RESPONSES TO THE NATIONAL PARKS SERVICE COMMENTS ON INDIANA'S REGIONAL HAZE STATE IMPLEMENTATION PLAN

Electric Generating Units
General Comments

Comment 1
We recommend that IDEM identify the specific Class I area that was the basis for each of its Q/d calculations.

Response 1
IDEM's Q/d analysis calculations are based on the distance from each source to Mammoth Cave because it is the closest Class I area and the one most impacted by all the Indiana sources.

Comment 2
It is not reasonable for Indiana Department of Environmental Management (IDEM) to exempt electric generating units (EGUs) from four-factor analyses. We recommend IDEM conduct four-factor analyses for EGUs within the state and include these in the draft Regional Haze (RH) State Implementation Plan (SIP).

Comment 3
Based on initial NPS analyses, there may be cost-effective controls for some of the Indiana EGUs, including (but not limited to) Alcoa Unit 4, Clifty Creek, and Petersburg. (Specific measures and requests for EGUs are discussed in section 2 of the attachment "National Park Service (NPS) Regional Haze SIP feedback for the Indiana Department of Environmental Management (IDEM)".)

Responses 2 and 3
IDEM understands that the FLMs would like to see four-factor analyses conducted for Indiana's EGUs brought forward as selected sources for four-factor analysis evaluation of emissions control measures necessary to make reasonable progress for the second implementation period. However, Indiana made the decision to evaluate all of the other sources brought forward using the four-factor analysis process and conduct a reasonable progress analysis for the EGUs early in the SIP development process based on EPA regional haze guidance available at that time. The following excerpt from EPA's "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period," dated August 20, 2019 (2019 EPA Guidance) provides the basis for Indiana's rationale for evaluating the state's EGUs using a quantitative analysis instead of four-factor analyses. According to the 2019 EPA Guidance, "A key flexibility of the regional haze program is that a state is not required to evaluate all sources of emissions in each implementation period. Instead, a state may reasonably select a set of sources for an analysis of control measures. The guidance that an analysis of control measures is not required for every source in each implementation period is based on Clean Air Act (CAA) section 169A(b)(2), which requires each SIP to contain emission limits, schedules of compliance, and other measures as may be necessary to make reasonable progress, but (in marked contrast to the statutory provision for Best Available Retrofit Technology (BART[24]) does not provide direction regarding the particular sources or source categories to which such emission limits, etc., must apply. Selecting a set of sources for analysis of control measures in each implementation period is also consistent with the Regional Haze Rule (RH Rule), which sets up an iterative planning process and anticipates that a state may not need to analyze

control measures for all its sources in a given SIP revision. Specifically, section 51.308(f)(2)(i) of the RH Rule requires a SIP to include a description of the criteria the state has used to determine the sources or groups of sources it evaluated for potential controls. Accordingly, it is reasonable and permissible for a state to distribute its own analytical work, and the compliance expenditures of source owners, over time by addressing some sources in the second implementation period and other sources in later periods. For the sources that are not selected for an analysis of control measures for purposes of the second implementation period, it may be appropriate for a state to consider whether measures for such sources are necessary to make reasonable progress in later implementation periods."

It is clear from the language in the guidance that "a state is not required to evaluate all sources of emissions in each implementation period. Instead, a state may reasonably select a set of sources for an analysis of control measures". As such, Indiana's EGUs were not exempt from four-factor analyses, this source category was not chosen to have four-factor analyses conducted for the second implementation period. A reasonable progress analysis for these units was conducted instead, which consists of a quantitative analysis of statewide NO_x and SO_2 emission reductions from Indiana's EGU fleet for 2007-2019; photochemical modeling using 2016 NO_x and SO_2 base-year modeled emissions for all existing Indiana EGUs in 2016 to projected 2028 emissions; and source apportionment modeling to assess visibility impacts by tagging all EGUs in Indiana.

"The guidance that an analysis of control measures is not required for every source in each implementation period is based on CAA section 169A(b)(2), which requires each SIP to contain emission limits, schedules of compliance, and other measures as may be necessary to make reasonable progress…", also contained in the excerpt above taken from the 2019 EPA Guidance. IDEM asserts that the Indiana EGUs are a perfect example of a case that "highlight(s) the discretion and flexibilities states have within statutory and regulatory requirements to develop regional haze SIPs" and "reduce the state planning burden". The power generation industry is in transition at this point in time with emission units designated for retirement, the shift from coal to other fuels and increasing reliance on renewable energy. As such, IDEM believes it would be more appropriate to continue to address these units by tracking emissions and evaluating visibility progress through both monitoring and modeling at the Class I areas and re-evaluate the EGUs as further emission reductions from retirements/shutdown are anticipated for additional control measures in subsequent planning periods. It makes no sense to evaluate EGUs at this time when the outcome of compliance with other CAA regulations and changes in energy use are not fully in place.

