

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[EPA–R05–OAR–2021–0544; FRL–12175–01–R5]

Air Plan Approval; Ohio; Regional Haze Plan for the Second Implementation Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The Environmental Protection Agency (EPA) is proposing to approve the Ohio regional haze state implementation plan (SIP) revision submitted by the Ohio Environmental Protection Agency (Ohio or Ohio EPA) on July 30, 2021, which Ohio EPA supplemented on August 6, 2024, as satisfying applicable requirements under the Clean Air Act (CAA) and EPA's Regional Haze Rule for the program's second implementation period. EPA proposes to find that Ohio's SIP submission addresses the requirement that States must periodically revise their long-term strategies for making reasonable progress towards the national goal of preventing any future, and remedying any existing, anthropogenic impairment of visibility, including regional haze, in mandatory Class I Federal areas, and also addresses other applicable requirements for the second implementation period of the regional haze program. EPA is taking this action pursuant to sections 110 and 169A of the CAA.

DATES: Written comments must be received on or before September 30, 2024.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–R05–OAR–2021–0544 at <https://www.regulations.gov> or via email to langman.michael@epa.gov. For comments submitted at [Regulations.gov](https://www.regulations.gov), follow the online instructions for submitting comments. Once submitted, comments cannot be edited or removed from the docket. EPA may publish any comment received to its public docket. Do not submit to EPA's docket at <https://www.regulations.gov> any information you consider to be confidential business information (CBI), Proprietary Business Information (PBI), or other information whose disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include

discussion of all points you wish to make. EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.*, on the web, cloud, or other file sharing system). For additional submission methods, please contact the person identified in the **FOR FURTHER INFORMATION CONTACT** section. For the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit <https://www.epa.gov/dockets/commenting-epa-dockets>.

FOR FURTHER INFORMATION CONTACT: Alisa Liu, Air and Radiation Division (AR–18J), Environmental Protection Agency, Region 5, 77 West Jackson Boulevard, Chicago, Illinois 60604, (312) 353–3193, liu.alisa@epa.gov. The EPA Region 5 office is open from 8:30 a.m. to 4:30 p.m., Monday through Friday.

SUPPLEMENTARY INFORMATION: Throughout this document whenever “we,” “us,” or “our” is used, we mean EPA.

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I. What action is EPA proposing?

On July 30, 2021, Ohio EPA submitted a revision to its SIP to address regional haze for the second implementation period and supplemented it on August 6, 2024. Ohio EPA made this SIP submission to satisfy the requirements of the CAA's regional haze program pursuant to CAA sections 169A and 169B and 40 CFR 51.308. EPA proposes to find that the Ohio regional haze SIP submission for the second implementation period meets the applicable statutory and regulatory requirements and thus proposes to approve Ohio's submission into its SIP.

II. Background and Requirements for Regional Haze Plans

A. Regional Haze Background

In the 1977 CAA Amendments, Congress created a program for protecting visibility in the nation's mandatory Class I Federal areas, which include certain national parks and wilderness areas.¹ CAA 169A. The CAA establishes as a national goal the “prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution.” CAA 169A(a)(1). The CAA further directs EPA to promulgate regulations to assure reasonable progress toward meeting this national goal. CAA 169A(a)(4). On December 2, 1980, EPA promulgated regulations to address visibility impairment in mandatory Class I Federal areas (hereinafter referred to as “Class I areas”) that is “reasonably attributable” to a single source or small group of sources. (45 FR 80084, December 2, 1980). These regulations, codified at 40 CFR 51.300 through 51.307, represented the first phase of EPA's efforts to address visibility impairment. In 1990, Congress added section 169B to the CAA to further address visibility impairment, specifically, impairment from regional

¹ Areas statutorily designated as mandatory Class I Federal areas consist of national parks exceeding 6,000 acres, wilderness areas and national memorial parks exceeding 5,000 acres, and all international parks that were in existence on August 7, 1977. CAA 162(a). There are 156 mandatory Class I areas. The list of areas to which the requirements of the visibility protection program apply is in 40 CFR part 81, subpart D.

haze, CAA 169B. EPA promulgated the Regional Haze Rule (RHR), codified at 40 CFR 51.308,² on July 1, 1999. (64 FR 35714, July 1, 1999). These regional haze regulations are a central component of EPA's comprehensive visibility protection program for Class I areas.

Regional haze is visibility impairment that is produced by a multitude of anthropogenic sources and activities which are located across a broad geographic area and that emit pollutants that impair visibility. Visibility impairing pollutants include fine and coarse particulate matter (PM) (*e.g.*, sulfates, nitrates, organic carbon, elemental carbon, and soil dust) and their precursors (*e.g.*, sulfur dioxide (SO₂), nitrogen oxides (NO_x), and, in some cases, volatile organic compounds (VOC) and ammonia (NH₃)). Fine particle precursors react in the atmosphere to form fine particulate matter (PM_{2.5}), which impairs visibility by scattering and absorbing light. Visibility impairment reduces the perception of clarity and color, as well as visible distance.³

To address regional haze visibility impairment, the 1999 RHR established an iterative planning process that requires both States in which Class I areas are located and States "the emissions from which may reasonably be anticipated to cause or contribute to any impairment of visibility" in a Class I area to periodically submit SIP revisions to address such impairment.

² In addition to the generally applicable regional haze provisions at 40 CFR 51.308, EPA also promulgated regulations specific to addressing regional haze visibility impairment in Class I areas on the Colorado Plateau at 40 CFR 51.309. The latter regulations are applicable only for specific jurisdictions' regional haze plans submitted no later than December 17, 2007, and thus are not relevant here.

³ There are several ways to measure the amount of visibility impairment, *i.e.*, haze. One such measurement is the deciview, which is the principal metric used by the RHR. Under many circumstances, a change in one deciview will be perceived by the human eye to be the same on both clear and hazy days. The deciview is unitless. It is proportional to the logarithm of the atmospheric extinction of light, which is the perceived dimming of light due to its being scattered and absorbed as it passes through the atmosphere. Atmospheric light extinction (b^{ext}) is a metric used to for expressing visibility and is measured in inverse megameters (Mm⁻¹). EPA's Guidance on Regional Haze State Implementation Plans for the Second Implementation Period ("2019 Guidance") offers the flexibility for the use of light extinction in certain cases. Light extinction can be simpler to use in calculations than deciview, since it is not a logarithmic function. See, *e.g.*, 2019 Guidance at 16, 19, <https://www.epa.gov/visibility/guidance-regional-haze-state-implementation-plans-second-implementation-period>, EPA Office of Air Quality Planning and Standards, Research Triangle Park (August 20, 2019). The formula for the deciview is $10 \ln(b^{ext})/10 \text{ Mm}^{-1}$. 40 CFR 51.301.

CAA 169A(b)(2);⁴ *see also* 40 CFR 51.308(b), (f) (establishing submission dates for iterative regional haze SIP revisions); (64 FR 35714 at 35768, July 1, 1999). Under the CAA, each SIP submission must contain "a long-term (ten to fifteen years) strategy for making reasonable progress toward meeting the national goal," CAA 169A(b)(2)(B); the initial round of SIP submissions also had to address the statutory requirement that certain older, larger sources of visibility impairing pollutants install and operate the best available retrofit technology (BART). CAA 169A(b)(2)(A); 40 CFR 51.308(d), (e). States' first regional haze SIPs were due by December 17, 2007, 40 CFR 51.308(b), with subsequent SIP submissions containing updated long-term strategies originally due July 31, 2018, and every ten years thereafter. (64 FR at 35768, July 1, 1999). EPA established in the 1999 RHR that all States either have Class I areas within their borders or "contain sources whose emissions are reasonably anticipated to contribute to regional haze in a Class I area"; therefore, all States must submit regional haze SIPs.⁵ *Id.* at 35721.

Much of the focus in the first implementation period of the regional haze program, which ran from 2007 through 2018, was on satisfying States' BART obligations. First implementation period SIPs were additionally required to contain long-term strategies for making reasonable progress toward the national visibility goal, of which BART is one component. The core required elements for the first implementation period SIPs (other than BART) are laid out in 40 CFR 51.308(d). Those provisions required that States containing Class I areas establish reasonable progress goals (RPGs) that are measured in deciviews (dv) and reflect the anticipated visibility conditions at the end of the implementation period including from implementation of States' long-term strategies. The first planning period RPGs were required to provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no

⁴ The RHR expresses the statutory requirement for States to submit plans addressing out-of-state class I areas by providing that States must address visibility impairment "in each mandatory Class I Federal area located outside the State that may be affected by emissions from within the State." 40 CFR 51.308(d) and (f).

⁵ In addition to each of the fifty States, EPA also concluded that the Virgin Islands and District of Columbia must also submit regional haze SIPs because they either contain a Class I area or contain sources whose emissions are reasonably anticipated to contribute regional haze in a Class I area. *See* 40 CFR 51.300(b) and (d)(3).

degradation in visibility for the least impaired days over the same period. In establishing the RPGs for any Class I area in a State, the State was required to consider four statutory factors: the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected sources. CAA 169A(g)(1); 40 CFR 51.308(d)(1).

States were also required to calculate baseline (using the five year period of 2000–2004) and natural visibility conditions (*i.e.*, visibility conditions without anthropogenic visibility impairment) for each Class I area, and to calculate the linear rate of progress needed to attain natural visibility conditions, assuming a starting point of baseline visibility conditions in 2004 and ending with natural conditions in 2064. This linear interpolation is known as the uniform rate of progress (URP) and is used as a tracking metric to help States assess the amount of progress they are making towards the national visibility goal over time in each Class I area.⁶ 40 CFR 51.308(d)(1)(i)(B), (d)(2). The 1999 RHR also provided that States' long-term strategies must include the "enforceable emissions limitations, compliance, schedules, and other measures as necessary to achieve the reasonable progress goals." 40 CFR 51.308(d)(3). In establishing their long-term strategies, States are required to consult with other States that also contribute to visibility impairment in a given Class I area and include all measures necessary to obtain their shares of the emission reductions needed to meet the RPGs. *See* 40 CFR 51.308(d)(3)(i), (ii). The provisions of 40 CFR 51.308(d) also contain seven additional factors States must consider in formulating their long-term strategies, 40 CFR 51.308(d)(3)(v), as well as provisions governing monitoring and other implementation plan requirements. 40 CFR 51.308(d)(4).

⁶ EPA established the URP framework in the 1999 RHR to provide "an equitable analytical approach" to assessing the rate of visibility improvement at Class I areas across the country. The start point for the URP analysis is 2004 and the endpoint was calculated based on the amount of visibility improvement that was anticipated to result from implementation of existing CAA programs over the period from the mid-1990s to approximately 2005. Assuming this rate of progress would continue into the future, EPA determined that natural visibility conditions would be reached in 60 years, or 2064 (60 years from the baseline starting point of 2004). However, EPA did not establish 2064 as the year by which the national goal *must* be reached. 64 FR at 35731–32. That is, the URP and the 2064 date are not enforceable targets but are rather tools that "allow for analytical comparisons between the rate of progress that would be achieved by the State's chosen set of control measures and the URP." (82 FR 3078 at 3084, January 10, 2017).

Finally, the 1999 RHR required States to submit periodic progress reports—SIP revisions due every five years that contain information on States' implementation of their regional haze plans and an assessment of whether anything additional is needed to make reasonable progress, *see* 40 CFR 51.308(g),(h)—and to consult with the Federal Land Manager(s)⁷ (FLMs) responsible for each Class I area according to the requirements in CAA 169A(d) and 40 CFR 51.308(i).

On January 10, 2017, EPA promulgated revisions to the RHR, (82 FR 3078, January 10, 2017), that apply for the second and subsequent implementation periods. The 2017 rulemaking made several changes to the requirements for regional haze SIPs to clarify States' obligations and streamline certain regional haze requirements. The revisions to the regional haze program for the second and subsequent implementation periods focused on the requirement that States' SIPs contain long-term strategies for making reasonable progress towards the national visibility goal. The reasonable progress requirements as revised in the 2017 rulemaking (referred to here as the 2017 RHR Revisions) are codified at 40 CFR 51.308(f). Among other changes, the 2017 RHR Revisions adjusted the deadline for States to submit their second implementation period SIPs from July 31, 2018, to July 31, 2021, clarified the order of analysis and the relationship between RPGs and the long-term strategy, and focused on making visibility improvements on the days with the most anthropogenic visibility impairment, as opposed to the days with the most visibility impairment overall. EPA also revised requirements of the visibility protection program related to periodic progress reports and FLM consultation. The specific requirements applicable to second implementation period regional haze SIP submissions are addressed in detail below.

EPA provided guidance to the states for their second implementation period SIP submissions in the preamble to the 2017 RHR Revisions as well as in subsequent, stand-alone guidance documents. In August 2019, EPA issued "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period" ("2019

Guidance").⁸ On July 8, 2021, EPA issued a memorandum containing "Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period" ("2021 Clarifications Memo").⁹ Additionally, EPA further clarified the recommended procedures for processing ambient visibility data and optionally adjusting the URP to account for international anthropogenic and prescribed fire impacts in two technical guidance documents: the December 2018 "Technical Guidance on Tracking Visibility Progress for the Second Implementation Period of the Regional Haze Program" ("2018 Visibility Tracking Guidance"),¹⁰ and the June 2020 "Recommendation for the Use of Patched and Substituted Data and Clarification of Data Completeness for Tracking Visibility Progress for the Second Implementation Period of the Regional Haze Program" and associated Technical Addendum ("2020 Data Completeness Memo").¹¹

As explained in the 2021 Clarifications Memo, EPA intends the second implementation period of the regional haze program to secure meaningful reductions in visibility impairing pollutants that build on the significant progress States have achieved to date. The Agency also recognizes that analyses regarding reasonable progress are State-specific and that, based on States' and sources' individual circumstances, what constitutes reasonable reductions in visibility impairing pollutants will vary from State-to-State. While there exist many opportunities for States to

⁸ Guidance on Regional Haze State Implementation Plans for the Second Implementation Period. <https://www.epa.gov/visibility/guidance-regional-haze-state-implementation-plans-second-implementation-period> EPA Office of Air Quality Planning and Standards, Research Triangle Park (August 20, 2019).

⁹ Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period. <https://www.epa.gov/system/files/documents/2021-07/clarifications-regarding-regional-haze-state-implementation-plans-for-the-second-implementation-period.pdf>. EPA Office of Air Quality Planning and Standards, Research Triangle Park (July 8, 2021).

¹⁰ Technical Guidance on Tracking Visibility Progress for the Second Implementation Period of the Regional Haze Program. <https://www.epa.gov/sites/default/files/2021-03/documents/tracking.pdf> EPA Office of Air Quality Planning and Standards, Research Triangle Park. (December 20, 2018).

¹¹ Recommendation for the Use of Patched and Substituted Data and Clarification of Data Completeness for Tracking Visibility Progress for the Second Implementation Period of the Regional Haze Program. <https://www.epa.gov/visibility/memo-and-technical-addendum-ambient-data-usage-and-completeness-regional-haze-program> EPA Office of Air Quality Planning and Standards, Research Triangle Park (June 3, 2020).

leverage both ongoing and upcoming emission reductions under other CAA programs, the Agency expects States to undertake rigorous reasonable progress analyses that identify further opportunities to advance the national visibility goal consistent with the statutory and regulatory requirements. *See generally* 2021 Clarifications Memo. This is consistent with Congress's determination that a visibility protection program is needed in addition to the CAA's National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) programs, as further emission reductions may be necessary to adequately protect visibility in Class I areas throughout the country.¹²

B. Roles of Agencies in Addressing Regional Haze

Because the air pollutants and pollution affecting visibility in Class I areas can be transported over long distances, successful implementation of the regional haze program requires long-term, regional coordination among multiple jurisdictions and agencies that have responsibility for Class I areas and the emissions that impact visibility in those areas. To address regional haze, States need to develop strategies in coordination with one another, considering the effect of emissions from one jurisdiction on the air quality in another. Five regional planning organizations (RPOs),¹³ which include representation from State and Tribal governments, EPA, and FLMs, were developed in the lead-up to the first implementation period to address regional haze. RPOs evaluate technical information to better understand how emissions from State and Tribal land impact Class I areas across the country, pursue the development of regional strategies to reduce emissions of particulate matter and other pollutants leading to regional haze, and help States meet the consultation requirements of the RHR.

The Lake Michigan Air Directors Consortium (LADCO) is an RPO that includes the States of Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. LADCO's work is a

¹² *See, e.g.*, H.R. Rep. No. 95-294 at 205 ("In determining how to best remedy the growing visibility problem in these areas of great scenic importance, the committee realizes that as a matter of equity, the national ambient air quality standards cannot be revised to adequately protect visibility in all areas of the country."), ("the mandatory class I increments of [the PSD program] do not adequately protect visibility in class I areas").

¹³ RPOs are sometimes also referred to as "multi-jurisdictional organizations," or MJOs. For the purposes of this notice, the terms RPO and MJO are synonymous.

⁷ EPA's regulations define "Federal Land Manager" as "the Secretary of the department with authority over the Federal Class I area (or the Secretary's designee) or, with respect to Roosevelt-Campobello International Park, the Chairman of the Roosevelt-Campobello International Park Commission." 40 CFR 51.301.

collaborative effort of State governments, Tribal governments, and various Federal agencies established to initiate and coordinate activities associated with the management of regional haze, visibility, and other air quality issues in the Midwest. Along with the six LADCO States, participants in LADCO's Regional Haze Technical Workgroup include EPA, U.S. National Parks Service (NPS), U.S. Fish and Wildlife Service (FWS), and U.S. Forest Service (USFS).

III. Requirements for Regional Haze Plans for the Second Implementation Period

Under the CAA and EPA's regulations, all 50 States, the District of Columbia, and the U.S. Virgin Islands were required to submit regional haze SIPs satisfying the applicable requirements for the second implementation period of the regional haze program by July 31, 2021. Each State's SIP must contain a long-term strategy for making reasonable progress toward meeting the national goal of remedying any existing and preventing any future anthropogenic visibility impairment in Class I areas. CAA 169A(b)(2)(B). To this end, 40 CFR 51.308(f) lays out the process by which States determine what constitutes their long-term strategies, with the order of the requirements in 40 CFR 51.308(f)(1) through (3) generally mirroring the order of the steps in the reasonable progress analysis¹⁴ and (f)(4) through (6) containing additional, related requirements. Broadly speaking, a State first must identify the Class I areas within the State and determine the Class I areas outside the State in which visibility may be affected by emissions from the State. These are the Class I areas that must be addressed in the State's long-term strategy. See 40 CFR 51.308(f), (f)(2). For each Class I area within its borders, a State must then calculate the baseline, current, and natural visibility conditions for that area, as well as the visibility improvement made to date and the URP. See 40 CFR 51.308(f)(1). Each State having a Class I area and/or emissions that may affect visibility in a Class I area must then develop a long-term strategy that includes the enforceable emission limitations, compliance schedules, and other measures that are necessary to make reasonable progress in such areas. A reasonable progress determination is based on applying the four factors in

CAA section 169A(g)(1) to sources of visibility-impairing pollutants that the State has selected to assess for controls for the second implementation period. Additionally, as further explained below, the RHR at 40 CFR 51.308(f)(2)(iv) separately provides five "additional factors"¹⁵ that States must consider in developing their long-term strategies. See 40 CFR 51.308(f)(2). A State evaluates potential emission reduction measures for those selected sources and determines which are necessary to make reasonable progress. Those measures are then incorporated into the State's long-term strategy. After a State has developed its long-term strategy, it then establishes RPGs for each Class I area within its borders by modeling the visibility impacts of all reasonable progress controls at the end of the second implementation period, *i.e.*, in 2028, as well as the impacts of other requirements of the CAA. The RPGs include reasonable progress controls not only for sources in the State in which the Class I area is located, but also for sources in other States that contribute to visibility impairment in that area. The RPGs are then compared to the baseline visibility conditions and the URP to ensure that progress is being made towards the statutory goal of preventing any future and remedying any existing anthropogenic visibility impairment in Class I areas. 40 CFR 51.308(f)(2) and (3).

In addition to satisfying the requirements at 40 CFR 51.308(f) related to reasonable progress, the regional haze SIP revisions for the second implementation period must address the requirements in 40 CFR 51.308(g)(1) through (5) pertaining to periodic reports describing progress towards the RPGs, 40 CFR 51.308(f)(5), as well as requirements for FLM consultation that apply to all visibility protection SIPs and SIP revisions. 40 CFR 51.308(i).

