter Tsirogotis to Regional Air Directors, Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period (July 8, 2021) [hereinafter, "2021 Clarification Memo"], https://www.epa.gov/visibility/clarifications-regarding-regional-haze-state-implementation-plans-second-implementation.

[42] Draft SIP Revision at 11.

[43] 2021 Clarification Memo at 2.

[44] *Id.* at 3.

[45] *Id*. at 2.

[46] *Id.* at 13.

needed regardless of the outcome of Four-Factor Analyses.[47]

As noted above, the reasonable progress analysis is the vehicle for identifying reasonable control measures and limitations necessary during this second implementation period, and must specifically include consideration of the four statutory factors.[48] Notably, the statute does *not* list visibility improvement as a fifth factor in the reasonable progress analysis, and EPA repeats in the 2021 Clarification Memo that it is *not* appropriate to reject cost-effective control measures based on purportedly insufficient visibility benefits.[49]

The 2021 Clarification Memo also instructs that, for sources that have previously installed controls, states should still evaluate the "full range of potentially reasonable options for reducing emissions," including options that may "achieve greater control efficiencies, and, therefore, lower emission rates, using their existing measures."[50] Moreover, if a state determines that an existing control at a source 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."[51] This also means that so-called "on-the-way" measures, including anticipated shutdowns or reductions in a source's emissions or utilization, that are relied upon to forgo a Four-Factor Analysis or to shorten the remaining useful life of a source "*must* be included in the SIP" as enforceable emission reduction measures.[52]

Finally, the 2021 Clarification Memo confirms EPA's recommendation that states take into consideration environmental justice concerns and impacts in issuing any SIP revision for the second planning period.[53]

C. States Must Ensure Their SIPs Satisfy the Requirements of the Clean Air Act and Regional Haze Rule.

The RHR tasks states, not regulated facilities, with ensuring that the SIP meets the applicable requirements of the Clean Air Act and the Regional Haze Program.[54] Consequently, if Kentucky DAQ, another state, or the FLMs identify a source as impacting visibility in a Class I Area, thereby warranting a Four-Factor Analysis of potential reasonable progress controls,

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[47] *Id.*

[48] 42 U.S.C. § 7491(g)(1); 40 C.F.R. § 51.308(f)(2)(i).

[49] 2021 Clarification Memo at 13.

[50] *Id.* at 7.

[51] *Id*. at 8.

[52] *Id*. at 10 (emphasis added).

[53] *Id.* at 16.

[54] *See* 40 C.F.R. § 51.308(f)(2)(i) ("*The State* must evaluate and determine the emission reduction measures that are necessary to make reasonable progress . . . . *The State* should consider evaluating major and minor stationary sources or groups of sources, mobile sources, and area sources. *The State* must include in its implementation plan a description of the criteria it used to determine which sources or groups of sources it evaluated and how the four factors were taken into consideration . . . .") (emphasis added)).

Kentucky DAQ must conduct such an analysis or demonstrate that such an analysis would be futile to inform its reasonable progress determinations.[55] The Agency must, therefore, independently review any facility-submitted analyses and cannot "rubber stamp" a source's analysis. Likewise, if a Four-Factor Analysis is conducted for a facility, that information must be provided to the public for review and comment on the draft SIP. If a source prepares an inaccurate, incomplete, or undocumented analysis, Kentucky DAQ must either require the source to make the necessary corrections or make the corrections itself.[56]

D. SIPs Must Include Enforceable Emission Reductions to Make Reasonable Progress.

The Clean Air Act and RHR both require states to submit SIPs that "contain such emission limits, schedules of compliance and other measures as may be necessary to make reasonable progress toward meeting" the natural visibility goal at all Class I areas.[57] In its 2019 Guidance, EPA explains that these requirements mandate that SIPs "include enforceable emission limitations and/or other measures to address regional haze, deadlines for their implementation, and provisions to make the measures practicably enforceable including averaging times, monitoring requirements, and record keeping and reporting requirements."[58]

Thus, the SIP is the basis for demonstrating and ensuring that SIPs meet RHR requirements, and states cannot rely on permit provisions that are not practically enforceable as providing emission reductions necessary to ensure reasonable progress. Rather, state-issued permits must complement the SIP.[59] Reasonable progress requirements apply to all sources, and states must not rely on existing or forthcoming permits to allow sources to avoid a Four-Factor Analysis.[60] There is no off-ramp for sources that hold permits.

III. Kentucky DAQ Fails to Include Emissions for the Most Recent Year for Which Data Are Available or to Clearly Identify Estimates of Future Projected Emissions.

As the Kentucky DAQ clearly acknowledges, the RHR requires states to provide a state-wide inventory of pollutants that contribute to visibility impairment at Class I areas, including

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[55] 2021 Clarification Memo at 4-5; *see also* Memorandum from Peter Tsirigotis, Dir., Env't Prot. Agency, to Reg'l Air Dirs., Regions 1-10 at 22-23 (Aug. 20, 2019) [hereinafter "2019 Guidance"], https://www.epa.gov/sites/default/files/2019-08/documents/8-20-2019__regional_haze_guidance_final_guidance.pdf.

[56] 40 C.F.R. § 51.308(f)(2)(iii); 2019 Guidance at 32 (explaining that "every source-specific cost estimate used to support an analysis of control measures must be documented in the SIP").

[57] 42 U.S.C. § 7491(b)(2); 40 C.F.R. § 51.308(f)(2).

[58] 2019 Guidance at 42-43.

[59] 57 Fed. Reg. 13,498, 13,568 (April 16, 1992).

[60] 40 C.F.R. § 70.6(f)(1) (providing that compliance with a permit is only deemed compliance with applicable requirements as of the date of permit issuance); *see Ohio Pub. Int. Rsch. Grp., Inc. v. Whitman*, 386 F.3d 792, 794 (6th Cir. 2004) ("Title V does not impose new obligations; rather, it consolidates pre-existing requirements into a single, comprehensive document for each source. . . .") (citing 42 U.S.C. § 7661c(a), (c) and 40 C.F.R. § 70.6(a)(3), (c)(1)).

"emissions for the most recent year for which data are available and estimates of future projected emissions."[61] However, the Draft SIP Revision fails to meet this requirement.

To fulfill its obligation to provide an inventory for the most recent year for which data are available, the state refers to National Emissions Inventory (NEI) data for 2014 and 2017 and Clean Air Markets Program Data (CAMPD) for 2018 and 2019.[62] Two issues are apparent with the current year inventory, however. First, it does not provide any level of detail, only summing emissions for those years in abbreviated tables, rather than providing full inventories that would be useful to anyone interested in analyzing the data. For example, NEI data is given in three tables for $PM_{2.5}$, NOx, and SO_2, but does not breakdown the data by location, source sector, or facility. Second, as the Kentucky DAQ is well-aware as a contributor through the Air Emission Reporting Requirements (AERR),[63] and through EPA consultation with states during development,[64] updated NEI data for 2020 was released over a year ago.[65] For most sources, therefore, the data in the Draft SIP Revision is now three years out of date. For sources reporting to CAMPD, data is reported quarterly and updated on the CAMPD website on approximately a two-to-three month delay. Full data for 2023 is now available, making the data in the Draft SIP Revision for the sources that report to CAMPD a full four years out of date.[66]

The Kentucky DAQ also does not clearly identify the data for its 2028 projected emissions inventory. While it is clear the Agency relied wholly on VISTAS for the 2028 projections, the Draft SIP Revision does not state anywhere precisely *what* data were used for emissions projections.[67] The Draft SIP Revision states that "[f]or EGU sources in projected year 2028, VISTAS states considered the EPA 2028el, the EPA 2023en, or 2028 emissions from the ERTAC EGU projection tool CONUS2.7 run and CONUS16.0 run" and discusses various pros and cons for each inventory.[68] The Kentucky DAQ never clearly identifies which of these emissions inventories its used for which sources and for which purposes (e.g., for the original modeling or the remodeling).

Furthermore, aside from the issues with the various inventories in the Draft SIP Revision, the Kentucky DAQ has been aware of mismatches between the 2016 modeling platform with

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[61] Draft SIP Revision at 41 (*citing* 40 C.F.R. § 51.308(f)(6)(V)).

[62] *Id.* at 41.

[63] *Id.*

[64] *See*, *e.g.*, Env't Prot. Agency, National Emissions Inventory (NEI) (last updated May 6, 2024), https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei.

[65] Env't Prot. Agency, 2020 NEI Supporting Data and Summaries (May 21, 2024), https://www.epa.gov/air-emissions-inventories/2020-nei-supporting-data-and-summaries (noting March 30, 2023, release for Data Summaries).

[66] *See*, *e.g.*, Env't Prot. Agency, Clean Air Markets Program Data Program (last visited July 6, 2024), https://campd.epa.gov/.

[67] *See*, *generally*, Draft SIP Revision at 42-47 (reviewing EPA's 2028 elv3, 2028 elv5, and ERTAC as data sources, and stating, for instance, "each VISTAS state determined the Draft Kentucky Regional Haze SIP estimated emissions for each EGU for the projected year 2028").

[68] *Id.* at 103.

known facts on the ground since at least 2020.[69] In fact, the Kentucky Energy and Environment Cabinet stated that:

> EPA's use of their IPM model makes assumptions about the operation of EGUs in Kentucky, frequently in error. Many times, IPM has included units that are retired and have no emissions, or it has inappropriately retired units that have no plans to do so. … EPA's IPM model base case indicates that 1,017 MW of Kentucky capacity will be idled for 2023. There are no plans by any Kentucky utility to idle any of the units identified by the IPM model.[70]

Therefore, the Kentucky DAQ has not complied with the letter or the spirit of the requirement of the RHR to provide comprehensive, up-to-date emissions inventories, either for the most recent year available or for projected future emissions.

IV. Kentucky DAQ's Source Selection Method Is Flawed.

Kentucky DAQ relies on VISTAS for its visibility modeling and source selection process in the Draft SIP Revision. Based on that faulty VISTAS modeling and unreasonable source selection process, the Agency selected just two sources for Four-Factor Analyses—Big Rivers Wilson and TVA Shawnee. However, Kentucky DAQ entirely ignores significant flaws in the VISTAS modeling and source selection process. By adopting the VISTAS selection process, Kentucky DAQ unreasonably excludes numerous sources from Four-Factor Analyses that contribute visibility impairment at Mammoth Cave National Park and other out-of-state Class I areas.

A. Kentucky DAQ Ignores Significant Flaws in VISTAS' Visibility Modeling.

Kentucky DAQ relies on visibility modeling performed by VISTAS to support its Draft SIP Revision and followed VISTAS' source selection process.[71] The Agency "concludes that one atmosphere modeling performed by VISTAS is representative of conditions in the southeastern states and is acceptable for use in regulatory modeling applications for . . . regional haze for the Class area in Kentucky."[72] However, the VISTAS modeling is highly flawed and does not accurately reflect the contribution of VISTAS region sources, including those in Kentucky, to visibility impairment at Class I areas.

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[69] *See, e.g.*, Melissa Duff, Dir., Ky. Div. Air Quality, Comments on EPA's Proposed Revised Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS; 85 Fed. Reg. 68,964 (Oct. 30, 2020) at 2 (Dec. 14, 2020), *available at* https://www.regulations.gov/comment/EPA-HQ-OAR-2020-0272-0128 (attached as Ex. 7).

[70] Rebecca Goodman, Sec'y, Ky. Energy & Env't Cabinet, Comments on EPA's Proposed Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard; 87 Fed. Reg. 20,036 (Apr. 6, 2022) at 6 (June 21, 2022), https://www.regulations.gov/comment/EPA-HQ-OAR-2021-0668-0340 (attached as Ex. 8).

[71] *See, e.g.*, Draft SIP Revision at 50 ("Modeling for regional haze was performed by VISTAS for the ten southeastern states, including Kentucky."); *see also* Draft SIP Revision, Apps. A-B, D-E.

[72] Draft SIP Revision at 96.

In 2021, NPCA commissioned an expert modeler, Howard Gebhart, to review the VISTAS modeling on which Kentucky DAQ relies in its Draft SIP Revision. Mr. Gebhart identified significant flaws in VISTAS' modeling methodology.[73] Although NPCA informed Kentucky DAQ, as well as all the states in the VISTAS region, about the major flaws in the modeling well before the Agency released its Draft SIP Revision for public comment, [74] the Agency fails to acknowledge or address these errors in its Draft SIP Revision. The numerous flaws in the VISTAS modeling infected Kentucky DAQ's entire source selection process.

First, the VISTAS modeling significantly underpredicted the contribution of sulfate to visibility impairment on the 20% most impaired days.[75] The sulfate errors were so significant that the modeling failed to come anywhere near meeting VISTAS' performance goals of less than ± 10% and failed to meet the modeling acceptance criteria of less than ± 30% for a number of Class I areas, including Mammoth Cave National Park.[76] The VISTAS modeling exceeded the model goal performance by -28.26% and the acceptance criteria by -8.26% for sulfate at Mammoth Cave.[77] The modeling also exceeded VISTAS' acceptance criteria for other Class I areas impacted by Kentucky sources, including Caney Creek Wilderness Area in Arkansas (by -16.01%), Okefenokee Wilderness Area in Georgia (by -11.42%) and Great Smoky Mountains National Park in Tennessee and North Carolina (by -6.92%).[78] The model underpredicted sulfate across all seasons but had the largest underprediction during the summer months when sulfate extinction is known to be a major contributor to visibility impairment.[79] As a result, the VISTAS model results do not accurately predict sulfate levels during the period when visibility is most problematic in the Class I areas. Although Kentucky DAQ acknowledges that the VISTAS modeling was biased low for sulfate on the 20% most impaired days,[80] it claims that the model's errors "are generally mitigated when using the [relative response factors (RRFs)] approach to estimate future-year impairment."[81] Yet Kentucky DAQ does not provide any kind of assessment of whether use of RRFs adequately corrected for the extremely large errors in the VISTAS modeling. In its 2018 modeling guidance, EPA discusses the use of RRFs and makes clear that

[73] Gebhart Howard, Technical Review of VISTAS Visibility Modeling for the Second Round of Regional Haze State Implementation Plans (May 2021) [hereinafter "Gebhart VISTAS Report"] (attached as Ex. 9).

[74] Letter from Stephanie Kodish, Sr. Dir. & Counsel, Clean Air and Climate Programs, Nat'l Parks Conservation Ass'n, et al. to Ron Gore, Chief, Air Quality Div., Ala. Dep't Env't Mgmt., et al. (May 12, 2021) [hereinafter "Letter to VISTAS States"] (attached as Ex. 10).

[75] Gebhart VISTAS Report at 4.

[76] *Id.*; Draft SIP Revision at 68, tbl.6.6 (providing that the model performance goal for 24-hour sulfate for fine particulate matter was less than ± 10% and the model performance acceptance criteria was less than ± 30%); *id.* at 95, tbl.6-10.

[77] Draft SIP Revision at 95, tbl.6-10.

[78] *Id.*

[79] Gebhart VISTAS Report at 4.

[80] *See, e.g.*, Draft SIP Revision at 75 ("Model performance for sulfate at Mammoth Cave is biased low on 20% most-impaired days.").

[81] *Id.* at 96.

the effectiveness of RRFs is dependent on the type of data used to calculate them.[82] Thus, the calculation of RRFs and their application to modeling to correct for errors, like the sulfate underpredictions in the VISTAS modeling, are also subject to potential errors.

Second, VISTAS relied on an outdated 2011 base year modeling platform for its 2028 future year emissions projections, using 2011 emissions profiles for EGUs.[83] VISTAS assumed that EGUs would operate in the exact same manner in 2028 as they did in 2011.[84] However, this model assumption is undoubtedly incorrect, as many EGUs in the VISTAS region, including those in Kentucky, are expected to have significant changes in load utilization, and so, significantly different emission profiles in 2028 than they did in 2011.[85] As a result, the VISTAS 2028 projection modeling does not accurately represent the contribution of the region's EGUs to visibility impairment.

Third, VISTAS used outdated monitoring data for its 2028 future year projections that did not reflect the dramatic shift in nitrate contribution to visibility impairment in the Southeast over the last five to ten years.[86] VISTAS used monitoring data from 2009 to 2013 to identify the 20% most impaired days for analyzing visibility impacts in Class I areas and assumed that the same days would make up the 20% most impaired days in 2028.[87] However, a review of more recent monitoring data from 2014 to 2018, which Kentucky DAQ uses to determine current conditions at Mammoth Cave National Park,[88] shows that the 20% most impaired days have shifted to include more winter days since the 2009-2013 baseline period.[89] Thus, nitrate has become a much larger contributor to visibility impairment at Class I areas, doubling or even tripling at some locations since the 2009-2013 timeframe.[90] Because VISTAS relied on base year emissions from 2009-2013, its 2028 future year projections did not reflect the shift in nitrate contribution or accurately reflect the contribution of nitrate to visibility impairment.

Although NPCA previously raised the significant flaws in the VISTAS modeling, as noted above, Kentucky DAQ entirely ignores these problems in Draft SIP Revision. Because the modeling does not accurately reflect the contribution of NOx or SO_2 pollution to visibility

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[82] Env't Prot. Agency, Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze, 454/R-18-009 at 103-10 (Nov. 2018), https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf.

[83] Gebhart VISTAS Report at 6; Draft SIP Revision at 41 (explaining that Kentucky DAQ relies on VISTAS modeling to project 2028 emissions and that "VISTAS started with EPA's 2011el-based air quality modeling platform with projections to 2028").

[84] Gebhart VISTAS Report at 6.

[85] *Id.* at 6-7.

[86] *Id.* at 7.

[87] *Id.*; Draft SIP Revision at 29 ("Visibility projections discussed in [the Draft SIP Revision] use IMPROVE data from 2009-2013 to estimate future year visibility at Class I areas.").

[88] *See, e.g.*, Draft SIP Revision at 33 ("The current visibility estimates are comprised of measurements from the five-year period between 2014 and 2018, inclusive.").

[89] Gebhart VISTAS Report at 7.

[90] *Id.*

impairment and does not accurately reflect the contribution of individual sources to impairment, Kentucky DAQ cannot rely on this flawed and inaccurate modeling to support its SIP Revision.

B. Kentucky DAQ Cannot Reasonably Ignore NOx Pollution or Controls in the Draft SIP Revision.

Based on VISTAS flawed visibility modeling, Kentucky DAQ claims that sulfate is the dominant pollutant that contributes to visibility impairment at Southeastern Class I areas, including Mammoth Cave National Park.[91] The Agency further states that "no facilities exceeded the screening thresholds for NOx/nitrate" for Kentucky based on the VISTAS screening process.[92] As a result, Kentucky DAQ asserts that "focusing resources on the control of SO_2 is appropriate for this round of regional haze planning."[93] However, readily available information, including the Agency's own statements in the Draft SIP Revision, do not support its conclusions.

EPA expects that states will, at a minimum, consider both SO_2 and NOx in this planning period[94] and has explained that "the rate of progress that will be achieved by the emission reductions resulting from all reasonable control measures is, by definition, a reasonable rate of progress."[95] Indeed, EPA has noted that the largest portion of anthropogenic visibility impairment from PM in nearly all Class I areas is attributable to sulfate and nitrate, which is caused primarily from emissions of PM precursors SO_2 and NOx, respectively.[96] Consequently, "[a] state that chooses not to consider at least these two pollutants in the second planning period should show why such consideration would be unreasonable."[97]

Again, Kentucky DAQ ignores all the significant flaws in the VISTAS modeling. As discussed above, the VISTAS modeling did not accurately reflect the shift in the 20% most impaired days and the corresponding increase in the contribution of nitrate to visibility impairment at Southeastern Class I areas.[98] As Mr. Gebhart explained in his report, more of the 20% most impaired days now occur in the winter, when nitrate plays a bigger role in visibility impairment.[99] Kentucky DAQ also explains in its Draft SIP Revision that "nitrate concentrations are higher on winter days and are more important for the coastal sites where the 20% most impaired days occur during the winter months."[100] Notably, according to NPCA's analysis, multiple Kentucky sources likely impact coastal Class I areas, including Swanquarter Wilderness

[91] Draft SIP Revision at 127-31.

[92] *Id.* at 178.

[93] *Id.* at 132.

[94] 2021 Clarification Memo at 4-5

[95] 82 Fed. Reg. at 3093; 2021 Clarification Memo at 7 (explaining that "[a] reasonable four-factor analysis will consider the full range of potentially reasonable options for reducing emissions").

[96] 2021 Clarification Memo at 4.

[97] *Id.* at 4-5.

[98] *See supra* Section IV.A.

[99] Gebhart VISTAS Report at 7.

[100] Draft SIP Revision at 28.

Area in North Carolina, Cape Romain Wilderness Area in South Carolina, and Wolf Island Wilderness Area in Georgia.[101]

A review of current conditions information in the Draft SIP Revision confirms that nitrate contributes a substantial portion of light extinction at Mammoth Cave National Park. Figure 2-7 in the Draft SIP Revision, which shows daily monitoring values for Mammoth Cave on the 20% most impaired days from 2014 to 2018, shows that nitrate was the dominant pollutant on at least half, if not more, of the most-impaired days during that period.[102] IMPROVE monitoring data for the Park from 2013 to 2022 shows that nitrate was the dominant pollutant on the most impaired days in 2018 and that nitrate contributed an equal amount to impairment as sulfate in both 2020 and 2022.[103] The Draft SIP Revision further shows that Mammoth Cave is the Class I area in the VISTAS region that is most heavily impacted by nitrate contribution to light extinction.[104] Indeed, Kentucky DAQ, the National Park Service (NPS), and the Forest Service have all noted that nitrate's contribution to visibility impairment has increased in recent years.[105]

Moreover, the updated EPA visibility air quality monitoring study that Kentucky DAQ claims supports its decision to focus on SO_2 controls actually shows that nitrate is projected to be a significant contributor to visibility impairment at Mammoth Cave in 2028.[106] Kentucky DAQ

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[101] NPCA Kentucky Source Analysis (see the "KYSourcesImpactNonKYCIA" tab).

[102] Draft SIP Revision at 35, fig.2-7.

[103] Nat'l Park Serv., Air Quality Conditions & Trends: Mammoth Cave National Park (last visited July 1, 2024) (chart titled "Visibility Components on Most Impaired Days"), https://www.nps.gov/subjects/air/park-conditions-trends.htm?tabName=trends&parkCode=MACA&paramCode=Visibility&startYr=2013&endYr=2022&monitoringSite=MACA1%20(IMPROVE)&timePeriod=10-year (attached as Ex. 11); Draft SIP Revision, App. H-2, Nat'l Park Serv., Regional Haze SIP Feedback for the Kentucky Energy and Environment Cabinet, Division for Air Quality at 7 (Oct. 11, 2022) [hereinafter "NPS Consultation Letter"] (stating that "in Mammoth Cave National Park, the nitrate contribution to impairment is on par with the sulfate contribution in the most recent three-year period and exceeded the contribution of sulfate in 2018").