A persuasive example of this rationale is the subject of remaining useful life. The 2019 EPA Guidance explains remaining useful life as follows: "If a source is expected to close by December 31, 2028, under an enforceable requirement, a state may consider that to be sufficient reason to not select the source at the source selection step." Given the time required for states to set an enforceable requirement including conducting rulemaking (which is typically two to three years), EPA review and action taken on both the RH SIP and states' rulemaking, as well as the time required for a facility or group of facilities to come into compliance if additional controls are required prior to shutdown of the emission unit; would be very resource intensive to provide what would amount to small visibility benefits at best. Larger visibility benefits will occur within the next decade due to the shift from coal to other fuels and increasing reliance on renewable energy. These emission reductions will be realized in subsequent implementation periods, continuing the reasonable progress that is mandated by the CAA and RH Rule.

The RH Rule allows states to determine how to show progress with regulation of industrial sources emissions and emission control strategies. This process, in general, is purposefully intended to give states discretion and flexibility in their statutory and regulatory requirements. It is also intended for states to leverage emission reductions achieved through other CAA programs that will further improve visibility in protected areas. Reasonable progress towards natural visibility conditions is addressed in the RH Rule (Federal Register Vol 64, No. 126, Pg. 35726): "Since the national goal is expressed in terms of air quality (i.e., visibility) rather than emissions, we (EPA) believe that it is very important to require the quantitative tracking of visibility impairment as an integral element in measuring reasonable progress." On page 35727, "Tracking "reasonable progress" should involve the tracking of both emissions and visibility improvement". IDEM has demonstrated the decrease of both emissions and visibility impairment by showing significant visibility improvement at Class I areas; and expects the emissions analyses, review of emission controls, current and expected retirements for coal-fired boilers with more renewable energy being utilized for future power generation, and modeled visibility impacts to adequately address Indiana's overall visibility impacts.

IDEM has determined existing emission controls are adequate to address regional haze for sources throughout the state based on current "on-the-books" regulatory measures for the second implementation period. Both factors (emissions and visibility impairment) are more than adequately addressed in Indiana's EGU reasonable progress analysis with future emission reductions anticipated. These reductions will be appropriately evaluated in upcoming implementation periods as the natural visibility goals are realized by 2064.

Comment 4
Any EGU shutdowns relied upon in the SIP should be made federally enforceable.

Response 4
Indiana's RH SIP's reasonable progress analysis relies on controls that are already in place and units that have already been shut down. Although the analysis does describe some of the EGU sources' plans for future retirements based on their Integrated Resource Plans, the emissions reductions to be realized from planned retirements are not included as a requirement in Indiana's long-term strategy for the second implementation period. EGU shutdowns that are planned in the future will be evaluated for that implementation period. Indiana has demonstrated that these future EGU shutdowns will continue to show its progress in emission reductions that will continue to help improve visibility.

EGU
Specific comments

Comment 1
AEP Rockport is subject to a Consent Agreement that will substantially reduce emissions by the end of this planning period. In addition, by the end of 2028; Unit 1 - Required by consent agreement to retire. In addition, AEP announced plans to retire Unit 2. We note that this must be federally enforceable for inclusion in the SIP. If Unit 2 retirement is made federally enforceable and included in the SIP, haze causing emissions from this facility will no longer be a concern for the NPS. Otherwise, we recommend that Indiana undertake/require a four-factor analysis of potential NO_x and SO_2 emission reduction opportunities from AEP Rockport Unit 2.

Response 1
Both units at Rockport are included in the Eastern Regional Technical Advisory Committee (ERTAC) modeling for 2028. In April 2021, AEP announced that in addition to Unit 1, Unit 2 will

also be retired by the end of 2028. Neither boiler's retirement was included in the ERTAC emissions file used for RH modeling conducted by the Lake Michigan Air Directors Consortium (LADCO). Therefore, the projected 2028 emissions for Units 1 and 2 were included in the modeling. These retirements will be addressed in a subsequent implementation period for regional haze and the emissions reductions will be accounted for in Indiana's continued reasonable progress towards natural visibility conditions by 2064.