A State must submit its regional haze SIP and subsequent SIP revisions to EPA according to the requirements applicable to all SIP revisions under the CAA and EPA's regulations. See CAA 169A(b)(2); CAA 110(a). Upon EPA approval, a SIP is enforceable by the Agency and the public under the CAA. If EPA finds that a State fails to make a required SIP revision, or if EPA finds that a State's SIP is incomplete or disapproves the SIP, the Agency must promulgate a Federal implementation plan (FIP) that satisfies the applicable requirements. See CAA 110(c)(1).

A. Identification of Class I Areas

The first step in developing a regional haze SIP is for a State to determine which Class I areas, in addition to those within its borders, "may be affected" by emissions from within the State. In the 1999 RHR, EPA determined that all States contribute to visibility impairment in at least one Class I area and explained that the statute and regulations lay out an "extremely low triggering threshold" for determining "whether States should be required to engage in air quality planning and analysis as a prerequisite to determining the need for control of emissions from sources within their State." 64 FR 35714 at 35720–22, July 1, 1999.

A State must determine which Class I areas must be addressed by its SIP by evaluating the total emissions of visibility impairing pollutants from all sources within the State. While the RHR does not require this evaluation to be conducted in any particular manner, EPA's 2019 Guidance provides recommendations for how such an assessment might be accomplished, including by, where appropriate, using the determinations previously made for the first implementation period. See 2019 Guidance at 8–9. In addition, the determination of which Class I areas may be affected by a State's emissions is subject to the requirement in 40 CFR 51.308(f)(2)(iii) to "document the technical basis, including modeling, monitoring, cost, engineering, and emissions information, on which the State is relying to determine the emission reduction measures that are necessary to make reasonable progress in each mandatory Class I Federal area it affects."

B. Calculations of Baseline, Current, and Natural Visibility Conditions; Progress to Date; and the Uniform Rate of Progress

As part of assessing whether a SIP submission for the second implementation period is providing for reasonable progress towards the national visibility goal, the RHR contains requirements in 40 CFR 51.308(f)(1) related to tracking visibility improvement over time. The requirements of this section apply only to States having Class I areas within their borders; the required calculations must be made for each such Class I area. EPA's 2018 Visibility Tracking Guidance¹⁶ provides recommendations

¹⁴ EPA explained in the 2017 RHR Revisions that we were adopting new regulatory language in 40 CFR 51.308(f) that, unlike the structure in 51.308(d), "tracked the actual planning sequence." (82 FR 3091, January 10, 2017).

¹⁵ The five "additional factors" for consideration in section 51.308(f)(2)(iv) are distinct from the four factors listed in CAA section 169A(g)(1) and 40 CFR 51.308(f)(2)(i) that States must consider and apply to sources in determining reasonable progress.

¹⁶ The 2018 Visibility Tracking Guidance references and relies on parts of the 2003 Tracking Guidance: "Guidance for Tracking Progress Under the Regional Haze Rule," which can be found at

to assist States in satisfying their obligations under 40 CFR 51.308(f)(1); specifically, in developing information on baseline, current, and natural visibility conditions, and in making optional adjustments to the URP to account for the impacts of international anthropogenic emissions and prescribed fires. See 82 FR 3078 at 3103–05, January 10, 2017.

The RHR requires tracking of visibility conditions on two sets of days: the clearest and the most impaired days. Visibility conditions for both sets of days are expressed as the average deciview index for the relevant five-year period (the period representing baseline or current visibility conditions). The RHR provides that the relevant sets of days for visibility tracking purposes are the 20 percent clearest (the 20 percent of monitored days in a calendar year with the lowest values of the deciview index) and 20 percent most impaired days (the 20 percent of monitored days in a calendar year with the highest amounts of anthropogenic visibility impairment).¹⁷ 40 CFR 51.301. A State must calculate visibility conditions for both the 20 percent clearest and 20 percent most impaired days for the baseline period of 2000–2004 and the most recent five-year period for which visibility monitoring data are available (representing current visibility conditions). 40 CFR 51.308(f)(1)(i) and (iii). States must also calculate natural visibility conditions for the clearest and most impaired days,¹⁸ by estimating the conditions that would exist on those two sets of days absent anthropogenic visibility impairment. 40 CFR 51.308(f)(1)(ii). Using all these data, States must then calculate, for each Class I area, the amount of progress made since the baseline period (2000–2004) and how much improvement is left to achieve to reach natural visibility conditions.

Using the data for the set of most impaired days only, States must plot a

<https://www.epa.gov/sites/default/files/2021-03/documents/tracking.pdf>.

¹⁷ This action also refers to the 20 percent clearest and 20 percent most anthropogenically impaired days as the “clearest” and “most impaired” or “most anthropogenically impaired” days, respectively.

¹⁸ The RHR at 40 CFR 51.308(f)(1)(ii) contains an error related to the requirement for calculating two sets of natural conditions values. The rule says, “most impaired days or the clearest days” where it should say “most impaired days and clearest days.” This is an error that was intended to be corrected in the 2017 RHR Revisions but did not get corrected in the final rule language. This is supported by the preamble text at 82 FR 3098: “In the final version of 40 CFR 51.308(f)(1)(ii), an occurrence of “or” has been corrected to “and” to indicate that natural visibility conditions for both the most impaired days and the clearest days must be based on available monitoring information.”

line between visibility conditions in the baseline period and natural visibility conditions for each Class I area to determine the URP—the amount of visibility improvement, measured in *dv*, that would need to be achieved during each implementation period to achieve natural visibility conditions by the end of 2064. The URP is used in later steps of the reasonable progress analysis for informational purposes and to provide a non-enforceable benchmark against which to assess a Class I area’s rate of visibility improvement.¹⁹ Additionally, in the 2017 RHR Revisions, EPA provided States the option of proposing to adjust the endpoint of the URP to account for impacts of anthropogenic sources outside the United States and/or impacts of certain types of wildland prescribed fires. These adjustments, which must be approved by EPA, are intended to avoid any perception that States should compensate for impacts from international anthropogenic sources and to give States the flexibility to determine that limiting the use of wildland-prescribed fire is not necessary for reasonable progress. See 82 FR 3078 at 3107, January 10, 2017, footnote 116.

EPA’s 2018 Visibility Tracking Guidance can be used to help satisfy the 40 CFR 51.308(f)(1) requirements, including in developing information on baseline, current, and natural visibility conditions, and in making optional adjustments to the URP. In addition, the 2020 Data Completeness Memo provides recommendations on the data completeness language referenced in 40 CFR 51.308(f)(1)(i) and provides updated natural conditions estimates for each Class I area.

C. Long-Term Strategy for Regional Haze

The core component of a regional haze SIP submission is a long-term strategy that addresses regional haze in each Class I area within a State’s borders and each Class I area that may be affected by emissions from the State. The long-term strategy “must include the enforceable emissions limitations, compliance schedules, and other measures that are necessary to make reasonable progress, as determined pursuant to (f)(2)(i) through (iv).” 40 CFR 51.308(f)(2). The amount of progress that is “reasonable progress” is based on applying the four statutory

¹⁹ Being on or below the URP is not a “safe harbor”; *i.e.*, achieving the URP does not mean that a Class I area is making “reasonable progress” and does not relieve a State from using the four statutory factors to determine what level of control is needed to achieve such progress. See, *e.g.*, 82 FR 3078 at 3093, January 10, 2017.

factors in CAA section 169A(g)(1) in an evaluation of potential control options for sources of visibility impairing pollutants, which is referred to as a “four-factor” analysis. The outcome of that analysis is the emission reduction measures that a particular source or group of sources needs to implement to make reasonable progress towards the national visibility goal. See 40 CFR 51.308(f)(2)(i). Emission reduction measures that are necessary to make reasonable progress may be either new, additional control measures for a source, or they may be the existing emission reduction measures that a source is already implementing. See 2019 Guidance at 43; 2021 Clarifications Memo at 8–10. Such measures must be represented by “enforceable emissions limitations, compliance schedules, and other measures” (*i.e.*, any additional compliance tools) in a State’s long-term strategy in its SIP. 40 CFR 51.308(f)(2).

The construct of 40 CFR 51.308(f)(2)(i) provides the requirements for the four-factor analysis. The first step of this analysis entails selecting the sources to be evaluated for emission reduction measures; to this end, the RHR requires States to consider “major and minor stationary sources or groups of sources, mobile sources, and area sources” of visibility impairing pollutants for potential four-factor control analysis. 40 CFR 51.308(f)(2)(i). A threshold question at this step is which visibility impairing pollutants will be analyzed. As EPA previously explained, consistent with the first implementation period, EPA generally expects that each State will analyze at least SO₂ and NO_x in selecting sources and determining control measures. See 2019 Guidance at 12, 2021, Clarifications Memo at 4. A State that chooses not to consider at least these two pollutants should demonstrate why such consideration would be unreasonable. 2021 Clarifications Memo at 4.

While States have the option to analyze *all* sources, the 2019 Guidance explains that “an analysis of control measures is not required for every source in each implementation period,” and that “[s]electing a set of sources for analysis of control measures in each implementation period is . . . consistent with the Regional Haze 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.” 2019 Guidance at 9. However, given that source selection is the basis of all subsequent control determinations, a reasonable source selection process “should be designed and conducted to ensure that source selection results in a

set of pollutants and sources the evaluation of which has the potential to meaningfully reduce their contributions to visibility impairment.” 2021 Clarifications Memo at 3.

EPA explained in the 2021 Clarifications Memo that each State has an obligation to submit a long-term strategy that addresses the regional haze visibility impairment that results from emissions from within that State. Thus, source selection should focus on the in-state contribution to visibility impairment and be designed to capture a meaningful portion of the State’s total contribution to visibility impairment in Class I areas. A State should not decline to select its largest in-state sources on the basis that there are even larger out-of-state contributors. 2021 Clarifications Memo at 4.²⁰

Thus, while States have discretion to choose any source selection methodology that is reasonable, whatever choices they make should be reasonably explained. To this end, 40 CFR 51.308(f)(2)(i) requires that a State’s SIP submission include “a description of the criteria it used to determine which sources or groups of sources it evaluated.” The technical basis for source selection, which may include methods for quantifying potential visibility impacts such as emissions divided by distance metrics, trajectory analyses, residence time analyses, and/or photochemical modeling, must also be appropriately documented, as required by 40 CFR 51.308(f)(2)(iii).

Once a State has selected the set of sources, the next step is to determine the emissions reduction measures for those sources that are necessary to make reasonable progress for the second implementation period.²¹ This is accomplished by considering the four factors—“the costs of compliance, the time necessary for compliance, and the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any

existing source subject to such requirements.” CAA 169A(g)(1). EPA has explained that the four-factor analysis is an assessment of potential emission reduction measures (*i.e.*, control options) for sources; “use of the terms ‘compliance’ and ‘subject to such requirements’ in section 169A(g)(1) strongly indicates that Congress intended the relevant determination to be the requirements with which sources would have to comply to satisfy the CAA’s reasonable progress mandate.” 82 FR 3078 at 3091, January 10, 2017. Thus, for each source it has selected for four-factor analysis,²² a State must consider a “meaningful set” of technically feasible control options for reducing emissions of visibility impairing pollutants. *Id.* at 3088. The 2019 Guidance provides that “[a] state must reasonably pick and justify the measures that it will consider, recognizing that there is no statutory or regulatory requirement to consider all technically feasible measures or any particular measures. A range of technically feasible measures available to reduce emissions would be one way to justify a reasonable set.” 2019 Guidance at 29.

EPA’s 2021 Clarifications Memo provides further guidance on what constitutes a reasonable set of control options for consideration: “A reasonable four-factor analysis will consider the full range of potentially reasonable options for reducing emissions.” 2021 Clarifications Memo at 7. In addition to add-on controls and other retrofits (*i.e.*, new emissions reduction measures for sources), EPA explained that States should generally analyze efficiency improvements for sources’ existing measures as control options in their four-factor analyses, as in many cases such improvements are reasonable given that they typically involve only additional operation and maintenance costs. Additionally, the 2021

Clarifications Memo provides that States that have assumed a higher emissions rate than a source has achieved or could potentially achieve using its existing measures should also consider lower emissions rates as potential control options. That is, a State should consider a source’s recent actual and projected emission rates to determine if it could reasonably attain lower emission rates with its existing measures. If so, the State should analyze the lower emission rate as a control option for reducing emissions. 2021 Clarifications Memo at 7. EPA’s recommendations to analyze potential efficiency improvements and achievable lower emission rates apply to both sources that have been selected for four-factor analysis and those that have forgone a four-factor analysis on the basis of existing “effective controls.” *See* 2021 Clarifications Memo at 5, 10.

After identifying a reasonable set of potential control options for the sources it has selected, a State then collects information on the four factors with regard to each option identified. EPA has also explained that, in addition to the four statutory factors, States have flexibility under the CAA and RHR to reasonably consider visibility benefits as an additional factor alongside the four statutory factors.²³ The 2019 Guidance provides recommendations for the types of information that can be used to characterize the four factors (with or without visibility), as well as ways in which States might reasonably consider and balance that information to determine which of the potential control options is necessary to make reasonable progress. *See* 2019 Guidance at 30–36. The 2021 Clarifications Memo contains further guidance on how States can reasonably consider modeled visibility impacts or benefits in the context of a four-factor analysis. 2021 Clarifications Memo at 12–13, 14–15. Specifically, EPA explained that while visibility can reasonably be used when comparing and choosing between multiple reasonable control options, it should not be used to summarily reject controls that are reasonable given the four statutory factors. 2021 Clarifications Memo at 13. Ultimately, while States have discretion to reasonably weigh the factors and to determine what level of control is needed, 40 CFR 51.308(f)(2)(i) provides that a State “must include in its implementation plan a description of . . . how the four factors were taken into consideration in selecting the

²⁰ Similarly, in responding to comments on the 2017 RHR Revisions, EPA explained that “[a] state should not fail to address its many relatively low-impact sources merely because it only has such sources and another state has even more low-impact sources and/or some high impact sources.” Responses to Comments on Protection of Visibility: Amendments to Requirements for State Plans; Proposed Rule (81 FR 26942 at 26987–88, May 4, 2016).

²¹ The CAA provides that, “[i]n determining reasonable progress there shall be taken into consideration” the four statutory factors. CAA 169A(g)(1). However, in addition to four-factor analyses for selected sources, groups of sources, or source categories, a State may also consider additional emission reduction measures for inclusion in its long-term strategy, *e.g.*, from other newly adopted, on-the-books, or on-the-way rules and measures for sources not selected for four-factor analysis for the second planning period.

²² “Each source” or “particular source” is used here as shorthand. While a source-specific analysis is one way of applying the four factors, neither the statute nor the RHR requires States to evaluate individual sources. Rather, States have “the flexibility to conduct four-factor analyses for specific sources, groups of sources or even entire source categories, depending on state policy preferences and the specific circumstances of each state.” 82 FR 3078 at 3088, January 10, 2017. However, not all approaches to grouping sources for four-factor analysis are necessarily reasonable; the reasonableness of grouping sources in any particular instance will depend on the circumstances and the manner in which grouping is conducted. If it is feasible to establish and enforce different requirements for sources or subgroups of sources, and if relevant factors can be quantified for those sources or subgroups, then States should make a separate reasonable progress determination for each source or subgroup. 2021 Clarifications Memo at 7–8.

²³ *See, e.g.*, Responses to Comments on Protection of Visibility: Amendments to Requirements for State Plans; Proposed Rule (81 FR 26942, May 4, 2016), Docket Number EPA–HQ–OAR–2015–0531, U.S. Environmental Protection Agency at 186; 2019 Guidance at 36–37.

measure for inclusion in its long-term strategy.”

As explained above, 40 CFR 51.308(f)(2)(i) requires States to determine the emission reduction measures for sources that are necessary to make reasonable progress by considering the four factors. Pursuant to 40 CFR 51.308(f)(2), measures that are necessary to make reasonable progress towards the national visibility goal must be included in a State’s long-term strategy and in its SIP.²⁴ If the outcome of a four-factor analysis is a new, additional emission reduction measure for a source, that new measure is necessary to make reasonable progress towards remedying existing anthropogenic visibility impairment and must be included in the SIP. If the outcome of a four-factor analysis is that no new measures are reasonable for a source, continued implementation of the source’s existing measures is generally necessary to prevent future emission increases and thus to make reasonable progress towards the second part of the national visibility goal: preventing future anthropogenic visibility impairment. *See* CAA 169A(a)(1). That is, when the result of a four-factor analysis is that no new measures are necessary to make reasonable progress, the source’s existing measures are generally necessary to make reasonable progress and must be included in the SIP. However, there may be circumstances in which a State can demonstrate that a source’s existing measures are *not* necessary to make reasonable progress. Specifically, if a State can demonstrate that a source will continue to implement its existing measures and will not increase its emissions rate, it may not be necessary to have those measures in the long-term strategy to prevent future emissions increases and future visibility impairment. EPA’s 2021 Clarifications Memo provides further explanation and guidance on how States may demonstrate that a source’s existing measures are not necessary to make reasonable progress. *See* 2021 Clarifications Memo at 8–10. If the State can make such a demonstration, it need

²⁴ States may choose to, but are not required to, include measures in their long-term strategies beyond just the emission reduction measures that are necessary for reasonable progress. *See* 2021 Clarifications Memo at 16. For example, States with smoke management programs may choose to submit their smoke management plans to EPA for inclusion in their SIPs but are not required to do so. *See, e.g.*, 82 FR 3078 at 3108–09, January 10, 2017, (requirement to consider smoke management practices and smoke management programs under 40 CFR 51.308(f)(2)(iv) does not require States to adopt such practices or programs into their SIPs, although they may elect to do so).

not include a source’s existing measures in the long-term strategy or its SIP.

As with source selection, the characterization of information on each of the factors is also subject to the documentation requirement in 40 CFR 51.308(f)(2)(iii). The reasonable progress analysis, including source selection, information gathering, characterization of the four statutory factors (and potentially visibility), balancing of the four factors, and selection of the emission reduction measures that represent reasonable progress, is a technically complex exercise, but also a flexible one that provides States with bounded discretion to design and implement approaches appropriate to their circumstances. Given this flexibility, 40 CFR 51.308(f)(2)(iii) plays an important function in requiring a State to document the technical basis for its decision making so that the public and EPA can comprehend and evaluate the information and analysis the State relied upon to determine what emission reduction measures must be in place to make reasonable progress. The technical documentation must include the modeling, monitoring, cost, engineering, and emissions information on which the State relied to determine the measures necessary to make reasonable progress. This documentation requirement can be met through the provision of and reliance on technical analyses developed through a regional planning process, so long as that process and its output has been approved by all State participants. In addition to the explicit regulatory requirement to document the technical basis of their reasonable progress determinations, States are also subject to the general principle that those determinations must be reasonably moored to the statute.²⁵ That is, a State’s decisions about the emission reduction measures that are necessary to make reasonable progress must be consistent with the statutory goal of remedying existing and preventing future visibility impairment.

The four statutory factors (and potentially visibility) are used to determine what emission reduction measures for selected sources must be included in a State’s long-term strategy for making reasonable progress. Additionally, the RHR at 40 CFR 51.308(f)(2)(iv) separately provides five

²⁵ *See Arizona ex rel. Darwin v. U.S. EPA*, 815 F.3d 519, 531 (9th Cir. 2016); *Nebraska v. U.S. EPA*, 812 F.3d 662, 668 (8th Cir. 2016); *North Dakota v. EPA*, 730 F.3d 750, 761 (8th Cir. 2013); *Oklahoma v. EPA*, 723 F.3d 1201, 1206, 1208–10 (10th Cir. 2013); *cf. also Nat’l Parks Conservation Ass’n v. EPA*, 803 F.3d 151, 165 (3d Cir. 2015); *Alaska Dep’t of Env’tl. Conservation v. EPA*, 540 U.S. 461, 485, 490 (2004).

“additional factors”²⁶ that States must consider in developing their long-term strategies: (1) Emission reductions due to ongoing air pollution control programs, including measures to address reasonably attributable visibility impairment; (2) measures to reduce the impacts of construction activities; (3) source retirement and replacement schedules; (4) basic smoke management practices for prescribed fire used for agricultural and wildland vegetation management purposes and smoke management programs; and (5) 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. The 2019 Guidance provides that a State may satisfy this requirement by considering these additional factors in the process of selecting sources for four-factor analysis, when performing that analysis, or both, and that not every one of the additional factors needs to be considered at the same stage of the process. *See* 2019 Guidance at 21. EPA provided further guidance on the five additional factors in the 2021 Clarifications Memo, explaining that a State 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 or merely because visibility is otherwise projected to improve at Class I areas. Additionally, States generally should not rely on these additional factors to summarily assert that the State has already made sufficient progress and, therefore, no sources need to be selected or no new controls are needed regardless of the outcome of four-factor analyses. 2021 Clarifications Memo at 13.