[104] Draft SIP Revision at 128 & fig.7-14, 130 & fig.7-17.

[105] *Id.* at 97 ("[Unlike the data for the baseline period of 2000 to 2004, where nearly all days with poor visibility were heavily dominated by sulfate impairment, the 2014 to 2018 data show some 20% most impaired days having large organic matter or nitrate impacts at Mammoth Cave. The organic matter components on poor visibility days are associated with episodic events while the nitrate components are associated with anthropogenic emissions."); NPS Consultation Letter at 7 (stating that "the nitrate contribution to visibility impairment on the 20% most impaired days has been increasing over the last decade at Great Smoky Mountains, Mammoth Cave, and Shenandoah National Parks"); Draft SIP Revision, App. H-1, U.S. Forest Serv., Kentucky Draft Regional Haze State Implementation Plan (RH SIP) – Specific Comments at 2-3 (Oct. 7, 2022) [hereinafter "Forest Serv. Consultation Letter"] (explaining that "the nitrate contribution to visibility impairment is increasing as sulfur dioxide emissions decrease, and there are still significant NOx sources within the point sector in [Kentucky]" and that IMPROVE monitoring data for Mammoth Cave, as well as Shinning Rock and Linville Wilderness Areas in North Carolina, which are both managed by the Forest Service, show that some of the highest rates of light extinction from ammonium nitrate have occurred within the last several years").

[106] Draft SIP Revision at 132 (citing to EPA's 2028 modeling and asserting that the results of that study "corroborate the findings of the VISTAS study and indicate that focusing resources on the control of SO_2 is appropriate for this round of regional haze planning").

states in its Draft SIP Revision that the EPA 2028 future year visibility modeling shows that "[a]t Mammoth Cave National Park, the projected 2028 sulfate to nitrate ratio is just under 2.0."[107]

As discussed in more detail below, there are multiple significant sources of NOx emissions that Kentucky DAQ should have, but failed to, analyze for NOx controls.[108] Kentucky DAQ must conduct Four-Factor Analyses of NOx controls (in addition to SO_2 and PM controls) for each of these sources discussed below and require the sources to install readily available and cost-effective NOx controls as necessary to make reasonable progress in the second planning period.

C. Kentucky DAQ Relies on Unreasonably High Source Selection Thresholds.

Kentucky DAQ further adopts VISTAS' unreasonable multi-step source screening process and unreasonably high source selection thresholds. VISTAS' source attribution analysis used a two-step process: (1) an "Area of Influence" (AOI) analysis to identify potential sources of visibility impairment impacting Class I areas within the VISTAS domain, and (2) a Particulate Matter Source Apportionment Technology (PSAT) "tagging" process for sources identified at the AOI step.[109] Kentucky DAQ adopts screening thresholds for each of these steps to eliminate sources: (1) a 2% threshold at the AOI step; and (2) a 1% contribution threshold at the PSAT step.[110] Based on the VISTAS selection process and thresholds, Kentucky DAQ selects just two sources in the entire state for Four-Factor Analyses.[111]

Kentucky DAQ's discretion to exclude sources, including EGUs and non-EGU industrial sources, from Four-Factor Analyses is constrained by the Clean Air Act, RHR, and EPA guidance for implementing the Rule. The RHR requires that states, including Kentucky, "evaluate and determine the emission reduction measures that are necessary to make reasonable progress by considering . . . any potentially affected anthropogenic source of visibility impairment," including "evaluating major and minor stationary sources or groups of sources."[112] EPA has explained that the source selection process "is a critical step in states' analytical processes" as it ultimately "determin[es] what constitutes reasonable progress" for the second planning period.[113] Consequently, EPA advises that selection processes "should be designed and conducted to ensure that [they] result[] in a set of pollutants and sources the evaluation of which

[107] *Id.* at 132.

[108] *See infra* Sections V, VII.

[109] Draft SIP Revision at 133-68; Gebhart VISTAS Report at 9.

[110] Draft SIP Revision at 148 ("The Cabinet requested that all facilities with an AoI contribution of 2% or more be tagged with PSAT."); *id.* at 146 (explaining that Kentucky DAQ listed "the facilities contributing more than 2.00% sulfate + nitrate" and that "[t]he lists of individual facilities identified by the AoI analysis for each Class I area were used to determine which facilities were tagged in the PSAT source contribution analysis"); Gebhart VISTAS Report at 10-11.

[111] Draft SIP Revision at 167-68, tbl.7-29; Gebhart VISTAS Report at 12.

[112] 40 C.F.R. § 51.308(f)(2)(i).

[113] 2021 Clarification Memo at 3.

has the potential to meaningfully reduce their contributions to visibility impairment."[114] Moreover, states must apply a reasonable methodology to exempting sources from further control analysis, and must apply that methodology "in a reasonable way given the statutory requirement to make reasonable progress towards natural visibility."[115] States that rely on a visibility thresholds, like Kentucky, "should set the threshold[s] at a level that capture[] a meaningful portion of the state's total contribution to visibility impairment" and "threshold[s] that captures only a small portion of a state's contribution to visibility impairment in Class I areas is more likely to be unreasonable."[116]

The errors in the VISTAS modeling discussed above were carried forward into the source selection process for VISTAS states, including Kentucky. Those errors caused VISTAS, and the states that relied on the VISTAS process, to improperly exclude sources from Four-Factor Analyses.[117] For instance, and as noted above, the VISTAS modeling underpredicted the contribution of sulfate to visibility impairment and did not accurately reflect the contribution of nitrate to impairment at Class I areas, thereby excluding major sources SO_2 and NOx in the source selection process.[118]

Moreover, as with the VISTAS modeling noted above, Mr. Gebhart similarly identified major flaws in the VISTAS source selection process at both the AOI and PSAT steps. First, the AOI analysis was too restrictive, employing unreasonably high selection thresholds that identified too few sources.[119] VISTAS identified just four Kentucky sources at the AOI step.[120] By using a percentage threshold, the calculated threshold in absolute terms was higher for Class I areas with the most severe visibility impairment, meaning that fewer sources were identified at the AOI step for Class I areas with the worst impairment.[121] As noted above, Mammoth Cave National Park is ranked third for national parks with the worst haze pollution.[122] Yet, for the areas like Mammoth Cave with the worst impairment, more sources should be selected to make progress toward the natural visibility goal.

Second, the PSAT tagging process introduced additional modeling errors into the source selection process.[123] VISTAS applied PSAT tagging to only sulfate and nitrate, and applied it to those pollutants individually. However, this does not reflect how these pollutants function in the atmosphere, where sulfate and nitrate act in combination, along with other haze precursors, to

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[114] *Id.*

[115] 2019 Guidance at 10.

[116] 2021 Clarification Memo at 3.

[117] Gebhart VISTAS Report at 13.

[118] *See supra* Section IV.A.

[119] Gebhart VISTAS Report at 9-10.

[120] *Id.* at 10.

[121] *Id.* at 11.

[122] Polluted Parks 2024 at 7.

[123] Gebhart VISTAS Report at 9, 13.

contribute to light extinction and visibility impairment.[124] As a result, VISTAS likely underestimated the overall visibility impact of individual sources in its PSAT analysis.[125] This underestimate is likely even more pronounced for sources that are located less than 50 km from a Class I area.[126] PSAT modeling has been shown to be unreliable for sources located within a short distance of Class I areas, likely causing Kentucky DAQ to improperly screen out the numerous in-state sources that are located in close proximity to nearby Class I areas.[127] VISTAS also tagged sources using an outdated 2028 emissions projection.[128] Although the VISTAS documentation notes that the initial 2028 emission inventory projections were updated for the final modeling, the associated PSAT modeling did not use the final 2028 inventory.[129] VISTAS claimed to account for its reliance on the outdated 2028 emissions projections by "scaling" predicted sulfate and nitrate to the corresponding changes in SO_2 and NOx emissions in the updated 2028 inventory.[130] This scaling assumes that there is a linear relationship between SO_2 and NOx emissions and sulfate and nitrate concentrations.[131] However, ample evidence shows that there is a non-linear relationship between emissions and sulfate/nitrate concentrations.[132]

Kentucky DAQ fails to justify its reliance on the VISTAS multi-step process and inappropriately high thresholds. The Agency claims that its selection process was reasonable because the "two-step process was used to select sources that have the largest contribution to visibility impairment."[133] Yet, as EPA has explained, a selection process that focuses only on the largest emission sources is likely unreasonable. Indeed, Kentucky DAQ notes that its selection process captured "under 10% of the entire sulfate plus nitrate point source visibility impact in 2028" for the State.[134] As NPS also noted in its consultation letter to Kentucky DAQ, the Agency used unreasonably high selection thresholds, rendering its Draft SIP Revision "inherently less protective of the more-impacted Class I areas within the region, including Mammoth Cave National Park, Great Smoky Mountains National Park, and Shenandoah National Park."[135] As NPS explained, the two sources Kentucky DAQ selected (Big Rivers Wilson and TVA Shawnee) account for only 30% of the State's 2028 projected EGU+non-EGU light extinction contribution

[124] *Id.* at 13.

[125] *Id.*

[126] *See* Joe Kordzi, A Review of EPA's Proposed Approval of the Georgia Regional Haze State Implementation Plan Report at 7-10 (June 2024) (attached as Ex. 12).

[127] *Id.* at 10.

[128] Gebhart VISTAS Report at 11, 13.

[129] *Id.* at 11.

[130] *Id.* at 11, 13.

[131] *Id.* at 13.

[132] *Id.*

[133] Draft SIP Revision at 167.

[134] *Id.* at 154.

[135] NPS Consultation Letter at 8 (explaining that Kentucky DAQ's use of a percent-based threshold to identify sources impacting Mammoth Cave is 74 times higher than that needed to identify sources for Everglades National Park, which is on the least-impacted Class I areas in the region.).

at Mammoth Cave; yet, Kentucky is the number one ranked state in the VISTAS region for contribution to haze at Mammoth Cave, Great Smoky Mountains, and Shenandoah national parks based on VISTAS' cumulative PSAT modeling results.[136] Kentucky DAQ responds to NPS's comments by repeating that it followed the VISTAS selection process.[137] However, as shown above, that selection method is based on significantly flawed VISTAS modeling and selection processes. Application of an unreasonable process cannot justify the selection of an unreasonably small set of sources. Kentucky DAQ, thus, fails to "reasonably choose factors" to select sources or "apply them in a reasonable way."[138]

As discussed in more detail below, there are numerous sources that Kentucky DAQ must select for Four-Factor Analyses given their likelihood to contribute to impairment at Mammoth Cave and other out-of-state Class I areas. Indeed, NPS identified 15 facilities for analysis,[139] and NPCA identifies 21 sources in Kentucky with a Q/d (emissions over distance value) of 5 or more for analysis that Kentucky DAQ does not select.[140] To ensure it captures a meaningful portion of in-state sources, Kentucky DAQ should use a different selection method with a lower threshold, such as a Q/d of 5 or lower, or an equivalent threshold.[141]

D. The Uniform Rate of Progress Is Not a Safe Harbor.

To justify its reliance "solely on reductions from existing and planned emissions controls," and its refusal to conduct additional control analyses for multiple sources, Kentucky DAQ repeatedly asserts, based on VISTAS modeling, that Mammoth Cave and "some" of the Class I areas affected by Kentucky emissions appear to be trending below their respective URPs.[142] That explanation is arbitrary and unlawful for several reasons. First, as explained above, the VISTAS modeling is flawed in numerous ways. Moreover, that modeling relies on unenforceable future emission reductions; and Kentucky cannot rely on those hypothetical

[136] *Id.* at 9.

[137] Draft SIP Revision at 201.

[138] 2019 Guidance at 10.

[139] NPS Consultation Letter at 10-11.

[140] *See infra* Section VII.

[141] *See also* NPS Consultation Letter at 10 (recommending a source selection method and threshold for Kentucky).

[142] *See, e.g.*, Draft SIP Revision at 4 ("For Kentucky's Class I area, Mammoth Cave National Park, visibility improvements on the most impaired days are expected to be better than the uniform rate of progress glidepath by 2028 based solely on reductions from existing and planned emissions controls."); *id*. at 192 ("some Class I areas are projected to see visibility improvements near the URP while most Class I areas are projected to have greater improvements than the URP."); *id*. at 148 ("Emissions are continuing to decline early in the second planning period and are expected to maintain a rate that is parallel with Mammoth Cave's URP based on the federal and state control programs and actions discussed in Section 7.2 of this SIP."); *id.* at 126 ("Kentucky's Class I area is expected to be well beneath the 2028 URP goal based on VISTAS modeling, which includes current and forthcoming control programs.").

planned reductions to avoid conducting further control analyses or to satisfy its obligation to ensure reasonable progress towards the Clean Air Act's visibility mandate.[143]

Second, EPA has made clear that meeting or exceeding the URP glidepath does not obviate the need for states to conduct a robust analysis or make a technical demonstration that additional controls or emission reductions are not reasonable. "[A]n evaluation of the four statutory factors is required . . . regardless of the Class I area's position on the glide path . . . . the URP does not establish a 'safe harbor' for the state in setting its progress goals."[144] Rather, states must "determine what emission limitations, compliance schedules and other measures are necessary to make reasonable progress by considering the four factors" and must not reject "control measures determined to be reasonable" based on the degree of progress.[145] In its 2021 Clarification Memo, EPA reiterated that the uniform rate of progress is "not a safe harbor," and that it is not appropriate to reject cost-effective emission reductions on the basis that visibility in a particular Class I area is on the glidepath. Instead, states are required to "evaluate and determine emission reduction measures that are necessary to make reasonable progress *by considering the four statutory factors*."[146] Here, Kentucky DAQ's refusal to evaluate reasonable and cost-effective controls for numerous sources, simply because the flawed VISTAS modeling indicates that Mammoth Cave is on the glidepath, is contrary to the Clean Air Act and the RHR.

Third, Kentucky DAQ's "glidepath" rationale is misplaced because the Agency failed to evaluate the Clean Air Act's reasonable progress factors in determining whether emission reductions are be necessary to ensure reasonable progress towards natural visibility in *each* Class I area that Kentucky sources impact.[147] In so doing, Kentucky DAQ must provide a "robust demonstration," including documenting the criteria used to determine which sources or groups or sources were evaluated and how the four factors were taken into consideration.[148] Given that Kentucky DAQ acknowledges that "some" out-of-state Class I areas that Kentucky sources

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[143] 42 U.S.C. § 7410(a)(2); 7491(a)(1); 40 C.F.R. §§ 51.308(d)(3), (f)(3).

[144] 81 Fed. Reg. 66,331, 66,631 (Sept. 27, 2016); *see also* 81 Fed. Reg. 296, 326 (Jan. 5, 2016) (determining, as part of the reasonable progress federal implementation plan for Texas, "the uniform rate of progress is not a 'safe harbor' under the Regional Haze Rule."); EPA, Responses to Comments at 120, Promulgation of Air Quality Implementation Plans; State of Texas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan: Best Available Retrofit Technology and Interstate Transport Provisions, EPA Docket No. EPA-R06-OAR-2016-6011 (June 2020) ("EPA has repeatedly and consistently taken the position that meeting a specific reasonable progress goal is not, itself, a "safe harbor," and does not relieve the state of the obligation to consider additional measures for reasonable progress. If it is reasonable to make more progress than the URP, a state must do so, as EPA explained in the 1999 Regional Haze Rule) (citing 64 Fed. Reg. at 35732); *see also* 81 Fed. Reg. at 66,370 ("EPA's longstanding interpretation of the Regional Haze Rule is that 'the URP does not establish a 'safe harbor' for the state in setting its progress goals.") (quoting 79 Fed. Reg. 74818, 74834)).

[145] 82 Fed. Reg. at 3093; *see also* 81 Fed. Reg. at 66,631.

[146] 2021 Clarification Memo. at 15-16 (emphasis added).

[147] *See* 40 C.F.R. § 51.308(f)(2) ("Each State must submit a long-term strategy that addresses regional haze visibility impairment for each mandatory Class I Federal area within the State *and for each mandatory Class I Federal area located outside the State that may be affected by emissions from the State*.") (emphasis added); *id*. § 51.308(f)(3)(ii)(A)-(B).

[148] 40 C.F.R. § 51.308(f)(3)(ii)(B).

impacts are not actually on the glidepath,[149] the Agency must provide a "robust demonstration," based on a consideration of the four statutory reasonable progress factors, that no further emission reductions are cost effective and reasonable for the sources that affect visibility in Class I areas outside the state. And again, as discussed further below and in the attached Stamper Report, there are, in fact, numerous cost-effective control measures available for numerous sources in the state.

Finally, as discussed in more detail below, Kentucky DAQ compounds its erroneous reliance on the URP to avoid evaluating available controls by adopting the VISTAS model's rate of progress as the state's reasonable progress goal for Mammoth Cave.[150] However, the VISTAS modeling for the Mammoth Cave does not reflect the visibility improvements that will be achieved at the end of the planning period as a result of the controls in Kentucky DAQ's long-term strategy, in violation of the Clean Air Act and RHR.

V. Kentucky DAQ Does Not Adequately Reduce Visibility-Impairing Pollution from the Two Sources Selected for Further Analysis.

The RHR requires states to "evaluate and determine the emission reduction measures that are necessary to make reasonable progress by considering the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected anthropogenic source of visibility impairment."[151] EPA has stated that, "for at least the next planning period or two, the requirement to consider the four statutory factors for a reasonably selected set of sources should result in the adoption of additional control measures."[152] "If four-factor analyses evaluate a reasonable range of potential control options, [EPA] anticipate[s] that in many cases states will find that new (*i.e.*, additional) measures are necessary to make reasonable progress."[153] To that end, EPA expects states to "undertake rigorous reasonable progress analyses that identify further opportunities to advance the national visibility goal."[154] Moreover, EPA has made clear that, "when the outcome of a four-factor analysis is a new measure, that measure is needed to remedy existing visibility impairment and is necessary to make reasonable progress."[155]

Although Kentucky DAQ selects Big Rivers Wilson and TVA Shawnee for Four-Factor Analyses, it incorrectly claims that neither source conducted a Four-Factor Analysis and no additional emissions reduction measures are necessary for either facility.[156] In fact, Kentucky

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[149] Draft SIP Revision at 192 ("some Class I areas are projected to see visibility improvements near the URP").

[150] *See infra* Section VIII.

[151] 42 U.S.C. § 7491(g)(1); 40 C.F.R. § 51.308(f)(2)(i).

[152] 82 Fed. Reg. at 3098.

[153] 2021 Clarification Memo at 8.

[154] *Id.* at 2.

[155] *Id.* at 8.

[156] Draft SIP Revision at 167, 172-76; *id.* at 168 ("These facilities did not complete four-factor analysis, instead the facilities used alternative methods to reduce SO_2 emissions.").

DAQ did receive two Four-Factor Analyses for TVA Shawnee but fails to include these analyses and its Draft SIP Revision for the public to review. The Agency's conclusions are flawed. Victoria R. Stamper's expert review, and TVA's own Four-Factor Analyses for Shawnee, also show that there are numerous available, feasible, and cost-effective controls that Kentucky DAQ must require as necessary to achieve reasonable progress in the second planning period for both facilities.

A. Kentucky Must Require Big Rivers Wilson to Improve Its SO2 and NOx Emissions and Remove Unlawful SSM Provisions from the Facility Permit.

Big Rivers Wilson consists of a single 509 MW coal-burning EGU, which is equipped with an electrostatic precipitator, wet flue gas desulfurization (FGD), selective catalytic reduction (SCR), hydrated lime injection, and low NOx burners. According to an NPCA analysis, Big Rivers Wilson is the 5th largest industrial source of visibility-impairing pollution in Kentucky.[157]

Although Kentucky DAQ selects Wilson for a reasonable progress analysis, the Agency does not complete a Four-Factor Analysis for the facility. Instead, based on the facility's recent installation of a wet FGD system with an SO_2 emissions removal efficiency of 97%, Kentucky DAQ determines that Wilson is "effectively controlled" and thus is not required to perform a Four-Factor Analysis.[158] According to Kentucky DAQ, the installation of a wet FGD system has resulted in a source-wide SO_2 potential to emit of 3,733 tons per year (tpy), and a Four-Factor Analysis is not necessary. Kentucky DAQ does not evaluate potential NOx reductions.

EPA has repeatedly explained that states cannot categorically exclude sources from a Four-Factor Analysis as "effectively controlled, " simply because the source has recently installed controls. In its 2019 Guidance, EPA explains that, even if sources have recently installed controls, states must provide a source-specific explanation as to why their decisions to exclude the sources from a Four-Factor Analysis are reasonable.[159] EPA re-emphasized this longstanding requirement in its 2021 Clarification Memo, noting that, if a state declines to select a source for further analysis based on the fact that it is already "effectively controlled" under the Regional Haze or other Clean Air Act programs, the state must "demonstrate why, for that source specifically, a four-factor analysis would not result in new controls and would, therefore, be a futile exercise."[160]

As demonstrated in the attached Stamper Report, however, there are cost-effective improvements to Wilson's FGD, which would result in improved SO_2 removal, and so, Kentucky

[157] *See* Nat'l Parks Conservation Ass'n, Kentucky Source Ranking (July 2024) [hereinafter "NPCA Kentucky Source Ranking"] (attached as Ex. 13). NPCA analyzed point sources based on the Q/d metric using 2020 NEI and updated 2023 CAMPD emissions data. *See* NPCA Source Analysis Method.

[158] Draft SIP Revision at 172-74.

[159] 2019 Guidance at 22-23.

[160] 2021 Clarification Memo at 5.

DAQ fails to show that the facility is effectively controlled for SO_2 and that a Four-Factor Analysis would not result in any additional controls. Moreover, Kentucky DAQ unreasonably refuses to consider improvements to the facility's SCR system, which could result in significant pollution reductions. Finally, because Kentucky DAQ relies on the emission reductions associated with the Wilson FGD to meet its haze obligations, the state must incorporate the Wilson permit into the SIP and remove unlawful affirmative defense or exemption provisions from Wilson's operating permit.