Rockport is subject to a federal Consent Agreement lodged by the Department of Justice, United States, et al. v. American Electric Power Service Corp., (www.govinfo.gov/content/pkg/FR-2019-06-07/pdf/2019-11948.pdf), which makes it federally enforceable. The agreement will substantially reduce emissions by the end of this planning period. Under the proposed Fifth Joint Modification to Consent Decree, the deadline for AEP to retrofit, refuel, or re-power Unit 1 is extended until December 31, 2028 and the requirement to retrofit, refuel, or re-power Unit 2 is removed. In exchange, AEP agrees to do the following: (1) Install enhanced dry sorbent injection technology to reduce SO_2 emissions on Rockport Unit 1 by December 31, 2020 and Rockport Unit 2 by June 1, 2020 - Rockport has complied with these terms; (2) comply with a 30-day rolling average emission rate of 0.15 pounds of SO_2 per million British thermal units of heat input at the Rockport Units for years 2021 and beyond; (3) reduce the AEP Eastern System-wide annual tonnage limitations for SO_2 for years 2021 and beyond; (4) reduce the Rockport Plant- wide annual tonnage limitations for SO_2 for years 2021 and beyond; (5) install selective catalytic reduction NO_x control technology on Rockport Unit 2 by June 1, 2020; (6) comply with a 30- day rolling average emission rate of 0.09 pounds of NO_x per million British thermal units of heat input at the Rockport Units for years 2021 and beyond; (7) reduce the AEP Eastern System-wide annual tonnage limitations for NO_x for years 2018 and beyond; (8) provide the State Co-Plaintiffs with an additional $4 million in mitigation funding; (9) provide the Citizen Co- Plaintiffs with an additional $3.5 million in mitigation funding; and (10) retire Rockport Unit 1 by December 31, 2028.

<u>Comment 2</u>
Gibson Generating Station-Unit 4 is the only unit expected to retire before 2028 at this facility; this retirement was included in 2028 modeling projections and should be made federally enforceable.

<u>Response 2</u>
Gibson Generating Station-Unit 4 retirement information was obtained from the 2019 Duke Integrated Resource Plan (IRP) and verbally verified with source for a 2026 offline date. Indiana will not be pursuing any rulemaking actions to make this shutdown federally enforceable. Indiana did not have to rely on these retirements to show visibility improvements that show great progress during the second implementation period. The time necessary to complete rulemaking and the state resources required to make an inevitable shutdown federally enforceable is deemed unnecessary. Indiana believes the flexibility afforded through the 2019 RH Guidance and U.S. EPA's desire to lessen the state burdens for addressing regional haze and each state's visibility impacts will allow retirements and shutdowns to be evaluated during subsequent implementation periods for addressing the Regional Haze Rule.

<u>Comment 3</u>
Gibson Generating Station graph 4-2 appears to show that only Unit #1 shows a NO_x increase in 2028. Why would NO_x emissions decrease at any unit if utilization increases?

<u>Response 3</u>

Review of CAMD data for Gibson showed a lower annual heat input for Unit 1 in 2016 as compared to other years, therefore the baseyear emissions were lower as a result. The projected heat input for 2028 in LADCO's ERTAC emissions modeling files is higher for Unit 1 so projected NOx emissions will be higher. Projected heat inputs for Units 2, 3 and 5 will be slightly higher but as a result of CSAPR, projected NOx emission rates will be lower at those units resulting in lower NOx emission projections in 2028. Ozone season emission control rates as well as non-ozone season control rates for NO_x applied in the ERTAC model for Unit 1 at Gibson Generating Station are slightly higher than the ozone and non-ozone season control rates for Units 2 through 5 but are still lower than 2016 CAMD rates for 2028. Overall, projected 2028 emissions at Gibson Generating Station are lower compared to 2016 as well as 2011. It is not unexpected to see variations in power generation between units over a long time period depending on power generation needs within the power grid.

Comment 4

Petersburg Generation Station Units 1 and 2 are expected to retire before 2028; these retirements must be made federally enforceable for inclusion in the SIP.

Response 4

IPL Petersburg Generating Station is now operating under a Federal Consent Decree (Civil Action No. 3:20-cv-202-RYL-MPB, found at https://www.epa.gov/sites/default/files/2020-09/documents/indianapolispowerlight-cd.pdf) and will be subject to NO_x and SO_2 limitations for 2025 and 2026 as follows:

- IPL shall operate the coal-fired Units 1 through 4 at the Petersburg Station so the units combined do not emit SO_2 in excess of an annual tonnage limitation of 10,100 tons per year.
- Commencing in calendar year 2021 and continuing thereafter, IPL shall operate the coal-fired Units 1 through 4 at the Petersburg Station so the units combined do not emit NO_x in excess of an annual tonnage limitation of 8,500 tons per year.