Because the air pollution that causes regional haze crosses State boundaries, 40 CFR 51.308(f)(2)(ii) requires a State to consult with other States that also have emissions that are reasonably anticipated to contribute to visibility impairment in a given Class I area. Consultation allows for each State that impacts visibility in an area to share whatever technical information, analyses, and control determinations may be necessary to develop coordinated emission management strategies. This coordination may be managed through inter- and intra-RPO consultation and the development of

²⁶ The five “additional factors” for consideration in section 51.308(f)(2)(iv) are distinct from the four factors listed in CAA section 169A(g)(1) and 40 CFR 51.308(f)(2)(i) that States must consider and apply to sources in determining reasonable progress.

regional emissions strategies; additional consultations between States outside of RPO processes may also occur. If a State, pursuant to consultation, agrees that certain measures (e.g., a certain emission limitation) are necessary to make reasonable progress at a Class I area, it must include those measures in its SIP. 40 CFR 51.308(f)(2)(ii)(A). Additionally, the RHR requires that States that contribute to visibility impairment at the same Class I area consider the emission reduction measures the other contributing States have identified as being necessary to make reasonable progress for their own sources. 40 CFR 51.308(f)(2)(ii)(B). If a State has been asked to consider or adopt certain emission reduction measures, but ultimately determines those measures are not necessary to make reasonable progress, that State must document in its SIP the actions taken to resolve the disagreement. 40 CFR 51.308(f)(2)(ii)(C). EPA will consider the technical information and explanations presented by the submitting State and the State with which it disagrees when considering whether to approve the State's SIP. *See Id.*; 2019 Guidance at 53. Under all circumstances, a State must document in its SIP submission all substantive consultations with other contributing States. 40 CFR 51.308(f)(2)(ii)(C).

D. Reasonable Progress Goals

Reasonable progress goals “measure the progress that is projected to be achieved by the control measures States have determined are necessary to make reasonable progress based on a four-factor analysis.” 82 FR 3078 at 3091, January 10, 2017. Their primary purpose is to assist the public and EPA in assessing the reasonableness of States' long-term strategies for making reasonable progress towards the national visibility goal. *See* 40 CFR 51.308(f)(3)(iii) and (iv). States in which Class I areas are located must establish two RPGs, both in days—one representing visibility conditions on the clearest days and one representing visibility on the most anthropogenically impaired days—for each area within their borders. 40 CFR 51.308(f)(3)(i). The two RPGs are intended to reflect the projected impacts, on the two sets of days, of the emission reduction measures the State with the Class I area, as well as all other contributing States, have included in their long-term strategies for the second implementation period.²⁷ The RPGs also

account for the projected impacts of implementing other CAA requirements, including non-SIP based requirements. Because RPGs are the modeled result of the measures in States' long-term strategies (as well as other measures required under the CAA), they cannot be determined before States have conducted their four-factor analyses and determined the control measures that are necessary to make reasonable progress. *See* 2021 Clarifications Memo at 6.

For the second implementation period, the RPGs are set for 2028. Reasonable progress goals are not enforceable targets, 40 CFR 51.308(f)(3)(iii); rather, they “provide a way for the states to check the projected outcome of the [long-term strategy] against the goals for visibility improvement.” 2019 Guidance at 46. While States are not legally obligated to achieve the visibility conditions described in their RPGs, 40 CFR 51.308(f)(3)(i) requires that “[t]he long-term strategy and the reasonable progress goals must provide for an improvement in visibility for the most impaired days since the baseline period and ensure no degradation in visibility for the clearest days since the baseline period.” Thus, States are required to have emission reduction measures in their long-term strategies that are projected to achieve visibility conditions on the most impaired days that are better than the baseline period and shows no degradation on the clearest days compared to the clearest days from the baseline period. The baseline period for the purpose of this comparison is the baseline visibility condition—the annual average visibility condition for the period 2000–2004. *See* 40 CFR 51.308(f)(1)(i), 82 FR 3078 at 3097–98, January 10, 2017.

So that RPGs may also serve as a metric for assessing the amount of progress a State is making towards the national visibility goal, the RHR requires States with Class I areas to compare the 2028 RPG for the most impaired days to the corresponding point on the URP line (representing visibility conditions in 2028 if visibility were to improve at a linear rate from conditions in the baseline period of 2000–2004 to natural visibility conditions in 2064). If the most

other States, and other on-going emissions changes, a particular State's RPGs may not reflect all control measures and emissions reductions that are expected to occur by the end of the implementation period. The 2019 Guidance provides recommendations for addressing the timing of RPG calculations when States are developing their long-term strategies on disparate schedules, as well as for adjusting RPGs using a post-modeling approach. 2019 Guidance at 47–48.

impaired days RPG in 2028 is above the URP (i.e., if visibility conditions are improving more slowly than the rate described by the URP), each State that contributes to visibility impairment in the Class I area must demonstrate, based on the four-factor analysis required under 40 CFR 51.308(f)(2)(i), that no additional emission reduction measures would be reasonable to include in its long-term strategy. 40 CFR 51.308(f)(3)(ii). To this end, 40 CFR 51.308(f)(3)(ii) requires that each State contributing to visibility impairment in a Class I area that is projected to improve more slowly than the URP provide “a robust demonstration, including documenting the criteria used to determine which sources or groups [of] sources were evaluated and how the four factors required by paragraph (f)(2)(i) were taken into consideration in selecting the measures for inclusion in its long-term strategy.” The 2019 Guidance provides suggestions about how such a “robust demonstration” might be conducted. *See* 2019 Guidance at 50–51.

The 2017 RHR, 2019 Guidance, and 2021 Clarifications Memo also explain that projecting an RPG that is on or below the URP based on only on-the-books and/or on-the-way control measures (i.e., control measures already required or anticipated before the four-factor analysis is conducted) is not a “safe harbor” from the CAA's and RHR's requirement that all States must conduct a four-factor analysis to determine what emission reduction measures constitute reasonable progress. The URP is a planning metric used to gauge the amount of progress made thus far and the amount left before reaching natural visibility conditions. However, the URP is not based on consideration of the four statutory factors and therefore cannot answer the question of whether the amount of progress being made in any particular implementation period is “reasonable progress.” *See* 82 FR at 3093, 3099–3100; 2019 Guidance at 22; 2021 Clarifications Memo at 15–16.

E. Monitoring Strategy and Other State Implementation Plan Requirements

The provisions of 40 CFR 51.308(f)(6) require States to have certain strategies and elements in place for assessing and reporting on visibility. Individual requirements under this section apply either to States with Class I areas within their borders, States with no Class I areas but that are reasonably anticipated to cause or contribute to visibility impairment in any Class I area, or both. A State with Class I areas within its borders must submit with its SIP revision a monitoring strategy for

²⁷ RPGs are intended to reflect the projected impacts of the measures all contributing States include in their long-term strategies. However, due to the timing of analyses, control determinations by

measuring, characterizing, and reporting regional haze visibility impairment that is representative of all Class I areas within the State. SIP revisions for such States must also provide for the establishment of any additional monitoring sites or equipment needed to assess visibility conditions in Class I areas, as well as reporting of all visibility monitoring data to EPA at least annually. Compliance with the monitoring strategy requirement may be met through a State's participation in the Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring network, which is used to measure visibility impairment caused by air pollution at the 156 Class I areas covered by the visibility program. 40 CFR 51.308(f)(6), (f)(6)(i), (f)(6)(iv). The IMPROVE monitoring data is used to determine the 20 percent most anthropogenically impaired and 20 percent clearest sets of days every year at each Class I area and tracks visibility impairment over time.

All States' SIPs must provide for procedures by which monitoring data and other information are used to determine the contribution of emissions from within the State to regional haze visibility impairment in affected Class I areas. 40 CFR 51.308(f)(6)(ii), (iii). The provisions of 40 CFR 51.308(f)(6)(v) further require that all States' SIPs provide for a statewide inventory of emissions of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any Class I area; the inventory must include emissions for the most recent year for which data are available and estimates of future projected emissions. States must also include commitments to update their inventories periodically. The inventories themselves do not need to be included as elements in the SIP and are not subject to EPA review as part of the Agency's evaluation of a SIP revision.²⁸ All States' SIPs must also provide for any other elements, including reporting, recordkeeping, and other measures, that are necessary for States to assess and report on visibility. 40 CFR 51.308(f)(6)(vi). Per the 2019 Guidance, a State may note in its regional haze SIP that its compliance with the Air Emissions Reporting Rule (AERR) in 40 CFR part 51, subpart A satisfies the requirement to provide for an emissions inventory for the most recent year for which data are available. To satisfy the requirement to provide estimates of future projected emissions, a State may explain in its SIP how projected emissions were developed for

use in establishing RPGs for its own and nearby Class I areas.²⁹

Separate from the requirements related to monitoring for regional haze purposes under 40 CFR 51.308(f)(6), the RHR also contains a requirement at 40 CFR 51.308(f)(4) related to any additional monitoring that may be needed to address visibility impairment in Class I areas from a single source or a small group of sources. This is called "reasonably attributable visibility impairment."³⁰ Under this provision, if EPA or the FLM of an affected Class I area has advised a State that additional monitoring is needed to assess reasonably attributable visibility impairment, the State must include in its SIP revision for the second implementation period an appropriate strategy for evaluating such impairment.

F. Requirements for Periodic Reports Describing Progress Towards the Reasonable Progress Goals

The provisions of 40 CFR 51.308(f)(5) require a State's regional haze SIP revision to address the requirements of paragraphs 40 CFR 51.308(g)(1) through (5) so that the plan revision due in 2021 will serve also as a progress report addressing the period since submission of the progress report for the first implementation period. The regional haze progress report requirement is designed to inform the public and EPA about a State's implementation of its existing long-term strategy and whether such implementation is in fact resulting in the expected visibility improvement. See 81 FR 26942, 26950, May 4, 2016, (82 FR 3078 at 3119, January 10, 2017). To this end, every State's SIP revision for the second implementation period is required to describe the status of implementation of all measures included in the State's long-term strategy, including BART and reasonable progress emission reduction measures from the first implementation period, and the resulting emissions reductions. 40 CFR 51.308(g)(1) and (2).

A core component of the progress report requirements is an assessment of changes in visibility conditions on the clearest and most impaired days. For second implementation period progress reports, 40 CFR 51.308(g)(3) requires States with Class I areas within their borders to first determine current visibility conditions for each area on the most impaired and clearest days, 40 CFR 51.308(g)(3)(i), and then to

²⁹ *Id.*

³⁰ EPA's visibility protection regulations define "reasonably attributable visibility impairment" as "visibility impairment that is caused by the emission of air pollutants from one, or a small number of sources." 40 CFR 51.301.

calculate the difference between those current conditions and baseline (2000–2004) visibility conditions to assess progress made to date. See 40 CFR 51.308(g)(3)(ii). States must also assess the changes in visibility impairment for the most impaired and clearest days since they submitted their first implementation period progress reports. See 40 CFR 51.308(g)(3)(iii), (f)(5). Since different States submitted their first implementation period progress reports at different times, the starting point for this assessment will vary State by State.

Similarly, States must provide analyses tracking the change in emissions of pollutants contributing to visibility impairment from all sources and activities within the State over the period since they submitted their first implementation period progress reports. See 40 CFR 51.308(g)(4), (f)(5). Changes in emissions should be identified by the type of source or activity. The provisions of 40 CFR 51.308(g)(5) also address changes in emissions since the period addressed by the previous progress report and requires States' SIP revisions to include an assessment of any significant changes in anthropogenic emissions within or outside the State. This assessment must explain whether these changes in emissions were anticipated and whether they have limited or impeded progress in reducing emissions and improving visibility relative to what the State projected based on its long-term strategy for the first implementation period.

G. Requirements for State and Federal Land Manager Coordination

CAA section 169A(d) requires that before a State holds a public hearing on a proposed regional haze SIP revision, it must consult with the appropriate FLM or FLMs; pursuant to that consultation, the State must include a summary of the FLMs' conclusions and recommendations in the notice to the public. Consistent with this statutory requirement, the RHR also requires that States "provide the [FLM] with an opportunity for consultation, in person and at a point early enough in the State's policy analyses of its long-term strategy emission reduction obligation so that information and recommendations provided by the [FLM] can meaningfully inform the State's decisions on the long-term strategy." 40 CFR 51.308(i)(2). Consultation that occurs 120 days prior to any public hearing or public comment opportunity will be deemed "early enough," but the RHR provides that in any event the opportunity for consultation must be provided at least 60 days before a public hearing or

²⁸ See "Step 8: Additional requirements for regional haze SIPs" in 2019 Guidance at 55.

comment opportunity. This consultation must include the opportunity for the FLMs to discuss their assessment of visibility impairment in any Class I area and their recommendations on the development and implementation of strategies to address such impairment. 40 CFR 51.308(i)(2). For EPA to evaluate whether FLM consultation meeting the requirements of the RHR has occurred, the SIP submission should include documentation of the timing and content of such consultation. The SIP revision submitted to EPA must also describe how the State addressed any comments provided by the FLMs. 40 CFR 51.308(i)(3). Finally, a SIP revision must provide procedures for continuing consultation between the State and FLMs regarding the State's visibility protection program, including development and review of SIP revisions, five-year progress reports, and the implementation of other programs having the potential to contribute to impairment of visibility in Class I areas. 40 CFR 51.308(i)(4).

IV. EPA's Evaluation of Ohio's Regional Haze Submission for the Second Implementation Period

A. Background on Ohio's First Implementation Period SIP Submission

Ohio submitted its regional haze SIP for the first implementation period for 2007–2018 to EPA on December 31, 2008. Based on the failure to submit a complete SIP addressing all elements of 40 CFR 51.308, EPA issued a finding of failure to submit on January 9, 2009. 74 FR 2392, January 15, 2009.

On March 11, 2011, Ohio submitted an updated first implementation period regional haze SIP, and EPA finalized a limited approval on May 29, 2012. 77 FR 39177, July 2, 2012.

In a separate action, EPA finalized a limited disapproval of Ohio's March 11, 2011, regional haze SIP because of deficiencies arising from the remand of the Clean Air Interstate Rule (CAIR). EPA promulgated a Federal Implementation Plan (FIP) to replace Ohio's reliance on CAIR with the Cross-State Air Pollution Rule (CSAPR). 77 FR 33642, June 7, 2012.

On April 14, 2014, Ohio submitted a revision to its March 11, 2011, regional haze SIP and supplemented it on July 27, 2015, to extend the compliance date for the non-EGU BART emission limits for SO₂, which EPA approved on February 22, 2016. 81 FR 11445, March 4, 2016.

On November 30, 2016, Ohio EPA submitted a second revision to change reliance on CAIR to reliance on the CSAPR, which EPA approved on April

30, 2018, converting EPA's limited approval/limited disapproval of Ohio's March 11, 2011, regional haze SIP to a full approval, and withdrawing the FIP provisions that addressed the limited disapproval. See 83 FR 21719, May 10, 2018. The requirements for regional haze SIPs for the first implementation period are contained in 40 CFR 51.308(d) and (e). 40 CFR 51.308(b).

Pursuant to 40 CFR 51.308(g), Ohio was also responsible for submitting a five-year progress report as a SIP revision for the first implementation period, which it did on March 11, 2016. EPA approved this five-year progress report as a revision to the Ohio SIP at 40 CFR 52.1870(e) on December 8, 2017 (82 FR 60543, December 21, 2017).

B. Ohio's Second Implementation Period SIP Submission and EPA's Evaluation

In accordance with CAA sections 169A and the RHR at 40 CFR 51.308(f), Ohio EPA submitted a revision to the Ohio SIP on July 30, 2021, to address its regional haze obligations for the second implementation period, which runs through 2028. Ohio EPA supplemented its SIP submittal on August 6, 2024. Ohio initiated an FLM consultation process and provided three public comment periods on the regional haze SIP for the second implementation period. The first public comment period on the initial SIP revision ran from May 10, 2021 through June 28, 2021, and a public hearing was held on June 14, 2021. The second public comment period, limited to proposed emission limitations for three sources, ran from January 16, 2024 through March 18, 2024, and a public hearing was held on March 18, 2024. The third public comment period, regarding draft administrative orders effectuating the proposed emission limitations for the three sources, ran from June 6, 2024 through July 8, 2024, and a public hearing was held on July 9, 2024. Ohio received and responded to comments from FLMs and the public. Ohio included the comments and responses in Appendices K1–K4, L1–L4, M1–M3, N1–N2, O, and P9–P12 of its July 30, 2021, submission and in Appendices C3, C4, C7, C8, E2, E3, F2, F3, F4, F5, and G of its August 6, 2024, supplement.

The following sections describe Ohio's SIP submission, including Ohio's assessment of progress made since the first implementation period in reducing emissions of visibility impairing pollutants, and the visibility improvement progress at nearby Class I areas. Also described is Ohio's August 6, 2024 supplement, which provides

administrative orders effectuating emission limitations for three sources to be incorporated into the regulatory portion of Ohio's SIP at 40 CFR 52.1870(d). This action also contains EPA's evaluation of Ohio's submission against the requirements of the CAA and the RHR for the second implementation period of the regional haze program.

C. Identification of Class I Areas

The provisions of section 169A(b)(2) of the CAA require each State in which any Class I area is located or "the emissions from which may reasonably be anticipated to cause or contribute to any impairment of visibility" in a Class I area to have a plan for making reasonable progress toward the national visibility goal. The RHR implements this statutory requirement at 40 CFR 51.308(f), which provides that each State's plan "must address regional haze in each mandatory Class I Federal area located within the State and in each mandatory Class I Federal area located outside the State that may be affected by emissions from within the State," and (f)(2), which requires each State's plan to include a long-term strategy that addresses regional haze in such Class I areas.

Ohio has no Class I areas within its borders that are among the 156 mandatory Class I Federal areas where EPA deemed visibility to be an important value. See 40 CFR part 81, subpart D. Thus, Ohio EPA only considered out-of-state mandatory Class I Federal areas covered under the RHR.

Ohio is a member of LADCO and participated in its regional approach for developing a strategy for making reasonable progress towards the national visibility in the northern Midwest Class I areas. Ohio EPA reviewed technical analyses conducted by LADCO to determine what Class I areas outside the State are affected by Ohio emission sources. For the second regional haze implementation period, LADCO used the Comprehensive Air Quality Model with extensions Particulate Matter Source Apportionment Tool (PSAT). LADCO tagged States and regions as well as individual point sources and inventory source groups to apportion emissions to States and regions. LADCO assessed relative visibility impacts in 2028 by projecting representative emissions inventories and known emission controls from 2016.³¹ A group of RPOs,

³¹ See appendix A of Ohio EPA's SIP submittal. Details of the analysis and source-apportioned visibility contributions at Class I areas within the LADCO region for regional haze second planning period are documented in LADCO's modeling

States, and EPA established 2016 as the base year for a national air quality modeling platform for future ozone, PM_{2.5}, and regional haze SIP development because of fairly typical ozone conditions and wildfire conditions.³² LADCO relied upon EPA's inventory estimates for 2016 and 2028 for most emission sectors as described in EPA's September 19, 2019, "Availability of Modeling Data and Associated Technical Support Document for the EPA's Updated 2028 Visibility Air Quality Modeling," (EPA's Updated 2028 Visibility Air Quality Modeling).³³ For Electric Generating Units (EGUs), LADCO used forecasts from the Eastern Regional Technical Advisory Committee (ERTAC) based on continuous emissions monitoring data from 2016 instead of the Integrated Planning Model used in EPA's 2016 modeling platform. LADCO also incorporated State-reported changes to EGUs received through September 2020 to estimate 2028 EGU emissions.

Ohio identified affected Class I areas where progress toward natural visibility conditions may be impacted by emissions from sources in Ohio. Ohio reviewed technical analyses conducted by LADCO and other RPOs to determine which Class I areas outside the State are affected by Ohio emission sources.