1. Kentucky DAQ Must Require Big Rivers Wilson to Improve Its SO2 Removal Efficiency.

Big Rivers Wilson burns primarily bituminous coal, but the unit is also permitted to burn distillate fuel oil and petroleum coke.[161] Kentucky DAQ states that Wilson's new wet FGD system increases SO_2 removal efficiency to 97%,[162] but the facility's Title V permit does not actually require Wilson to meet a 97% SO_2 removal efficiency, and there is no SO_2 emission limit in the permit that reflects such a removal rate. Instead, the permit requires only a 90% SO_2 removal efficiency and an SO_2 emissions rate of 1.20 lb/MMBtu, or a 70% removal efficiency when emissions are less than 0.60 lb/MMBtu.[163] An SO_2 emission limit reflective of 97% removal would equate to an emission limit of 0.13 lb/MMBtu, but again, there is no such limit in the permit.[164] If Kentucky DAQ is going to rely on Wilson's new wet FGD system and its claimed 97% SO_2 removal efficiency to conclude the facility is "effectively controlled," and is therefore exempt from further control analysis, then it must, at the very minimum, impose an emission limit or an SO_2 removal efficiency limit that reflects 97% SO_2 removal and include that limit in the SIP.[165]

Moreover, as demonstrated in the attached Stamper Report, there are control options that would improve Wilson's SO_2 emissions. First, Kentucky DAQ should consider removing petroleum coke as an approved fuel, given petroleum coke's higher emissions.[166] Second, Kentucky DAQ must evaluate whether Wilson's wet FGD system can achieve an even higher SO_2 removal efficiency than 97%. A typical wet FGD retrofit is designed for 98% SO_2 control

[161] *See* KDEP, Air Quality Permit V-21-018, Big Rivers Electric Corporation – D.B. Wilson Station, Source ID 21-183-00069, at 2 (Nov. 21, 2021) [hereinafter "Wilson Title V Permit"] (attached as Ex. 1 to Stamper Report).

[162] Draft SIP Revision at 173.

[163] *See* Wilson Title V Permit at 7.

[164] Stamper Report at 10.

[165] 40 C.F.R. §§ 51.308(d)(3), (f)(2); 2021 Clarification Memo at 8-9 (explaining that, if a state does not require a source to adopt new control measures based on a Four-Factor Analysis, "the source's existing measures are generally needed to prevent future visibility impairment (i.e., to prevent future emission increases)[, they are] necessary to make reasonable progress"); *see also id.* at 5, 11.

[166] Stamper Report at 10.

with a typical emission rate of 0.04 lb/MMBtu.[167] EPA's Control Cost Manual demonstrates that wet FGD systems can achieve SO_2 removal efficiencies of 99%.[168]

As the Stamper Report demonstrates, improved SO_2 removal rates would result in significant pollution reductions and could be achieved by cost-effective improvements in the FGD system's limestone injection rate. Indeed, a 98% removal efficiency would result in approximately 655 tpy of additional SO_2 removal for ***zero*** capital costs and just $247/ton annually from slightly increased operations and maintenance costs.[169] Similarly, Wilson could achieve a 99% SO_2 removal efficiency, resulting in the removal of 1,310 tpy for ***no capital costs*** and just $289/ton annually from a modest increase in operations and maintenance costs.[170] These improvements would be extremely cost effective, and it would be arbitrary for Kentucky DAQ to refuse to consider them.

Cost Effectiveness of Wet FGD Operational Upgrades to Improve SO_2 Removal Efficiency from 97% to 98% or 99% SO_2 Removal at D.B. Wilson[171]

Increased Wet FGD Removal Efficiency	Controlled Annual SO_2 Rate, lb/MMBtu	Capital Costs	Net Increase in O&M Costs	Total Annualized Costs	SO_2 Reduced, tpy	Cost Effectiveness, $/ton (2023 $)
98%	0.088 lb/MMBtu	0	$161,661	$161,661	655 tpy	$247/ton
99%	0.044 lb/MMBtu	0	$378,621	$378,621	1,310 tpy	$289/ton

The costs to optimize the Wilson wet FGD are well below the cost thresholds adopted by other states for the second planning period. For instance, both Colorado and Nevada used a $10,000/ton of pollution reduced threshold,[172] and New Mexico has adopted a $7,000/ton

[167] *Id*.

[168] *Id*.

[169] Id. at 13.

[170] *Id*. at 13.

[171] *See id.* at 13 (and attached cost-calculation exhibits).

[172] In the Matter of Proposed Revisions to Regulation Number 23, Colo. Dep't Pub. Health & Env't, Air Pollution Control Div., Prehearing Statement at 7 (Oct. 7, 2021) (explaining that "[t]his threshold value is an increase from Round 1 and reflects the fact that with each successive round of planning, less costly and easier to implement strategies have already been adopted") (attached as Ex. 14); Nev. Div. of Env't Prot., Nevada Regional Haze State Implementation Plan for the Second Planning Period at 5-6 (Aug. 2022) (stating that Nevada doubled its cost threshold from the first implementation "to ensure that the entire fleet of potential new control measures throughout

threshold.[173] Although the Clean Air Act does not require Kentucky DAQ to "use []a bright line rule" for determining cost effectiveness, the Ninth Circuit has explained that "the law does require [the Agency] to cogently explain why it has exercised its discretion in a given manner."[174] Kentucky DAQ, thus, should establish a threshold for determining cost effectiveness that is in line with those used by other states, such as $10,000/ton of pollution reduced.

2. There Are Cost-Effective NOx Control Improvements for Wilson.

The Big Rivers Wilson facility has low NOx burners and is equipped with SCR. Kentucky DAQ did not evaluate the status of NOx controls for Wilson, claiming it found that the Wilson facility's NOx emissions were contributing less than 1.0% to visibility impairment on the 20% most impaired days.[175] However, Kentucky DAQ must consider potential improvements in Wilson's NOx emission rates because the facility's NOx emissions have ***nearly doubled*** over the last 12 years.[176] Kentucky DAQ acknowledges that nitrate-based visibility impairment at Class I areas like Mammoth Cave is increasing and is the dominant pollutant, especially in the winter months.[177]

As demonstrated in the Stamper Report, Kentucky DAQ must take steps to ensure that Big Rivers Wilson reduces its NOx emissions commensurate with the operation of optimized SCR. Based on historical data, Wilson should be able to achieve an annual NOx emission rate no higher than 0.06 lb/MMBtu.[178] Thus, Kentucky must impose a NOx emission limit into the Wilson permit and the SIP to ensure that NOx emissions are effectively controlled.[179]

3. Kentucky Must Remove the Unlawful Emergency Affirmative Defense Provisions from the Wilson Title V Permit.

The Wilson Title V permit contains an unlawful "affirmative defense to an action brought for the noncompliance with the technology-based emission limitations" if the permittee demonstrates through properly signed contemporaneous operating logs or relevant evidence" that excess emissions are the result of an "emergency."[180] This affirmative defense is identical to

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Nevada are thoroughly considered, as well as, to ensure that enough controls are implemented during the second period to continue achieving reasonable progress at . . . [Class I Areas]") (attached as Ex. 15).

[173] NM Env't Dep't and City of Albuquerque, Regional Haze Stakeholder Outreach Webinar #2 at 12 (attached as Ex. 16).

[174] *Nat'l Parks Conservation Ass'n v. EPA*, 788 F.3d 1134, 1142-43 (9th Cir. 2015) (citation and internal quotation omitted).

[175] Draft SIP Revision at 147-48.

[176] Stamper Report at 14.

[177] Draft SIP Revision at 28, 34.

[178] Stamper Report at 13.

[179] 40 C.F.R. §§ 51.308(d)(3), (f)(23); *see also* 2021 Clarification Memo at 5, 8-9, 11.

[180] Draft SIP Revision, App'x G at 60-61.

EPA's now-repealed affirmative defense,[181] and would preclude a federal court in an enforcement action from finding liability and ordering penalties, if the relevant factors are met. The affirmative defense provision is contrary to the Clean Air Act, which provides federal district courts—not states or EPA—with exclusive jurisdiction to "apply any appropriate civil penalties" after considering the mandatory statutory factors in citizen suits brought to enforce applicable emission limits and standards.[182]

In July 2023, EPA confirmed this interpretation when the agency finalized its removal of an identical affirmative defense for emergencies from EPA's federal Title V regulations.[183] In doing so, EPA made clear that affirmative defense provisions in Title V permits are "inconsistent with the enforcement structure of the [Clean Air Act] and thus legally impermissible," because they "operate to limit a court's authority or discretion to determine the appropriate remedy in an enforcement action."[184] In the final rule removing affirmative defense provisions from EPA's federal operating permit regulations, EPA made clear that states "must also remove title V-based affirmative defense provisions contained in individual operating permits."[185] Moreover, in that rulemaking, EPA specifically identified 401 KAR 52:020, § 24—Kentucky DAQ's cited authority for the Wilson permit—as being an impermissible affirmative defense.[186]

As discussed above, Kentucky DAQ must require Big Rivers Wilson to optimize its existing wet FGD and SCR systems to reduce its emissions of haze-forming pollution during the second planning period and must include enforceable emission limits implementing those controls in the Wilson permit and in the SIP. At a minimum, because Kentucky DAQ relies on Wilson's existing controls to meet its haze SIP obligations and ensure reasonable progress, those terms must be included in the SIP. As a result, Kentucky DAQ must remove the emergency affirmative defense provision from Wilson's permit because these regional haze limits are technology-based "emission standards"[187] that must apply on a "continuous basis."[188] The requirement for "continuous" emission limitations means that "temporary, periodic, or limited

[181] *See* 40 C.F.R. §§ 70.6(g), 71.6(g) (2014), *repealed by* 88 Fed. Reg. 47,054 (July 21, 2023).

[182] 42 U.S.C. § 7604(a); *id*. § 7413(e)(1) (providing mandatory factors for court to consider "[i]n determining the amount of any penalty to be assessed under this section or section 7604(a)"); *see also Nat. Res. Def. Council v. EPA*, 749 F.3d 1055, 1063 (D.C. Cir. 2014) (holding that § 7604(a) "creates a private right of action, and as the Supreme Court has explained, 'the Judiciary, not any executive agency, determines "the scope"—including the available remedies—"of judicial power vested by" statutes establishing private rights of action'") (*quoting City of Arlington v. FCC*, 133 S. Ct. 1863, 1871 n.3 (2013)).

[183] 88 Fed. Reg. 47,054 (July 21, 2023).

[184] *Id*. at 47,032, 47,039.

[185] *Id*. at 47,046.

[186] Env't Prot. Agency, Removal of Title V Emergency Affirmative Defense Provisions from State Operating Permit Programs and Federal Operating Permit Program Proposed Rule (EPA-HQ-OAR-2016-0186), (attached as Ex. 17).

[187] 42 U.S.C. § 7412(d)(1).

[188] *Id*. § 7602(k); *Sierra Club v. EPA*, 551 F.3d 1019, 1027-28 (D.C. Cir. 2008).

systems of control" do not comply with the Clean Air Act.[189] As the D.C. Circuit has twice held, such "exemption[s] violate[] the CAA's requirement" that technology-based emission limits apply continuously."[190] Kentucky DAQ does not have authority "to relax emission standards on a temporal basis."[191] "To the extent that the affirmative defense provisions could [be] interpreted to provide an exemption or define whether a violation has occurred," such an exemption would be "impermissible under the EPA's interpretation of the [Clean Air Act] and in light of Sierra Club."[192] Kentucky DAQ's affirmative defense provision offers a defense to an action brought for noncompliance. It is thus entirely possible this could be misinterpreted to mean that, where its terms are met, the source did not violate the governing emission limitation. That is an exemption from the emission limitation. Section 302(k) of the Clean Air Act requires that emission standards limit emissions "on a continuous basis," and therefore exemptions from emission limitations are unlawful.[193]

Additionally, Kentucky DAQ must remove the emergency affirmative defense from Wilson's permit now, rather than waiting for EPA to approve any state revision to the Kentucky permitting program, because 401 KAR 52:020, § 24 is based on EPA's now-repealed affirmative defense at 40 C.F.R. § 71.6(g). Indeed, Kentucky DAQ's affirmative defense provision is identical to EPA's now-defunct federal affirmative defense.[194] The Wilson permit's emergency affirmative defense provision, like the federal counterpart, is unlawful and must be removed.

As EPA explained in disapproving Wyoming's exemptions for malfunction emissions in that state's regional haze plan:

> The RHR [Regional Haze Rule] states that "Section 302(k) of the CAA requires emissions limits such as BART [and reasonable progress] to be met on a continuous basis. Although this provision does not necessarily require the use of continuous emissions monitoring, it is important that sources employ techniques that ensure compliance on a continuous basis." . . . it is clear that the rule intended for BART [and reasonable progress] emission limits to be met on a continuous basis and did not provide either explicitly or implicitly exceptions for… malfunction.[195]

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[189] *Sierra Club*, 551 F.3d at 1027 (quoting H.R. Rep. No. 95-294, at 92 (1977), *as reprinted in* 1977 U.S.C.C.A.N. 1077, 1170); *see also U.S. Sugar Corp. v. EPA*, 830 F.3d 579 (D.C. Cir. 2016) ("exempt[ing] periods of malfunction entirely from the application of the emissions standards . . . is [not] consistent with the Agency's enabling statutes").

[190] *Sierra Club v. EPA,* 551 F.3d 1019, 1021 (D.C. Cir. 2008); *see also U.S. Sugar Corp. v. EPA*, 830 F.3d 579 (D.C. Cir. 2016) ("exempt[ing] periods of malfunction entirely from the application of the emissions standards . . . is [not] consistent with the Agency's enabling statutes").

[191] *Sierra Club*, 551 F.3d at 1028.

[192] 88 Fed. Reg. at 47035; *See, e.g.*, *Sierra Club*, 551 F.3d at 1027-28 (D.C. Cir. 2008) (finding that malfunction exemptions conflicts with the Act's plain language).

[193] *Sierra Club,* 551 F.3d at 1027-28.

[194] *Compare* 401 KAR 52:020, section 24, *with* 40 C.F.R. § 71.6(g) (2014).

[195] 79 Fed. Reg. 5032, 5170 (Jan. 30, 2014).

Wilson's Title V permit emergency affirmative defense and exemption from the permit's technology-based emission limits is unlawful, and Kentucky DAQ must remove it.[196]

B. TVA Shawnee Fossil Plant

TVA's Shawnee Fossil Plant is a nine-unit coal-fired EGU in far western Kentucky, just outside of Paducah. Each unit is an identical 175 MW drybottom, wall-fired unit with low NO_X burner. TVA installed spray dry absorbers (SDAs - also known as dry flue gas desulfurization, dry FGDs) for SO_2 control and SCRs for control of NO_X between 2015 and 2017. All units have baghouses for control of PM and units 2-3 and 5-9 have hydrated lime injection for control of acid gasses. Shawnee is the largest polluting facility in Kentucky[197] and is approximately 124 km from the Mingo Wilderness Area in Missouri, the closest Class I area, and approximately 223 km from Mammoth Cave National Park.

1. Kentucky DAQ Has Violated the Public Participation Requirements of the Clean Air Act and Must Redevelop and Re-propose the Draft SIP Revision Transparently.

Transparent public participation is a cornerstone of democratic government actions generally, and for the Clean Air Act in particular. Kentucky DAQ has woefully failed to provide the reasonable notice and opportunity to comment on the basis for its decisions for TVA Shawnee and has outright misled the public about the basis for its decision on that facility. For this reason alone the Agency must at least correct the record for the Draft SIP Revision, renotice the Draft SIP Revision for public comment, and start again with its public participation process.

The Clean Air Act requires that states must provide for "reasonable notice and public hearing" on any SIP submitted to EPA under Title I of the Act, including Regional Haze SIPs.[198] EPA's regulations further require that "[s]tates must provide notice, provide the opportunity to submit written comments and allow the public the opportunity to request a public hearing"[199] and must include the "technical basis . . . on which the State is relying to determine the emission reduction measures that are necessary to make reasonable progress" for haze SIPs.[200] According to EPA, "[p]ublic participation is not simply a nice or necessary thing to do; it actually results in

[196] The D.C. Circuit recently held that exemptions from emission limits in state implementation plans are not *per se* unlawful because the Clean Air Act gives states authority to adopt emission limitations as necessary or appropriate, or other control measures, means, or techniques that need not be continuous, to meet the requirements of the Act. *Env't Comm. of Fla. Elec. Power Coordinating Grp., Inc. v. Env't Prot. Agency*, 94 F.4th 77, 100 (D.C. Cir. 2024). That decision explicitly does not apply to technology-based emission limitations, like those at issue here. The decision also makes clear that to the extent a state adopts an emission limit like the regional haze numeric SO_2 limit for Wilson, the limitation must still satisfy the Act's requirement that emission limits be continuous.

[197] *See* NPCA Kentucky Source Ranking.

[198] Section 110(a)(2), 42 U.S.C. § 7410(a)(2).

[199] 40 C.F.R. § 51.102(a).

[200] *Id.* § 51.308(f)(2)(iii).

better outcomes and better governance."[201] Meaningful public participation processes have significant regulatory benefits, including allowing agencies to "make better and more easily implementable decisions that reflect public interests and values and are better understood by the public."[202] Public participation processes also must be transparent. As EPA explains, "[w]ithout transparency, public input will not [be] based on the same considerations that decision-makers are actually using to make decisions. . . . Much public outrage is a result of not being provided complete and timely information, or being excluded from the process."[203] Kentucky DAQ falls far short of its public participation obligations in this action and created public mistrust of the Agency.

As an initial matter, the Conservation Groups requested, and were denied, an extension of the 30-day comment period on the Draft SIP Revision. In our request we noted "[i]t would be nearly impossible to meaningfully review the 260-page Draft Regional Haze SIP in that amount of time, let alone the 74 appendices totaling thousands of pages and nearly 100 MB of data."[204] While acknowledging that EPA has a September deadline to approve a SIP Revision for Kentucky or issue a Federal Implementation Plan, we made clear

> it would be manifestly unjust to give the public participation short shrift to make up for [Kentucky DAQ]'s delay. The Regional Haze SIP is now three years overdue pursuant to regulations enacted in 2017. Any further delay from extending the comment period would be far outweighed by the benefits of allowing meaningful public engagement and full consideration of comments submitted.[205]

Kentucky DAQ provided only a terse response, stating that "[d]ue to time constraints, we will not be extending the public comment period."[206] This context is important to note in reviewing the shortcomings of Kentucky DAQ's public participation process in this case, and highlights precisely why the Agency should have provided more time and public engagement.

Moreover, in the Draft SIP Revision, Kentucky DAQ claims that TVA Shawnee "chose to forego performing [] four-factor analyses for the Shawnee facility by taking emission limits that would be implemented in two phases."[207] Further, with regard to both Shawnee and Wilson, Kentucky DAQ states "[t]hese facilities did not complete four-factor analysis, instead the facilities used alternative methods to reduce SO_2 emissions.[208] Similarly, Kentucky DAQ claims

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[201] Env't Prot. Agency, Public Participation Guide: Introduction to Public Participation (last updated Feb. 9, 2024), https://www.epa.gov/international-cooperation/public-participation-guide-introduction-public-participation.

[202] *Id.*

[203] *Id.*

[204] Letter from Ashley Wilmes, Executive Director, Kentucky Resources Council, Inc., et al., to Leslie Poff Environmental Scientist Consultant Kentucky Division for Air Quality (June 12, 2024) (attached as Ex. 18).

[205] *Id.*

[206] Email from Leslie Poff, Kentucky Division for Air Quality, to Byron Gary, Kentucky Resources Council, et al. (June 13, 2024) (attached as Ex. 19).

[207] Draft SIP Revision at 4.

[208] *Id.* at 168.

"[t]he facilities selected for the reasonable progress analysis, TVA – Shawnee and Big Rivers - Wilson did not complete four-factor analysis."[209]

Kentucky DAQ's claims throughout the Draft SIP Revision that TVA Shawnee did not conduct a Four-Factor Analysis are blatantly misleading and categorically incorrect. In the Draft SIP Revision, Kentucky DAQ references a letter it sent to TVA requesting a reduction in SO_2 emissions from the Shawnee Fossil Plant.[210] That letter is included as Appendix G-3 to the Draft SIP Revision and provides that Kentucky DAQ told TVA

> [o]n July 21, 2020, the Division for Air Quality (Division) sent a letter requesting TVA perform a four-factor analysis to assess potential emission control options that could be used to attain reasonable progress toward the state's visibility goals. *After review of the four-factor analysis report provided by Trinity Consultants* (February 19, 2021), the Division determines that SO2 emissions reductions at the Shawnee Plant are not only necessary, but achievable.[211]

TVA and Kentucky DAQ were clearly, therefore, in possession of a Four-Factor Analysis that the Agency repeatedly states in the main body of the Draft SIP Revision ***does not exist***. Only through a request pursuant to the Kentucky Open Records Act were the Conservation Groups able to obtain a copy of that Four-Factor Analysis,[212] as well as additional communications between TVA and Kentucky DAQ covering comments from Kentucky DAQ and EPA on that Four-Factor Analysis. Through the records request, the Conservation Groups also obtained a **revised Four-Factor Analysis** showing controls are not only **necessary, but achievable and cost effective**.[213] It is not clear whether Kentucky DAQ intentionally deceived the public about the existence of a Four-Factor Analysis, and the results of that analysis, but it is clear that the Agency's statements in the Draft SIP Revision are, at the very least, incorrect and misleading.

Four-Factor Analyses are the crux of reasonable progress under the Regional Haze Program for the second planning period. Given Kentucky DAQ's misleading and factually incorrect statements that a Four-Factor Analysis for Shawnee does not exist, the Agency clearly has not provided reasonable notice or an opportunity to comment on all essential pieces of the Draft SIP Revision as required by the Clean Air Act and RHR. Kentucky DAQ must go back to the drawing board, and re-notice the Draft SIP Revision for public comment, including in the

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[209] *Id.* at 172.

[210] *Id.* at 174.

[211] Draft SIP Revision, Appendix G-3, *KY DAQ Letter to TVA Request to Reduce SO2 Emissions at Shawnee February 14, 2023* (emphasis added).

[212] Trinity Consultants, Regional Haze Four-Factor Analysis: Tennessee Valley Authority Shawnee Fossil Plant (Oct. 23, 2020) [hereinafter "Shawnee 2020 4FA"] (attached as Ex. 20).