In addition, emission limitations may be met by retiring units according to Section IV-6&7 of the Civil Action No. 3:20-cv-202-RYL-MPB:

- By no later than July 1, 2023, IPL shall install an SNCR at Unit 4 at the Petersburg Station unless IPL retires Units 1 and 2 before this date.
- If IPL retires Units 1 and 2 before the SNCR is scheduled to be installed pursuant to the requirement above, IPL is released from the obligation for Unit 4 to achieve and maintain the 30-Day Rolling Average NO_x emission rate of 0.19 lbs/mmBTU.

Comment 5

Alcoa Warrick Power Plant Boilers 1–3 appear to have ceased operation in 2018. Shutdowns must be federally enforceable for inclusion in the SIP. Both the Total and Incremental cost-effectives estimates for replacing the SCR are well within the range $4,000 - $10,000/ton now being considered by states for Total Cost Effectiveness. Alcoa should replace (or upgrade) the existing SCR on Unit 4.

Response 5

Boilers 1-3 have not shut down but rather operate as non-EGUs. SCR operation at Unit 4 was addressed in general comments about SCR emission controls for EGUs. Indiana will not be pursuing any rulemaking actions to make this shutdown federally enforceable. Indiana did not have to rely on these retirements to show visibility improvements that show great progress during the second implementation period. The time necessary to complete rulemaking and the state resources required to make an inevitable shutdown federally enforceable is deemed

unnecessary. Indiana believes the flexibility afforded through the 2019 RH Guidance and U.S. EPA's desire to lessen the state burdens for addressing regional haze and each state's visibility impacts will allow retirements and shutdowns to be evaluated during subsequent implementation periods for addressing the Regional Haze Rule.

Comment 6
Clifty Creek Station-IDEM should explain why it expects NO_x emissions to decrease. Is there some IDEM "on-the-books" requirement that is driving this decrease? If not, would IDEM consider a requirement that EGUs make better utilization of emission controls? Addition of SCR to unit 6 is cost-effective and would reduce NO_x emissions by over 1,000 ton/yr.

Response 6
Increased utilization of SCRs on Units 1 through 5 at the Clifty Creek facility combined with the allowances mandated from the CSAPR update rule will reduce Clifty Creek's annual NO_x emissions, thus making the emissions reductions from CSAPR federally enforceable and permanent. In addition, ozone season budgets/allowances for NO_x will be lower than currently allowed under CSAPR. The ERTAC model predicts very small increases in utilization for the Clifty Creek EGUs, an average plant wide increase in utilization of only around 3%, which will result in slightly increased NO_x and SO_2 emissions. However, IDEM surmises that the higher utilization rates will result in small increases in SO_2 but will result in lower NO_x emissions because on-the-books control measures will require these units to be better controlled. The SCRs on Clifty Creek's EGUs do not operate continuously, however the emissions trends based on CAMD reporting since 2016 does show that SCR controls on these units are being operated more frequently which has caused NO_x emissions to decrease significantly. In addition, the ERTAC used "optimized rates" for NO_x based off the 2018 CAMD data.

Comment 7
FB Cully-Unit 2 retirement should be made federally enforceable. Unit 3 is effectively controlled for SO_2 but not for NO_x. A four-factor analysis should be conducted to determine if Unit 3 NO_x controls can be improved in a cost-effective manner.

Response 7
Per the 2019-2020 Vectren IRP, Unit 2 is set to retire in 2023 as verified with Vectren as well as terminated of a power generation agreement with Alcoa Warrick #4. Indiana will not be pursuing any rulemaking actions to make this shutdown federally enforceable. Indiana did not have to rely on these retirements to show visibility improvements that show great progress during the second implementation period. The time necessary to complete rulemaking and the state resources required to make an inevitable shutdown federally enforceable is deemed unnecessary. Indiana believes the flexibility afforded through the 2019 RH Guidance and U.S. EPA's desire to lessen the state burdens for addressing regional haze and each state's visibility impacts will allow retirements and shutdowns to be evaluated during subsequent implementation periods for addressing the Regional Haze Rule.

Non-EGUs
General Comments

Comment 1
IDEM found cost-effective controls for several non-EGUs but is not including any of these emission reduction measures in the draft SIP.

Comment 2

We request that IDEM incorporate these cost-effective controls for non-EGUs identified through the four-factor analyses, including the Alcoa Warrick facility, the Burns Harbor facility, and Greencastle Cement (specific measures and requests are discussed in section 3 of the attachment "National Park Service (NPS) Regional Haze SIP feedback for the Indiana Department of Environmental Management (IDEM)").