For the second implementation period, Ohio used LADCO's modeled emissions projections for 2028 as a framework to assess the potential for changes in visibility-impairing emissions. Like the metrics used in the first implementation period,³⁴ Ohio EPA retained the 2 percent light extinction threshold for determining Ohio's contribution to visibility at Class I areas. LADCO's modeling results showed that a 2 percent light extinction threshold, when applied to all six LADCO States and seven other States, would account for 92 percent or more of the total light extinction at the Class I areas located in the LADCO States on the most impaired days. When applying the 2 percent total light extinction threshold, Ohio identified 17 Class I

areas affected by Ohio emission sources for the second implementation period. These Class I areas, along with Ohio's 2028 projected contributions to visibility impairment, are: Sipsey Wilderness Area in Alabama (2.3 percent); Cohutta Wilderness Area in Georgia (2.1 percent); Mammoth Cave National Park in Kentucky (5.9 percent); Seney Wilderness Area in Michigan (2.0 percent); Great Gulf Wilderness Area (2.5 percent) and Presidential Range—Dry River Wilderness in New Hampshire (2.5 percent); Brigantine Wilderness Area in New Jersey (4.3 percent); Linville Gorge (3.8 percent) and Shining Rock Wilderness Areas (2.8 percent) and Swanquarter National Wildlife Refuge in North Carolina (3.6 percent); Great Smoky Mountains National Park (2.3 percent) and Joyce-Kilmer-Slickrock Wilderness Area in Tennessee (2.3 percent); Lye Brook Wilderness Area in Vermont (3.3 percent); James River Face Wilderness Area (6.5 percent) and Shenandoah National Park in Virginia (10.5 percent); and Dolly Sods (13.1 percent) and Otter Creek Wilderness Areas (13.1 percent) in West Virginia.³⁵ Based on the adjusted URP glidepaths for each of these Class I areas provided in EPA's Updated 2028 Visibility Air Quality Modeling, visibility conditions, as depicted in Table 1 of Ohio's SIP submission, are projected to be below their respective glidepaths in 2028. Visibility conditions at Dolly Sods and Otter Creek Wilderness Areas, the Class I areas impacted most significantly by Ohio, are projected to be approximately 5 dv below their respective glidepaths in 2028.

D. Calculations of Baseline, Current, and Natural Visibility Conditions; Progress to Date; and the Uniform Rate of Progress

The provisions of 40 CFR 51.308(f)(1) require States to determine the following for "each mandatory Class I Federal area located within the State": baseline visibility conditions for the most impaired and clearest days, natural visibility conditions for the most impaired and clearest days, progress to date for the most impaired and clearest days, the differences between current visibility conditions and natural visibility conditions, and the URP. This section also provides the option for States to propose adjustments to the URP line for a Class I area to account for visibility impacts from anthropogenic

sources outside the United States and/or the impacts from wildland prescribed fires that were conducted for certain, specified objectives. 40 CFR 51.308(f)(1)(vi)(B).

Ohio has no mandatory Class I areas within its borders to which the requirements of the visibility protection program apply in 40 CFR part 81, subpart D, and therefore, 40 CFR 51.308(f)(1) and its requirements do not apply.

E. Long-Term Strategy for Regional Haze

Each State having a Class I area within its borders or emissions that may affect visibility in a Class I area must develop a long-term strategy for making reasonable progress towards the national visibility goal. CAA 169A(b)(2)(B). As explained in the Background section of this notice, reasonable progress is achieved when all States contributing to visibility impairment in a Class I area are implementing the measures determined through application of the four statutory factors to sources of visibility impairing pollutants to be necessary to make reasonable progress. 40 CFR 51.308(f)(2)(i). Each State's long-term strategy must include the enforceable emission limitations, compliance schedules, and other measures that are necessary to make reasonable progress. 40 CFR 51.308(f)(2). All new (*i.e.*, additional) measures that are the outcome of four-factor analyses are necessary to make reasonable progress and must be in the long-term strategy. If the outcome of a four-factor analysis and other measures necessary to make reasonable progress is that no new measures are reasonable for a source, that source's existing measures are necessary to make reasonable progress, unless the State can demonstrate that the source will continue to implement those measures and will not increase its emission rate. Existing measures that are necessary to make reasonable progress must also be in the long-term strategy. In developing its long-term strategies, a State must also consider the five additional factors in 40 CFR 51.308(f)(2)(iv). As part of its reasonable progress determinations, the State must describe the criteria used to determine which sources or group of sources were evaluated (*i.e.*, subjected to four-factor analysis) for the second implementation period and how the four factors were taken into consideration in selecting the emission reduction measures for inclusion in the long-term strategy. 40 CFR 51.308(f)(2)(iii).

technical support document (TSD), dated June 17, 2021.

³² See "Base Year Selection Workgroup Final Report," produced by the Inventory Collaborative Base Year Selection Workgroup, April 5, 2017. https://www.wrapair2.org/pdf/2017-12-12_Base_Year_Selection_Report_V1.1.pdf.

³³ EPA, Office of Air Quality Planning and Standards, "Availability of Modeling Data and Associate Technical Support Document for EPA's Updated 2028 Visibility Air Quality Modeling," September 19, 2019. https://www.epa.gov/sites/default/files/2019-10/documents/updated_2028_regional_haze_modeling-td-2019_0.pdf

³⁴ See Section III.2. and Appendix A of Ohio's SIP submission for LADCO's technical support document and supporting materials.

³⁵ The list of Class I areas impacted by Ohio, including the 2028 projections for visibility on the 20 percent most impaired days and Ohio's contribution, is found in Table 1 of Ohio's SIP submission.

1. Selection of Sources for Analysis

This section summarizes how Ohio EPA's SIP submission addressed the requirements of 40 CFR 51.308(f)(2)(i) of the Regional Haze Rule. Specifically, it describes the criteria Ohio EPA used to determine the selection of sources or groups of sources it evaluated for an analysis of potential emission control measures. States may rely on technical information developed by the RPOs of which they are members to select sources for four-factor analysis and to conduct that analysis, as well as to satisfy the documentation requirements under 40 CFR 51.308(f).

In selecting sources to determine possible additional control measures during the second planning period, Ohio EPA considered NO_x, SO₂, PM_{2.5}, and NH₃, which are direct or precursor pollutants than can impair visibility. Based on EPA's Updated 2028 Visibility Air Quality Modeling showing that the EGU and non-EGU point source sectors contribute 37 to 76 percent of the visibility impact at Class I areas impacted by Ohio sources, Ohio found it reasonable to focus on point sources for the second implementation period.

To assist States with their source selection, LADCO generated source lists based on total process-level emissions (Q) divided by distance (d) to the nearest Class I area, where Q/d was used as a surrogate quantitative metric of visibility impact. Total emissions of Q refer to the sum of NO_x, SO₂, PM_{2.5}, and NH₃. The National Emissions Inventory Collaborative 2016 alpha inventory was selected by participants in the LADCO Regional Haze Technical Workgroup for the Q/d analysis in 2018 as the best available inventory at that time. LADCO identified unit level sources above Q/d thresholds of 1, 4, and 10, providing key information the States could use to select potential sources to be subject to the four-factor analysis. For details on the data and methods used in the Q/d analysis, see LADCO's October 14, 2020, technical memorandum "Description of the Sources and Methods Used to Support Q/d Analysis for the 2nd Regional Haze Planning Period" and section 5 of LADCO's June 17, 2021, Technical Support Document "Modeling and Analysis for Demonstrating Reasonable Progress for the Regional Haze Rule 2018–2028 Planning Period," (LADCO's 2021 TSD) contained in appendix A and B of Ohio's SIP submission.

In addition to LADCO's Q/d analysis, Ohio EPA compared point source inventories from the 2017 National Emissions Inventory (NEI) and the 2018 Ohio Emissions Inventory System

(EIS)³⁶ with the emissions used in LADCO's analysis. For sources where Q was greater than 500 tons per year for the sum of NO_x, SO₂, PM_{2.5}, and NH₃ in either the emissions data from the 2016 alpha inventory, 2017 NEI, or 2018 Ohio EIS, Ohio calculated updated Q/d values to determine if any additional sources would be identified beyond those in LADCO's list. However, the process did not result in the identification of any additional sources. As such, Ohio EPA relied upon the Q/d information developed by LADCO to select emission units for further analysis.

Ohio EPA began by using a unit Q/d greater than 5 as a threshold for selecting sources for further evaluation. Then on May 12, 2020, and October 2, 2020, Ohio received lists of sources recommended for four-factor analyses that were prepared by NPS and USFS, respectively, and are included in Appendices K2, K3, and K4 in Ohio's SIP submission. The list from NPS identified facilities with emissions comprising 80 percent of Ohio's total Q based on only SO₂ and NO_x that covered a mix of years from 2014 to 2017, whereas the list from USFS identified facilities with a Q/d greater than 8 as calculated by LADCO with the addition of VOC to represent 80 percent of Ohio's total Q at the closest Class I area to Ohio managed by USFS, the Dolly Sods Wilderness Area. While Ohio EPA's primary approach was to consider Q/d on an individual unit basis, the FLM's consideration of Q/d on a facility-wide basis prompted Ohio to include facility-wide contribution as an additional consideration. As such, Ohio EPA added a secondary selection criterion for facility-wide Q/d and developed a two-tiered approach to capture significant point source emissions in Ohio for further analysis. Ohio EPA's first tier identified individual units with a Q/d greater than 5 for a potential four-factor analysis. For facilities with Q/d greater than 10, Ohio EPA's second tier selected individual units with Q/d greater than 4 for a potential four-factor analysis. This secondary selection criteria resulted in the addition of two units to Ohio EPA's initial list for a total of 38 units at 16 facilities, accounting for 73 percent of the total Q for all sources in Ohio with Q greater than 0.1 tons per year, including 80 percent of SO₂, 57 percent

of NO_x, 47 percent of PM_{2.5}, and 23 percent of NH₃.

Using this two-tiered approach, Ohio EPA identified the following facilities and units: Avon Lake Power Plant Unit B012; Cardinal Power Plant Units B001, B002, B009; Carmeuse Lime, Inc.—Maple Grove Operations Units P003, P004; Conesville Power Plant Units B004, B007, B008; City of Orrville Department of Public Utilities Units B001, B004; Dover Municipal Light & Power Plant Unit B004; DP&L, J.M. Stuart Generating Station Units B001, B002, B003, B004; DP&L, Killen Generating Station Unit B001; FirstEnergy Generation LLC—Bay Shore Plant Unit B006; General James M. Gavin Power Plant Units B003, B004; Haverhill Coke Company LLC Unit P902; Miami Fort Power Station Units B015, B016; Ohio Valley Electric Corp.—Kyger Creek Station Units B001, B002, B003, B004, B005; P.H. Glatfelter Company—Chillicothe Facility Units B002, B003; W.H. Sammis Plant Units B007, B008, B009, B010, B011, B012, B013; and Zimmer Power Station Unit B006.

Ohio then refined the list above by considering whether units had permanently shut down, accepted a commitment to permanently shut down by 2028, converted to natural gas only, converted to limited use, accepted new emission limits, or had existing effective controls such that, in all these cases, a full four-factor analysis would likely result in a conclusion that no further controls are necessary. For units accepting a commitment to permanently shut down by 2028 or to comply with new emission limits by 2025, Ohio issued Director's Final Findings and Orders (DFFO) and requested they be incorporated into its SIP to ensure that the measures become permanent and federally enforceable. For units that had already permanently shut down or had converted to natural gas or limited use, Ohio ensured measures were permanent and federally enforceable through Ohio's permitting process under its SIP approved Permit to Install (PTI) program and its title V program. Ohio has PTI rules under Ohio Administrative Code (OAC) Chapter 3745–31 that have been approved into Ohio's SIP at 40 CFR 52.1870 as well as a federally approved title V operating permit program set forth at 40 CFR part 70. When an owner or operator certifies a permanent shutdown and notifies Ohio EPA, the unit cannot resume operation without being considered a new source subject to the Federal New Source Review (NSR) requirements. Ohio's rules at OAC 3745–31 prevent installation or

³⁶ Ohio EPA's Emission Inventory System (EIS) is a compilation of data describing emissions from different sources of air pollution. Ohio EPA's EIS data and reports are available at <https://epa.ohio.gov/divisions-and-offices/air-pollution-control/reports-and-data/emission-inventory-system>.

modification and subsequent operation of a new source without a new permit.

Of the emission units that had already permanently shut down during the second implementation period, 12 met Ohio's two-tier Q/d source selection criteria. For Conesville Power Plant, coal-fired boiler B007 permanently shut down on May 31, 2019, and coal-fired boilers B004 and B008 permanently shut down on May 31, 2020. DP&L—J.M. Stuart Generating Station permanently shut down its coal-fired boiler B001 on September 30, 2017, and boilers B002, B003, and B004 on June 1, 2018. DP&L—Killen Generating Station also shut down its coal-fired boiler B001 on June 1, 2018. W.H. Sammis Plant permanently shut down its coal-fired boilers B007, B008, B009, and B010 on May 31, 2020.³⁷

Of the units that met Ohio's Q/d source selection criteria but had not yet permanently shut down by Ohio's SIP submittal date in 2021, 3 units accepted enforceable commitments to permanently shut down by 2028: Miami Fort Power Station's coal-fired boilers B015 and B016 and Zimmer Power Station's coal-fired boiler B006. On September 29, 2020, the owner of Miami Fort and Zimmer Power Stations announced plans to permanently shut down these units. In lieu of a four-factor analysis, Ohio determined that these permanent shutdowns were necessary for reasonable progress. As such, on July 9, 2021, Ohio EPA issued DFFOs which established enforceable commitments for the shutdown of these three units by January 1, 2028, and requested that the DFFOs be approved into Ohio's SIP at 40 CFR 52.1870(d) for EPA approved State source-specific requirements.³⁸

Units that met Ohio's Q/d source selection criteria but have since converted from coal to natural gas or limited use include the non-EGUs at P.H. Glatfelter Company—Chillicothe Facility Units B002 and B003 as well as the EGUs at the City of Orrville Department of Public Utilities Units B001 and B004. P.H. Glatfelter

³⁷ Each of these units have been certified by the source owner or operator as retired under the provisions for Retired Unit Exemptions in the Acid Rain Program and/or CSAPR NO_x and SO₂ Trading Programs. The Retired Unit Exemption prohibits these units from emitting SO₂, NO_x, or both starting on the day the exemption takes effect. See 40 CFR 72.8, 40 CFR 97.405, 40 CFR 97.505, 40 CFR 97.605, 40 CFR 97.705, 40 CFR 97.805. Copies of the Retired Unit Exemption forms for each of these units are included in the docket. Also included in the docket is a copy of the list of retired generators from the Pennsylvania-New Jersey-Maryland Interconnection (PJM) Regional Transmission Organization (RTO), which includes each of these units as well.

³⁸ Appendix C of Ohio's July 30, 2021, SIP revision contains the DFFOs issued for the Miami Fort and Zimmer Power Stations.

Company, now Pixelle Specialty Solutions LLC, converted units B002 and B003 to natural gas on May 31, 2016, and September 6, 2016, respectively. The conversions were part of a strategy to address BART requirements under the first implementation planning period as well as Boiler Maximum Achievable Control Technology (Boiler MACT) under permit PTI P0118906. Following the conversions, SO₂ emissions from P.H. Glatfelter Company units B002 and B003 decreased from 2,873 tons per year (tpy) and 5,708 tpy in 2016 to 1 tpy and 1 tpy in 2018, respectively, and NO_x emissions decreased from 412 tpy and 691 tpy in 2016 to 134 tpy and 195 tpy in 2018, respectively. Similarly, the City of Orrville Department of Public Utilities converted B004 to natural gas on December 20, 2016, and converted B001 to a limited use boiler beginning January 31, 2017, to comply with requirements of Boiler MACT and the Data Requirements Rule (DRR) for the SO₂ NAAQS designation process under permit PTI P0124959 and title V Permit No. P0125633. Following the conversions, SO₂ emissions from B001 and B004 decreased from 3,846 tpy and 3,030 tpy in 2016 to 275 tpy and 0 tpy in 2018, respectively, and NO_x emissions decreased from 647 tpy and 510 tpy in 2016 to 57 tpy and 20 tpy in 2018, respectively. For both facilities, reversing the conversion back to coal or fulltime use would require approval for a modification of its federally enforceable permit.

Beyond the 15 units shutting down and 4 units converting to natural gas or limited use as described above, Ohio EPA also evaluated 13 units at 5 facilities for existing effective controls. As explained in EPA's July 8, 2021, Clarifications Memo (section 4.1), a "source's existing measures are generally needed to prevent future visibility impairment (*i.e.*, to prevent future emission increases) and thus necessary to make reasonable progress." Measures that are necessary to make reasonable progress must be included in the SIP. However, if a State can demonstrate that a source will continue to implement its existing measures and will not increase its emission rate, it may not be necessary to require those measures under the regional haze program in its long-term strategy or SIP in order to prevent future emission increases.

The units that Ohio identified with existing effective controls are FirstEnergy Generation LLC—Bay Shore Plant Unit B006; Haverhill Coke Company LLC Unit P902; and W.H. Sammis Plant Units B011, B012, B013.

Ohio provided a weight-of-evidence demonstration as each unit has consistently implemented their existing measures and have achieved, using those measures, a reasonably consistent emission rate. With historical data from 2016 through 2019 showing reasonably consistent emission rates and 2028 projections from LADCO showing rates consistent with 2016, Ohio demonstrated that NO_x and SO₂ emission rates for these units are not expected to increase in the future. As such, except where expressly noted below for Cardinal Power Plant, Ohio Valley Electric Corp.—Kyger Creek Station, and General James M. Gavin Power Plant, Ohio determined the existing measures are not necessary to make reasonable progress or prevent future emission increases and, thus, do not need to be included in the regulatory portion of the SIP.

FirstEnergy Generation LLC—Bay Shore Plant Unit B006 is a fluidized bed boiler with limestone injection and a baghouse. The operational nature of this process, whereby calcium sulfate is formed in the boiler and is captured in the baghouse, results in approximately 94 percent removal of SO₂ and a SO₂ emission rate of 0.34 pounds per million British thermal units (lbs/MMBtu) or less. Unit B006 operates with low combustion temperatures along with very low nitrogen content petroleum coke fuel, which have resulted in NO_x emission rates of 0.08 lbs/MMBtu and less from 2016 to 2019. The facility's title V permit contains both SO₂ and NO_x emission limits as well as a requirement for 90 percent SO₂ reduction. Given the reasonably consistent emission rates, the permitted emission limitations, and the operational nature of the process in which SO₂ is inherently controlled and NO_x has a low formation potential, Ohio determined that B006 is effectively controlled and that a full four-factor analysis would likely result in the conclusion that no further controls are necessary for reasonable progress.

Haverhill Coke Company LLC Unit P902 is a coke battery with SO₂ controls installed in 2007 with design control efficiency of 92 percent. Under the terms of a Federal consent decree entered in 2014 and amended in 2018,³⁹ portions of which were incorporated into the facility's title V permit, Heat Recovery Steam Generators were

³⁹ *United States of America, the State of Illinois and the State of Ohio v. Gateway Energy & Coke Company, LLC, Haverhill Coke Company, LLC and Suncoke Energy, Inc.* (S.D. Illinois Case No. 3:13-cv-00616-DH-SCW), entered on November 10, 2014, as amended on June 5, 2015, and July 10, 2018.

installed on P902. This resulted in further SO₂ emission reductions from 1,183 tpy in 2016 to 777 tpy in 2019. With SO₂ controls demonstrating greater than 90 percent effectiveness, title V permit limits, and consent decree requirements resulting in decreasing emissions, Ohio EPA determined that P902 is effectively controlled.

While W.H. Sammis Plant permanently shut down coal-fired Units B007, B008, B009, and B010 in 2020 as noted above, there are three remaining coal-fired Units B011, B012, B013 operating with an SO₂ emission limit of 0.130 lbs/MMBtu under the terms of a Federal consent decree,⁴⁰ which was incorporated into the facility's title V permit. For NO_x control, a selective non-catalytic reduction (SNCR) system was installed on B011 in 2006, and selective catalytic reduction (SCR) systems with at least 90 percent control efficiency were installed on B012 and B013 in 2010, all of which must be operated continuously under the Federal consent decree. Flue Gas Desulfurization (FGD) systems with 95 percent SO₂ control efficiency were installed on each unit in 2010. With SO₂ and NO_x controls achieving greater than 90 percent control efficiency, title V SO₂ permit limits below the 0.2 lbs/MMBtu limit in the Mercury and Air Toxics Standards for coal-fired EGUs, and reasonably consistent emission rates showing no increasing future trends, Ohio EPA determined that B012 and B013 are effectively controlled as described in the 2019 Guidance. For B011 with a Q/d of 5, Ohio determined that although the existing SNCR does not meet the examples of in the 2019 Guidance, its year-round operation and an emission rate consistently between 0.13 and of 0.15 lbs/MMBtu with no future projected increase indicate that a full four-factor analysis would likely result in the conclusion that no further controls are necessary.