[213] Letter from Michael K. Bottorff, Plant Manager, Shawnee Fossil Plant, to Melissa Duff, Dir., Ky. Div. for Air Quality (Feb. 19, 2021) [hereinafter "TVA 2021 Letter to Kentucky DAQ"] (including responses to Kentucky DAQ comments on the original TVA Shawnee Four-Factor Analysis, and revised four-factor analysis) (attached as Ex. 21); TVA 2021 Letter to Kentucky DAQ, Trinity Consultants, Regional Haze Four-Factor Analysis: Tennessee Valley Authority Shawnee Fossil Plant (Feb. 19, 2021) [hereinafter "Revised Shawnee 2021 4FA"] (attached as Enclosure 2 to TVA 2021 Letter to Kentucky DAQ).

record for public review the actual bases for decisions made in the Draft SIP Revision. As discussed further below, that reproposed Draft SIP Revision must include enforceable emissions reductions for the TVA Shawnee facility based on a robust Four-Factor Analysis.

2. Kentucky DAQ Cannot Forego a Four-Factor Analysis for Shawnee Based on an Emission Limit That Is Not Determined Through the Four Statutory Factors.

Having selected Shawnee for further analysis, Kentucky DAQ then erroneously claims the facility "did not complete four-factor analysis" and instead "used alternative methods to reduce SO_2 emissions."[214] As noted above, the claim that Shawnee did not complete a Four-Factor Analysis is belied by the record. In any event, Kentucky DAQ cannot exclude Shawnee from a Four-Factor Analysis, as doing so violates the Clean Air Act and RHR.

Kentucky DAQ must identify measures that are necessary to make reasonable progress in the second planning period by analyzing the four statutory factors and must include enforceable emission limits, compliance schedules, and other measures as necessary to implement those measures in the SIP.[215] Thus, the Agency cannot *ex post facto* arbitrarily lower Shawnee's projected emissions to a level determined to just barely circumvent the source-selection threshold, which in this case are already unreasonably high and based on flawed modeling.

Yet that is exactly what Kentucky DAQ attempts to do. With regard to Shawnee, the Agency tries to step backwards in its SIP development process and rely on an SO_2 emission cap that would allow the facility to fall below its selection threshold in the first place. As Kentucky DAQ shows in the SIP Revision, the 8,208 SO_2 emission cap for Shawnee would bring the facility to a *0.99%* rather than 1% contribution to visibility impairment from sulfates alone.[216] Even Kentucky DAQ recognized the impropriety of evading the Regional Haze Program in this way in its correspondence with TVA on the facility-submitted Four-Factor Analysis, stating that TVA improperly:

> used the 1.00% sulfate PSAT threshold at Class I areas as a standard for adequately meeting reasonable progress goals. However, the Division used the 1.00% threshold as a screening method to exercise further evaluation of facilities that are impacting the State's Class I area at a level greater than or equal to 1.00%. The four-factor analysis (FFA) should not focus to reduce emissions to satisfy a sulfate-screening threshold, but rather should be framed to reduce visibility impairment at the impacted Class I areas. Therefore, the use of the screening threshold as a goal for reasonable progress is not appropriate for the requested analysis.[217]

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[214] Draft SIP Revision at 168.

[215] 40 C.F.R. § 51.308(f)(2)(i); *see also* 42 U.S.C. § 7491(g)(1).

[216] Draft SIP Revision at 175-76.

[217] Tenn. Valley Auth., Response to Kentucky Division for Air Quality Comments on TVA Shawnee Fossil Plant Four-Factor Analyses at 1 (Feb. 19, 2021) [hereinafter "Revised 4FA Responses"] (citing 2019 Guidance at 19)

Apparently at some point Kentucky DAQ changed its position, without any explanation, stating in the letter included at Appendix G-3 that TVA could either accept an 8,208 tpy SO_2 limit beginning in 2028 or "install and operate a Flue Gas Desulfurization Unit (FGD) on the seven uncontrolled units (2-3 and 5-9), effective no later than January 1, 2028."[218]

What's more, the proposed 8,208 tpy emissions limit is not yet enforceable as required by the RHR. In its Draft SIP Revision, Kentucky DAQ discusses Shawnee's proposed draft permit, which includes the 8,208 tpy SO_2 limit, and includes a copy of the draft permit "for reference only" (i.e., not to be included in the SIP) in Appendix G-7.[219] The Agency goes on to state that "[o]nce the permit is final, the Cabinet will request" language reflecting the limit be included in the SIP.[220] The Kentucky DAQ therefore tries to rely on a *draft* permit that is not yet final, and on which several of the same organizations commenting here pointed out that Kentucky DAQ did not adequately explain or justify the proposed SO_2 limit in the first place.[221]

Additionally, as noted above, Kentucky DAQ appears to rely on Shawnee's proposed SO_2 emission cap to evade the regional haze process by allowing the facility to merely lower its emissions to fall just below the source selection threshold. Even if Kentucky DAQ could evade the RHR process in this manner, the proposed SO_2 limit is still insufficient. First, Kentucky DAQ ignores that the VISTAS visibility modeling and source selection thresholds on which it relies are flawed and do not accurately reflect the contribution of Kentucky sources to visibility impairment.[222] Second, the proposed limit does not account for the VISTAS modeling's significant sulfate underpredictions. For example, the VISTAS modeling was biased low for sulfate, with a normalized mean error (NME) of between approximately 30% and 45% and a normalized mean bias (NMB) between approximately 0% and 40%.[223] Thus, even assuming Kentucky DAQ's attempt to adopt a limit that brings Shawnee's SO_2 emissions below the 1% PSAT threshold were an acceptable method, the limit would have to be approximately 40-45% lower to account for modeling variability and error. Furthermore, a mass-based annual limit alone says nothing about when such emissions can occur, so the limit would have to be revised further to account for emissions variability throughout the year and otherwise account for meteorological variability.

(attached as Enclosure 1 to TVA 2021 Letter to Kentucky DAQ). Kentucky DAQ seems to imply here that the reduction in visibility impairment is one of the four-factors, and as explained more fully above it is not.

[218] Draft SIP Revision, Appendix G-3.

[219] Draft SIP Revision at 175.

[220] *Id.* Kentucky DAQ also claims elsewhere that emissions limits will be implemented in phases, starting with a 0.7 lb/MMBtu limit for all units in 2028, and an 8,208 ton per year limit in 2034. *Id.* at 4. It is unclear where the phased plan comes from or went as it is mentioned nowhere else in the Draft SIP Revision or Draft Permit, so Commenters here assume the SIP intends only the latter plan, namely an 8,208 tpy limit beginning in 2028. The phased approach would also not satisfy the requirements of the RHR.

[221] *See* Ky. Res. Council, Inc., et al, Comments on Draft Permit V-23-006 for the TVA Shawnee Fossil Plant (Mar. 14, 2024) (attached as Ex. 22).

[222] *See supra* Sections IV.A-C.

[223] Draft SIP Revision at 72.

Kentucky DAQ cannot evade the requirements to conduct a Four-Factor Analysis and include in the SIP enforceable emissions limitations as necessary to make reasonable progress. It must instead conduct a compliant Four-Factor Analysis for Shawnee and incorporate enforceable emissions limitations requisite with controls identified based on that analysis. As shown in both the revised Four-Factor Analysis obtained through the open records request and the attached Stamper Report, there are feasible, available, and cost-effective controls to reduce Shawnee's haze-forming emissions, as more fully discussed below.

3. Additional Enforceable Limits Are Required for TVA Shawnee.

The revised Four-Factor Analysis from TVA and the attached Stamper Report clearly show that additional controls are feasible, cost effective, and justified under the four statutory factors. Kentucky DAQ must therefore require installation of those controls.

i. Control Options at Units 1 & 4

TVA Shawnee Fossil Plant already has SO_2 and NO_X controls on Units 1 & 4 which could *very* cost-effectively be optimized to further reduce emissions. As shown in the Stamper Report, the cost of optimizing SO_2 controls to meet an emissions rate of 0.05 lb/MMBtu could reduce nearly an additional 794 tons of SO_2 per year across both units, at a cost of only $281/ton[224] - cost-effective by any measure. What's more, TVA acknowledges that it already has a manufacturer-provided guarantee for the controls on Units 1 & 4 of 0.06 lb/MMBtu,[225] well-below the reported 0.56 to 0.57 lb/MMBtu or likely actual 0.15 lb/MMBtu emission rates currently being achieved.[226] The Four-Factor Analyses from TVA did not look at additional optimization or lower limits for Units 1 & 4, only stating that the 0.2 lb/MMBtu MATS emissions limit for SO_2 for coal-fired EGUs is "low enough that it is unlikely that an analysis of control measures for a source already equipped with a scrubber and meeting [this limit] would conclude that even more stringent control of SO_2 is necessary to make reasonable progress."[227] However, the Stamper Report clearly shows that further reductions are feasible, cost-effective, and would meaningfully contribute to reasonable progress. As pointed out in the Stamper Report, the dry FGD systems at Units 1 & 4 were designed to achieve 96% SO_2 removal, so they are capable of higher levels of SO_2 removal, yet only have been achieving 67-75% SO_2 control.[228]

Additional reductions in NO_X emissions may be possible from these units as well, although neither the Draft SIP Revision nor the analyses from TVA obtained through KORA contain sufficient information on NOx pollution or controls for Shawnee, as Kentucky DAQ had

[224] Stamper Report at 22.

[225] Revised Shawnee 2021 4FA at 2-3.

[226] Stamper Report at 18-20.

[227] Revised Shawnee 2021 4FA at 2-2 (markup omitted) (citing EPA 2019 Regional Haze Guidance at 23).

[228] Stamper Report at 19.

already pre-determined that it would not consider NO_X reductions.[229] As discussed further in the Stamper Report, Kentucky DAQ must analyze the possibility of cost-effective optimization of the existing SCRs at these units to achieve the 90% control efficiency they were designed to achieve.[230]

ii. Control Options at Units 2-3 and 5-9

Analyses from both TVA and the Stamper Report show that add-on controls, in particular dry FGDs, could cost-effectively be installed and operated at Shawnee to achieve reasonable progress in visibility at Class I areas.

The initial Four-Factor Analysis from TVA for Shawnee purported to show that SDAs (aka dry FGDs) would cost $12,805 per ton of SO_2 removed.[231] That analysis originally relied on a remaining useful life of six years for the control, claiming that the facility would retire the units in 2034.[232] Kentucky DAQ provided comment stating that

> Use of shorter lifetimes for purposes of the cost analysis must include evidence to support the proposed shortened lifetime. In order to forego the addition of control measures to reduce emissions, TVA Shawnee will need to adopt a federally enforceable measure that guarantees the retirement of these units.[233]

Kentucky DAQ was correct on this point. In response, TVA decided to extend the remaining useful life used for cost calculations to avoid taking such an enforceable measure.[234] TVA's revised Four-Factor Analysis shows a cost effectiveness for SDAs of $6,059 per ton of SO_2 removed in 2019 dollars.[235] Even this estimate, however, is inflated, and a cost of $5,558/ton in 2023 dollars is more reasonable.[236]

Even though TVA acknowledges that the Shawnee units have existing baghouses, which would provide cost savings if TVA installed dry FGD,[237] TVA did not exclude the costs for

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[229] *See supra* Section IV.B.; Email from Leslie Poff, Ky. Div. Air Quality, to Jack Byars, (date uncertain, in response to a message dated Jul. 28, 2020) (stating that "[t]he Division concurs that the Shawnee Four-Factor Analysis need only focus on SO_2 emissions") (attached as Ex. 23).

[230] Stamper Report at 33.

[231] Shawnee 2020 4FA at 2-8.

[232] *Id.* at 2-6.

[233] Revised 4FA Responses at 3.

[234] *Id.* In response to another comment from Kentucky DAQ, TVA stated that it "believes that SHF plant closure will happen by 2034, but would prefer to preserve the option of continuing to operate beyond 2034 for exigent circumstances." *Id.* at 4. This is *precisely* why control measures relied upon must be made enforceable.

[235] Revised Shawnee 2021 4FA at 2-9.

[236] Stamper Report at 28-30.

[237] Revised Shawnee 2021 4FA at 2-1 ("Because the seven boilers at SHF currently without SO_2 controls already have such fabric filter systems in place, there would be a cost savings to implement flue gas desulfurization technologies on these boiler units.").

baghouses that are part of EPA's cost spreadsheet in its analysis of SDA systems.[238] Additionally, TVA assumed a 25 year life of SDA controls,[239] as opposed to a 30-year life of controls consistent with the EPA's Control Cost Manual FGD chapter.[240]

By either measure, however, dry FGDs would be cost-effective, as discussed further in the Stamper Report.[241] Kentucky DAQ apparently agreed, stating in a letter to TVA that "[a]fter review of the four-factor analysis report provided by Trinity Consultants (February 19, 2021), the Division determines that SO_2 emissions reductions at the Shawnee Plant are not only necessary, but achievable."[242] Thus, the Agency must require TVA to install dry FGDs at Shawnee units 2-3 and 5-9.

Turning to the remaining factors, the non-air quality environmental impacts of compliance are minimal. Dry scrubbers have been effectively used with little impact for decades.[243] While TVA claims "the new landfill will have enough space to accommodate the solid waste generated from five (5) SDA Systems, the estimated life of the new landfill will decrease dramatically over its current design,"[244] this should not disqualify the option Regardless, it clearly belies TVA's claim that the plant will close in 2034, since the landfill has an estimated life of 25-years.[245]

TVA claims that "[a] minimum of five (5) years, counting from the effective date of an approved determination, would be needed for implementing either the WFGD or SDA options."[246] This unsupported statement is in direct contradiction of the evidence, as provided in the Stamper Report, citing testimony from David Foerter, executive director of the Institute of Clean Air Companies (ICAC), that dry scrubbing technology could be installed in 24 months.[247]

There are also additional control options for NO_X emissions. As stated in the Stamper Report,

> TVA has indicated that it plans to install SCR at Shawnee Units 2-3 and Units 5-9, thus SCR has been deemed to be a cost-effective control by TVA. . . . KDEP should clearly indicate in the regional haze plan which Shawnee units are installing SCR

[238] *Id.*, App. A at 5.

[239] Revised 4FA Responses at 3.

[240] US EPA, *EPA Air Pollution Control Cost Manual*, Section 5 SO_2 and Acid Gas Controls, Chapter 1, Wet and Dry Scrubbers for Acid Gas Control (Apr. 2021), at 1-55, *available at* https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.

[241] Stamper Report at 28-29.

[242] Draft SIP Revision, App. G-3.

[243] *Id.* at 29.

[244] Revised Shawnee 2021 4FA at 2-12

[245] *Id.* at 2-8 to 2-9.

[246] *Id.* at 2-5.

[247] Stamper Report at 29 (*citing* 76 Fed. Reg. 24976, 25054 (May 3, 2011)).

> and when those installations have occurred or will be complete. More importantly, KDEP must impose emission limits reflective of the operation of SCR systems at the Shawnee units and that require year-round operation of the SCR. . . . KDEP must adopt NOx emission limits reflective of operation of the SCR systems in its regional haze plan.[248]

VI. Kentucky DAQ Does Not Identify the Measures It Proposes to Include in its Long-Term Strategy for the Second Planning Period.

The RHR requires that states submit a long-term strategy addressing regional haze visibility impairment for in-state Class I Area, as well as any out-of-state Class I areas that may be affected by in-state sources.[249] The long-term strategy must include the "enforceable emission limitations, compliance schedules, and other measures that are necessary to make reasonable progress."[250] States must also include elements in their SIPs to ensure the emission limits and other measures that form the basis of the long-term strategies are practically enforceable. Thus, states' SIPs must (1) be "duly adopted, and specify clear, unambiguous, and measurable requirements"; (2) contain a "legal means for ensuring that sources [comply] with the control measure"; and (3) be "enforceable in practice."[251] State Implementation Plans, 57 F3d. Reg. 13,498, 13568 (Apr. 16, 1992). States must further document the technical basis for the SIP, including monitoring data, modeling, and emission information, and the baseline emission inventory upon which its strategies are based.[252]

Although Chapter 7 of the Draft SIP Revision purportedly contains the State's long-term strategy for the second planning period,[253] Kentucky DAQ does not identify anywhere in this chapter, or any other section of the Draft SIP Revision, the emission limits and other measures that it proposes to include in its long-term strategy. As noted above, Kentucky DAQ claims that Big Rivers Wilson is "effectively controlled" by its existing wet FGD systems and that TVA Shawnee is adopting a new SO2 emissions cap.[254] The only measure that the Agency states that it will include in the Regional Haze SIP is the TVA Shawnee SO2 emissions cap provisions from the facility's forthcoming Title V permit modification, but the Agency explains that permit provisions as reproduced in the Draft SIP Revision is "provided for reference only" and those provisions will be proposed for inclusion in the SIP later "[o]nce the permit is final."[255] Thus, Kentucky DAQ does not identify any enforceable emission limits or other measures for inclusion in its long-term strategy for its two selected sources.

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[248] *Id.* at 38.

[249] 40 C.F.R. § 51.308(f)(2).

[250] *Id.* § 51.308(f)(2)(i); *see also* 42 U.S.C. § 7491(b)(2).

[251] 57 Fed. Reg. 13,498, 13,568 (Apr. 16, 1992).

[252] 50 C.F.R. § 51.308(f)(2)(iii).

[253] *See* Draft SIP Revision at 97 (titling Chapter 7 "Long-Term Strategy").

[254] *Id.* at 174-75.

[255] *Id.* at 175.

Kentucky DAQ also lists numerous federal and state control programs that it claims "reduce emissions of visibility impairing pollutants between the base year 2011 and the future year projection year of 2028"[256] and that were purportedly included in the 2028 future year projections for the VISTAS modeling.[257] The federal programs include: (1) Good Neighbor provisions "for a variety of [National Ambient Air Quality Standards (NAAQS)"; (2) the Cross-State Air Pollution Rule (CSAPR) finalized on August 8, 2011, as well as updates and amendments to that Rule, including the CSAPR Update finalized on October 26, 2016 and the Amended CSAPR Update finalized on April 30, 2021; (3) the Mercury and Air Toxics Standards (MATS) finalized on February 16, 2012; the 2010 SO2 NAAQS finalized on June 22, 2010; (4) the 2007 Heavy-Duty Highway Rule codified at 40 CFR Part 86, Subpart P; (5) the Tier 3 Motor Vehicle Emissions and Fuel Standards codified at Subpart H of 40 CFR Part 85, Subpart H and 40 CFR Part 86; (6) Non-Road Diesel Emissions Programs codified at 40 CFR Parts 89 to 92 and 94; and (7) Emission Control Area Designation and Commercial Marine Vessels found in the MARPOL Annex VI international convention for the prevention of pollution from ocean-going ships.[258] The state programs include: (1) North Carolina's Clean Smokestacks Act; (2) Georgia's Multi-Pollutant Control for Electric Utility Generating Units program; and (3) consent agreements for the Lehigh Cement Company/Lehigh White Cement Company in Pennsylvania, eight Virginia Electric and Power Company coal-fired power plants, and the Anchor Glass Container facilities in Florida, Georgia, Indiana, Minnesota, New York, and Oklahoma.[259] However, Kentucky DAQ does not explain how any of these federal or state programs apply to or affect emissions from in-state sources or out-of-state sources that impact Mammoth Cave National Park.[260] And none of the state programs noted apply to Kentucky sources.

It is not clear whether Kentucky DAQ proposes to include any of these federal or state programs in the long-term strategy. If it does, the Agency fails to clearly specify exactly which measures from these programs as applied to which sources it seeks to include and fails to document the emission reductions to be achieved through implementation of any programs it proposes to include in the long-term strategy. Kentucky DAQ therefore does not provide the technical basis for its Draft SIP Revision and does not demonstrate that any of the proposed measures are practically enforceable, in violation of the Clean Air Act and the RHR.[261]

Kentucky DAQ further appears to indicate that, because of the emission reductions that have been achieved and will be achieved under the federal and state programs listed above, it

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[256] *Id.* at 98.

[257] *Id.* at 98, 102.

[258] *Id.* at 98-101. In Chapter 8 of the Draft SIP Revision addressing reasonable progress goals, Kentucky DAQ claims that the VISTAS 2028 projections modeling did not include the Amended CSAPR Update finalized on April 30, 2021, *see id.* at 181-82, contrary to its statements in Chapter 7. Kentucky DAQ's Draft SIP Revision is, thus, internally inconsistent.

[259] *Id.* at 102.

[260] Kentucky DAQ merely makes vague statements claiming the programs have resulted or will continue to achieve emission reductions, such as "reductions in SO_2 emissions have occurred and further reductions may be necessary at certain point" for compliance with the 2010 SO2 NAAQS or the federal on-road and non-road programs "address SO_2 emissions." *See, e.g.*, *id.* at 100.

[261] 42 U.S.C. § 7491(b)(2); 40 C.F.R. § 51.308(f)(2)(i), (iii); 57 Fed. Reg. at 13,568.

does not have to select additional sources for Four-Factor Analyses or require additional measures to make progress in the second planning period. The Agency frames the long-term strategy chapter of the Draft SIP Revision and discussion of the federal and state programs by posing a series of questions, such as "how much visibility improvement, compared to the glide path, is expected at Mammoth Cave National Park by 2028" assuming continued implementation of existing federal and state programs and whether any "additional emissions reductions were needed" during the second planning period.[262] It also notes that the 2028 future year modeling shows that Mammoth Cave is projected to be below the URP by 2028 without additional emission reductions.[263] To the extent that Kentucky DAQ claims that it does not have to select sources or identify controls to make reasonable progress based on emission reductions achieved and forthcoming under the federal and state programs, that assertion is misplaced. EPA has made clear that states "should generally not reject cost-effective and otherwise reasonable controls merely because there have been emission reductions since the first planning period owing to other ongoing air pollution control programs."[264] And, as discussed above, the URP is not a safe harbor.[265]

VII. Kentucky DAQ Must Conduct Four-Factor Analyses for Additional Sources of Visibility-Impairing Pollution.

To correct the serious errors in the Agency's source selection method discussed in Section IV.C., Kentucky DAQ must assess additional EGU and non-EGU industrial sources identified by NPS and NPCA with emissions that likely contribute to impairment in Class I areas in Kentucky and other states. Kentucky DAQ cannot justify its failure to analyze additional sources by relying on the VISTAS modeling and source selection process, as discussed above. Consideration of these additional sources is necessary to ensure that Kentucky's SIP Revision meaningfully reduces the State's contribution to visibility impairment to make progress toward the natural visibility goal in the second planning period.[266]

A. Electric Generating Units

Kentucky's source selection methodology arbitrarily exempted numerous EGUs from any control analysis, thereby forgoing significant pollution reductions and potential visibility benefits for numerous Class I areas. To correct the serious errors in its source selection methodology, Kentucky DAQ must assess the following additional EGU sources with emissions that likely contribute to impairment in Class I areas in Kentucky and other states:

1. Ghent Generating Station
2. Mill Creek Generating Station
3. Trimble County Generating Station

[262] Draft SIP Revision at 98.