Response 1 and 2

IDEM understands that the FLMs would like for the state to require additional controls for some of the sources selected for four-factor analysis based on the cost effectiveness results for specific units; however, a cost effectiveness result at the unit level for sources with modeled insignificant impacts to Class I areas outside the state do not provide an adequate visibility benefit in light of the significant benefits already realized to date. Furthermore, additional benefits expected to result from "on-the-books" controls will result in even more visibility improvements over the next RH SIP implementation period.

The four-factor analysis is used to evaluate potential controls for specific pollutants emitted from individual emission units at a source to determine what controls are cost effective for reducing that pollutant. The RH Rule requires states with Class I areas to consider these factors in establishing their reasonable progress goals for reducing the impact of emissions from sources within and outside the state on visibility impairment at each Class I area within the state. However, the use of the four-factor analysis and by extension the cost effectiveness evaluation for states that do not have Class I areas for the purpose of establishing a long-term strategy is not clearly defined. For example, a cost-effective control for a source when establishing a state's long-term strategy could be shutting down a unit in order to allow other units at that source to operate at their existing permitted levels. This would still reduce the overall emissions from the source versus simply requiring an additional control based on the four-factor analysis. Regional Haze impacts on a Class 1 area is independent of unit level reductions; therefore, sources that evaluate the cost of additional emission controls also need to evaluate their emissions from a plant level perspective. Likewise, IDEM believes that Indiana should be able to take the same approach by looking at every source individually to determine if an additional control for an individual unit at the source is actually cost effective as source-wide emission reductions will accomplish goals that will benefit visibility.

In addition, IDEM believes that the level of visibility impairment should also be considered when evaluating sources for additional controls and establishing a state's long-term strategy for the second implementation period. The RH Rule was designed to be implemented with respect to reasonable visibility progress to natural conditions by the year 2064 with several implementation periods to measure and assess reasonable progress towards the natural visibility conditions. The visibility progress realized so far has been substantial and was strongly considered in the development of Indiana's RH SIP.

The uniform rate of progress (URP) for each Class I area, especially in the eastern half of the country, shows the visibility progress made during the last implementation period represents another positive step towards attaining natural conditions at all Class I areas by 2064, if not much sooner. A comparison of visibility impairment values over time is an appropriate measure to determine if improvements or progress is made for Class I area visibility. The URP is adjusted to account for several different factors that make up visibility impairment. The fact that the most current monitored and modeled visibility values are below the uniform path to natural visibility conditions for eastern U.S. Class I areas must be considered in establishing Indiana's long-term strategy for the RH SIP second implementation period.

Indiana believes the “safe harbor” term is hardly an appropriate term to describe the progress that all states have made in reducing emissions from haze-causing pollutants. The fact that monitored visibility data from the IMPROVE monitoring network has shown progress from 2000 to 2018 is considerable, indicating states have been responsive to reducing emissions through state and federal regulatory measures and as a result, visibility impairment is trending downward. Current 2018 monitored visibility data nearly match the projected modeled visibility values for 2028 at most Class I areas throughout the eastern U.S. This clearly shows tremendous progress, ranging up to 10 years ahead of what is projected through visibility modeling. These visibility benefits are expected to continue with anticipated future reductions in emissions.

Indiana has determined existing emission controls are adequate to address regional haze for sources throughout the state based on the tremendous visibility progress made to date along with current “on-the-books” regulatory measures. Both factors (emissions and visibility impairment) are addressed in Indiana’s RH SIP with future emission reductions anticipated. These reductions will be appropriately evaluated in upcoming implementation periods as the natural visibility goals are realized by 2064.

Comment 3
We recommend that the emission controls evaluated in the four-factor analyses may be even more cost-effective than estimated by IDEM due to analysis errors that inflated the costs. These analysis errors should be corrected.

Response 3
The evaluations conducted for emission controls in the four-factor analyses submitted by sources identified by the FLMs in Comment 2 have been addressed by these sources and are included as attachments to this document.

Attachment 1 - Cleveland Cliffs Burns Harbor Responses to NPS Source Specific Comments

- Comment 1 - Cleveland Cliffs Burns Harbor Facility
  We found several errors in the cost analyses provided for this facility and we request that these errors are corrected. Once corrected, we believe controls may be even more cost effective than estimated by IDEM.