Of the 13 units that Ohio initially identified with existing effective controls, there were 8 units for which Ohio later provided, in its August 6, 2024, supplement, new enforceable measures necessary for reasonable progress as described below: Cardinal Power Units B001, B002, B009; and Ohio Valley Electric Corp.—Kyger Creek Station Units B001, B002, B003, B004, B005.

Cardinal Power Plant operates three coal-fired boilers: B001, B002, and

B009. For NO_x control, SCRs with approximately 90 percent control efficiency were installed on all three boilers in 2003. The SCRs must be continuously operated under the terms of their PTI permits and a Federal consent decree.⁴¹ From 2016–2019, the SCRs have consistently achieved NO_x emission rates of 0.09 lbs/MMBtu and lower. For SO₂ control, FGD systems with approximately 95 percent control efficiency were installed on B001 in 2008, on B002 in 2007, and on B009 in 2011. The FGD systems must be operated continuously under the terms of the same Federal consent decree that were incorporated into their PTI permits. The permitted SO₂ emission limits were set at 1.056 lbs/MMBtu for B001 and B002 as well as 0.66 lbs/MMBtu for B009. From 2016–2019, the FGDs have consistently achieved SO₂ emission rates at or below 0.24 lbs/MMBtu for B001, 0.27 lbs/MMBtu for B002, and 0.15 for B009. With FGD systems achieving at least 90 percent effectiveness that were installed since 2007 and emission rates that were reasonably consistent from 2016 to 2019 with no projected increase, Ohio determined that the units were effectively controlled as described in the 2019 Guidance.

Subsequently, on August 6, 2024, Ohio EPA submitted a supplement to its July 30, 2021, Regional Haze SIP after going through FLM consultation and two public notice and comment periods. Units B001, B002, and B009 combined are subject to a SO₂ emission limit of 4,858.75 lbs/hour as a rolling, thirty-day average that was derived as a part of the attainment demonstration for the Steubenville, OH–WV 2010 1-hour SO₂ nonattainment area. The SO₂ limit became effective on July 5, 2019 and was approved into Ohio's SIP, effective November 21, 2019.⁴² 84 FR 56385, October 22, 2019. Ohio EPA submitted its August 6, 2024, supplement to incorporate the SO₂ limit through a DFFO into the SIP for Regional Haze purposes and to ensure reasonable progress by maintaining the existing measures.

⁴¹ *United States, et al. v. American Electric Power Service Corp., et al.*, S.D. Ohio Civil Action Nos. C2–99–1250, C2–99–1182, C2–05–360, and C2–04–1098 entered on December 10, 2007, and substantively modified on July 17, 2019 (AEP Consent Decree). Ohio provided a link to the AEP Consent Decree and modification, which are included in the docket.

⁴² For the technical justification and development methodology behind the SO₂ limit, Ohio EPA provided a link to its June 2019 Redesignation Request and Maintenance Plan for the Ohio Portion of the Steubenville, OH–WV 1-hour SO₂ Nonattainment Area, a copy of which is provided in the docket.

Ohio Valley Electric Corp.—Kyger Creek Station operates five coal-fired boilers: B001, B002, B003, B004, and B005. For SO₂ control, FGD systems operating year-round with 97 percent control efficiency were installed on B001 and B002 in 2012 and on B003, B004, and B005 in 2011. Under its title V permit, the facility demonstrates compliance with the Mercury and Air Toxics Standard through the SO₂ emission limit of 0.2 lbs/MMBtu. For NO_x control, SCRs with 70–90 percent efficiency were installed on B001 and B002 in 2002 and on B003, B004, and B005 in 2003. Together with overfire air systems, the SCRs achieve an average 87 percent NO_x control efficiency. Ohio EPA recognized that the SCRs do not meet the 90 percent control efficiency examples of effectively controlled units in the 2019 Guidance and that NO_x emission control is limited by ammonia slip and mercury oxidation that jeopardize compliance with the Mercury and Air Toxics Standards. Since Ohio submitted its SIP in 2021, Kyger Creek enhanced its preventative maintenance and made process improvements to increase the reliability of the urea injection system. This is expected to increase both seasonal and year-round NO_x removal efficiency. To ensure that these recent improvements are sustained going forward, Ohio EPA adopted NO_x emission limits of 0.4 lbs/MMBtu on a 720-operating rolling hourly average for each stack: Common Stack 12 for combined emissions from B001 and B002 and Common Stack 35 for combined emissions from B003, B004, and B005. Both stacks are equipped with continuous emissions monitoring systems. The limits were developed by analysis of NO_x emission rates from 2018 to 2023, prior to and following system improvements, and represent a reduction from the previous permitted limit of 0.84 lbs/MMBtu. As such, in the supplement that Ohio EPA submitted on August 6, 2024, Ohio requested to incorporate the new NO_x emission limit of 0.4 lbs/MMBtu for both Common Stacks 12 and 35 into Ohio's SIP at 40 CFR 52.1870(d) through a DFFO for Regional Haze purposes to ensure reasonable progress by maintaining the recent improvements.

After refining the list of 38 units identified by Ohio's Q/d source selection threshold and addressing 32 of those as described above, Ohio EPA provided four-factor analyses for the remaining 6 units at the following 4 facilities: Avon Lake Power Plant Unit B012; Carmeuse Lime, Inc.—Maple Grove Operations Units P003 and P004; Dover Municipal Light & Power Plant

⁴⁰ *United States of America, et al. v. Ohio Edison Company, et al.*, U.S. District Court for the Southern District of Ohio, Eastern Division, Civil Action No. C2–99–1181, entered on March 18, 2005. Ohio EPA provided a link to the Consent Decree, a copy of which is provided in the docket.

Unit B004; and General James M. Gavin Power Plant Units B003 and B004. The emission units that Ohio selected for a four-factor analysis are described below.

Consistent with the first regional haze implementation period, Ohio EPA focused on NO_x and SO₂ emissions in considering potential additional control measures at these four facilities. As demonstrated by the analysis in LADCO's Technical Support Document of the IMPROVE monitoring data, the NO_x and SO₂ emissions lead to the formation of the particulate species of nitrate and sulfate that currently contribute more to visibility impairment in the LADCO Class I Areas than PM_{2.5}, NH₃, and VOC. The LADCO Class I Areas consist of Boundary Waters Canoe Area Wilderness and Voyageurs National Park in Minnesota, as well as Isle Royale National Park and Seney Wilderness Area in Michigan. Additionally, in Table 20 of its submittal, Ohio EPA provided 2017 NEI data for Ohio point sources, showing smaller VOC, PM, and NH₃ emissions relative to NO_x and SO₂ emissions. For this reason, Ohio EPA chose to focus on reducing emissions of NO_x and SO₂, which the 2019 Guidance recommended would be a reasonable approach for the second implementation period. See 2019 Guidance at page 12. Nevertheless, Ohio considered emissions from each of the regional haze precursors NO_x, SO₂, PM_{2.5}, NH₃ and VOC in the source selection process. As shown in Table 4 of its submittal, the sources meeting Ohio's primary and secondary Q/d selection criteria account for 38 units at 16 facilities, representing 80 percent of SO₂ emissions, 57 percent of NO_x emissions, 47 percent of PM_{2.5} emissions, and 23 percent of NH₃ emissions for all sources with a sum of SO₂, NO_x, PM_{2.5}, and NH₃ emissions from 2016 greater than 0.1 tpy. The background on each of the 6 units selected for a four-factor analysis is described below.

Avon Lake Power Plant

Avon Lake Power Plant is an EGU, and Unit B012 is a 6,040 MMBtu/Hour pulverized coal-fired boiler that was installed in 1970. For NO_x control, B012 is equipped with low-NO_x cell burners and overfire air. For SO₂ control, Avon Lake Power Plant accepted a federally enforceable SO₂ emissions limit of 9,600 lbs/hr on a 1-hour average basis for all SO₂-emitting sources at the facility (B010, B012, B013, B015, and B016) to satisfy requirements under the DRR for the 2010 SO₂ NAAQS designation

process.⁴³ See 83 FR 40723, August 16, 2018. The facility's title V permit P0085253, effective April 18, 2017, contains a SO₂ permit limit for B012, which was reduced from the previous limit of 4.65 lbs/MMBtu to a new combined SO₂ permit limit on B010 and B012 of 1.59 lbs/MMBtu as a rolling, 30-day average. To comply with the new SO₂ emissions limits, the facility switched to a blend of Western Bituminous and Powder River Basin coal in 2016, which contributed to reductions in annual SO₂ emissions for B012 from 8,862 tpy in 2016 to 1,597 tpy in 2019, lowered the SO₂ emission rate from 1.60 lbs/MMBtu in 2016 to 0.70 lbs/MMBtu in 2019, and reduced Q/d from 32 in 2016 to 7 in 2019.

Carmeuse Lime, Inc.—Maple Grove Operations

Carmeuse Lime, Inc.—Maple Grove Operations is a lime manufacturing plant. Unit P003 and Unit P004 both consist of a rotary kiln and cooler as well as a shared stack for emissions. P003 and P004 burn coal, petroleum coke, and/or natural gas. For PM control, both units have baghouses, however, there are no add-on controls for SO₂ or NO_x. Although both units were subject to a best available control technology analysis under the Federal PSD program in 2002–2003 when lime manufacturing operations were restarted, no add-on control technologies for NO_x or SO₂ were found to be cost-effective. However, SO₂ at both units is inherently controlled when calcium-rich lime kiln dust chemically absorbs the SO₂ in the flue gas, which is then removed in the baghouse. NO_x emissions at both units are controlled by good combustion practices.

Limits on SO₂ and NO_x are included in the facility's title V Permit P0125171. The permit includes a maximum sulfur content limit for fuel of 5.50 percent for coal and 6.50 percent for coke by weight. P003 and P004 are subject to SO₂ limits of 1,102 lbs/hour and 4,826.80 tons per rolling, 12-month period. P003 and P004 are also subject to NO_x limits of 1,234.90 lbs/hour and 5,408.90 tons per rolling 12-month period.

Dover Municipal Light & Power Plant

Dover Municipal Light & Power Plant is a coal-fired electrical generating

⁴³ Ohio's January 13, 2017, submittals for the 2010 SO₂ NAAQS DRR describing the AERMOD Modeling Results for Avon Lake Power Plant with the derivation of the limits of 1.59 lbs/MMBtu and 9,600 lbs/hour as the resulting critical emissions value is available at <https://www.epa.gov/so2-pollution/so2-data-requirements-rule-january-13-2017-state-submittals-ohio>.

plant. Unit B004 is a 247 MMBtu/hour coal-fired stoker boiler that was installed in 1962 that uses natural gas as a backup fuel. Under title V Permit P0090810, B004 is subject to SO₂ emissions limit of 4.60 lbs/MMBtu.

General James M. Gavin Power Plant

General James M. Gavin Power Plant is a coal-fired electrical generating plant. Unit B003 and Unit B004 are both 11,936 MMBtu/hr pulverized coal-fired, dry-bottom boilers installed in 1974. For SO₂, wet FGD systems with 95 percent control efficiency were installed on B003 in 1994 and on B004 in 1995. NO_x emissions for B003 and B004 are controlled through the use of low NO_x burners and SCR, achieving 91 percent control efficiency. The FGDs and SCRs are operated continuously under the terms of the facility's title V Permit P0089258 and the Federal AEP Consent Decree. A federally enforceable SO₂ emission limit of 7.41 lbs/MMBtu applies to both B003 and B004 under the title V permit. From 2016 to 2019, SO₂ emission rates have ranged from 0.27 to 0.37 lbs/MMBtu for B003 and 0.29 to 0.39 lbs/MMBtu for B004, while NO_x emission rates have remained between 0.10 and 0.11 for both units during the same time period.

2. Emission Measures Necessary To Make Reasonable Progress

The provisions of 40 CFR 51.308(f)(2)(i) require States to evaluate and determine the emission reduction measures that are necessary to make reasonable progress by applying the four statutory factors to sources in a control analysis. The emission reduction measures that are necessary to make reasonable progress must be included in the long-term strategy. 40 CFR 51.308(f)(2).

Ohio EPA's four-factor analyses are described below for each of the 6 units identified through its Q/d source selection process. This includes units that had not already permanently shut down, accepted an enforceable commitment to permanently shut down or comply with new limits, converted to natural gas or limited use, or had existing effective controls.

Avon Lake Power Plant

Avon Lake Power Plant Unit B012 was selected for a four-factor analysis based on 2016 emissions resulting in a Q/d of 32. Avon Lake evaluated B012 for both NO_x and SO₂ controls.

Avon Lake evaluated wet FGD and a spray dryer absorber (SDA) for SO₂ control. Capital costs were estimated at \$417,000,000 for SDA and \$483,000,000 for wet FGD. Annual operating costs

were estimated at \$44,500,000 for SDA and \$51,600,000 for wet FGD. Based on a remaining useful life of either 20 or 30 years and retrofit factors of 1.2 and 1, the cost effectiveness was estimated at \$19,500/ton and \$22,600/ton for wet FGD for 2,284 tpy in potential emission reductions from either control option.

For NO_x control, Avon Lake evaluated SNCR and SCR with capital costs ranging from \$13,000,000 for SNCR to \$191,000,000 for SCR, while annual operating costs were estimated at \$1,679,100 for SNCR and \$25,600,000 for SCR. Cost effectiveness was estimated at \$10,200/ton for SNCR for 164 tpy in potential emission reductions and \$26,700/ton for SCR for 959 tpy in reductions. Installation time was estimated at 5 years for SO₂ controls and 2 to 5 years for SNCR and SCR, respectively. Impacts from energy requirements, solid waste, and ammonia usage were also evaluated.

Carmeuse Lime, Inc.—Maple Grove Operations

Carmeuse Lime, Inc.—Maple Grove Operations Units P003 and P004 were selected for a four-factor analysis.

The evaluation of SO₂ controls at Units P003 and P004 included conditioning tower slurry injection, DSI, and wet scrubbers. Capital costs for each unit were estimated at \$14,437,783 for conditioning tower slurry injection, \$16,960,653 for DSI, and \$23,784,927 for wet scrubbers. Annual costs were estimated at \$3,982,597 for conditioning tower slurry injection, \$9,140,819 for DSI, and \$6,305,184 for wet scrubber. The cost effectiveness values at Units P003 and P004, respectively, were estimated for conditioning tower slurry injection at \$3,266 and \$3,274/ton, DSI at \$5,857 and \$5,862/ton, and wet scrubbing at \$4,506 and 4,043/ton SO₂. Potential SO₂ emission reductions for each unit P003 and P004, respectively, were 1,221 and 1,216 tpy for conditioning tower slurry injection, 1,566 and 1,559 tpy for DSI, and 1,559 and 1,559 tpy for wet scrubbing.

Switching fuel to solely natural gas was also evaluated and found to be technically infeasible due to the insufficient supply of natural gas in the region as well as the impact on the production process that would result from altering the product chemistry and capacity. The switch to natural gas would fundamentally change the production process since the flame temperature would be lower, altering product chemistry and quality, changing the thermal profile of the kiln, and reducing production capacity.

For NO_x, several control options were evaluated, including preheater

installation, low-NO_x burners, SCR, and SNCR. However, no options were determined to be technically feasible beyond current operation under good combustion practices. Despite the concerns about technical feasibility, Carmeuse Lime, Inc.—Maple Grove Operations performed a four-factor analysis on the addition of tail-end SCR, which would have required the installation of an SO₂ wet scrubber upstream and stack gas reheat downstream. Estimated capital costs for Units P003 and P004 were \$16,878,012 and \$16,722,674, respectively, while estimated annual costs were \$11,596,001 and \$11,431,638, resulting in cost effectiveness values of \$10,419 and \$11,484/ton NO_x.

Both SO₂ and NO_x analyses considered a remaining useful life of 20 or 25 years, a 4 to 5 year installation time, and energy and non-air quality environmental impacts. In addition to the consideration of candidate control options, Carmeuse Lime, Inc.—Maple Grove Operations considered visibility impact and noted that an analysis done during the first implementation period shows that the facility is located outside the area of influence for the closest Class I area, the Dolly Sods Wilderness Area, and that it was not one of the four sources in Ohio identified by VISTAS in their June 22, 2020, request as a source that strongly contributes to regional haze.

Dover Municipal Light & Power Plant

Dover Municipal Light & Power Plant Unit B004 was selected for a four-factor analysis based on 2016 emissions resulting in a Q/d of 7 and the absence of existing SO₂ add-on controls. The unit is controlled with a baghouse for PM, activated carbon for mercury, and DSI for hydrogen chloride.

The evaluation of SO₂ controls considered fuel switching, DSI, wet FGD, and SDA. The City of Dover determined that switching from the current low sulfur coal to natural gas was infeasible, not only because it would require major changes to the boiler's burner design and an additional mile of natural gas pipeline, but also because of the insufficiency of a natural gas supply. For the other control options, capital costs were estimated at \$2,640,000 for DSI, \$28,110,269 for wet FGD, and \$24,274,288 for SDA. Annual costs were estimated at \$1,558,509 for DSI, \$4,615,991 for wet FGD, and \$4,030,803 for SDA. The cost effectiveness and potential reductions in SO₂ emissions were estimated at \$2,985/ton for 522 tpy with DSI, \$5,016/ton for 920 tpy with wet FGD, and \$4,402/ton for 916 tpy with SDA.

The analyses considered a remaining useful life of 30 years, a 5-year installation time, as well as energy and non-air quality environmental impacts. Dover Municipal Light & Power Plant also compared annualized compliance costs as a percentage of sales for each control option, which resulted in 6.2 percent for DSI and 18.5 percent for wet FGD. Citing to guidance for the Regulatory Flexibility Act,⁴⁴ Dover Municipal Light & Power Plant observed that EPA has employed discretion in not proceeding with rulemakings that regulate only a small number of small businesses with annualized compliance costs as a percentage of sales greater than 3 percent. As such, Dover Municipal Power & Light Plant noted that as a non-profit governmental organization, the costs of any of the controls evaluated would threaten the viability of the plant, with the options of wet FGD and SDA almost certainly resulting in closure.

General James M. Gavin Power Plant

General James M. Gavin Power Plant was selected for a four-factor analysis based on 2016 emissions resulting in a Q/d above Ohio's threshold for Units B003 and B004 as well as the relative impact of this source on visibility impairment.

For NO_x, Ohio EPA determined that the units were effectively controlled. This determination considered that the SCRs were installed in 2001, are operated continuously, and achieve 91 percent control efficiency with low NO_x burners. In addition, Ohio found that the emission rates, which ranged between 0.10 and 0.11 lbs/MMBtu from 2016 to 2019, were reasonably consistent and that no increase in those rates was projected into 2028.

SO₂ was considered in the four-factor analysis since the current FGDs were installed in 1994–1995 before the beginning of the first implementation period. General James M. Gavin Power Plant evaluated fuel switching, retrofitting new dry FGD, retrofitting new wet FGD, and making operational improvements to the existing wet FGD. General James M. Gavin Power Plant currently burns eastern bituminous coal with a sulfur content of 3.9 to 4.2 percent. Switching to lower sulfur coal was considered technically infeasible due to operational issues from a higher ash content causing slagging issues and overburdening the electrostatic precipitator (ESP), thereby decreasing

⁴⁴ EPA Office of Policy, Economic and Innovation, "Final Guidance for EPA Rulewriters: Regulatory Flexibility Act as Amended by the Small Business and Regulatory Enforcement Fairness Act," November 30, 2006.

its control efficiency. Switching to natural gas was precluded since natural gas is not currently available at the site, and the nearest pipeline 10 miles away does not have the capacity to supply the required loading to the plant.

In terms of add-on SO₂ controls, the existing DSI systems designed for SO₃ emissions control were evaluated for collateral removal of SO₂. However, the analysis determined that modifying operational parameters with higher sorbent injection rates required for significant SO₂ emissions control would overburden the ESP in handling particulate emissions. Similarly, the analysis found that installation of a new SDA would require replacing the existing ESP and would offer no advantage compared to the existing wet FGD. In 2019, General James M. Gavin Power Plant made significant expenditures to upgrade and optimize the existing wet FGD systems which improved control efficiency to 95 percent. With the significant recent expenditures for the upgrades and the lack of technically feasible options for further optimization, the analysis cited to the 2019 Guidance in determining that replacing the existing wet FGD was not a practical option and that additional controls were unlikely to be reasonable. *See* 2019 Guidance at 22–23.