[263] *Id.* at 121-22, 179-80.

[264] 2021 Clarification Memo at 13.

[265] *See supra* Section IV.D.

[266] 2021 Clarification Memo at 3.

4. H.L. Spurlock Generating Station
5. East Bend Generating Station

As discussed below, and in the attached Stamper Report, Kentucky DAQ's basis for excluding these facilities from any control analysis are flawed. Given that EGUs generally contribute the majority of point source sulfate and nitrate visibility impairment in VISTAS Class I areas,[267] consideration of these additional sources is necessary to ensure that Kentucky's SIP Revision meaningfully reduces the State's contribution to visibility impairment and makes progress toward the natural visibility goal in the second planning period.[268]

1. Ghent Generating Station

The Ghent Generating Station is a four-unit coal-fired power plant with a net generating capacity of 1,919 MW. Each unit is equipped with wet FGD systems, low NOx burners with overfire air, and baghouses. Units 3 and 4 also have electrostatic precipitators. Units 1, 3, and 4 are equipped with SCR. We note that Kentucky DAQ's Draft SIP Revision erroneously indicates that Unit 2 is also equipped with SCR. It is not, and the Agency must correct that part of the Draft SIP Revision.[269] According to an NPCA analysis, the Ghent Generating Station ranks 2nd on its list of sources of visibility impairment in Kentucky.[270]

Kentucky exempts Ghent from a Four-Factor Analysis, and the Draft SIP Revision includes no analysis of potential emission reduction measures at the plant. Although Units 1 and 4 achieve relatively low SO_2 emission rates with wet FGD and low NOx rates with SCR, the Draft SIP Revision unlawfully fails to ensure those emission rates are enforceable.[271] Moreover, nothing in the facility's operating permit requires the facility to maintain those levels of control. And as explained in the Stamper Report, recent data shows that the facility's emissions fluctuate significantly. In fact, Unit 1's SO_2 emissions rate increased to as high as 0.10 lb/MMBtu from 2020 to 2021, resulting in as much as 500 tons more SO_2 per year than during the 2017-2019 timeframe.[272] NPS's analysis confirms that, although Ghent's scrubbers had been achieving 98.5% control, their removal efficiencies have deteriorated over the last five years to as low as 93.5% SO_2 removal efficiency at Unit 2, and 94.5% at Unit 3.[273] Despite that downward trend, Kentucky DAQ unlawfully fails to conduct any evaluation of potential upgrades or control improvements that could cost-effectively reduce emissions.[274]

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[267] Draft SIP Revision at 43-44.

[268] 2021 Clarification Memo at 3.

[269] *Compare* Draft SIP Revision at 169 (stating that all four units have SCR), *with* Stamper Report, Ex. 29, KDEP, Air Quality Permit V-12-028 R1, Ghent Generating Station, AI 704, at 15 (October 16, 2015).

[270] *See* NPCA Kentucky Source Ranking.

[271] 41 U.S.C. § 7410(a)(2)(A).

[272] Stamper Report at 42.

[273] NPS Consultation Letter at 40.

[274] 82 Fed. Reg. at 3084 (noting that sources that have installed only moderately effective controls (or no controls at all) will have to be reassessed for improvements); *id*. (explaining that if a state decides that control upgrades are

Although Kentucky DAQ fails to evaluate cost-effective control options for the Ghent units, we did. As explained in the Stamper Report,[275] improvements to the Ghent units' FGD systems would be cost effective and are readily achievable. Post-combustion NOx controls for Unit 2 are similarly cost effective; and Unit 3 is emitting NOx at much higher rates than being achieved at Ghent Units 1 and 4 with the same NOx controls.

First, as noted, and as explained in detail in the Stamper Report, Ghent's scrubbers are capable of achieving 98-99% SO_2 removal, but Units 2 and 3 are achieving only 93-94% removal.[276] Kentucky DAQ must therefore evaluate whether those scrubbers could be upgraded to improve SO_2 removal efficiency, consistent with the 98-99% reduction being achieved at Ghent Units 1 and 4. Given that all four scrubber units were installed at the same time, and by the same manufacturer, it is very likely that they can all achieve the same emission rates on a consistent basis.[277] Nevertheless, the Draft SIP Revision unreasonably ignores commonly-used modifications (e.g., elimination of scrubber bypass, upgrades or overhauls to the scrubber module, installation or modification of reagent spray headers and absorber trays, or simply increasing the limestone injection rate) that would likely be cost effective.[278]

Second, relying on EPA's Wet and Dry Scrubber cost spreadsheet made available with its Control Cost Manual and unit-specific emission, cost, and fuel data, the Stamper Report provides an estimate of costs for such improvements.[279] As reflected in the table below, upgrades to improve SO_2 removal efficiency at Ghent would be extremely cost effective. Upgrading Unit 3's wet FGD to achieve a SO_2 removal efficiency of 98% would result in a reduction of ***1,853 tons annually***, with ***zero capital costs*** and just a $246/ton cost associated with a slight increase in operations and maintenance expense. Increasing the unit's SO_2 removal efficiency to 99% would result in the removal of ***2,416 tons per year***, again with ***zero capital costs*** and a cost-effectiveness value of only $247/ton due to moderate increases in operations and maintenance costs. These costs are well within the range of costs that EPA and other states have deemed cost effective.[280] Kentucky DAQ must evaluate this SO_2 control option to ensure the maximum regional haze benefits from the wet FGD at Ghent Unit 3.

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unnecessary, the state must still "explain why the decision is consistent with the requirement to make reasonable progress, i.e., why it is reasonable to assume for the purposes of efficiency and prioritization that a full four factor analysis would likely result in the conclusion that no further controls are necessary"); 2021 Clarification Memo at 5 (stating that a state relying on current controls "to avoid performing a four factor analysis for a source should demonstrate why, for that source specifically, a four factor analysis would not result in new controls and would, therefore, be a futile exercise").

[275] *See generally* Stamper Report at 40-50.

[276] Stamper Report at 43-44.

[277] *Id*. at 45.

[278] *Id*.

[279] Stamper Report at 45-46.

[280] *See* 88 Fed. Reg. 36,654, 26,742 (June 5, 2023) (Good Neighbor Plan, concluding that $11,000/ton NOx removal was cost effective); *see supra* pp. 30-31 & nn.172-74.

Cost Effectiveness (2023$) of Wet FGD Operational Upgrades to Improve SO2 Removal Efficiency from 93.9% to 98% or to 99% SO2 Removal at Ghent Unit 3.[281]

Wet FGD Removal Efficiency	Controlled Annual SO2 Rate, lb/MMBtu	Capital Costs	Net Increase in O&M Costs	Total Annualized Costs	Additional SO2 Reduced, tpy	Cost Effectiveness, $/ton
98%	0.10	0	$456,265	$456,265	1,853	$246/ton
99%	0.05	0	$596,519	$596,519	2,416	$247/ton

Third, the Stamper Report demonstrates that post-combustion NOx controls at Ghent Unit 2 are cost effective. As noted, the Draft SIP Revision incorrectly states that Unit 2 has SCR. It does not. Instead, the unit has only low NOx burners and separated overfire air, which result in significant NOx emissions. The Stamper Report evaluates the lowest NOx emission rates that could be achieved with SCR or SNCR at Ghent. An SCR system could reduce Gent Unit 2's current emission rate from 0.20 lb/MMBtu to 0.04 lb/MMBtu—an 80% reduction. SNCR would result in a 20% reduction, or an annual NOx emission rate of 0.16 lb/MMBtu.[282] With EPA's Control Cost Manual and unit-specific emission, cost, fuel, and remaining useful life data, the Stamper Report provides a Four-Factor Analysis demonstrating that the installation of SCNR or SCR would be cost effective, at $8,279/ton to $9,793/ton NOx removal, respectively.[283] Notably, NPS's cost analysis indicates that the installation of SNCR or SCR would be even more cost-effective, at $6,321/ton and $7,491/ton respectively.[284] In either event, these costs are within the range that EPA and other states have established as cost effective, [285] and Kentucky DAQ must reevaluate those controls here.

2. Mill Creek Generating Station

Mill Creek Generating Station currently consists of four coal-burning EGUs located in Louisville, Kentucky. Units 1 and 2 are equipped with wet limestone scrubbers, low NOx burners and separated overfire air, baghouses, and ESPs for pollution controls. Units 3 and 4 also have wet limestone scrubbers, baghouses, and ESPs, and are equipped with low NOx burners and SCR for NOx control. According to an NPCA analysis, Mill Creek is the 3rd largest source of haze pollution in Kentucky.[286]

As explained in the attached Stamper Report, as well as NPS's comments, Kentucky DAQ's proposal to exempt Mill Creek from any control analysis is arbitrary and unlawful, for

[281] Stamper Report at 46.

[282] Stamper Report at 47.

[283] *Id*. at 47-50.

[284] NPS Comments at 42-43.

[285] *See, e.g.*, 88 Fed. Reg. at 26,742; *see supra* pp. 30-31 & nn.172-74.

[286] *See* NPCA Kentucky Source Ranking.

several reasons. First, Kentucky DAQ arbitrarily refuses to conduct any analysis of potential SO_2 emission improvements at Unit 4, which has achieved only 97% control efficiency, whereas Units 1, 2, and 3 have achieved about 99% SO_2 control efficiency.[287] Given the similar vintage of all four FGD systems, Kentucky DAQ must evaluate requiring Unit 4 to improve its SO_2 emissions. Kentucky DAQ similarly refuses to evaluate optimizing the SCR systems at Units 3 and 4, which are capable of consistently achieving a NOx emission rate in the range of 0.05 to 0.07 lb/MMBtu, as demonstrated by its ozone-season emissions.[288] Given the increase in nitrate-based visibility impairment at Mammoth Cave in the winter months, [289] Kentucky DAQ must adopt a NOx emission limit that would require the effective operation of the SCR systems year-round at Mill Creek Units 3 and 4.

Second, post-combustion NOx controls would be cost effective at Units 1 and 2, but Kentucky DAQ arbitrarily exempts the facility from a Four-Factor Analysis. Those units are currently equipped with low NOx burners and separated overfire air, achieving an annual NOx emission rate of 0.30 lb/MMBtu. As demonstrated in the Stamper Report, however, SCR and SNCR controls (which could reduce NOx emissions by approximately 85% and 23%, respectively) would be cost effective.[290] Using EPA's Control Cost Manual Chapters for SNCR and for SCR, along with modified EPA's cost calculation spreadsheets, the Stamper Report concludes that the installation of SCR or SNCR for each unit would be cost effective.

Cost Effectiveness (2023$) of SCR and SNCR at Mill Creek Units 1 and 2.[291]

Mill Creek Unit	NOx Control	Controlled Annual NOx Rate, lb/MMBtu	Capital Costs	O&M Costs	Total Annualized Costs	NOx Reduced, tpy	Cost Effectiveness, $/ton
1	SCR	0.04	$143,356,444	$1,661,129	$15,008,843	2,216	$6,774/ton
1	SNCR	0.23	$23,865, 351	$1,684,089	$3,916,693	572	$6,850/ton
2	SCR	0.04	$144,101,424	$1,651,076	$15,078,193	2,198	$6,861/ton
2	SNCR	0.23	$23,933,668	$1,674,504	$3,913,499	565	$6,925/ton

Those costs are within the range that other states have deemed cost effective for NOx controls, including Colorado and Nevada, which are using a cost-effectiveness threshold of $10,000/ton.[292] EPA has also concluded that $11,000 per ton is cost effective under the Good

[287] Stamper Report at 52.

[288] *Id*. at 51-52.

[289] Draft SIP at 34.

[290] Stamper Report at 52-53.

[291] *See* Stamper Report at 53-54, and attached spreadsheet calculations.

[292] *See supra* pp. 30-31 & nn.172-74.

Neighbor Plan.[293] Mill Creek could likely reduce the capital costs of SCRs for Units 1 and 2 by constructing a single SCR reactor for both units, which other power plants have done.[294] In any event, Kentucky DAQ must evaluate potential NOx upgrades for Mill Creek Units 1 and 2.

Kentucky DAQ's decision not to conduct any control analysis appears to be based, in part, on LG&E's plans to build a gas-burning, combined-cycle EGU at the site.[295] The permit for the proposed power plant does not, however, require Mill Creek Units 1 and 2 to be retired by a date certain and, under the terms of the permit, the two coal units could continue to operate if the new gas-fired combined cycle unit is not constructed.[296] To the extent that Kentucky DAQ declines to conduct a control analysis for Mill Creek Units 1 and 2 based on the planned retirement of those units, the Agency must make those retirements federally enforceable through the Regional Haze SIP. Otherwise, Kentucky DAQ must conduct a Four-Factor Analysis. Such an analysis is provided herein.

Even if the retirement of Units 1 and 2 were enforceable, Kentucky DAQ must conduct a Four-Factor Analysis of NOx controls the combined-cycle units. While the new combined cycle unit will be equipped with SCR and the turbine will be equipped with dry low NOx combustors,[297] the permit does not include NOx emission limits that reflect application of these controls. New combined cycle plants with such controls are typically permitted with NOx limits of 2.0 parts per million (ppm), which equates to a NOx emission rate of about 0.008 lb/MMBtu.[298] Based on the 4,216 MMBtu/hour heat input capacity of the proposed new combined cycle plant,[299] the plant should not emit more than 148 tpy of NOx with the dry low NOx combustors and SCR. However, the permit only incorporates a 15 ppm NOx limit (based on the New Source Performance Standard (NSPS) limit in 40 C.F.R. Part 60, Subpart KKKK) and the permit does not definitively require continuous operation of the SCR system.[300] Thus, Kentucky DAQ must adopt additional NOx emission limitations for the new combined cycle plant to ensure that NOx emissions are minimized in a manner reflective of the control technology that will be installed. Such requirements should include a provision requiring operation in combined cycle mode and not allowing operation in simple cycle mode except for very limited periods, as well as limitations on emissions during periods of startup or shutdown. And as discussed above, the permit cannot include any affirmative defense or exemption for

[293] 88 Fed. Reg. 36654, 36745 (June 5, 2023).

[294] *See* SRP, SRP Selects Operation Plan for Coronado Generating Station: Units 1 and 2 to Run on Existing Selective Catalytic Reduction until 2032, (Jan. 6, 2020), https://media.srpnet.com/srp-selects-operation-plan-for-coronado-generating-station/.

[295] Stamper Report, Ex. 39, Title V Construction Permit No. C-0127-22-0046-V, Louisville Gas& Electric, Mill Creek Generating Station at 11 (May 2, 2024) (Condition S1) [hereinafter, "Mill Creek Permit"].

[296] Stamper Report at 56.

[297] Mill Creek Permit at 14 (under "Equipment" and "Control Devices").

[298] Stamper Report at 56-57.

[299] *See Id.* at 57.

[300] *Id.*

excess emissions during emergency operations. Kentucky DAQ must impose these limitations on NOx emissions from the new combined cycle power plant under its Regional Haze SIP.

3. Trimble County Generating Station

LG&E's Trimble County Generating Station consists of 2 coal-burning EGUs (Units 1 and 2) and six natural gas-fired simple cycle combustion turbines. Unit 1 (514 MW) and Unit 2 (760 MW) have wet limestone FGD systems, SCR, and baghouses. According to an NPCA, the Trimble County Generating Station is the 6th largest source of haze pollution in the state.[301]

Although each of the Trimble County units has FGD and SCR controls, Kentucky DAQ must evaluate opportunities for optimizing the operation of each units' controls. First, although Trimble County Unit 1's wet FGD was upgraded in 2005, its SO_2 removal efficiency has declined in each year since, and it appears that the scrubber is not being operated to achieve the maximum SO_2 removal efficiency.[302] Kentucky DAQ must evaluate the reasons for Unit 1's declining SO_2 removal efficiency, and the availability of cost-effective improvements. Kentucky DAQ must similarly evaluate whether Unit 2 can achieve greater SO_2 removal.[303]

Second, although both Trimble units are equipped with SCR, a review of monthly emissions data shows that Unit 1's emissions are consistently about three times higher than Unit 2.[304] Moreover, it appears that Unit 1 is not operating its SCR controls at the same removal efficiency during the non-ozone season months.[305] Accordingly, Kentucky DAQ must evaluate a requirement for Trimble Unit 1 to operate the SCR year-round and establish a NOx emission rate limit that reflects year-round operation of the SCR. Although sulfate is the dominant visibility impacting pollutant for the Class I areas affected by Kentucky pollution, the state cannot ignore potential cost-effective NOx optimizations or upgrades. Consideration of NOx is especially important given that, as SO_2 emissions continue to decline, NOx emissions are causing a greater proportion of visibility impacts in many Class I areas, especially during the winter months.[306]

4. H.L. Spurlock Generating Station

The H.L. Spurlock Generating Station consists of four coal-burning EGUs in Maysville, Kentucky. Units 1 (357.6 MW) and 2 (592.1 MW) are equipped with low NOx burners (and also close-coupled overfire air at Unit 2) and SCR, wet limestone FGD systems, an ESP and a wet ESP. Units 3 and 4 (329.4 MW each) are circulating fluidized bed (CFB) boilers with limestone injection and are also each equipped with SNCR, dry lime FGD, and baghouses. According to an

[301] *See* NPCA Kentucky Source Ranking.

[302] Stamper Report at 59.

[303] *Id.* at 59-60.

[304] *Id*.

[305] *Id.* at 60.

[306] Draft SIP Revision at 34-35.

NPCA analysis, the H.L. Spurlock Generating Station is the 4th on its list of sources of visibility impairment in Kentucky.[307]

As explained in the Stamper Report, as well as NPS's comments, Kentucky DAQ's refusal to evaluate potential emission reductions at Spurlock is flawed for several reasons. First, Kentucky DAQ appears to have unlawfully exempted Spurlock from any control analysis based on anticipated, but unenforceable, SO_2 emissions reductions. Kentucky relies on 2028 regional haze modeling, which assumes a reduction in emissions from approximately 4,702.60 tpy to 2842.30 tpy.[308] In fact, the modeled SO_2 emissions are lower than the 2017-2019 plantwide average SO_2 emissions of 3,470 tpy.[309] The Draft SIP Revision fails to include any explanation for this assumed reduction. Moreover, Kentucky DAQ cannot avoid evaluating the availability of additional emissions reductions based on an anticipated, unenforceable reduction in emissions, unless the Agency incorporates those operating parameters or assumptions as enforceable limitations in the second planning period SIP.[310]

Second, as explained in the Stamper Report, each of the Spurlock units should be able to consistently achieve 99% SO_2 control.[311] Because that level of controls is technically achievable and likely cost effective, Kentucky DAQ must evaluate requiring the Spurlock units to meet a level of SO_2 control of 99% and impose SO_2 emission limits consistent with that level of control.

Finally, although units 1 and 2 are equipped with low NOx burners and SCR, the units are only achieving NOx rates of 0.09 lb/MMBtu, even though SCR systems at similarly-situated coal EGUs burning bituminous coal should be able to achieve emission rates of at least as low as 0.07 lb/MMBtu, if not lower.[312] Thus, Kentucky DAQ must evaluate whether Spurlock can optimize operation of its SCR systems at Units 1 and 2 to lower NOx.

5. East Bend Generating Station

The East Bend Generating Station is a single unit coal-fired EGU operated by Duke Energy and located in Rabbit Hash (Boone County), Kentucky. It has a generating capacity of 648 MW. The unit is equipped with a wet lime scrubber, overfire air, SCR, and an ESP. According to NPS, East Bend Station is ranked #13 among the Kentucky facilities for haze contributions in Class I areas.[313] The unit ranks #95 of 238 VISTAS state sources for cumulative

[307] *See* NPCA Kentucky Source Ranking.

[308] Draft SIP Revision at 171.

[309] Stamper Report at 61-62.

[310] *See* 42 U.S.C. § 7410(a)(2)(A) (The Clean Air Act requires that "[e]ach state implementation plan . . . *shall*" include "enforceable limitations and other control measures" as necessary to "meet the applicable requirements" of the Act; 40 C.F.R. § 51.308(d)(3) (each SIP must include "enforceable emission limitations" as necessary to ensure reasonable progress toward the national visibility goal).

[311] Stamper Report at 62.

[312] Stamper Report at 62 (citing Sargent & Lundy, IPM Model – Updates to Cost and Performance for APC Technologies, SCR Cost Development Methodology for Coal-Fired Boilers at 2 (February 2022), available at https://www.epa.gov/power-sector-modeling/documentation-post-ira-2022-reference-case).

[313] NPS Comments at 53-54.

impact to VISTAS Class I areas, and #123 of 1,382 power plants in EPA's Clean Air Markets Database for overall SO_2 emissions (1,756 tons) and #148 for NOx emissions (1,466 tons) in 2021.[314]

As explained in the Stamper Report, as well as NPS's comments, Kentucky DAQ's refusal to evaluate potential emission reductions at East Bend is flawed for multiple reasons. First, Kentucky DAQ's decision to exempt East Bend from analysis is predicated on anticipated, but unenforceable SO_2 emissions reductions. Specifically, Kentucky DAQ relies on 2028 VISTAS regional haze modeling, which assumes a reduction in emissions from 2,680.74 tpy to 1,308.67 tpy, to avoid an evaluation of further control options.[315] The Draft SIP Revision fails to include any explanation for this reduction. In any event, to the extent Kentucky DAQ declines to evaluate additional emission reductions for East Bend based on anticipated reductions, the Agency must incorporate those operating parameters or assumptions as enforceable limitations in the second planning period SIP.[316]

Second, even if the assumed East Bend emission reductions were enforceable (they are not), Kentucky DAQ is still obligated to consider whether there are cost-effective control measures that could be implemented in the meantime.[317] As discussed in the Stamper Report, there are likely cost-effective measures that East Bend could implement to achieve lower annual SO_2 emissions in the short term.[318] For example, although East Bend's existing scrubber has been achieving about 97.5% SO_2 removal, the scrubber was designed for 99% SO_2 removal efficiency.[319] Such an improvement would reduce East Bend's annual SO_2 emission rate from as high as 0.126 lb/MMBtu to approximately 0.05 lb/MMBtu (well within the range of emission rates achieved by similar FGD systems), and would reduce SO_2 emissions by 1,400 tpy.[320] Given that the scrubber was designed to meet that improved emission rate, it is very likely that an enforceable 99% emission reduction rate would be technically achievable and cost effective. Kentucky DAQ must evaluate improvements to the East Bend scrubber that would achieve the designed level of SO_2 removal.