- Comment 2 - Cleveland Cliffs Burns Harbor Facility

Notwithstanding the analysis issues highlighted here, IDEM still identified a number of cost-effective control options for the Burns Harbor facility that are within the range of $4,000-$10,000/ton cost thresholds being used by other states in their regional haze implementation plans. We request that IDEM include these cost effective controls in their RH SIP. Attachment 2 - Cleveland Cliffs Indiana Harbor East and Indiana Harbor West Facilities Responses to NPS Source Specific Comments

- Comment 1 - Cleveland Cliffs Indiana Harbor East and West Facilities
  We found several errors in the cost analyses provided for these facilities and we request that these errors are corrected. Once corrected, we believe controls may be even more cost effective than estimated by IDEM.

- Comment 2 - Cleveland Cliffs Indiana Harbor East Facility

We recommend the IDEM consider whether SNCR may be feasible for the Lime Plant Nos. 1 and 2 Preheater and Rotary Kilns at the Cleveland Cliffs Indiana Harbor East Facility.

Attachment 3 - United States Steel Corporation - Gary Works Facility Responses to NPS Source Specific Comment

- Comment 1 - Gary Works Facility
  We found several errors in the cost analyses provided for these facilities and we request that these errors are corrected. Once corrected, we believe controls may be even more cost effective than estimated by IDEM.

Attachment 4 - Alcoa Warrick Operations Facility Responses to NPS Source Specific Comments

- Comment 1 - Alcoa Warrick Operations Facility
  The Alcoa four-factor analysis (4FA) is almost completely lacking in essential economic and emissions information. Please provide the necessary cost information in the SIP, including the Burns & McDonnell update of Babcock Power budgetary proposal, which was the basis of the Alcoa 4FA.

- Comment 2 - Alcoa Warrick Operations Facility
  The inflation adjustment used in the Alcoa analysis is too high. The EPA CCM recommends use of the CEPCI which increased by 13% since the original 2007 cost estimates. Instead, Burns & McDonnell assumed a 2.5% annual interest rate which inflated costs by 38%.

- Comment 3 - Alcoa Warrick Operations Facility
  The Alcoa 4FA assumed 70% control efficiency for the FGD. This seems low. What is the basis for this assumption? Note, a 95% control efficiency was assumed for the FGD in the BART analysis for the Warrick facility in the previous round of RH planning.

Attachment 5 - Buzzi Unicem Greencastle Plant Responses to NPS Source Specific Comments

- Comment 1 - Buzzi Unicem Greencastle Plant
  We disagree with the use of a 15-year expected lifetime for the facility, as there is no federally enforceable requirement for the facility to shut down in that time.

- Comment 2 - Buzzi Unicem Greencastle Plant
  We also disagree with the use of a 7% interest rate for the reasons discussed earlier. Nonetheless, the estimated cost for adding SNCR is clearly cost effective at $873/ton of NO_x removed and should be required as part of the state's long-term strategy.

- Comment 3 - Buzzi Unicem Greencastle Plant
  The analysis for dry sorbent injection only summarized the costs; we request that IDEM provide a detailed cost analysis so that we may complete our review."

Modeling

General Comments

Comment 1

The use of percent contribution to an already impaired background is counter to the overarching goal of the Regional Haze Program. The goal of the Regional Haze Program is to achieve natural visibility conditions by 2064. Natural visibility at Mammoth Cave National Park on the 20% most impaired days is 9.8 deciviews (26.64 Mm^{-1}). Contributions from Indiana's EGUs (5.091 Mm^{-1} = 1.75 dv) represents 19% of natural conditions at Mammoth Cave.

Response 1

IDEM questions the conversion from light extinction to deciviews provided by NPS. The website referenced by NPS (http://vista.cira.colostate.edu/Improve/haze-metrics-converter/) provides calculators that convert deciviews to light extinction and vice versa. A deciview value of 1.75 converts to 11.91 Mm^{-1}.

The conversion of light extinction to deciviews requires taking the natural logarithm of a ratio whose denominator is 10 ($dv = 10 * \ln(b_{ext}/10)$). The natural logarithm of 1 (ln 1) is 0. The natural logarithm of a number less than 1 is a negative number. So, converting 5.091 Mm^{-1} to deciviews results in a negative value of -6.75, as verified from the referenced website.
NPS seems to make an argument for not using the percent contribution analysis when applied to light extinction, but instead to deciview values. This would imply the 19% EGU contribution is equal to 1.75 dv/9.8 dv, which is 17.8%. 5.091 Mm^{-1}/26.64 Mm^{-1} is equal 19%, which seems to go against the initial argument.

NPS states that the analysis was evaluated to an already impaired background and compares 2028 modeling with the 2064 natural visibility goal. This methodology is also used in NPS comments on Duke Gibson and Petersburg. IDEM does not believe it is correct to compare 2028 modeling results to 2064 visibility goals. It is more appropriate to show that reasonable progress has been made by 2028 towards reaching the 2064 visibility goal.