In December 2023, General James M. Gavin Power Plant provided to Ohio EPA a supplemental analysis with new information on \$9.3 million in additional upgrades and improvements to their FGD systems made since 2020, many of which occurred after Ohio EPA submitted its Regional Haze SIP in July 2021. Additionally, General James M. Gavin Power Plant evaluated whether the facility could, at a reasonable cost, achieve a consistently lower SO₂ emission rate either through existing measures or potential low-cost upgrades. Although no additional upgrades were found to be feasible based on the custom-build nature of the FGD systems and the recent improvements, General James M. Gavin Power Plant identified the feasibility of consistently achieving a lower SO₂ emission rate as a result of the recent upgrades based on 2019–2023 emissions data, load variability, coal content and supply. To ensure that the recent improvements are maintained going forward, Ohio adopted new SO₂ emission limits of 0.75 lbs/MMBtu on a rolling 30-operating day average for both B003 and B004, representing a reduction from the former SO₂ limits of 7.41 lbs/MMBtu. To ensure the new SO₂ limits are permanent and federally enforceable, Ohio EPA submitted the August 6, 2024, supplement to

incorporate the new SO₂ limits through a DFFO into the SIP at 40 CFR 52.1870(d) for Regional Haze purposes.

Ohio's Evaluation of the Four-Factor Analyses

In considering the four-factor analyses for each of the four facilities described above, Ohio determined that additional add-on controls are not cost-effective and thus not necessary for reasonable progress in the second planning period. In making its determination, Ohio evaluated the analyses of energy and solid waste impacts from increased power usage and generation of solid waste and wastewater. Ohio evaluated capital and operating costs, costs per ton of pollutant removed, and potential emission reductions, and took under consideration compliance costs/sales ratios. To compare the candidate control options at a facility, Ohio estimated the visibility benefit of potential emission reductions as a part of a weight-of-evidence approach to be considered alongside, not instead of, the four statutory factors. In determining the maximum visibility benefit at any Class I area in 2028, Ohio used source apportionment modeling conducted by VISTAS⁴⁵ and scaled the modeled visibility impacts to the expected emissions reductions from the potential controls evaluated, which ranged from 0.001 to 0.180 Mm⁻¹ at Avon Lake Power Plant, 0.192 to 0.246 Mm⁻¹ at Carmeuse Lime, Inc.—Maple Grove, and 0.041 to 0.072 Mm⁻¹ at Dover Municipal Power & Light Plant. Ohio also pointed to the State's progress report in its regional haze SIP revision for the second planning period, showing emission trends with significant reductions of 90 percent SO₂ and 57 percent NO_x from 2005 to 2017. Looking forward to 2028, Ohio identified additional emission reductions that will be achieved in the second planning period through measures identified in the long-term strategy, which are discussed below.

Ohio concluded that on-the-books and on-the-way controls identified in the State's long-term strategy, including the DFFOs for permanent shutdowns at Miami Fort Power Plant and Zimmer Power Station as well as the DFFOs for SO₂ and NO_x limits at Cardinal Power Plant, General James M. Gavin Power

Plant, and Ohio Valley Electric Corp.—Kyger Creek, are necessary to achieve reasonable progress at the Class I areas impacted by emissions from Ohio.

3. Ohio's Long-Term Strategy

Each State's long-term strategy must include the enforceable emission limitations, compliance schedules, and other measures that are necessary to make reasonable progress. 40 CFR 51.308(f)(2). After considering information regarding existing effective controls, analyses under the four statutory factors in 40 CFR 51.308(f)(2)(i), and the five additional factors in 40 CFR 51.308(f)(2)(iv) in addition to other requirements in 40 CFR 51.308(f)(2)(ii) described below, Ohio determined the State's long-term strategy for the second implementation planning period is comprised of the following measures to make reasonable progress.⁴⁶ These measures represent reductions beyond those planned in the first implementation planning period with numerous changes in emissions and emission limits since the first implementation planning period, as well as emission reductions due to ongoing air pollution control programs and permanent shutdowns. Except as noted below for the DFFOs and Ohio's Beneficiary Mitigation Plan for the Volkswagen Settlement, the following measures in Ohio's long-term strategy are already permanent and federally enforceable. Ohio EPA requested that the DFFOs be incorporated into the regulatory portion of Ohio's SIP at 40 CFR 52.1870(d) to ensure that they will also be federally enforceable and permanent for regional haze purposes.

On-the-books controls for the long-term strategy in the 2nd implementation period include:

- Permanent shutdown of Conesville Power Plant Units B004, B007, and B008
- Permanent shutdown of DP&L J.M. Stuart Units B001, B002, B003, and B004
- Permanent shutdown of DP&L J.M. Killen Unit B001
- Permanent shutdown of W.H. Sammis Plant Units B007, B008, B009, and B010
- National Emission Standards for Hazardous Air Pollutants (NESHAP) for Reciprocating Internal Combustion Engines
- Control of Hazardous Air Pollutants from Mobile Sources (also known as the Federal Mobile Source Air Toxics Rules)

⁴⁵ "The VISTAS Regional Haze Project," <https://metro4-sesarm.org/content/vistas-regional-haze-program>; "Task 7—PSAT Source Apportionment Modeling/Tagging," <https://www.metro4-sesarm.org/content/task-7-source-apportionment-modelingtagging>; "PSAT Source Apportionment Modeling Results Report—August 2020," https://www.metro4-sesarm.org/sites/default/files/VISTAS%20Task%207%20PSAT_20200831.pdf.

⁴⁶ The measures listed in Ohio's long-term strategy are described in Ohio's SIP submission in Section III.3(e)(5) and III.5(e).

- Mercury and Air Toxics Standards (40 CFR 63, subpart UUUUU)
- Federal Oil and Natural Gas Industry Standards
- NO_x Emission Standards for New Commercial Aircraft Engines (40 CFR 87, 40 CFR 1068)
- NESHAPs for Industrial, Commercial, and Institutional Area Source Boilers, Major Source Boilers (40 CFR 63)
- New Source Performance Standards (NSPS) for Commercial and Industrial Solid Waste Incinerators (CISWI) (40 CFR 60, subpart CCCC, 40 CFR 60, subpart DDDD)
- NSPS for New Residential Wood Heaters (40 CFR 60, subpart AAA)
- SO₂ Data Requirements Rule (40 CFR 51)
- Ohio's Beneficiary Mitigation Plan for the Volkswagen Settlement (84 FR 43508, August 21, 2019)

On-the-way controls for the long-term strategy that reflect additional emission reductions expected by 2028 include:

- Revised CSAPR Update (40 CFR 97, subpart GGGGG)
- DFFO for Miami Fort Power Station, providing for the permanent shutdown of coal-fired Boilers B015 and B016, and for Zimmer Power Station, providing for the permanent shutdown of coal-fired Boiler B006
- DFFO for Cardinal Power Plant, providing for an SO₂ emission limit on coal-fired Boilers B001, B002, and B009
- DFFO for Ohio Valley Electric Corp.—Kyger Creek, providing for a new NO_x emission limit on coal-fired Boilers B001, B002, B003, B004, and B005
- DFFO for General James M. Gavin Power Plant, providing for a new SO₂ emission limit on coal-fired Boilers B003 and B004

4. EPA's Evaluation of Ohio's Compliance With 40 CFR 51.308(f)(2)(i)

EPA proposes to find that Ohio has satisfied the requirements of 40 CFR 51.308(f)(2)(i) related to evaluating sources and determining the emission reduction measures that are necessary to make reasonable progress by considering the four statutory factors. Ohio's selection of sources and evaluation of control measures was reasonable and consistent with the requirements of 40 CFR 51.308(f)(2)(i).

For Ohio's source selection methodology, Ohio EPA targeted the sources with the highest potential to impair visibility at mandatory Class I areas. Ohio EPA included a thorough description of its source selection methodology. Starting with LADCO's calculations for Q/d based on 2016 data, Ohio EPA compared more recent point

source inventories from the 2017 NEI and 2018 Ohio EIS to determine if updated Q/d values on a unit basis would identify additional sources for selection. Then, in response to other methods used by NPS and USFS to identify sources for further evaluation, Ohio EPA modified its source selection process by adding a secondary criterion for a facility-wide Q/d. Ohio EPA's two-tiered approach broadened its source selection process and identified individual units with a Q/d greater than 5 as well as units with a Q/d greater than 4 at facilities with a Q/d greater than 10. Using this source selection methodology, Ohio EPA selected 38 units at 16 facilities for further analysis, accounting for 80 percent of SO₂ and 57 percent of NO_x for point sources with Q greater than 0.1 tpy.

In determining which facilities to evaluate through a four-factor analysis, Ohio EPA refined the list of sources selected using its Q/d thresholds by providing adequate justification for no further analysis where sources had accepted an enforceable commitment for SO₂ or NO_x limits, permanently shut down, accepted an enforceable commitment to permanently shut down by 2028, converted to natural gas or limited use, or had existing effective controls.

For selected sources that had accepted an enforceable commitment for SO₂ or NO_x limits, Ohio issued DFFOs to be incorporated into its SIP at 40 CFR 52.1870(d) for 10 units at 3 facilities: Cardinal Power Units B001, B002, and B009; Ohio Valley Electric Corp.—Kyger Creek Station Units B001, B002, B003, B004, and B005; and General James M. Gavin Power Plant Units B003 and B004. These limits in the DFFOs ensure recent improvements in emission controls are maintained and that the measures are permanent and federally enforceable for regional haze purposes.

For selected sources that had permanently shut down or had accepted an enforceable commitment to permanently shut down by 2028, Ohio identified 15 units at 6 facilities: Conesville Power Plant Units B004, B007, and B008; DP&L J.M. Stuart Units B001, B002, B003, and B004; DP&L JM Killen Unit B001; W.H. Sammis Plant Units B007, B008, B009, and B010; Miami Fort Power Station Units B015 and B016; and Zimmer Power Station Unit B006. Based on 2016 inventories, the permanent shutdown of these units represents federally enforceable and permanent emission reductions from some of Ohio's largest sources as follows. In 2019 and 2020, the shutdowns at Conesville Power Plant Units B004, B007, and B008 achieved

emission reductions of 5,013 tpy SO₂ and 5,981 tpy NO_x. In 2017 and 2018, the shutdowns at DP&L, J.M. Stuart Generating Station achieved emission reductions of 9,005 tpy SO₂ and 5,466 tpy NO_x. In 2018, the shutdown at DP&L, Killen Generating Station achieved emission reductions of 10,130 tpy SO₂ and 6,057 tpy NO_x. In 2020, the shutdowns at W.H. Sammis Plant achieved reductions of 2,996 tpy SO₂ and 1,634 NO_x. By 2028, under the DFFOs, the shutdowns at Miami Fort Power Station will achieve emission reductions of 10,214 tpy SO₂ and 5,052 tpy NO_x, while the shutdown at Zimmer Power Station will achieve emission reductions of 9,973 tpy SO₂ and 5,458 tpy NO_x. Together, these shutdowns will reduce SO₂ by over 47,000 tpy and NO_x by over 33,000 tpy and represent emission reductions of 32 percent SO₂ and 32 percent NO_x from all point sources in Ohio with total emissions of SO₂, NO_x, PM, and NH₃ greater than 0.1 tpy based on 2016 emissions.

For selected sources that converted to natural gas or limited use under enforceable permit conditions, Ohio identified conversions at 4 units within 2 facilities, where add-on controls or more stringent limits would not be necessary for reasonable progress. Compared to 2016 base-year emissions, the conversions at the City of Orrville Department of Public Utilities Units B001 and B004 reduced SO₂ emissions by 6,601 tpy, and the conversions at P.H. Glatfelter Company—Chillicothe Facility B002 and B003 reduced SO₂ emissions by 8,579 tpy. Together, in addition to the emission reductions from the shutdowns mentioned above, these conversions represent an additional 10 percent reduction in SO₂ emissions from all point sources in Ohio with total emissions of SO₂, NO_x, PM, and NH₃ greater than 0.1 tpy.

For selected sources that had existing effective controls, Ohio sufficiently provided a weight-of-evidence demonstration as described in the 2021 Clarifications Memo for 5 units at 3 facilities: FirstEnergy Generation LLC—Bay Shore Plant Unit B006; Haverhill Coke Company LLC Unit P902; and W.H. Sammis Plant Units B011, B012, B013. Ohio documented that these units are effectively controlled for SO₂ and NO_x by inherent process or control systems installed during the first implementation period with greater than 90 percent control efficiency as well as federally enforceable limits in Federal consent decrees or limits below levels recommended in the 2019 Guidance as potentially existing effective controls. With reasonably

consistent trends in emission rates, Ohio also adequately demonstrated that the existing measures for these units are not necessary to make reasonable progress or prevent future emission increases and, thus, do not need to be included in the regulatory portion of the SIP.

Of all the 38 emission units Ohio identified through its Q/d source selection process listed above, Ohio relied upon the following specific control measures at 25 units in its long-term strategy in addition to the other Federal regulations and State programs included. For 12 of those units, Ohio's long-term strategy relies upon permanent shutdowns that have already occurred during the 2nd implementation period. For the other 13 units, Ohio EPA provided DFFOs with enforceable commitments for either SO₂ limits or NO_x limits by 2025 or permanent shutdowns by 2028 to be incorporated into Ohio's SIP for regional haze purposes at 40 CFR 52.1870(d).

For the remaining 13 emission units that Ohio EPA identified through its Q/d source selection process, Ohio did not rely on new or existing measures as part of the long-term strategy to make reasonable progress in the second planning period. At 4 of those units, Ohio EPA documented enforceable conversions to natural gas or limited use. At another 5 of those units, Ohio provided a weight of evidence demonstration and determined their existing measures are not necessary to make reasonable progress or prevent future emission increases. At the other 4 units, Ohio provided four-factor analyses. Each of these analyses considered all four statutory factors and appropriately followed the methods in the EPA Air Pollution Control Cost Manual.⁴⁷ The lowest cost control options in the four-factor analyses outlined the potential for emission reductions at each unit for Avon Lake Power Plant of 2,284 tpy SO₂ for \$19,500/ton, Dover Municipal Power & Light Plant of 522 tpy SO₂ for \$2,985/ton, and at Carmeuse Lime, Inc.—Maple Grove Operations of 1,221 and 1,216 tpy SO₂ for \$3,226/ton and \$3,274/ton, respectively. With the emission reductions from already implemented shutdowns and fuel conversions, Ohio made a reasoned determination that additional add-on controls are not cost effective and thus not necessary for

reasonable progress in the second planning period.

The permanent shutdown of 15 units at 6 large EGUs during the second implementation period represents large enforceable reductions in SO₂ and NO_x from Ohio sources that had impacted the same Class I areas that are impacted by the 4 units evaluated in the four-factor analyses. With a relatively small potential for additional emission reductions identified in the four-factor analyses compared to those of the shutdowns and fuel conversions already taking place, Ohio EPA provided a reasoned basis for its conclusions to not require additional controls at those 4 units for the second implementation period.

Overall, 29 out of 38 coal-fired units above Ohio's Q/d threshold either converted to natural gas or limited use, accepted enforceable limits, or have or will permanently shut down by 2028. The trends in NO_x and SO₂ emissions noted in Ohio's progress report discussed below demonstrate how Ohio's long-term strategy will continue to make significant reductions during the second implementation period. The shutdowns will reduce statewide SO₂ by over 47,000 tpy and NO_x by over 33,000 tpy, and the conversions to natural gas add another 15,000 tpy of SO₂ reductions to that total. Together, these shutdowns and fuel conversions represent statewide emission reductions of 43 percent SO₂ and 32 percent NO_x from point sources in Ohio with total emissions of SO₂, NO_x, PM, and NH₃ greater than 0.1 tpy based on 2016 emissions. Ohio's plan shows that these measures will achieve substantial SO₂ and NO_x emission reductions beyond those included in its first implementation period. These shutdowns, conversions, and committed controls contribute to Ohio's emission reductions and the associated visibility improvements at the affected Class I areas for the second implementation planning period.

EPA proposes to find that the shutdowns and conversions noted above that have already taken place during the second planning period are already federally enforceable and permanent and do not need to be included in the regulatory portion of the SIP. For the upcoming permanent shutdowns and committed controls provided for in the DFFOs, EPA proposes to find that those are necessary for reasonable progress and must be included in the SIP and made federally enforceable and permanent. For the other 9 coal-fired units, Ohio EPA determined that no additional controls would be necessary for reasonable progress in the second

planning period based on existing effective controls that have achieved reasonably consistent emission rates that are not expected to increase in the future.

EPA proposes to find that Ohio has satisfied the requirements of 40 CFR 51.308(f)(2)(i) related to evaluating sources and determining the emission reduction measures that are necessary to make reasonable progress by applying the four statutory factors to sources in a control analysis. Ohio EPA's SIP submission, as supplemented, reasonably applied the Q/d source selection process in relying on the closest Class I areas and the emissions of NO_x, SO₂, PM_{2.5}, NH₃ and VOC. Ohio EPA examined a reasonable set of sources, including sources identified by FLMs. In addition, Ohio EPA adequately explained its decision to focus on the two pollutants—SO₂ and NO_x—that currently drive visibility impairment within the LADCO region. EPA proposes to find that Ohio EPA adequately supported its conclusions for its top-impacting sources in determining permanent and federally enforceable shutdowns, controls, and fuel conversions necessary for reasonable progress. EPA is basing this proposed finding on the State's examination of its largest operating EGU and non-EGU sources. EPA proposes to find the State's approach reasonable because it demonstrated that these sources with the greatest modeled impacts on visibility, as well as other sources above the State's Q/d threshold that might be expected to impact visibility, either have shut down, accepted an enforceable commitment to shut down by 2028, accepted new emission limits by 2025, converted to natural gas or limited use, or have existing effective controls.

As part of the State's long-term strategy, Ohio EPA submitted 4 DFFOs providing legally binding, enforceable commitments upon the owners or operators of the facilities, and any subsequent owner or operator, at the State level under Ohio Revised Code 3704.03 and 3745.01. Since Ohio is relying on these 4 DFFOs to make reasonable progress as part of its long-term strategy for the second implementation period, Ohio EPA requested the incorporation of the DFFOs into the Ohio SIP to ensure that they are federally enforceable and permanent for regional haze purposes. The first DFFO was effective on July 9, 2021, and provides for the shutdown of Miami Fort Power Station Units B015 and B016 and Zimmer Power Station Unit B006 by no later than January 1, 2028. The other three DFFOs provide for

⁴⁷ See EPA Air Pollution Control Cost Manual, available at <https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution>.

SO₂ emission limits at Cardinal Power Plant Units B001, B002, and B009 and General James M. Gavin Power Plant Units B003 and B004 as well as a NO_x emission limit Ohio Valley Electric Corp.—Kyger Creek Units B001, B002, B003, B004, and B005. These three DFFOs became effective July 26, 2024, when they were entered into the Ohio EPA Director's journal, and compliance begins on January 1, 2025. Based on the discussion herein, these 4 DFFOs provide an adequate technical and legal basis for source-specific measures that are consistent with the CAA requirements and EPA's Regional Haze Rule. As such, EPA proposes to approve Ohio EPA's request and incorporate by reference these 4 DFFOs into the SIP.

5. Consultation With States

The consultation requirements of 40 CFR 51.308(f)(2)(ii), provides that States must consult with other States that are reasonably anticipated to contribute to visibility impairment in a Class I area to develop coordinated emission management strategies containing the emission reductions measures that are necessary to make reasonable progress. The provisions of 40 CFR 51.308(f)(2)(ii)(A) and (B) require States to consider the emission reduction measures identified by other States as necessary for reasonable progress and to include agreed upon measures in their SIPs, respectively. The provisions of 40 CFR 51.308(f)(2)(ii)(C) speak to what happens if States cannot agree on what measures are necessary to make reasonable progress. States may satisfy the requirement of 40 CFR 51.308(f)(2)(ii) to engage in interstate consultation with other States that have emissions that are reasonably anticipated to contribute to visibility impairment in a given Class I area under the auspices of intra- and inter-RPO engagement.

Although Ohio has no mandatory Class I Federal areas within its borders, Ohio has previously been shown to have sources with emissions that impact visibility at downwind mandatory Class I Federal areas. Ohio EPA consulted with other States to develop a coordinated emission management approach to its regional haze SIP and to address Ohio's impact on nearby Class I areas. Ohio EPA participated in the LADCO and inter-RPO processes, which developed the technical information needed for such coordinated strategies.

Ohio participated in the LADCO Regional Haze Technical Workgroup meetings with other LADCO States, FLMS, and EPA Region 5. Through LADCO, Ohio also consulted with other States and Tribes.