Third, Kentucky DAQ unreasonably refuses to evaluate potential improvements to the operation of the East Bend SCR controls. SCR systems at coal fired boilers burning bituminous

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[314] *Id.* at 54.

[315] Draft SIP Revision at 171.

[316] *See* 42 U.S.C. § 7410(a)(2)(A) (The Clean Air Act requires that "[e]ach state implementation plan . . . *shall*" include "enforceable limitations and other control measures" as necessary to "meet the applicable requirements" of the Act; 40 C.F.R. § 51.308(d)(3) (each SIP must include "enforceable emission limitations" as necessary to ensure reasonable progress toward the national visibility goal).

[317] 2019 Guidance § II.B.3(f) ("If a control measure involves only operational changes, there typically will be only small capital costs, if any, and the useful life of the source or control equipment will not materially affect the annualized cost of the measure"); 2021 Clarification Memo at 7 (in evaluating reasonable progress for all sources, states should consider the "full range of potentially reasonable options for reducing emissions . . . may be able to achieve greater control efficiencies, and, therefore, lower emission rates, using their existing measures").

[318] Stamper Report at 70.

[319] *See Id.* at 71 (citing Weilert, Carl & Emily Meyer, Burns & McDonnell, Utility FGD Design Trends).

[320] *See Id.*; *see also* NPS Comments at 53.

coal should be able to achieve emission rates of at least as low as 0.07 lb/MMBtu, if not lower.[321] Kentucky DAQ should evaluate whether Ghent can optimize operation of its SCR system.

B. Non-Electric Generating Unit Industrial Sources

Kentucky DAQ excludes from consideration possible cost-effective controls at a number of non-EGU point sources through its use of flawed modeling and an arbitrary source selection process, including the eight sources discussed below and at more length in the Stamper Report.

1. Century Aluminum Sebree, LLC

Century Aluminum operates two primary aluminum smelters in Kentucky, Century Aluminum Sebree, and Century Aluminum Hawesville.[322] Because the modeling relied upon by Kentucky DAQ is more than two years old, the Agency selects Century Aluminum Hawesville for PSAT Tagging,[323] but that facility was idled more than two years ago.[324] As pointed out in the Stamper Report, Kentucky DAQ must evaluate how the idling of the Hawesville facility may affect production at the Sebree facility.[325]

Regardless of the effects of the idling of the Hawesville facility, Kentucky DAQ must evaluate potentially feasible and cost-effective controls for Sebree. The facility lies approximately 119 km from Mammoth, generally northwest of the Park in the area showing the greatest impact in Kentucky DAQ's AOI analysis.[326] According to and NPCA analysis, Century Aluminum Sebree has emissions of 3,974 tons of SO_2, 176 tons of PM_{10}, and 45 tons of NO_X, and has a Q/d of 35.33 for Mammoth Cave National Park, making it a significant source of haze-inducing pollutants.[327] Yet, Kentucky DAQ did not further evaluate Century Aluminum Sebree.[328]

Century Aluminum Sebree is effectively uncontrolled for SO_2 or NO_X. As shown in the Stamper Report, there are several potentially cost-effective control technologies available to

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[321] Stamper Report at 71 (citing Sargent & Lundy, IPM Model – Updates to Cost and Performance for APC Technologies, SCR Cost Development Methodology for Coal-Fired Boilers at 2 (February 2022), available at https://www.epa.gov/power-sector-modeling/documentation-post-ira-2022-reference-case).

[322] Facility IDs 21101-7352311 and 21091-7352411 in Draft SIP Revision Table 7-28, respectively. Century Aluminum Hawesville is simply labeled as "Century Aluminum of KY LLC" in Table 7-28 and elsewhere in the Draft SIP Revision, but is referred to as Century Aluminum Hawesville here for clarity.

[323] Draft SIP Revision at 148.

[324] Century Aluminum, *Century Aluminum to Temporarily Idle Its Hawesville Smelter Due to Soaring Energy Prices; Issues WARN Notice to Employees*, https://centuryaluminum.com/investors/press-releases/press-release-details/2022/Century-Aluminum-to-Temporarily-Idle-Its-Hawesville-Smelter-Due-to-Soaring-Energy-Prices-Issues-WARN-Notice-to-Employees/default.aspx.

[325] Stamper Report at 64.

[326] Draft SIP Revision at 140-41.

[327] NPCA Kentucky Source Analysis.

[328] Draft SIP Revision at 164-65.

reduce the facility's substantial SO_2 emissions.[329] Sebree produces significant amounts of SO2 in the process of baking petroleum coke and coal tar pitch anodes.[330] The facility could entirely eliminate these emissions, as well as other greenhouse gas co-pollutants, by switching to use of inert anode technologies, with myriad additional benefits.[331] Sebree could also install wet FGD controls at the plant's potlines, which the facility analyzed in 2009 as a potential BACT control.[332] NPS revised Sebree's 2009 sodium based wet FGD analysis and found that this control could reduce SO_2 emissions at the plant by 3,700 tpy at a cost effectiveness of $5,700/ton.[333] The Stamper Report further revised the NPS cost analysis to reflect 2023 dollars and the current 8.5% bank prime rate.[334] The revised Stamper Report analysis shows that sodium based wet FGD would reduce SO_2 emissions from the plant by 3,727 tpy at a cost of $7,588/ton.[335] The costs for wet FGD at Sebree in both the NPS and Stamper Report analyses are well below the cost thresholds used by other states in this planning period.[336] Sebree could also very easily reduce its SO_2 emissions by limiting the sulfur content of the petroleum coke and pitch used to produce anodes.[337]

Kentucky DAQ must therefore require a full Four-Factor Analysis for the Century Aluminum Sebree plant.

2. Carmeuse Lime & Stone Black River Operation

Carmeuse Lime & Stone operates a limestone mine and lime manufacturing plant in Pendleton County, Kentucky, approximately 234 km from Mammoth Cave. The plant operates five coal-fired kilns. According to an NPCA analysis, the facility emits 1,136.96 tpy of SO_2 and 1,121.43 tpy of NOx, and has a Q/d of 10 for Mammoth Cave.[338] However, Kentucky DAQ does not select Carmeuse Lime for a Four-Factor Analysis.

In the VISTAS 2028 future year modeling, Kentucky DAQ modeled Carmeuse Lime's SO2 emissions at approximately half of the facility's current emissions, using 698.68 tpy of SO_2 for the facility.[339] The Agency does not explain anywhere in the Draft SIP Revision why it modeled such different SO_2 emissions than what the facility currently emits. Kentucky DAQ must either provide an adequate explanation for its modeled SO_2 emissions and provide

[329] Stamper Report at 63-69.

[330] *Id.* at 64-65.

[331] *Id.* at 66.

[332] *Id.*; NPS Consultation Letter at 36.

[333] NPS Consultation Letter at 37.

[334] Stamper Report at 67.

[335] *Id*.

[336] *See supra* pp. 30-31 & nn.172-74.

[337] Stamper Report at 69.

[338] NPCA Kentucky Source Analysis.

[339] *Id.*; Draft SIP Revision at 200.

documentation supporting its model assumptions, or it must correct the modeling to reflect the facility's current SO_2 emissions.

Moreover, as pointed out in the Stamper Report, there are likely available and cost-effective controls that would reduce the Carmeuse Lime plant's haze forming emissions.[340] For SO_2 control, Kentucky DAQ must consider requiring dry sorbent injection, a wet (semi-dry) scrubber, or a dry scrubber.[341] Indeed, because the facility already has baghouses on its five kilns, use of DSI could readily be installed at the five kilns and used in conjunction with the baghouses to reduce SO_2.[342] For NOx, it is not clear whether the facility is currently equipped with any NOx controls. However, there are readily available NOx controls that Kentucky DAQ must consider, including SNCR and catalytic filtration systems.[343] Both of these technologies have been installed at lime plants to reduce NOx emissions by 50% or 90%, respectively.[344]

Kentucky DAQ must select Carmeuse Lime and conduct a Four-Factor Analysis of SO_2 and NOx controls for the facility.

3. Tennessee Gas Pipeline Company, LLC – Stations 106 & 200

Tennessee Gas Pipeline Company operates 26 compressor engines between Stations 106 and 200 that were manufactured between 1946 and 1968.[345] The two facilities combined emitted in excess of 2,600 tons of NO_X in 2020 according to the NEI. Despite this, the two facilities are not mentioned in the Draft SIP, and Kentucky DAQ did not conduct Four-Factor Analyses for either facility.

According to the Stamper Report, there are significant cost-effective controls available for Stations 106 and 200.[346] First, Kentucky DAQ must consider replacing the engines at both stations given their age and should require Tennessee Gas Pipeline to replace the gas-fired engines with electric engines, which would eliminate all emissions from the engines and have myriad other benefits, including significantly lower maintenance costs.[347] EPA has found that replacing gas-fired engines with electric engines can be very cost effective for small and large engines at costs ranging from $1,228/ton of NOx reduced to $2,766/ton of NOx reduced.[348] Kentucky DAQ must also consider low emission combustion (LEC) controls for Station 106's and 200's gas-fired engines. LECs are readily available and can be retrofitted to most engines for NOx reductions of 87% at a cost-effectiveness of $47/ton to $332/ton of NOx reduced for

[340] Stamper Report at 71-74.

[341] *Id.* at 72.

[342] *Id.*

[343] *Id.* at 72-74.

[344] *Id.* at 74

[345] *Id.* at 74.

[346] *Id.* at 74-44.

[347] *Id.* at 75-76.

[348] *Id.* at 76.

engines of the same size as those at Stations 106 and 200.[349] SCR is also an available control that can cost-effectively reduce NOx emissions at lean burn engines.[350] Additionally, for Station 106's two gas-fired turbines, Kentucky DAQ must consider retrofitting the turbines with SCR to reduce NOx emissions by 90% or more.[351]

4. Kosmos Cement Company LLC

Kosmos Cement Company operates a single large cement kiln in southwest Jefferson County, directly adjacent to the LG&E Mill Creek Generating Station, and approximately 85 km north of Mammoth Cave. It is permitted to burn a variety of fuels including coal and petroleum coke.[352] According to NPCA's analysis of 2020 NEI data for Kosmos, the facility emits 1,339.35 tpy of NOx and 260 tpy of SO_2 and, because of its sizeable emissions and proximity to Mammoth Cave, the facility has a Q/d of 20.20 for that Class I area.[353]

In the VISTAS 2028 modeling, Kentucky DAQ used projected NOx emissions of 850 tons, which is significantly lower than the facility's recent emissions[354] Kentucky DAQ does not explain in the Draft SIP Revision why it's used NOx emissions in the modeling that are significantly lower than the facility's recent emissions. The Agency must either provide an explanation, including supporting documentation, or it must correct the modeling to reflect the facility's recent NOx emission levels.

Moreover, Kentucky DAQ must conduct Four-Factor Analyses for available NO_X and SO_2 controls. As with the Carmeuse Lime facility discussed above, Kentucky DAQ must evaluate available catalytic ceramic filtration systems for Kosmos to reduce NOx emissions by 90%.[355] Because Kosmos already uses SNCR, it already has ammonia injection installed on its kiln, which would reduce some of the capital costs of installing catalytic filters.[356] This control can also reduce SO_2 emissions with the addition of DSI.[357]

5. CC Metals and Alloys, LLC

CC Metals and Alloys, LLC operates a factory producing ferrosilicon and other ferroalloy products in Calvert City, Kentucky, just east of Paducah and approximately 162 km west of Mammoth Cave. According to NPCA's analysis of 2020 NEI data, the facility emits 184

[349] *Id.*at 76-77.

[350] *Id.*at 77.

[351] *Id.*

[352] *Id.* at 77.

[353] NPCA Kentucky Source Analysis.

[354] Stamper Report at 77; Draft SIP Revision at 200.

[355] Stamper Report at 78.

[356] *Id.*

[357] *Id.*

tpy of NOx, 349 tpy of SO_2, and 397 tpy of PM10,[358] but has seen emissions as high as 874 tons of SO_2.[359] Based on NPCA's analysis, CC Metals likely impacts Mammoth Cave National Park with a Q/d of 5.[360]

Kentucky DAQ does not analyze available controls to reduce emissions from CC Metals, even though the facility does not have any NO_X or SO_2 controls currently. The facility is currently permitted to burn a large variety of potentially high-sulfur fuels at its three submerged electric arc furnaces (EAFs), and could easily lower emissions by eliminating use of petroleum coke or utilizing lower-sulfur raw materials as fuel.[361] Kentucky DAQ must also analyze installation of dry scrubbers for the three EAFs, as EPA's RACT/BACT/LAER Clearing house shows that CDS has been installed on EAFs to achieve over 99% SO_2 removal.[362] For NOx, Kentucky DAQ must consider low NOx/oxyfuel burners, which have been required at other EAFs to meet BACT requirements.[363] CC Metals has existing baghouses for PM control, but Kentucky DAQ must analyze whether the facility's hooding and ducting is routing as much gas from the EAFs to the baghouses as possible because the facility's Title V permit currently assumes only 90% control for the existing baghouses.[364] Rather, the existing baghouses with hooding and ducting systems should be able to achieve up to 99.9% PM control.[365] To ensure this facility is reducing emissions to make reasonable progress in the second planning period, Kentucky DAQ must conduct Four-Factor Analyses of available NOx, SO_2, and PM controls for CC Metals.

6. Marathon Petroleum Company, LP – Catlettsburg Refining, LLC/MPLX Terminals, LLC

Marathon Petroleum operates a petroleum refinery in Catlettsburg in eastern Kentucky. The facility is approximately 260 miles west of Otter Creek Wilderness in West Virginia and, according to an NPCA analysis, has a Q/d of 5.9 for that Class I area and likely impacts seven other Class I areas.[366] The Draft SIP Revision states that the Catlettsburg Refinery emits approximately 200 tpy of SO_2 emissions,[367] but ignores that the facility also emits 323 tpy of PM10, 315 tpy of PM 2.5, and 958 tpy of NO_X.[368]

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[358] NPCA Kentucky Source Analysis.

[359] Draft SIP Revision at 171.

[360] NPCA Kentucky Source Analysis.

[361] Stamper Report at 78.

[362] *Id.*at 79.

[363] *Id.*

[364] *Id.*

[365] *Id.*

[366] NPCA Kentucky Source Analysis.

[367] Draft SIP Revision at 171.

[368] NPCA Kentucky Source Analysis.

Given the facility's significant haze-forming emissions, Kentucky DAQ must analyze available controls that would likely cost-effectively reduce emissions from the facility's fluidized catalytic cracking unit (FCCU), boilers, heaters, sulfur plants, and processing units. As explained in the Stamper Report, there are available controls to reduce NOx emissions from the Refinery's FCCU, boilers, and heaters, including SCR and low NOx burners. California, Texas, Massachusetts, New York, and Georgia have all set NOx emission limits for refineries that reflect use of low NOx burners, ultra low NOx burners, SNCR, and SCR, and the San Joaquin Valley Air Pollution Control District (SJVAPCD) determined that ultra low NOx burners at refineries are highly cost effective at $545/ton to $3,270/ton of NOx reduced.[369] The SJVAPCD also found that SCR employed to meet a NOx emission rate of 2.5 ppm had a cost effectiveness of $1,025/ton to $6,149/ton of NOx reduced for heaters and boilers as small as 30 MMBtu/hr.[370] Indeed, SCRs have been retrofitted at numerous refineries, including on FCCUs.[371]

7. Domtar Paper Company, LLC – Hawesville

Domtar Paper Company, LLC operates a pulp and paper mill in Hawesville, Kentucky, along the Ohio River between Louisville and Owensboro. It is approximately 80 km north/northwest of Mammoth Cave. Domtar Paper Hawesville emits 1,014 tpy of NOx, 214 tpy of PM10, and 153 tpy of PM2.5 and has a Q/d of 15.87 for Mammoth Cave, according to an NPCA analysis.[372] Despite the facility's significant NOx emissions, Domtar Paper Hawesville does not employ any NOx controls.[373] Kentucky DAQ must select Domtar Paper Hawesville for a Four-Factor Analysis of potential NOx controls.

8. Kentucky DAQ Fails to Select Nine Additional Sources That Likely Contribute to Impairment at Class I Areas.

In addition to the sources noted above, Kentucky DAQ also fails to select nine additional sources that likely contribute to visibility impairment at in-state and out-of-state Class I Areas: Columbia Gulf Transmission Co.; Tennessee Gas Pipeline Co., LLC – Stations 96 and 871; ANR Pipeline Co. – Madisonville Compressor Station; Texas Gas Transmission, LLC; Arcosa Lightweight of Kentucky, LLC; Phoenix Paper Wickliffe, LLC; Kingsford Manufacturing Company; Logan Aluminum, Inc.; and Kenway-Concrete of Kentucky, LLC. Each of these sources have reported NOx and/or SO_2 emissions in the 2020 NEI and, according to an NPCA analysis, have Q/ds of 5 more for multiple Class I Areas in the Southeast.[374]

For example, Tennessee Gas Pipeline Co. Station 96 similarly emits significant amounts of haze-forming pollution and impacts multiple Class I Areas. According to NPCA's analysis, Station 96 emits 1,281.51 tpy of NOx and likely impacts Mammoth Cave National Park with a

[369] Stamper Report at 81.

[370] *Id.*

[371] *Id.*

[372] NPCA Kentucky Source Analysis.

[373] Stamper Report at 82.

[374] *See generally* NPCA Kentucky Source Analysis.

Q/d of 22.45, Great Smoky Mountains National Park with a Q/d of 5.52, and Joyce-Kilmer Slickrock Wilderness Area with a Q/d of 5.24.[375]

Although each of these nine sources likely contribute to visibility impairment at both in-state and out-of-state Class I Areas, Kentucky DAQ erroneously does not select any of them for a Four-Factor Analysis. The Agency must conduct a Four-Factor Analysis of potential controls for each of these facilities to ensure that the State meets the Clean Air Act's requirements to make reasonable progress in the second planning period.

VIII. Kentucky DAQ Did Not Follow the Required Planning Sequence in Setting Its Reasonable Progress Goals.

Kentucky DAQ recognizes in the Draft SIP Revision EPA's "long-standing" SIP planning sequence whereby states must first identify in their long-term strategies controls *and then* develop reasonable progress goals.[376] As the Agency explains, reasonable progress goals "must reflect the visibility conditions that are projected to be achieved by the end of the applicable implementation as a result of those enforceable emission limitations, compliance schedules, and other measures established as part of the [long-term strategy,] as well as the implementation of other [Clean Air Act] requirements."[377]

Kentucky DAQ did not follow EPA's SIP planning sequence in setting the reasonable progress goals for Mammoth Cave National Park. First, as discussed above, the Agency fails to identify the enforceable emission limits and other measures necessary for reasonable progress that form the basis of the long-term strategy for the second planning period.[378] As a result, it also has not properly identified controls and limits that form the basis of the reasonable progress goals. Second, Kentucky DAQ states that it used the VISTAS modeling to determine its reasonable progress goals for Mammoth Cave.[379] Yet, that VISTAS modeling was conducted in 2020, well before Kentucky DAQ analyzed controls for its two selected sources and proposed its long-term strategy in this Draft SIP Revision.[380] In fact, the Agency admits that it did not follow the planning sequence, stating that the reasonable progress goals for Mammoth Cave "do not include reductions resulting from four-factor reasonable progress analyses or recently announced retirements and fuel switches" and that it "is not adjusting the [reasonable progress goals] to account for these reductions."[381] Kentucky DAQ's reasonable progress goals are, thus, not

[375] NPCA Kentucky Source Analysis.

[376] 82 Fed. Reg. at 3091.

[377] Draft SIP Revision at 97 (stating that reasonable progress coals "must be met through measures contained in the state's [long-term strategy] through the year 2028" and citing 40 C.F.R. § 51.308(f)(3)); *id.* at 179 (same).

[378] *See supra* Section VI.

[379] Draft SIP Revision at 179 ("Through the VISTAS modeling, Kentucky estimated the expected visibility improvements by 2028 in Mammoth Cave National Park.").

[380] Draft SIP Revision, App. E-6, VISTAS, Future Year Model Projections Task 9a (Sept. 23, 2020).

[381] *Id.* at 180.

reflective of the visibility improvements that the long-term strategy controls will achieve, in violation of the Clean Air Act and RHR.

IX. Kentucky DAQ's State-to-State Consultations Violate the Clean Air Act and the RHR.

"Congress was clear that both downwind states (*i.e.*, 'a State in which any [mandatory Class I Federal] area . . . is located[']) and upwind states (*i.e.*, 'a State the emissions from which may reasonably be anticipated to cause or contribute to any impairment of visibility in any such area') must revise their SIPs to include measures that will make reasonable progress at all affected Class I areas."[382] "This consultation obligation is a key element of the regional haze program. Congress, the states, the courts and the EPA have long recognized that regional haze is a regional problem that requires regional solutions."[383] Congress intended this provision of the Clean Air Act to "equalize the positions of the States with respect to interstate pollution,"[384] and EPA's interpretation of this requirement accomplishes this goal by ensuring that downwind states can seek recourse from EPA if an upwind state is not doing enough to address visibility transport.[385]

In developing a long-term strategy for regional haze, 40 C.F.R. § 51.308(f)(2) requires that a state take three distinct steps: consultation; demonstration; and consideration. Specifically, the regulation requires:

> (ii) The State must consult with those States that have emissions that are reasonably anticipated to contribute to visibility impairment in the mandatory Class I Federal area to develop coordinated emission management strategies containing the emission reductions necessary to make reasonable progress.
>
> (A) The State must demonstrate that it has included in its implementation plan all measures agreed to during state-to-state consultations or a regional planning process, or measures that will provide equivalent visibility improvement.
>
> (B) The State must consider the emission reduction measures identified by other States for their sources as being necessary to make reasonable progress in the mandatory Class I Federal area.[386]

In its 2017 amendments to the RHR, EPA explained that "states *must* exchange their four-factor analyses and the associated technical information that was developed in the course of

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[382] 82 Fed. Reg. at 3094.

[383] *Id.* at 3085 (citing *Vermont v. Thomas*, 850 F.2d 99, 101 (2d Cir. 1988)).

[384] S. Rep. No. 95-127, at 41 (1977).