Comment 2

The percent contribution analysis approach provides less protection for the more-impacted Class I areas. When modeled impairment from a single source is divided by the total impairment at a given Class I area, the percentage (aka "contribution") will be smaller at a more impaired area than an area with less overall impairment. Indiana's EGUs contribute 5.091 Mm^{-1} to light extinction at Mammoth Cave, and IDEM calculates that this represents 6.9% of the Total Light Extinction (74.18 Mm^{-1}) at the park. That same amount of impairment, if it were to occur at Shining Rock, would account for 12% of the Total Light Extinction (41.42 Mm^{-1})

Response 2

IDEM believes that this line of thinking would apply to Class I areas that were not modeled. However, LADCO RH modeling did include Shining Rock Wilderness Area, resulting in a contribution from Indiana's EGUs of 0.545 Mm^{-1}.

Comment 3

When a percent contribution approach is used, the significance threshold should be relatively low (and applied to a fixed value). For example, the updated CSAPR applies a 1% contribution relative to the ozone NAAQS to determine if a state contributes significantly to ozone concentrations in a downwind state. Indiana's EGUs contribute to more than 1% of the projected 2028 light extinction in 13 of the Class 1 areas in Table 16-2. One percent of the

visibility goal at Mammoth Cave is 0.27 Mm^{-1} and Indiana sources would exceed that threshold by a factor of 19.

Response 3

NPS is attempting to tie a component of CSAPR into the Regional Haze Program. IDEM believes it is not acceptable to equate ozone and regional haze. U.S. EPA RH guidance does not provide a threshold criterion for states to use for determining source contributions to regional haze impacts. In fact, U.S. EPA provided comments to Indiana's draft RH SIP and addressed the significance issue, stating that the term "significantly impact" … is not an applicable statutory or regulatory term for Regional Haze. The 2019 EPA Guidance provides the states with the flexibility to determine appropriate thresholds to set in a contribution analysis. IDEM is confident that its approach to evaluating Indiana's source contributions to visibility impairment at all Class I areas shows continued progress towards natural conditions and is on track to attain well within the mandated 2064 date. As stated within the SIP, Indiana's source emissions and modeled visibility impacts demonstrate vast improvements. Evaluation of regional haze impacts from Indiana sources will continue throughout the multiple regional haze implementation periods through 2064.

RESPONSES TO THE UNITED STATES FOREST SERVICE COMMENTS ON INDIANA'S REGIONAL HAZE STATE IMPLEMENTATION PLAN

Comment 1
The following electric generating units (EGUs) need a four-factor analysis conducted for both SO_2 and NO_x controls:

- Whitewater Valley Power Generating Station - Unit 1 and Unit 2
- Petersburg Power Generating Station- Unit 3 and Unit 4

Comment 2
All six EGUs at the Clifty Creek Generating Station need a four-factor analysis conducted for NO_x:

Comment 3
Unit 1, Unit 2, Unit 3 and Unit 5 at the Gibson Power Generating Station need a four-factor analysis conducted for SO_2:

Comment 4
Future operational status of emission units, operating scenarios for emission units that represent a reduced capacity, and pollution control equipment efficiency used to designate a unit as "effectively controlled" need to be made federally enforceable.

Response 1, 2, 3, and 4
IDEM understands that the FLMs would like to see four-factor analyses conducted for Indiana's EGUs brought forward as selected sources for four-factor analysis evaluation of emissions control measures necessary to make reasonable progress for the second implementation period. However, Indiana made the decision to evaluate all of the other sources brought forward using the four-factor analysis process and conduct a reasonable progress analysis for the EGUs early in the SIP development process based on EPA regional haze guidance available at that time. The following excerpt from EPA's "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period," dated August 20, 2019 (2019 EPA Guidance) provides the basis for Indiana's rationale for evaluating the state's EGUs using a quantitative analysis instead of four-factor analyses. According to the 2019 EPA Guidance, "A key flexibility of the regional haze program is that a state is not required to evaluate all sources of emissions in each implementation period. Instead, a state may reasonably select a set of sources for an analysis of control measures. The guidance that an analysis of control measures is not required for every source in each implementation period is based on Clean Air Act (CAA) section 169A(b)(2), which requires each SIP to contain emission limits, schedules of compliance, and other measures as may be necessary to make reasonable progress, but (in marked contrast to the statutory provision for Best Available Retrofit Technology (BART[24]) does not provide direction regarding the particular sources or source categories to which such emission limits, etc., must apply. Selecting a set of sources for analysis of control measures in each implementation period is also consistent with the Regional Haze Rule (RH Rule), which sets up an iterative planning process and anticipates that a state may not need to analyze control measures for all its sources in a given SIP revision. Specifically, section 51.308(f)(2)(i) of the RH Rule requires a SIP to include a description of the criteria the state has used to determine the sources or groups of sources it evaluated for potential controls. Accordingly, it is reasonable and permissible for a state to distribute its own analytical work, and the compliance expenditures of source owners, over time by addressing some sources in the second

implementation period and other sources in later periods. For the sources that are not selected for an analysis of control measures for purposes of the second implementation period, it may be appropriate for a state to consider whether measures for such sources are necessary to make reasonable progress in later implementation periods."