Ohio EPA received and responded to requests from MANE-VU and VISTAS on behalf of the States in their RPOs. On August 25, 2017, Ohio EPA received the "Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Class I Area States concerning a Course of Action in Contributing States Located Upwind of MANE-VU toward Assuring Reasonable Progress for the Second Regional Haze Implementation Period (2018–2028)," (2017 MANE-VU Ask).⁴⁸ MANE-VU is the RPO for the Northeastern and Mid-Atlantic States and Tribal Governments, which include: Connecticut, Delaware, the District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Penobscot Indian Nation, Rhode Island, St. Regis Mohawk Tribe, and Vermont. For the second implementation period, MANE-VU performed contribution analyses to identify source and State-level contributions to visibility impairment and the need for interstate consultation. MANE-VU used the results of these analyses to determine emission units in various States that have a potential for visibility impacts of 3.0Mm⁻¹ or greater using action 2015 emissions from EGUs and 2011 emissions from other sources. For Ohio, MANE-VU identified 8 units at the following facilities: Avon Lake Power Plant (Unit 12), General James M. Gavin Power Plant (Units 1 and 2), and Muskingum River (Units 1, 2, 3, 4, and 5). The five specific parts of the 2017 MANE-VU Ask requested Ohio and other upwind States to pursue specific emission management strategies to meet the 2028 reasonable progress goals for the second regional haze implementation period. On December 20, 2017, LADCO responded to the MANE-VU Ask, indicating that LADCO did not agree with MANE-VU's impact assessment results and recommended that MANE-VU use emissions estimates that, in the opinion of LADCO, better reflect the current state of knowledge.⁴⁹ On December 29, 2017, Ohio EPA also responded to the 2017 MANE-VU Ask to address the requests and alleged inaccuracies regarding Ohio sources,

⁴⁸ MANE-VU's "2017 Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Class I Area States concerning a Course of Action in Contributing States Located Upwind of MANE-VU toward Assuring Reasonable Progress for the Second Regional Haze Implementation Period (2018–2028)" dated August 25, 2017, which includes a link to MANE-VU's contribution analyses report at <http://www.otcair.org/manevu>, is provided as appendix M1 to Ohio's Regional Haze SIP submission in the docket.

⁴⁹ LADCO's December 20, 2017, response to the MANE-VU Ask is found in appendix M2 of Ohio's Regional Haze SIP revision submittal in the docket.

which did not include recent permanent shutdowns or fuel conversions and resulted in modeling that overestimated Ohio's contribution.⁵⁰

MANE-VU Ask 1 requested that States "ensure the most effective use of control technologies on a year-round basis to consistently minimize emissions of haze precursors, or obtain equivalent alternative emission reductions" at EGUs "with a nameplate capacity larger than or equal to 25 MW with already installed NO_x and/or SO₂ controls." MANE-VU Ask 2 requested four-factor analyses be performed for any source modeled by MANE-VU that has the potential for a visibility impact greater than 3.0 Mm⁻¹. In response to both MANE-VU Asks 1 and 2, Ohio EPA referred to its Q/d source selection process and four-factor analyses, where Ohio made a determination of existing effective controls or provided a four-factor analysis for the sources identified by MANE-VU: Avon Lake Power Plant and General James M. Power Plant, with the exception of Muskingum River Power Plant, which permanently shut down in 2015.

MANE-VU Ask 3 requested States pursue, before 2028, an ultra-low sulfur fuel oil standard for #2 distillate oil of 0.0015 percent sulfur by weight or 15 ppm, for #4 residual oil of 0.25–0.5 percent sulfur by weight, and for #6 residual oil of 0.3–0.5 percent sulfur by weight. Ohio responded to MANE-VU Ask 3 by explaining that these fuel types do not comprise a significant portion of fuel usage in Ohio, and as such, would have little impact on visibility and would not warrant further evaluation and standard setting.

MANE-VU Ask 4 requested States lock in lower emission rates for SO₂, NO_x, and PM at EGUs and sources with more than 250 MMBtu/hour heat input that have switched to lower emitting fuels by updating permits, enforceable agreements, and/or rules. Ohio responded to MANE-VU Ask 4 that, in most cases, switches to lower emitting fuels have already been incorporated into Ohio's federally enforceable permits, however, lowering emission rates for such facilities across the board is not required or appropriate.

MANE-VU Ask 5 requested States include, in their Regional Haze SIP revision, measures to decrease energy demand by improved energy efficiency and to increase use of Combined Heat and Power and distributed generation technologies, such as fuel cells, wind,

⁵⁰ Ohio EPA's December 29, 2017, Technical Response Letter to the 2017 MANE-VU Ask is found in appendix M3 of Ohio's Regional Haze SIP revision in the docket.

and solar. Ohio responded to MANE–VU Ask 5, noting that Ohio EPA lacks the legislative authority to set energy policy, but encourages energy efficiency through efforts such as Ohio’s Encouraging Environmental Excellence Program.⁵¹

MANE–VU issued a second statement to Ohio EPA, similar to the one discussed above and also dated August 25, 2017, entitled, “Statement of the Mid-Atlantic/Northeast Visibility Union (MANE–VU) Concerning a Course of Action Within MANE–VU Toward Assuring Reasonable Progress for the Second Implementation Period (2018–2028).”⁵² Ohio EPA responded to MANE–VU’s request, noting that even though Ohio’s source selection process did not result in the selection of peaking combustion turbines for four-factor analysis, Ohio considered such NO_x controls and did not find the measures necessary for Ohio sources during the second implementation period.

On June 22, 2020, the VISTAS RPO sent a letter to Ohio EPA on behalf of Alabama, Georgia, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.⁵³ VISTAS shared with Ohio EPA the results of a technical analyses identifying Ohio sources to which VISTAS attributed significant impacts on visibility impairment at Class I areas within the VISTAS states. VISTAS’ analyses identified sources with a sulfate or nitrate impact greater than 1.00 percent of the total sulfate plus nitrate point source visibility impairment on the 20 percent most impaired days for each Class I area. For Ohio, VISTAS identified the following four sources: Ohio Valley Electric Corp.—Kyger Creek Station, Cardinal Power, General James M. Gavin Power Plant, and Zimmer Power Station. VISTAS requested that Ohio conduct a reasonable progress analysis for each of the four sources, and, if Ohio determined that a four-factor analysis was not warranted, provide a rationale.

On October 29, 2020, Ohio EPA responded to VISTAS request by providing information for each of the four sources on emissions controls,

control efficiencies, permitted limits, consent decree provisions, and trends in emission rates and annual emissions from 2016 to 2019.⁵⁴ Citing to examples in the 2019 Guidance of sources with effective emission controls, Ohio replied to VISTAS that, other than Zimmer Power Station, each of the other sources have existing effective controls with FGD or SCR with at least 90 percent effectiveness, and that a four-factor analysis would likely result in the conclusion that no further controls are necessary. For Zimmer Power Station, Ohio EPA confirmed that the facility announced it would permanently shut down in 2027, and that discussions were underway to secure the upcoming shutdown in an enforceable commitment such that a four-factor analysis would not be warranted.

In addition to the measures identified by MANE–VU and VISTAS above, Ohio reviewed the Regional Haze SIPs for other States, that were available at the time, to ensure appropriate consideration was given to measures determined necessary by other States for similar types of sources as those selected by Ohio for four-factor analysis, which were EGUs and lime manufacturing plants.

EPA proposes to find that Ohio has satisfied the consultation requirements of 40 CFR 51.308(f)(2)(ii). Ohio has met the 40 CFR 51.308(f)(2)(ii)(A) and (B) requirements with its participation in the LADCO consultation process plus its individual consultation meetings with contributing States. There were no disagreements with another State, therefore 40 CFR 51.308(f)(2)(ii)(C) does not apply to Ohio.

The requirements of 40 CFR 51.308(f)(2)(iii) provide that a State must document the technical basis for its decision making to determine the emission reductions measures that are necessary to make reasonable progress. The documentation requirement of 40 CFR 51.308(f)(2)(iii) provides that States may meet their obligations to document the technical bases on which they are relying to determine the emission reductions measures that are necessary to make reasonable progress through an RPO, as long as the process has been “approved by all State participants.” Ohio documented the technical basis, including the modeling, monitoring, engineering, costs, and emissions information that was relied on in determining the emission reduction measures that are necessary to make reasonable progress.

For modeling, Ohio EPA documented the modeling done by LADCO to determine visibility projections and contributions to impairment at the Class I areas. Ohio included justification for the 2016 base year selection and the 2028 emission projections based on ERTAC forecasts and State-reported changes.

For monitoring, Ohio described how ambient air quality monitoring data were analyzed to produce a conceptual understanding of the air quality problems contributing to haze as well as to project visibility conditions in 2028 through LADCO’s modeling and EPA’s Updated 2028 Visibility Air Quality Modeling. Ohio noted that LADCO relied upon the IMPROVE monitoring data to track the chemical composition of PM_{2.5} in haze at Class I areas in the LADCO region, which included ammonium nitrate, ammonium sulfate, elemental carbon, organic carbon, sea salt, and inorganic soil. Ohio EPA also pointed to its statewide monitoring network of EPA-approved monitors for ozone and PM_{2.5}, which Ohio continually reviews and uses to determine the contribution of emissions from sources within Ohio to visibility impairment at Class I areas in other States for SIP development.

For emissions information, Ohio EPA provided data for 2016 through 2019, the most recent data year available at the time, from various sources for each unit screened in using Ohio’s Q/d source selection threshold. Data from 2016 for annual emissions of NO_x, SO₂, PM_{2.5}, and NH₃ that was used by LADCO in the Q/d analysis relied upon the 2016 inventory developed by the National Emissions Inventory Collaborative described above. Emissions data for 2016–2019 for NO_x and SO₂ were obtained from EPA’s Clean Air Markets Database (CAMD) for sources that report emissions data to CAMD. To quantify emissions from sources that do not report to CAMD, data for 2017–2019 was obtained from Ohio EPA’s EIS. Ohio also provided an emissions summary by source category and pollutant obtained from the 2017 NEI, the most recent triennial NEI available at the time. For engineering and costs, Ohio EPA provided site-specific four-factor analyses, which evaluated potential engineering designs and costs for various NO_x and SO₂ emission control systems for 4 coal-fired EGUs at 3 different power plants (Avon Lake Power Plant, Dover Municipal Light & Power Plant, and General James M. Gavin Power Plant) and 2 coal-fired boilers at one lime manufacturing plant (Carmeuse Lime, Inc.—Maple Grove Operations). Additionally, Ohio EPA

⁵¹ Ohio’s Encouraging Environmental Excellence Program is available at <https://epa.ohio.gov/divisions-and-offices/environmental-financial-assistance/recognition-and-awards/e3-program>.

⁵² MANE–VU’s second statement dated August 25, 2017, entitled “Statement of the Mid-Atlantic/Northeast Visibility Union (MANE–VU) Concerning a Course of Action Within MANE–VU Toward Assuring Reasonable Progress for the Second Implementation Period (2018–2028)” is included as appendix O in Ohio’s Regional haze SIP revision included in the docket.

⁵³ VISTAS June 22, 2020, letter to Ohio EPA is included as appendix N1 in Ohio’s Regional Haze SIP revision included in the docket.

⁵⁴ Ohio’s October 29, 2020, response to VISTAS is included as appendix N2 to Ohio’s Regional Haze SIP revision included in the docket.

provided information to support to the incorporation of specific emissions rates in the long-term strategy and the SIP at 40 CFR 52.1870(d) at three power plants for the purposes of regional haze (Cardinal Power Plant, General James M. Gavin Power Plant, and Ohio Valley Electric Corp.—Kyger Creek Station). EPA proposes to find that such documentation of the technical basis of the long-term strategy satisfies the requirements of 40 CFR 51.308(f)(2)(iii).

The provisions of 40 CFR 51.308(f)(2)(iii) require that the emissions information considered to determine the measures that are necessary to make reasonable progress include information on emissions for the most recent year for which the State has submitted triennial emissions data to EPA (or a more recent year), with a 12-month exemption period for newly submitted data. As previously mentioned above, Ohio EPA participated in the development of technical analyses, including emission inventory information, by LADCO and its member States, and is relying in part on those analyses to satisfy the emission inventory requirements. Ohio EPA explained that emissions for the 2016 base year and the 2028 projected year used in LADCO's modeling address elements of 40 CFR 51.308(f)(6)(v) of the Regional Haze Rule, which requires that States provide recent and future year emissions inventories of pollutants anticipated to contribute to visibility impairment in any Class I areas. Ohio EPA's regional haze SIP revision for the second implementation period also included 2017 NEI emission data, which corresponds to the year of the most recent triennial NEI at the time of Ohio's SIP submission, as required under 40 CFR 51.308(f)(2)(iii) of the Regional Haze Rule. Based on Ohio EPA's consideration and analysis of the 2017 emission data in its SIP submittal, EPA proposes to find that Ohio has satisfied the emissions information requirement in 40 CFR 51.308(f)(2)(iii).

6. Five Additional Factors

In addition to the four statutory factors, States must also consider the five additional factors listed in 40 CFR 51.308(f)(2)(iv) in developing their long-term strategies.

As required by 40 CFR 51.308(f)(2)(iv)(A), Ohio EPA considered emission reductions due to ongoing air pollution control programs. Ohio EPA noted ongoing Federal and State emission control programs that have reduced and will continue to reduce visibility impairing pollutants from Ohio point and area sources as well as on-road and non-road mobile

sources in the second implementation period. For point sources, this included Federal provisions for title V permitting actions; Acid Rain Program; Boiler MACT; VOC MACT; Combustion turbine MACT; NSPS for New Residential Wood Heaters; NSPS for Commercial and Industrial Solid Waste Incinerators; NESHAPs for Industrial, Commercial, and Institutional Area Source Boilers, Major Source Boilers; NESHAP for Reciprocating Internal Combustion Engines; Mercury and Air Toxics Standards for power plants; oil and natural gas industry standards; SO₂ DRR; and Revised CSAPR Update. For area sources, regulations include national emission standards for aerosol coatings plus State regulations for Ohio's consumer product rules, Ohio's Architectural and Industrial Maintenance coatings rules, and Ohio's portable fuel container rules.

For on-road mobile sources, Ohio EPA cited to Federal regulations for the Motor Vehicle Emission Control Program—low sulfur gasoline and ultra-low sulfur diesel fuel; Control of Hazardous Air Pollutants from Mobile Sources; and NO_x Emission Standards for New Commercial Aircraft Engines. Among the controls for on-road mobile sources is the Ohio-administered Federal inspection and maintenance (I/M) program known as “E-check” in northeast Ohio, codified at Ohio Administrative Code 3745–26–01(Z). For non-road mobile sources, Ohio EPA cited to Federal regulations for the Clean Air Non-road Diesel Rule, Non-road Spark-Ignition Engines and Recreational Engine Standards, New Non-road Spark Ignition Engines, heavy-duty diesel engine standard/low sulfur fuel, railroad/locomotive standards, and commercial marine vessel engine standards. For both on-road and non-road mobile sources, Ohio EPA also provided information about Ohio's Beneficiary Mitigation Plan, which accepted and distributed funds from the Volkswagen settlement in 2018, resulting in benefits that compound over the lifetime of the equipment purchased or repowered. This included \$40 million to on-road fleets (school bus replacements, transit bus replacements, and class 4–8 local freight and port drayage trucks and shuttle buses), \$19 million to non-road equipment (tugboats, ferries, switcher locomotives, airport ground support, and port cargo handling equipment); and \$11.25 million for infrastructure to support Zero Emissions Vehicles.

As required by 40 CFR 51.308(f)(2)(iv)(B), Ohio's consideration of measures to mitigate the impacts of construction activities in its SIP

submission focus on windblown dust resulting from earth moving activities as a primary source of airborne particles. For work on construction sites where greater than one acre of land is disturbed, Ohio EPA points to general permits required under the National Pollutant Discharge Elimination System, which require best management practices to control soil erosion and stormwater runoff that are also effective in preventing and reducing airborne soil as particulate matter emissions.

Pursuant to 40 CFR 51.308(f)(2)(iv), Ohio EPA's SIP submission addressed schedules for source retirements, replacements, and natural gas conversions for 18 coal-fired units that are or will be permanent and federally enforceable during the second implementation period. As such, Ohio did not select these sources for a four-factor analysis. During the second implementation period, as enumerated above, 12 coal-fired EGUs have already permanently shut down, 3 coal-fired units converted to natural gas, and 3 coal-fired EGUs will permanently shut down by 2028. These retirements and conversions contribute to Ohio's emission reductions and the associated visibility improvements at the affected Class I areas for the second implementation period.

In considering smoke management for prescribed burns as required in 40 CFR 51.308(f)(2)(iv)(D), Ohio EPA referred to interrelated laws and regulations for management of air emissions from prescribed fires. Among the enforcing agencies is the Ohio Department of Natural Resources Division of Forestry, which has the authority under Ohio Revised Code (ORC) 1503.18⁵⁵ to ban outdoor burning statewide in unincorporated areas during certain months and times of the year and to provide waivers only for individuals who are Certified Prescribed Fire Managers. In addition, OAC 3745–19⁵⁶ “Open Burning Standards” regulates prescribed fires for horticultural, silvicultural, range, or wildfire management practices and requires applications for permission, which must specify methods to reduce air emissions and certify adherence to the requirements of OAC 3745–19. To put Ohio's contribution from prescribed fires into context, Ohio EPA also provided emissions data from the 2017

⁵⁵ Ohio Revised Code (ORC), title 15 Conservation of Natural Resources, Chapter 1503 Division of Forestry, Section 1503.18 is available at <https://codes.ohio.gov/ohio-revised-code/section-1503.18>.

⁵⁶ Ohio Administrative Code (OAC), Chapter 3745–19 Open Burning Standards is available at <https://codes.ohio.gov/ohio-administrative-code/chapter-3745-19>.

NEI showing that prescribed fire activity in the State constitutes less than 1 percent of total U.S. prescribed fire emissions.

As required by 40 CFR 51.308(f)(2)(iv), Ohio EPA considered the anticipated net effect on visibility improvements at the LADCO Class I Areas due to projected changes in emissions from point, area, and mobile sources during the second implementation period. For each potential control measure evaluated in the four-factor analyses, Ohio EPA projected the maximum estimated visibility benefit at any Class I area among the sources that were modeled, as listed in Table 18 of Ohio's SIP submission, to compare the relative control measures at a particular facility. Ohio considered cost-effectiveness along with time necessary to install controls, energy and non-air quality environmental impacts, and remaining useful life. Ohio found no potential new add-on controls necessary for reasonable progress.

Ohio EPA considered other projected changes in emissions that would affect visibility at the LADCO Class I Areas. The visibility improvement expected during the second implementation period was estimated using LADCO's 2016 base year and 2028 future year inventory components to simulate 2016 and 2028 air quality. As described above, for EGUs, projected changes for 2028 emissions in LADCO's modeling platform were based on ERTAC forecasts and State-reported changes. For most other emission sectors, LADCO relied upon EPA's 2016 and 2028 inventory estimates for projected changes. As Ohio EPA pointed out in section III.3(e)(5) of its SIP submission, these projected changes in EPA's 2016 and 2028 inventory estimates took into account Federal on-the-books controls, such as those listed in Ohio's long-term strategy above. In addition, as noted in section III.3(e)(5) of Ohio's SIP submission, improvements in visibility are also anticipated by the end of the second implementation period due to the upcoming permanent shutdowns of coal-fired EGUs at Miami Fort Power Station and Zimmer Power Station by 2028.

Ohio EPA also demonstrated that visibility conditions in the LADCO Class I Areas have shown continued improvement relative to baseline conditions. As depicted in LADCO's 2021 TSD, 2016 visibility impairment conditions at the LADCO Class I Areas on the 20 percent most impaired days as well as the 20 percent clearest days were below their respective glidepaths. By the end of the second

implementation period in 2028, both LADCO's projections and EPA's Updated 2028 Visibility Air Quality Modeling show 2028 visibility conditions will be below the URP glidepaths for the LADCO Class I Areas.