[385] *Id.*

[386] 40 C.F.R. § 51.308(f)(2) (emphasis added); *see also*, 64 Fed. Reg. 35,765, 35,735 (July 1, 1999) (explaining that "the State must consult with other States which are anticipated to contribute to visibility impairment in the Class I area under consideration [and] any such State must consult with other States before submitting its long-term strategy to EPA").

devising their long-term strategies. This information includes modeling, monitoring and emissions data and cost and feasibility studies."[387] In the event of a recalcitrant state, "[t]o the extent that one state does not provide another other state with these analyses and information, or to the extent that the analyses or information are materially deficient, the latter state should document this fact so that the EPA can assess whether the former state has failed to meaningfully comply with the consultation requirements."[388] In any event, "[a]ll substantive interstate consultations must be documented."[389]

A. Kentucky DAQ's State-to-State Consultation Process Is Inadequate.

Kentucky DAQ fails to meaningfully consult with numerous states that have emissions that are reasonably anticipated to contribute to visibility impairment in Mammoth Cave National Park and to develop coordinated emission management strategies with these states containing the emission reductions necessary to make reasonable progress, in violation of 40 C.F.R. § 51.308(f)(2). Kentucky DAQ selects no sources in other VISTAS states and only four sources in two non-VISTA states: Indiana Michigan Power – Rockport (Indiana), Duke Energy – Gibson (Indiana), New Madrid Power Plant – Marston (Missouri), and Indianapolis Power & Light – Petersburg (Indiana).[390]

As discussed above, Kentucky DAQ relies on the outdated and flawed VISTAS modeling and source selection process to eliminate consideration of a number of out-of-state sources. Kentucky DAQ must request consultation with other VISTAS states, and non-VISTAS states. Specifically, as shown in the of VISTAS stat sources, sources in Florida, Georgia, Alabama, Mississippi, Tennessee, South Carolina, West Virginia, and Virginia likely impact visibility impairment at Mammoth Cave National Park, based on an NPCA analysis of 2023 CAMPD and 2020 NEI data.[391]

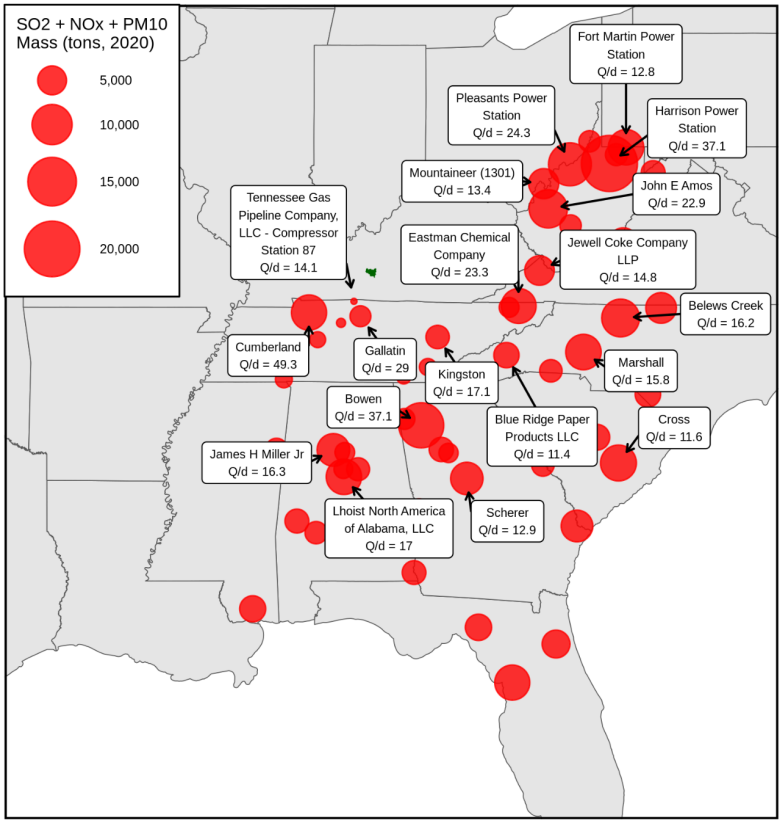
[387] 82 Fed. Reg. at 3088 (emphasis added).

[388] *Id.*

[389] *Id.* § 51.308(f)(2)(ii)(C).

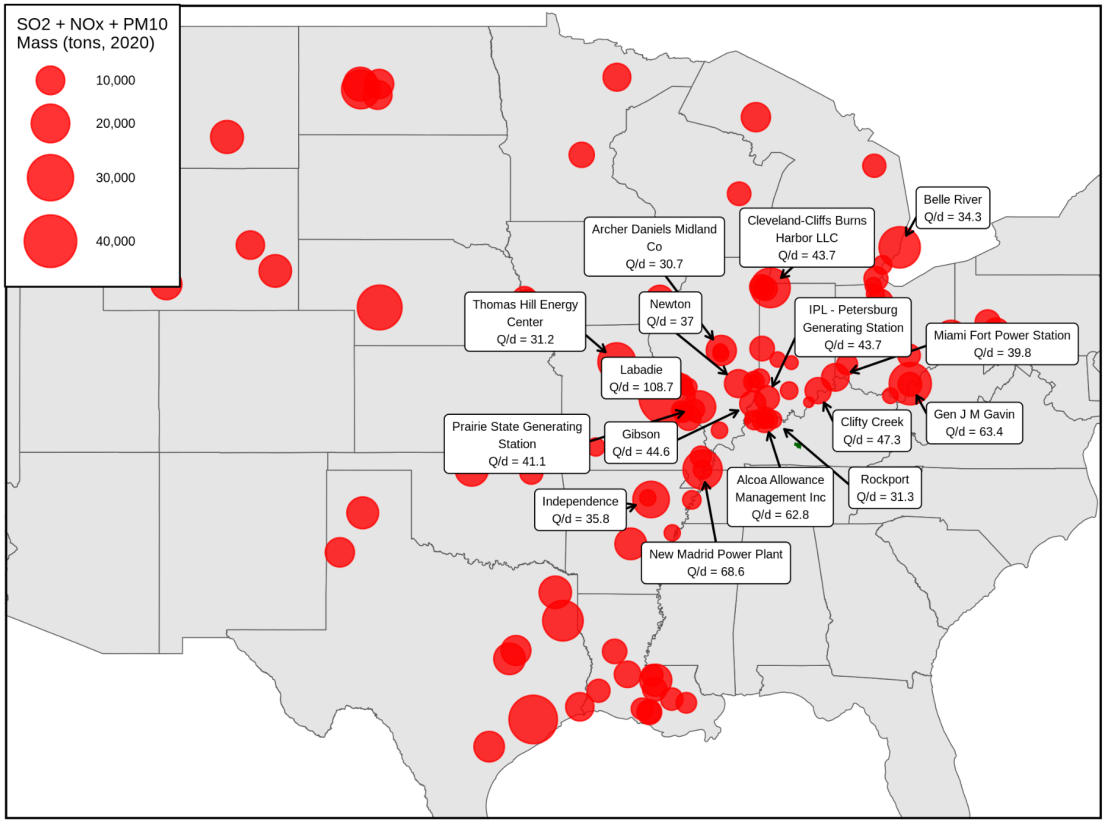
[390] Draft SIP Revision at 189-90.

[391] NPCA Kentucky Source Analysis (see "NonKYSourcesImpactKYCIA" tab).



Kentucky DAQ must also request consultation with other non-VISTAS states. Specifically, as shown in the map below of sources in non-VISTAS states, numerous sources in surrounding states including Nebraska, Arkansas, Iowa, Illinois, Indiana, Missouri, and Ohio, and as far away as Montana, Texas, and Minnesota impact visibility impairment at a Q/d greater than 5 at Mammoth Cave National Park.[392]

[392] *See id.*



B. Kentucky DAQ's Interstate Consultations with Indiana and Missouri Are Flawed and Incomplete.

To evaluate potential reasonable progress emission reductions from out-of-state sources, Kentucky DAQ relies on VISTAS' modeling and source screening process.[393] Even setting aside the flaws with the Agency's methodology, Kentucky DAQ's consultations with Indiana and Missouri are inadequate and incomplete. Kentucky DAQ summarizes the responses from Indiana and Missouri, but provides no analysis or evidence of any true consultation as required by the Clean Air Act and RHR.

1. Indiana

Kentucky DAQ selects three Indiana EGUs for consultation based on their impact at Mammoth Cave National Park. By letter dated June 22, 2020, VISTAS, on behalf of Kentucky and other VISTAS states, requested that Indiana conduct (or require the sources to initiate and share) reasonable progress analyses for certain sources, including Indiana Michigan Power – Rockport, Duke Energy – Gibson, and Indianapolis Power & Light – Petersburg.[394] By email dated October 22, 2020, Indiana advised VISTAS that it was "working closely with LADCO to

[393] Draft SIP Revision at 148, 155, 188-89.

[394] Draft SIP Revision, App. F-2a, Letter from John E. Hornback, Exec. Dir., VISTAS to Keith Baugues, Asst. Comm'nr, In. Off. Air Quality at 2 (June 22, 2022).

identify and complete a detailed analysis of sources within the region that contribute to Class 1 areas throughout the country, including those within the VISTAS region. This work includes modeling, source and sector tagging, and 4-factor analyses for affected sources."[395] Nevertheless, in a formal response dated December 22, 2021, the Indiana Department of Environmental Management (IDEM) declined to conduct Four-Factor Analysis for any of its EGUs, including the three sources Kentucky DAQ identifies.[396] IDEM stated that it chose to evaluate other emission sectors for this implementation period and would "evaluate EGUs for the third implementation period of the RH rule, as necessary, to be submitted in 2028."[397]

Kentucky DAQ's SIP is incomplete, and it must not accept the lack of a response from Indiana. As the record for the Indiana Regional Haze Plan shows there are, in fact, feasible and likely cost-effective controls available to reduce emissions from Indiana EGUs, including the three that Kentucky DAQ identifies.[398] Kentucky DAQ cannot simply ignore that there are available controls for these facilities. Yet, nothing in the Draft SIP indicates that Kentucky DAQ followed up with Indiana as required by the RHR, requested more information, agreed or disagreed regarding the need for a Four-Factor Analysis, or took any additional steps to ensure reasonable progress. If Kentucky DAQ disagrees with IDEM, there is no discussion as to how those disagreements were resolved. The Draft SIP Revision is therefore incomplete and must be supplemented with the missing analysis before submittal to EPA.

To correct this error, Kentucky DAQ must follow-up with Indiana on its three EGUs and provide adequate documentation explaining the substance of its discussions with Indiana, any disagreements that may arise, and how those disagreements are resolved.

2. Missouri

The fourth source that Kentucky DAQ identifies for state-to-state consultation, New Madrid Power Plant, is located in Missouri. By letter dated June 22, 2020, VISTAS, on behalf of Kentucky and other VISTAS states, requested that Missouri conduct (or require the source to initiate and share) a Four-Factor Analysis for New Madrid Power Plant-Marston.[399] On October 19, 2020, Missouri sent a letter in response, stating that it requested information from the facility and would provide the information once it was received and reviewed.[400] Nothing in the Draft SIP Revision shows that Kentucky DAQ ever received this analysis. Instead, Kentucky DAQ

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[395] Draft SIP Revision, App. F-2d, Email from Scott Deloney, In. Dep't Env't Mgmt., to Chad LaFontaine, VISTAS (Oct. 22, 2022).

[396] *See generally* Draft SIP Revision, App. F-2f, Letter from Chad LaFontaine, VISTAS, to Scott Hodges, Interim Exec. Dir., In. Dep't Env't Mgmt. (Dec. 22, 2021).

[397] *Id*. at 33.

[398] *See* Joe Kordzi, A Review of the Indiana Regional Haze State Implementation Plan, at 11-14, 19-21 (Nov. 2021) (attached as Ex. 24).

[399] Draft SIP Revision, App. F-2b, Letter from John E. Hornback, Exec. Dir., VISTAS to Darcy A. Bybee, Dir. Mo. Air Pollution Control Program (June 22, 2022).

[400] Draft SIP Revision, App. F-2g, Letter from Darcy A. Bybee, Dir. Mo. Air Pollution Control Program, to Chad LaFontaine, VISTAS (Oct. 19, 2020).

relies on Missouri's conclusions in Missouri's August 26, 2022 Regional Haze Plan for the Second Planning Period finding that "as a result of the four-factor analysis, no new control measures are required to be installed at New Madrid. The analysis considered DSI, spray dryer absorber (SDA) FGD, and wet FGD systems for the control of SO_2 emissions. All were considered feasible but not cost effective."[401] Kentucky DAQ also notes, without sufficient analysis, that "Missouri entered into a consent agreement with New Madrid which requires the plant burn primarily western sub-bituminous coal to limit SO_2 emissions and to continuously operate separated over-fire air and SCR to control NOx."[402]

Kentucky DAQ does not state whether it reviewed the Four-Factor Analysis and technical evaluation for New Madrid-Marston, or whether it agrees with Missouri's conclusions as to cost effectiveness. There is also no evidence in the Draft SIP Revision that Kentucky DAQ followed up with Missouri regarding its analysis or conclusions as required by the RHR. Furthermore, EPA now proposes to partially disapprove Missouri's Regional Haze SIP.[403] Specifically, EPA proposes to disapprove of that state's long-term strategy, including its interstate consultation.[404] With regard to SO_2 controls, EPA stated that

> if Missouri would have set the cost threshold for this planning period nearer other states thresholds or near the maximum of costs from the first planning period (i.e., around $6,000/ton), both the cost effectiveness values presented by Missouri and the EPA's revised values would be below that threshold for most SO2 control types.[405]

EPA also proposes to find "that existing SCR should be required to be operated continuously on those units already equipped with SCR at the John Twitty, Thomas Hill, and New Madrid plants."[406]

Kentucky DAQ may not simply give Missouri a free pass to ignore cost-effective reasonable progress controls for the New Madrid Power Plant that would improve visibility in Mammoth Cave National Park. Instead, Kentucky DAQ must follow-up with the State, particularly once EPA finalizes its proposed disapproval for that state's plan, and request a Four-Factor Analysis for Marston anew. Kentucky DAQ must also adequately document its consultation with Missouri for this facility, including any disagreements with Missouri's approach for the facility and how those disagreements were resolved. Without such analysis and documentation, the Draft SIP Revision is incomplete and must be supplemented with the missing analysis before submittal to EPA.

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[401] Draft SIP Revision at 214.

[402] *Id.* at 215.

[403] 89 Fed. Reg. 55,140 (July 3, 2024).

[404] *Id.* at 55,165.

[405] *Id.* at 55,158.

[406] *Id.* at 55,160.

C. Kentucky DAQ Fails to Adequately Consult with Arkansas, Tennessee, Georgia, Florida, and North Carolina as Requested.

Kentucky DAQ received letters from other states requesting reasonable progress Four-Factor Analyses for certain facilities in Kentucky. On February 4, 2020, Arkansas requested a Four-Factor Analysis analysis for TVA – Shawnee (Appendix F-2c). The following VISTAS states also requested a Four-Factor Analysis for TVA – Shawnee: Tennessee (October 23, 2020 - Appendix F-1a); West Virginia (November 6, 2020 - Appendix F-1b); Georgia (November 24, 2020 - Appendix F-1c); Florida (December 18, 2020 - Appendix F-1d); and North Carolina (February 1, 2021 - Appendix F-1e).

Based on the record, it appears that Kentucky DAQ failed to respond to these states' requests for a Four-Factor Analysis for TVA – Shawnee. Moreover, there is nothing in the record indicating that Kentucky DAQ followed up with those states to resolve whether additional reductions are necessary to ensure reasonable progress. Consequently, the Draft SIP Revision is incomplete on its face.

Furthermore, Kentucky DAQ conducted all of its consultations prior to the updates at TVA Shawnee and Big Rivers Wilson Stations discussed, above.[407] One non-VISTAS state, and five VISTAS states requested Four-Factor Analyses from Kentucky, but the Agency fails to describe whether any follow-up was conveyed to any of these other states.[408] The Agency also fails to note whether it shared the Four-Factor Analysis or revised Four-Factor Analysis conducted by TVA with any of the other states that requested such analyses for Shawnee, clearly falling short of its consultation requirements under the RHR.[409]

D. Kentucky DAQ Fails to Adequately Consult with MANE-VU States.

MANE-VU notified Kentucky DAQ that in-state sources may impact Class I areas in its region, however the Draft SIP Revision fails to identify which sources MANE-VU requested consultation on.[410] The Draft SIP Revision lists several concerns with MANE-VU's "Asks," specifically regarding the timing, technical analysis (including inventories, modeling, and evaluation), and reliance on reductions that are not permanent and enforceable.[411] In response to MANE-VU's consultation request, VISTAS, on behalf of states in the region including

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[407] *Compare* Draft SIP Revision at 191 (listing consultation requests from Arkansas, Tennessee, Georgia, Florida, West Virginia, and North Carolina from Feb. 4, 2020 through Feb. 1, 2021), *with id.* at 174-75 (explaining that Shawnee applied to modify its Title V permit and implement an SO_2 emissions cap in August 2023).

[408] *See id.* at 191-93.

[409] 40 C.F.R. § 51.308(2)(ii)(A), (C); 2019 Guidance at 52 (The consultation requirement "is meant to ensure that states share and consider each other's technical information, and does not mean that states' strategies must be developed with the same thresholds and other decision approaches or that states must apply the same measures to similar sources.").

[410] Draft SIP Revision at 193-96; Draft SIP Revision, App. F-4, Letter from Letter from John E. Hornback, Exec. Dir., VISTAS, to David Foerter, Ozone Transp. Comm'n (Jan. 27, 2018) [hereinafter "VISTAS letter to MANE-VU"].

[411] Draft SIP Revision at 193-96.

Kentucky, stating that "it is not possible for the seven VISTAS states to provide a detailed technical response to the MANE-VU requests."[412] Moreover, it appears that Kentucky DAQ did not engage in any consultation with MANE-VU after May 2018, well before the Agency selected any sources for Four-Factor Analyses or finalized its long-term strategy.[413]

Thus, Kentucky DAQ fails to meaningfully engage in consultation with MANE-VU and the states in that region. Indeed, the entire section in the Draft SIP Revision on the consultation process with MANE-VU appears to be directly copied and pasted from North Carolina's April 2022 Final Regional Haze State Implementation Plan (SIP) for North Carolina Class I Federal Areas for Second Planning Period (2019 – 2028),[414] with no attempt to include any Kentucky-specific information. The Draft SIP Revision even states that "Appendix F-4 provides documentation of *North Carolina's* consultation with MANE-VU including *North Carolina's* and VISTAS' comments on the MANE-VU Ask."[415] The Draft SIP Revision further states that "[d]uring the consultation process, Florida, North Carolina, Tennessee, Virginia, and West Virginia submitted to MANE-VU updated information on emissions associated with facilities identified in the MANE-VU Ask and documenting concerns with MANE-VUs approach and conclusions."[416] However, nothing in the Draft SIP Revision indicates that Kentucky DAQ followed-up with MANE-VU to provide new information or analyses once the Agency developed its Draft SIP Revision.

The only Kentucky-specific information in the entire section is the last paragraph, which notes that Kentucky Power Company's Big Sandy Plant has closed one unit and converted the other to natural gas.[417] The Agency does not state what other sources, if any, were covered by the MANE-VU Asks, and so it is clearly deficient in documenting all interstate consultations.[418] As noted above, if the Ask included either TVA Shawnee or Big Rivers' Wilson stations, the Agency conducted all of its consultation prior to the updates at those plants.

X. Kentucky DAQ Did Not Meaningfully Respond to FLM Consultation Comments.

The consultation process with FLMs is a critical step in the SIP development process. FLMs contribute valuable expertise in managing the very Class I resources that the Regional Haze Program was created to protect. States must consult with FLMs on (1) their assessment of visibility impairment in impacted Class I Areas and (2) their recommendations on the

[412] VISTAS letter to MANE-VU at 1.

[413] Draft SIP Revision at 193.

[414] N.C. Dep't Env't Quality, Final Regional Haze State Implementation Plan (SIP) for North Carolina Class I Federal Areas for Second Planning Period (2019 – 2028) (Apr. 04, 2022), https://www.deq.nc.gov/about/divisions/air-quality/air-quality-planning/state-implementation-plans-sips/regional-haze-state-sip (attached as Ex. 25).

[415] Draft SIP Revision at 193 (emphasis added).

[416] *Id.* at 196.

[417] *Id.*

[418] 40 C.F.R. § 51.308(f)(2)(ii)(C).

development and implementation of strategies to address such impairment.[419] FLM consultation must take place "early enough in the State's policy analyses of its long-term strategy emission reduction obligation so that information and recommendations provided by the Federal Land Manager can *meaningfully inform* the State's decisions on the long-term strategy."[420] Thus, the FLM consultation process is not a mere box checking exercise. Rather, it is a mandatory, iterative, and substantive process, requiring Kentucky DAQ to meaningfully consider and incorporate into its SIP Revision the FLMs' concerns. In order for the public and EPA to assess whether states have satisfied their consultation requirements, states must also document the timing and content of their consultation with FLMs, including a description of how states addressed any comments provided by FLMs.[421]

Here, although Kentucky DAQ provided FLMs an opportunity to consult on the Draft SIP Revision, the Agency did not meaningfully engage with or respond to the FLMs' recommendations or incorporate any of the FLMs' suggestions into the Draft SIP Revision. As we detail in these comments above, Kentucky DAQ did not incorporate any of the FLMs' suggestions on the following problems:

- The Draft SIP Revision should more clearly acknowledge that in-state sources contribute to visibility impairment at Great Smoky Mountains and Shenandoah National Parks;[422]
- The source screening process used unreasonably high thresholds and resulted in the selection of a small number of sources that account for only a small portion of the State's contribution to impairment at Class I Areas in the region;[423]
- Nitrate and NOx pollution account for a significant portion of visibility impairment at Class I Areas in the region, including Mammoth Cave National Park, and Kentucky DAQ should conduct Four-Factor Analyses of NOx controls for the State's major sources of NOx pollution;[424]
- Kentucky DAQ should revise its source selection and conduct Four-Factor Analyses for 13 additional in-state sources;[425]
- Kentucky DAQ should require in-state sources to adopt and install all technically feasible and cost-effective controls identified in Four-Factor Analyses for this planning period;[426]

[419] 40 C.F.R. § 51.308(i)(2)(i)-(ii); *see also* 42 U.S.C. § 7491(d).

[420] 40 C.F.R. § 51.308(i)(2) (emphasis added); Env't Prot. Agency, Responses to Comments at 445, Protection of Visibility: Amendments to Requirements for State Plans; Proposed Rule, 81 Fed. Reg. 26,942 (May 4, 2016), Docket No. EPA-HQ-OAR-2015-0531 (Dec. 2016).

[421] 40 C.F.R. § 51.308(i)(3).

[422] NPS Consultation Letter at 5.

[423] *Id.* at 8-10; Forest Serv. Consultation Letter at 2.

[424] NPS Consultation Letter at 6-8; Forest Serv. Consultation Letter at 2-3.