It is clear from the language in the guidance that "a state is not required to evaluate all sources of emissions in each implementation period. Instead, a state may reasonably select a set of sources for an analysis of control measures". As such, Indiana's EGUs were not exempt from four-factor analyses, this source category was not chosen to have four-factor analyses conducted for the second implementation period. A reasonable progress analysis for these units was conducted instead, which consists of a quantitative analysis of statewide NO_x and SO_2 emission reductions from Indiana's EGU fleet for 2007-2019; photochemical modeling using 2016 NO_x and SO_2 base-year modeled emissions for all existing Indiana EGUs in 2016 to projected 2028 emissions; and source apportionment modeling to assess visibility impacts by tagging all EGUs in Indiana.

"The guidance that an analysis of control measures is not required for every source in each implementation period is based on CAA section 169A(b)(2), which requires each SIP to contain emission limits, schedules of compliance, and other measures as may be necessary to make reasonable progress…", also contained in the excerpt above taken from the 2019 EPA Guidance. IDEM asserts that the Indiana EGUs are a perfect example of a case that "highlight(s) the discretion and flexibilities states have within statutory and regulatory requirements to develop regional haze SIPs" and "reduce the state planning burden". The power generation industry is in transition at this point in time with emission units designated for retirement, the shift from coal to other fuels and increasing reliance on renewable energy. As such, IDEM believes it would be more appropriate to continue to address these units by tracking emissions and evaluating visibility progress through both monitoring and modeling at the Class I areas and re-evaluate the EGUs as further emission reductions from retirements/shutdown are anticipated for additional control measures in subsequent planning periods. It makes no sense to evaluate EGUs at this time when the outcome of compliance with other CAA regulations and changes in energy use are not fully in place.

A persuasive example of this rationale is the subject of remaining useful life. The 2019 EPA Guidance explains remaining useful life as follows: "If a source is expected to close by December 31, 2028, under an enforceable requirement, a state may consider that to be sufficient reason to not select the source at the source selection step." Given the time required for states to set an enforceable requirement including conducting rulemaking (which is typically two to three years), EPA review and action taken on both the RH SIP and states' rulemaking, as well as the time required for a facility or group of facilities to come into compliance if additional controls are required prior to shutdown of the emission unit; would be very resource intensive to provide what would amount to small visibility benefits at best. Larger visibility benefits will occur within the next decade due to the shift from coal to other fuels and increasing reliance on renewable energy. These emission reductions will be realized in subsequent implementation periods, continuing the reasonable progress that is mandated by the CAA and RH Rule.

The RH Rule allows states to determine how to show progress with regulation of industrial sources emissions and emission control strategies. This process, in general, is purposefully intended to give states discretion and flexibility in their statutory and regulatory requirements. It is also intended for states to leverage emission reductions achieved through other CAA programs that will further improve visibility in protected areas. Reasonable progress towards natural visibility conditions is addressed in the RH Rule (Federal Register Vol 64, No. 126, Pg.

35726): “Since the national goal is expressed in terms of air quality (i.e., visibility) rather than emissions, we (EPA) believe that it is very important to require the quantitative tracking of visibility impairment as an integral element in measuring reasonable progress.” On page 35727, “Tracking “reasonable progress” should involve the tracking of both emissions and visibility improvement”. IDEM has demonstrated the decrease of both emissions and visibility impairment by showing significant visibility improvement at Class I areas; and expects the emissions analyses, review of emission controls, current and expected retirements for coal-fired boilers with more renewable energy being utilized for future power generation, and modeled visibility impacts to adequately address Indiana’s overall visibility impacts.

IDEM has determined existing emission controls are adequate to address regional haze for sources throughout the state based on current “on-the-books” regulatory measures for the second implementation period. Both factors (emissions and visibility impairment) are more than adequately addressed in Indiana’s EGU reasonable progress analysis with future emission reductions anticipated. These reductions will be appropriately evaluated in upcoming implementation periods as the natural visibility goals are realized by 2064.