[425] NPS Consultation Letter at 10-12 & tbl.1.

[426] *Id.* at 3, 12-70.

- Kentucky DAQ must ensure anticipated emission reductions, operating scenarios, pollution control efficiencies, and source shutdowns or fuel conversions are federally enforceable.[427]

Rather than provide substantive and meaningful responses to the FLMs' recommendations on these points, Kentucky DAQ provides only perfunctory responses that fail to grapple with the issues the FLMs raised. For example, in response to FLM comments that Kentucky DAQ should analyze NOx controls and select additional in-state sources that contribute to impairment at Class I Areas throughout the VISTAS region, Kentucky DAQ merely summarizes its selection process, without responding to any of the errors in that process raised by FLMs, and repeats that the selection process identified only two sources for Four-Factor Analyses.[428] Indeed, Kentucky DAQ does not acknowledge, let alone meaningfully respond to, the detailed and extensive technical analyses that NPS provided for each of the 13 additional sources it recommended for analysis in the Draft SIP Revision.[429] Contrary to the requirements of the Clean Air Act and RHR, Kentucky DAQ treated FLM consultation as a mere box checking exercise, making only terse, inadequate responses to FLM recommendations.[430]

Moreover, as discussed above and noted by the FLMs, Kentucky DAQ's source selection, source-specific analyses, long-term strategy, and reasonable progress goals all violate the requirements of the Clean Air Act and RHR.[431] Thus, the Agency's FLM "consultation was based on a [Draft] SIP [R]evision that did not meet the required statutory and regulatory requirements" of the Clean Air Act and RHR.[432] Kentucky DAQ must correct the errors discussed above and conduct consultation anew, meaningfully considering, incorporating, and responding to FLM recommendations.

XI. Kentucky DAQ Fails to Incorporate Environmental Justice and Civil Rights Considerations into its Draft SIP Revision.

EPA has encouraged states to address equity and environmental justice in their regional haze SIPs for the second implementation period. Indeed, the Draft SIP Revision provides an opportunity for Kentucky DAQ to advance environmental justice and civil rights by implementing additional emission controls to reduce harms from visibility impairing pollution on disproportionately impacted communities. Rather than take advantage of this unique opportunity, Kentucky DAQ generally ignores environmental justice and civil rights impacts in its Draft SIP Revision.

[427] *Id.* at 15-16; Forest Serv. Consultation Letter at 3.

[428] Draft SIP Revision at 201, 203-04, 209, 211.

[429] *See generally id.* at 197-211.

[430] 42 U.S.C. § 7491(d); 40 C.F.R. § 51.308(i)(2)(i)-(ii).

[431] *See supra* Sections IV-VIII.

[432] 89 Fed. Reg. at 47,436.

A. EPA Regional Haze Memorandum and Guidance Directs States to Consider Environmental Justice.

In its regional haze memorandum and guidance, EPA urges states to incorporate environmental justice into their SIP revisions. In its 2021 Clarification Memo, EPA explains that states can and should advance equity goals by conducting meaningful outreach to environmental justice communities and ensuring adequate opportunities for feedback on proposed SIPs.[433] EPA also explains that states should consider environmental justice and equity in their technical analyses, both when determining which sources to select for a Four-Factor Analysis and when determining what reasonable progress measures to require for a source.[434]

Additionally, EPA's 2019 Guidance specifies that "[s]tates may also consider any beneficial non-air quality environmental impacts."[435] This includes consideration of environmental justice in keeping with other agency policies. For example, EPA pointed to guidance under the National Environmental Policy Act (NEPA) that states could rely upon in assessing non-air quality environmental impacts in their Regional Haze SIPs: "When there are significant potential non-air environmental impacts, characterizing those impacts will usually be very source- and place-specific. Other EPA guidance intended for use in environmental impact assessments under [NEPA] may be informative."[436] One of these policies concerns environmental justice.[437] Kentucky DAQ should consider these sources of information in conducting a meaningful environmental justice analysis.

B. Kentucky DAQ Must Consider Title VI of the Civil Rights Act.

Kentucky DAQ and all other entities that accept federal funding must consider civil rights of impacted communities to comply with applicable federal law. Title VI of the Civil Rights Act of 1964 requires Kentucky, as a recipient of federal funding, to ensure that federal funds do not subsidize activities or programs that discriminate on the basis of race, color, or national origin.[438] Kentucky DAQ is obligated, then, to ensure the fair treatment of communities that have been and still are impacted by sources of pollution. Specifically, it must ensure the fair treatment of these communities in the development and implementation of agency programs and activities, including those related to its SIP Revision. Kentucky DAQ should conduct a thorough analysis of the current and potential effects on impacted communities from sources considered in the SIP Revision, as well as those facilities that commenters and other stakeholders identified but that the Agency did not review.

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[433] 2021 Clarification Memo at 16.

[434] *Id.*

[435] 2019 Guidance at 42.

[436] *Id.* at 33. A collection of EPA policies and guidance related to NEPA is available at https://www.epa.gov/nepa/national-environmental-policy-act-policies-and-guidance.

[437] *See* Env't Prot. Agency, Environmental Justice and National Environmental Policy Act (last updated Jan. 29, 2024), https://www.epa.gov/environmentaljustice/environmental-justice-and-national-environmental-policy-act.

[438] 42 U.S.C. § 2000d.

C. EPA Itself Must Consider Environmental Justice.

Ultimately, EPA must review Kentucky DAQ's final SIP Revision and must ensure that its action on the Agency's SIP Revision addresses any disproportionate environmental impacts resulting from haze pollution and its precursors. Executive Orders in place since 1994 require EPA to make environmental justice "part of its mission by identifying and addressing . . . disproportionately high and adverse human health or environmental effects of its programs, policies, and activities," including Regional Haze SIP actions, "on minority populations and low-income populations."[439]

The Biden Administration has reaffirmed this directive through a series of recent Executive Orders. In 2021, the Biden Administration issued back-to-back Executive Orders directing federal agencies, including EPA, to incorporate environmental justice into all of their actions. With these Orders, the Biden Administration directs agencies to embed equity in their missions, programs, and services,[440] providing that "[a]ffirmatively advancing equity, civil rights, racial justice, and equal opportunity is the responsibility of the whole of our Government."[441]

Again, in 2023, the Biden Administration issued the Executive Order "Revitalizing Our Nation's Commitment to Environmental Justice for All," declaring that federal agencies "must advance environmental justice for all by implementing and enforcing the Nation's environmental and civil rights laws."[442] The Order directs agencies to engage in meaningful and robust communication with impacted communities and to "consider adopting or requiring measures to avoid, minimize, or mitigate disproportionate and adverse human health and environmental effects . . . of Federal activities on communities with environmental justice concerns."[443] Kentucky DAQ can facilitate EPA's compliance with these Executive Orders by considering environmental justice in its SIP Revision.[444]

Moreover, if a state fails to submit its SIP on time (as Kentucky has), or if EPA finds that all or part of a state's SIP does not satisfy the Regional Haze regulations, then EPA must promulgate its own FIP to address the SIP's inadequacies. Should EPA promulgate a FIP that reconsiders a state's Four-Factor Analysis, it is completely free to reconsider any aspect of that state's analysis. The Executive Orders referenced above direct federal agencies to integrate

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[439] Exec. Order No. 12898, § 1-101, 59 Fed. Reg. 7629, 7629 (Feb. 16, 1994), as amended by Exec. Order No. 12948, 60 Fed. Reg. 6381 (Feb. 1, 1995).

[440] Exec. Order No. 14008, § 201, 86 Fed. Reg. 7619, 7622 (Feb. 1, 2021); Exec. Order No. 13985, § 1, 86 Fed. Reg. 7009, 7009 (Jan. 25, 2021).

[441] Exec. Order No. 13985, § 1, 86 Fed. Reg. at 7009.

[442] Exec. Order No. 14096, § 1, 88 Fed. Reg. 25,251, 25,251 (Apr. 21, 2023).

[443] *Id.* § 3(vi), 88 Fed. Reg. at 25,254; *see also id.* § 3, 88 Fed. Reg. at 25,253-56 (directing agencies to "identify, analyze, and address" disproportionate impacts resulting from Federal activities).

[444] Under the Clean Air Act, states are permitted to include in a SIP measures that are authorized by state law but go beyond the minimum requirements of federal law. *See Union Elec. Co v. EPA*, 427 U.S. 246, 265 (1976) ("States may submit implementation plans more stringent than federal law requires and . . . the Administrator must approve such plans if they meet the minimum requirements of § 110(a)(2).").

environmental justice principles into their decision-making. EPA has a lead role in coordinating these efforts, and EPA Administrator Regan directed all EPA offices to clearly integrate environmental justice considerations into their plans and actions.[445] Consequently, should EPA promulgate a FIP, it can integrate environmental justice principles into its decision-making.

D. Properly Addressing Haze Pollution from Kentucky Sources Would Likely Result in Significant Environmental Justice and Civil Rights Benefits.

The same pollutants that mar scenic views at national parks and wilderness areas also cause significant public health impacts, particularly for the people living closest to polluting facilities. NOx, SO_2, and PM are all haze precursors and are all associated with severe respiratory and cardiovascular diseases and can lead to premature death.[446] Haze-forming pollutants and their resulting adverse health effects disproportionately impact low-income communities and communities of color across the country, including those in Kentucky.

Kentucky DAQ's failure to consider the environmental justice and civil rights impacts of haze-forming pollution emitted by the State's sources or how it could mitigate those impacts by requiring sources to adopt new control measures is inexcusable given the plethora of readily available materials that the Agency could use such an analysis. In addition to the NEPA guidance materials referenced above, EPA provides a wealth of additional material.[447] For example, EPA's EJScreen tool uses census tract data to identify the communities that are most vulnerable to, or likely to be exposed to, dangerous pollution. It also provides data on places that may have higher environmental burdens and vulnerable populations.[448]

Using EPA's EJScreen tool, it is clear that a number of sources that emit haze-forming pollution also likely impact low-income communities and communities of color in Kentucky. For example, the population living within 20 miles of TVA Shawnee is 37% low-income and 16% people of color.[449] Those communities are also in the 72nd percentile for the PM environmental justice (EJ) index and the 63rd percentile for the ozone EJ index compared to the rest of the

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[445] *See* Env't Prot. Aagency, News Release, EPA Administrator Announces Agency Actions to Advance Environmental Justice (Apr. 7, 2021), https://www.epa.gov/newsreleases/epa-administrator-announces-agency-actions-advance-environmental-justice.

[446] Env't Prot. Agency, Basic Information about NO_2 (last updated July 25, 2023), https://www.epa.gov/no2-pollution/basic-information-about-no2; Env't Prot. Agency, Sulfur Dioxide Basics (last updated Jan. 31, 2024), https://www.epa.gov/so2-pollution/sulfur-dioxide-basics; Env't Prot. Agency, Particulate Matter (PM) Basics (last updated July 11, 2023), https://www.epa.gov/pm-pollution/particulate-matter-pm-basics; EPA, Health and Environmental Effects of Particulate Matter (PM), https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm (last visited Jan. 4, 2024).

[447] *See* Env't Prot. Agency, Learn About Environmental Justice (last updated Feb. 6, 2024), https://www.epa.gov/environmentaljustice/learn-about-environmental-justice.

[448] *See* Env't Prot. Agency, EJScreen: Environmental Justice Screening and Mapping Tool, Additional Resources and Tools Related to EJSscreen (last updated June 26, 2023), https://www.epa.gov/ejscreen/additional-resources-and-tools-related-ejscreen.

[449] Env't Prot. Agency, EJScreen Community Report: 20 Miles Ring Centered at 37.152108, -88.777084 at 1 (July 3, 2024) (attached as Ex. 26).

state.[450] EJScreen data also show that a number of sources that Kentucky DAQ should have, but failed to, select for Four-Factor Analyses likely have significant environmental justice impacts on local communities. The EJScreen report for the communities within 20 miles of the Mill Creek Station are 34% low-income and 32% people of color, and are in the 89th percentile and 87th percentile for the PM and ozone EJ indices, respectively.[451] Similarly, the population around Kosmos Cement are 34% low-income and 33% people of color, and are in the 89th percentile and 87th percentile for the PM and ozone EJ indices, respectively.[452] Emissions from each these sources, thus, are likely negatively affecting these communities.

In the Draft SIP Revision, Kentucky DAQ claims that an environmental justice analysis is not necessary because the Regional Haze Program focuses on impacts to Class I Areas and the Agency "has not identified any EJ communities living in any federal Class I area whose visibility would be disproportionately impacted by the [State's] selection of reasonable progress controls."[453] Kentucky DAQ completely misses the mark with this assertion. The Agency ignores that the same sources that emit haze-forming pollution also negatively impact communities surrounding those facilities, as shown above. A Clean Air Task Force analysis based on 2019 emissions also shows that Kentucky's power plants directly contribute to significant and adverse health impacts. The CATF analysis shows that TVA Shawnee's emissions are responsible for 154 deaths, 69 heart attacks, 31 asthma-related emergency room visits, and 7,416 lost work days per year.[454] That analysis also shows that Ghent Station, which Kentucky DAQ fails to select for a Four-Factor Analysis, is responsible for 95 deaths, 41 heart attacks, 20 asthma-related emergency room visits, and 4,670 lost work days each year.[455] Kentucky's Regional Haze SIP offers an unique opportunity to address the disparate impacts of pollution from sources that also contribute to visibility impairment at Class I Areas. To advance environmental justice and civil rights and maximize the benefits of strong Regional Haze SIP, Kentucky DAQ must properly consider these impacts in the SIP Revision in light of the serious health effects that are associated with SO_2, NOx, and PM exposure.

XII. Conclusion

The Clean Air Act's Regional Haze Program presents an excellent opportunity for Kentucky DAQ to improve air quality at Mammoth Cave National Park, at other nearby Class I Areas, and in communities across the state. Despite the Clean Air Act and RHR's clear directive that the State must make reasonable progress toward the natural visibility goal in the second planning period, Kentucky DAQ's Draft SIP Revision contains fundamental flaws and arbitrarily

[450] *Id.* at 2.

[451] Env't Prot. Agency, EJScreen Community Report: 20 Miles Ring Centered at 38.048171, -85.908110 at 1-2 (July 3, 2024) (attached as Ex. 27).

[452] Env't Prot. Agency, EJScreen Community Report: 20 Miles Ring Centered at 38.034694, -85.906010 at 1-2 (July 3, 2024) (attached as Ex. 28).

[453] Draft SIP Revision at 178.

[454] Clean Air Task Force, Toll From Coal: Shawnee (last visited July 3, 2024), https://www.tollfromcoal.org/#/map/(title:1379//detail:1379//map:1379/KY) (attached as Ex. 29).

[455] Clean Air Task Force, Toll From Coal: Ghent (last visited July 3, 2024), https://www.tollfromcoal.org/#/map/(title:1356//detail:1356//map:1356/KY) (attached as Ex. 30).

fails to meaningfully evaluate or require cost-effective emission reductions for sources that contribute to visibility impairment in Class I Areas across the region. As such, the Draft SIP Revision is unlawful and cannot be approved. Kentucky DAQ must revise its Draft SIP Revision to address the legal requirements of the Clean Air Act and RHR discussed above and in the attached expert report.

We appreciate Kentucky DAQ's consideration of these comments and ask that the Agency amend its SIP Revision to correct the deficiencies described herein and attached. Please do not hesitate to contact us with any questions.

Sincerely,

Eboni Preston Goddard, Ph.D.
Southeast Regional Director
National Parks Conservation Association
775 Haywood Road, Suite A
Asheville, NC 28806
epreston@npca.org

Caitlin Miller
Associate General Counsel, Clean Air and Climate
National Parks Conservation Association
P.O. Box 101705
Denver, CO 80250
cmiller@npca.org

Joshua Smith
Senior Attorney
Sierra Club Environmental Law Program
2101 Webster St., Suite 1300
Oakland, CA 94612
joshua.smith@sierraclub.org

Philip A. Francis Jr.
Chair
Coalition to Protect America's National Parks
2 Massachusetts Ave NE, Unit 77436
Washington, DC 20013
Editor@protectnps.org

Ashley Wilmes
Director
Kentucky Resources Council
P.O. Box 1070
Frankfort, KY 40602
ashley@kyrc.org

Thomas Cmar
Senior Attorney, Clean Energy Program
Earthjustice
6608 Wooster Pike
Cincinnati, OH 45227
tcmar@earthjustice.org

Lane Boldman
Executive Director
Kentucky Conservation Committee
316 Wapping St.
Frankfort, KY 40601
director@kyconservation.org

CC: Jeaneanne Gettle, Regional Administrator, EPA Region 4, gettle.jeaneanne@epa.gov

Leif Palmer, Regional Counsel, Office of Regional Counsel, EPA Region 4, palmer.leif@epa.gov

Sara Taft, Director, Air and Radiation Division, EPA Region 4, taft.sara@epa.gov

Anthony Toney, Acting Director Environmental Justice, Community Engagement and Environmental Review Division, EPA Region 4, toney.anthony@epa.gov

Nancye Elizabeth Sovine, Kentucky EJ Specialist, EPA Region 4, sovine.nancye@epa.gov

Lynorae Benjamin, Chief, Air Planning & Implementation Branch, Air and Radiation Division, EPA Region 4, Benjamin.Lynorae@epa.gov

Michele Notarianni, Air and Radiation Division, EPA Region 4, Notarianni.Michele@epa.gov

Pearlene Williams-Miles, Air and Radiation Division, EPA Region 4, WilliamsMiles.Pearlene@epa.gov

Brian Timin, Air Quality Policy Division, Office of Air Quality Planning and Standards, timin.brian@epa.gov

Emily Millar, Air Quality Policy Division, Office of Air Quality Planning and Standards, millar.emily@epa.gov

Vera Kornylak, Air Quality Policy Division, Office of Air Quality Planning and Standards, Kornylak.Vera@epa.gov

XIII. List of Exhibits

Exhibits can be accessed here:
https://drive.google.com/drive/folders/1lSlA6dYxHdB3a9rodT_b5GqSjrlRRT4a?usp=drive_link

1. Victoria R. Stamper, Review and Comments on Reasonable Progress Controls for the Kentucky Regional Haze Plan for the Second Implementation Period (July 10, 2024) and attachments
2. Nat'l Parks Conservation Ass'n, Analysis of Kentucky Sources (2024)
3. Nat'l Parks Conservation Ass'n, Regional Haze Rule: Details of Analysis and Data Sources (2024)
4. Nat'l Parks Conservation Ass'n, Polluted Parks: How Air Pollution and Climate Change Continue to Harm America's National Parks (2024)
5. Nat'l Park Serv., 2022 National Park Visitor Spending Effects (Aug. 2023)
6. David Keiser et al., Air Pollution and Visitation at U.S. National Parks, 4 Sci. Advances 3 (July 18, 2018)
7. Melissa Duff, Dir., Ky. Div. Air Quality, Comments on EPA's Proposed Revised Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS; 85 Fed. Reg. 68,964 (Oct. 30, 2020) (Dec. 14, 2020)
8. Rebecca Goodman, Sec'y, Ky. Energy & Env't Cabinet, Comments on EPA's Proposed Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard; 87 Fed. Reg. 20,036 (Apr. 6, 2022) (June 21, 2022)
9. Gebhart Howard, Technical Review of VISTAS Visibility Modeling for the Second Round of Regional Haze State Implementation Plans (May 2021)
10. Letter from Stephanie Kodish, Sr. Dir. & Counsel, Clean Air and Climate Programs, Nat'l Parks Conservation Ass'n, et al. to Ron Gore, Chief, Air Quality Div., Ala. Dep't Env't Mgmt., et al. (May 12, 2021)
11. Nat'l Park Serv., Air Quality Conditions & Trends: Mammoth Cave National Park (last visited July 1, 2024)
12. Joe Kordzi, A Review of EPA's Proposed Approval of the Georgia Regional Haze State Implementation Plan Report (June 2024)
13. Nat'l Parks Conservation Ass'n, Kentucky Source Ranking (July 2024)
14. In the Matter of Proposed Revisions to Regulation Number 23, Colo. Dep't of Pub. Health & Env't, Air Pollution Control Div., Prehearing Statement (Oct. 7, 2021)
15. Nev. Div. of Env't Prot., Nevada Regional Haze State Implementation Plan for the Second Planning Period (Aug. 2022)
16. NM Env't Dep't and City of Albuquerque, Regional Haze Stakeholder Outreach Webinar #2

17. EPA, Removal of Title V Emergency Affirmative Defense Provisions from State Operating Permit Programs and Federal Operating Permit Program Proposed Rule (EPA-HQ-OAR-2016-0186)
18. Letter from Ashley Wilmes, Executive Director, Kentucky Resources Council, Inc., et al., to Leslie Poff Environmental Scientist Consultant Kentucky Division for Air Quality (June 12, 2024)
19. Email from Leslie Poff, Kentucky Division for Air Quality, to Byron Gary, Kentucky Resources Council, et al. (June 13, 2024)
20. Trinity Consultants, Regional Haze Four-Factor Analysis: Tennessee Valley Authority Shawnee Fossil Plant (Oct. 23, 2020)
21. Letter from Michael K. Bottorff, Plant Manager, Shawnee Fossil Plant, to Melissa Duff, Dir., Ky. Div. for Air Quality (Feb. 19, 2021)
22. Ky. Res. Council, Inc., et al, Comments on Draft Permit V-23-006 for the TVA Shawnee Fossil Plant (Mar. 14, 2024)
23. Email from Leslie Poff, Ky. Div. Air Quality, to Jack Byars, (date uncertain, in response to a message dated Jul. 28, 2020)
24. Joe Kordzi, A Review of the Indiana Regional Haze State Implementation Plan (Nov. 2021)
25. N.C. Dep't Env't Quality, Final Regional Haze State Implementation Plan (SIP) for North Carolina Class I Federal Areas for Second Planning Period (2019 – 2028) (Apr. 04, 2022)
26. Env't Prot. Agency, EJScreen Community Report: 20 Miles Ring Centered at 37.152108, -88.777084 at 1 (July 3, 2024)
27. Env't Prot. Agency, EJScreen Community Report: 20 Miles Ring Centered at 38.048171, -85.908110 at 1-2 (July 3, 2024)
28. Env't Prot. Agency, EJScreen Community Report: 20 Miles Ring Centered at 38.034694, -85.906010 at 1-2 (July 3, 2024)
29. Clean Air Task Force, Toll From Coal: Shawnee (last visited July 3, 2024)
30. Clean Air Task Force, Toll From Coal: Ghent (last visited July 3, 2024)