Ohio EPA concluded, in section V of its SIP submission, that when weighing the four-factor analyses and the five additional required factors, new add-on controls are not necessary to meet second implementation period regional haze SIP requirements beyond the measures included in Ohio's long-term strategy. Ohio's process for selecting sources for four-factor analyses represented 80 percent of the total SO₂ and 57 percent of NO_x for all sources with Q greater than 0.1 tons per year and provided an analytical means for refining the list based on shutdowns, conversions, and existing effective controls. For the add-on controls evaluated for the 6 units selected for four-factor analyses, Ohio considered the cost effectiveness, time necessary to install the controls, energy and solid waste impacts, the costs/sales ratio, and comparable visibility benefits in determining that the controls evaluated were not cost effective to achieve emission reductions during the second implementation period. Ohio EPA reflected upon the steady and significant improvement in visibility at each of the Class I areas impacted by sources in Ohio and noted that LADCO's modeling shows continued improvement with 2028 projections below their URP glidepaths. As discussed under the progress report elements below, from 2005 to 2017, Ohio's SO₂ emissions decreased by 90 percent while NO_x emissions decreased by 47 percent. During the second implementation period, the decreasing trend continues with the shutdowns of 12 coal-fired EGUs at 4 facilities and the upcoming permanent shutdowns of 3 more coal-fired EGUs at 2 power stations. Given all these factors, Ohio concluded that the on-the-books and on-the-way controls included in its long-term strategy, including the shutdowns and emission limits for NO_x and SO₂ in the DFFOs, are more than sufficient to make reasonable progress in the second implementation period. EPA proposes to find that Ohio reasonably considered and satisfied the requirements for each of the five additional factors in 40 CFR 51.308(f)(2)(iv) in developing its long-term strategy.

F. Reasonable Progress Goals

The provisions of 40 CFR 51.308(f)(3) contain the requirements pertaining to RPGs for each Class I area. Under 40 CFR 51.308(f)(3)(i), a State, in which a

mandatory Class I area is located, is required to establish RPGs—one each for the most impaired and clearest days—reflecting the visibility conditions that will be achieved at the end of the implementation period as a result of the emission limitations, compliance schedules and other measures required under paragraph (f)(2) to be in States' long-term strategies, as well as implementation of other CAA requirements. The long-term strategies as reflected by the RPGs must provide for an improvement in visibility on the most impaired days relative to the baseline period and ensure no degradation on the clearest days relative to the baseline period. The provisions of 40 CFR 51.308(f)(3)(ii) apply in circumstances in which a Class I area's RPG for the most impaired days represents a slower rate of visibility improvement than the uniform rate of progress calculated under 40 CFR 51.308(f)(1)(vi). Under 40 CFR 51.308(f)(3)(ii)(A), if the State in which a mandatory Class I area is located establishes an RPG for the most impaired days that provides for a slower rate of visibility improvement than the URP, the State must demonstrate that there are no additional emission reduction measures for anthropogenic sources or groups of sources in the State that would be reasonable to include in its long-term strategy. The provisions of 40 CFR 51.308(f)(3)(ii)(B) requires that if a State contains sources that are reasonably anticipated to contribute to visibility impairment in a Class I area in *another* State, and the RPG for the most impaired days in that Class I area is above the URP, the upwind State must provide the same demonstration. Because Ohio has no Class I areas within its borders to which the requirements of the visibility protection program apply in 40 CFR part 81, subpart D, Ohio is subject only to 40 CFR 51.308(f)(3)(ii)(B), but not 40 CFR 51.308(f)(3)(i) or (f)(3)(ii)(A).

Under 40 CFR 51.308(f)(3)(ii)(B), a State that contains sources that are reasonably anticipated to contribute to visibility impairment in a Class I area in another State for which a demonstration by the other State is required under 40 CFR 51.308(f)(3)(ii)(B) must demonstrate that there are no additional emission reduction measures that would be reasonable to include in its long-term strategy. Ohio's SIP submission at Table 1, section III(7)(b), and appendix A show that at each of the Class I areas impacted by emissions from Ohio, the 2028 projected visibility impairment is not above the adjusted URP glidepaths for the 20 percent most impaired days

and ensures no degradation on the 20 percent clearest days. Therefore, EPA proposes it is reasonable to assume that the demonstration requirement under 40 CFR 51.308(f)(3)(ii)(B) as it pertains to these areas will not be triggered.

EPA proposes to determine that Ohio has satisfied the applicable requirements of 40 CFR 51.308(f)(3) relating to RPGs.

G. Monitoring Strategy and Other Implementation Plan Requirements

The requirements of 40 CFR 51.308(f)(6) specify that each comprehensive revision of a State's regional haze SIP must contain or provide for certain elements, including monitoring strategies, emissions inventories, and any reporting, recordkeeping and other measures needed to assess and report on visibility. A main requirement of this subsection is for States with Class I areas to submit monitoring strategies for measuring, characterizing, and reporting on visibility impairment. Compliance with this requirement may be met through participation in the IMPROVE network.

The provisions of 40 CFR 51.308(f)(6)(i) require SIPs to provide for the establishment of any additional monitoring sites or equipment needed to assess whether reasonable progress goals to address regional haze for all mandatory Class I Federal areas within the State are being achieved. The provisions of 51.308(f)(6)(ii) require SIPs to provide for procedures by which monitoring data and other information are used in determining the contribution of emissions from within the State to regional haze visibility impairment at mandatory Class I Federal areas both within and outside the State. As noted above, Ohio does not have any mandatory Class I Federal areas located within its borders to which the requirements of the visibility protection program apply in 40 CFR part 81, subpart D. Therefore, 40 CFR 51.308(f)(6)(i) and (ii) do not apply.

The provisions of 40 CFR 51.308(f)(6)(iii) require States with no Class I areas to include procedures by which monitoring data and other information are used in determining the contribution of emissions from within the State to regional haze visibility impairment at Class I areas in other States. States with Class I areas must establish a monitoring program and report data to EPA that is representative of visibility at the Class I Federal areas. The IMPROVE network meets this requirement. Ohio EPA stated that, as a participant in LADCO, it reviewed information about the chemical

composition of baseline monitoring data at LADCO Class I Federal areas to understand the sources of haze causing pollutants. Ohio EPA does not operate any monitoring sites under the Federal IMPROVE program and, therefore, does not require approval of its monitoring network under the Regional Haze Rule. Ohio EPA relies upon participation in the IMPROVE network as part of the State's monitoring strategy for regional haze to review progress and trends in visibility at Class I areas that may be affected by emissions from Ohio, for comprehensive periodic revisions of this implementation plan, and for periodic reports describing progress towards the reasonable progress goals for those areas. Ohio also runs a monitoring network of EPA-approved monitors for ozone and PM_{2.5}, as described in section III(8)(c) of Ohio's SIP submission, which Ohio EPA uses to determine the contribution of emissions from sources within Ohio to visibility impairment at Class I areas in other States for SIP development.

The provisions of 40 CFR 51.308(f)(6)(iv) require the SIP to provide for the reporting of all visibility monitoring data to the Administrator at least annually for each Class I area in the State. As noted above, Ohio does not have any mandatory Class I Federal areas located within its borders to which the requirements of the visibility protection program apply in 40 CFR part 81, subpart D, and, therefore, 40 CFR 51.308(f)(6)(iv) does not apply.

The provisions of 40 CFR 51.308(f)(6)(v) require SIPs to provide for a statewide inventory of emissions of pollutants that are reasonably anticipated to cause or contribute to visibility impairment, including emissions for the most recent year for which data are available. Ohio EPA, as described in section III(8)(c)(ii) of its SIP submission, provided statewide emission inventories, including data from 2017 as the most recent year available at the time of the State's SIP submission, by complying with EPA's AERR. In 40 CFR part 51, subpart A, the AERR requires States to submit updated emissions inventories for criteria pollutants to EPA's Emissions Inventory System every three years. The emission inventory data is used to develop the NEI, which provides for, among other things, a triennial State-wide inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment. Ohio's SIP submission, in section III(8)(b), includes a table of 2017 NEI data with source categories covering emissions from EGU point, non-EGU point, on-road, non-road, commercial marine vessels, dust,

and other for the following pollutants: SO₂, NO_x, PM_{2.5}, PM₁₀, VOC, and NH₃. To depict changes in emissions over time, Ohio EPA accompanied the 2017 NEI data with side-by-side comparisons comparing 2005 emissions for the same source categories and pollutants. Ohio EPA also provided a summary of SO₂, NO_x, PM_{2.5}, VOCs, and NH₃ emissions for 2016 that LADCO used in developing Q/d metrics and the 2016 base year emissions inventory to project emissions to year 2028. Additionally, as described in further detail under the progress report elements in section III(8)(b) of Ohio's SIP submission, Ohio EPA provided more recent data through 2019 from CAMD to depict trends in EGU emissions, which demonstrated a 94 percent decrease in SO₂ emissions and an 84 percent decrease in NO_x emissions from 2005 to 2019.

The provisions of 40 CFR 51.308(f)(6)(v) also require States to include estimates of future projected emissions and include a commitment to update the inventory periodically. For future projected emissions, Ohio relied on the LADCO modeling and analysis, which estimated 2028 projected emissions of SO₂ and NO_x for specific facilities in the LADCO States to provide an assessment of expected future year air quality based on 2016 emissions as well as ERTAC and State forecasts. In addition to Ohio's commitment to comply with the AERR to periodically update EPA's emission inventories for creating and analyzing the NEI, Ohio annually updates the State's own EIS for pollutants anticipated to cause or contribute to visibility impairment in Class I areas to support future regional haze progress reports and SIP revisions.

EPA proposes to find that Ohio has met the requirements of 40 CFR 51.308(f)(6) as described above, including through its continued participation in LADCO, its own statewide EIS, and its emissions reporting to EPA under AERR.

H. Requirements for Periodic Reports Describing Progress Towards the Reasonable Progress Goals

The provisions of 40 CFR 51.308(f)(5) require that periodic comprehensive revisions of States' regional haze plans also address the progress report requirements of 40 CFR 51.308(g)(1) through (5). The purpose of these requirements is to evaluate progress towards the applicable RPGs for each Class I area within the State and each Class I area outside the State that may be affected by emissions from within that State. The provisions of 40 CFR 51.308(g)(1) and (2) apply to all States

and require a description of the status of implementation of all measures included in a State's first implementation period regional haze plan and a summary of the emission reductions achieved through implementation of those measures. The provisions of 40 CFR 51.308(g)(3) apply only to States with Class I areas within their borders and requires such States to assess current visibility conditions, changes in visibility relative to baseline (2000–2004) visibility conditions, and changes in visibility conditions relative to the period addressed in the first implementation period progress report. The provisions of 51.308(g)(4) apply to all States and requires an analysis tracking changes in emissions of pollutants contributing to visibility impairment from all sources and sectors since the period addressed by the first implementation period progress report. This provision further specifies the year or years through which the analysis must extend depending on the type of source and the platform through which its emission information is reported. Finally, 40 CFR 51.308(g)(5), which also applies to all States, requires an assessment of any significant changes in anthropogenic emissions within or outside the State have occurred since the period addressed by the first implementation period progress report, including whether such changes were anticipated and whether they have limited or impeded expected progress towards reducing emissions and improving visibility.

Ohio's previous progress report, which was a 5-year progress report submitted as a SIP revision for the first implementation period on March 11, 2016, included emission inventories from 2002–2014 of NO_x and SO₂ for EGUs as well as inventories from 2005 and 2011 of NO_x, SO₂, PM_{2.5}, PM₁₀, VOC, and NH₃ for additional source categories: EGUs, non-EGUs, on-road, non-road, commercial marine vessels, and other. Based on CAMD data for emissions from EGUs covering the period 2002 to 2014, Ohio's 2016 5-year progress report showed a decrease in NO_x emissions by 76 percent and a decrease in SO₂ emissions by 75 percent. (82 FR 60543, December 21, 2017).

For the second implementation period SIP submittal, the 2019 Guidance recommends the progress report cover the first full year that was not incorporated into the previous progress report through a year that is as close as possible to the submission date of the SIP. 2019 Guidance at 55. Ohio's 2021 progress report, contained in section III(8)(b) of its SIP submission, covered

the measures and emissions reductions achieved from 2005 through 2019, including 2017 as the most recent NEI year available at the time for sector level emissions.

To address the progress report elements of 51.308(g)(1), Ohio EPA described the status of implementation of all measures in the long-term strategy under its first implementation period regional haze plan. These measures included several Federal measures, including CAIR and its successor CSAPR, to which Ohio attributed the majority of reductions in visibility-impairing emissions from the largest point-source sector, EGUs, during the first implementation period, along with the Acid Rain Program under title IV and the NO_x SIP Call. Additional on-the-books control measures that generated further emission reductions addressed mobile sources, such as on-road provisions under the Federal Motor Vehicle Emission Control Program for low-sulfur gasoline and ultra-low sulfur diesel fuel as well as the Ohio-administered Federal I/M program, E-check. Non-road Federal measures for mobile sources included the Clean Air Non-road Diesel Rule, the evaporative Large Spark Ignition and Recreational Vehicle standards, heavy-duty diesel engine standard for low-sulfur diesel fuel, railroad/locomotive standards, and commercial marine vessel engine standards. Measures for area sources included Ohio's consumer products rules for consumer solvents, Ohio's Architectural and Industrial Maintenance coatings rules, Ohio's portable fuel container rules, and NESHAP for aerosol coatings. Among the other measures, Ohio also included BART and Industrial Boiler MACT, which applied to only one EGU in the State.

As required by 40 CFR 51.308(g)(2), Ohio provided a summary of the emission reductions achieved through the measures outlined above from the first implementation period. As a result of these measures, NEI data from 2005 to 2017 from across all emission categories, discussed more fully below, show that Ohio's SO₂ emissions decreased by 90 percent, NO_x emissions decreased by 57 percent, VOC emissions decreased by 33 percent, and ammonia emissions decreased by 26 percent. The most significant emissions reductions from Ohio's SIP strategies were realized mainly as a result of CAIR and CSAPR, where CAMD data show that the EGU sector experienced a 94 percent decrease in SO₂ from 1,085,485 tpy in 2005 to 68,905 tpy in 2019 as well as an 84 percent decrease in NO_x from 255,000 tpy in 2005 to 40,493 tpy in

2019. EPA proposes to find that Ohio has met the requirements of 40 CFR 51.308(g)(1) and (2) because its SIP submission describes the measures included in the long-term strategy from the first implementation period, as well as the status of their implementation and the emission reductions achieved through such implementation.

The provisions of 40 CFR 51.308(g)(3) require States to assess Reasonable Progress Goals, including current visibility conditions and changes, for any Class I areas within the State. As described above, Ohio has no mandatory Class I Federal areas within its borders that are among the 156 mandatory Class I Federal areas where EPA deemed visibility to be an important value. Therefore, 40 CFR 51.308(g)(3) does not apply.

To address 40 CFR 51.308(g)(4), Ohio EPA provided an analysis, in section III.8(b)(iv) of its SIP submittal, tracking the change in emissions of NO_x, SO₂, PM_{2.5}, PM₁₀, NH₃, and VOC from all sources and activities in the State. Table 21 of Ohio's SIP submission documents changes in emissions of each of these pollutants for the EGU point, non-EGU point, on-road, non-road, commercial marine vessels, and other categories based on the NEIs from 2005 through 2017, the most recent NEI year available at the time for category level emissions. As a caveat, Ohio noted that there were several changes in the methodologies for estimating emissions between the 2005 and 2017 NEIs, such that they are not readily comparable as explained in EPA's 2017 National Emissions Inventory: January 2021 Updated Release, Technical Support Document.⁵⁷ Specifically, these inconsistencies resulted from changes in the reporting of the condensable portion of PM emissions, changes in the model used for on-road and non-road emissions, as well as improvements in methodologies for other sources such as paved and unpaved PM emissions, ammonia fertilizer and animal waste emissions, oil and gas production, residential wood combustion, solvents, industrial and commercial/institutional fuel combustion, and commercial marine vessel emissions. While Ohio EPA noted that the inventories are not directly comparable, 40 CFR 51.308(g)(4) does not require States to revise previous NEI year estimates to use the same methods as a more recent year.

⁵⁷ 2017 National Emissions Inventory: January 2021 Updated Release, Technical Support Document," EPA-454/R-21=001, February 2021. https://www.epa.gov/sites/default/files/2021-02/documents/nei2017_tsd_full_jan2021.pdf.

Ohio EPA's analysis of Table 21 documents overall emission reductions in NO_x and SO₂ across all source categories from the 2005 and 2017 NEIs, with a 90 percent reduction in SO₂ and 57 percent reduction in NO_x. Based on the 2005 and 2017 NEIs, Ohio documented decreases in NO_x emissions of 77 percent from EGU Point, 32 percent from non-EGU point, 49 percent from on-road, 55 percent from non-road, 38 percent from commercial marine vessels, and 44 percent from other categories. For SO₂, Ohio calculated decreases from the 2005 to 2017 NEIs of 92 percent from EGU point, 77 percent from non-EGU point, 87 percent from on-road, 99 percent from non-road, 92 percent from commercial marine vessels, and 36 percent from other categories. Overall reductions in VOC and NH₃ emissions, which Ohio EPA notes are less impactful on visibility in the LADCO Class I Areas, reached 33 percent and 26 percent, respectively, despite an apparent increase in EGU point source emissions in NH₃, which Ohio EPA attributes to changes in estimation methodologies at a few select facilities that Ohio EPA is investigating further. Similarly, while overall PM_{2.5} and PM₁₀ emissions appear to increase by 14 percent and 12 percent, respectively, Ohio EPA notes that a direct comparison between the 2005 and 2017 NEIs would be inaccurate because of the inconsistencies in PM reporting and changes in the modeling of emissions as explained above. In addition to the NEIs, Ohio EPA provided data, as noted earlier, with respect to EGUs that report to CAMD from 2005 to 2019, the most recent year available at the time, tracking the change in emissions and chronicling the decrease in SO₂ by 94 percent and the decrease in NO_x by 84 percent. EPA proposes to find that Ohio has satisfied the requirements of 40 CFR 51.308(g)(4) by tracking the change in emissions of NO_x, SO₂, PM_{2.5}, VOCs, and NH₃ identified by type of source since the first progress report.

To address 40 CFR 51.308(g)(5), Ohio EPA assessed significant changes in anthropogenic emissions since the first implementation period plan, within and outside of the State, including whether they were anticipated and whether they limited or impeded progress in improving visibility. Within the State, Ohio compared the 2005 and 2017 NEIs in Table 21 of its submittal to identify changes in anthropogenic emissions, finding that emissions significantly decreased across all categories for NO_x and SO₂. As previously mentioned,

these changes were anticipated and occurred mainly as a result of CSAPR as it replaced CAIR. Where emissions appeared to increase significantly, such as for NH₃ emissions from EGU-point source category, Ohio explained the changes occurred as a result the inconsistencies in the reporting, modeling, and methodologies used for the 2005 and 2017 NEI data sets as described above, and that Ohio is investigating the potential for the increases to be attributed to errors at a few select facilities. With the significant decreases in anthropogenic emissions of NO_x, SO₂, VOC, and NH₃ across all source categories from 2005 to 2017 NEIs, Ohio EPA found that no changes in anthropogenic emissions within or outside Ohio have occurred from 2005 to 2017 that would limit or impede progress in reducing pollutant emissions and improving visibility. Ohio noted that further improvements in visibility are anticipated with the emission reductions to be realized the Revised CSAPR Update along with the permanent shutdown of coal-fired boilers at Miami Fort Power Station and Zimmer Power Station. The emissions trend data in Ohio's SIP submission support an assessment that anthropogenic haze-causing pollutant emissions in Ohio have decreased during the reporting period and that changes in emissions have not limited or impeded progress in reducing pollutant emissions and improving visibility. EPA proposes to find that Ohio has met the requirements of 40 CFR 51.308(g)(5).

Following up on Ohio's 2021 progress report, in section III.8(b) of its SIP submission, Ohio EPA committed to submit a progress report for the second implementation period by January 31, 2025, to evaluate progress towards the reasonable progress goal for each mandatory Class I Federal area located within and outside the State that may be affected by emissions from within the State as required by 40 CFR 51.308(g).

I. Requirements for State and Federal Land Manager Coordination

CAA section 169A(d) requires States to consult with FLMs before holding the public hearing on a proposed regional haze SIP and to include a summary of the FLMs' conclusions and recommendations in the notice to the public. In addition, 40 CFR 51.308(i)(2)'s FLM consultation provision requires a State to provide FLMs with an opportunity for consultation that is early enough in the State's policy analyses of its emission

reduction obligation so that information and recommendations provided by the FLMs' can meaningfully inform the State's decisions on its long-term strategy. If the consultation has taken place at least 120 days before a public hearing or public comment period, the opportunity for consultation will be deemed early enough. Regardless, the opportunity for consultation must be provided at least 60 days before a public hearing or public comment period at the State level. The requirements of 40 CFR 51.308(i)(2) also provide two substantive topics on which FLMs must be provided an opportunity to discuss with States: assessment of visibility impairment in any Class I area and recommendations on the development and implementation of strategies to address visibility impairment. In 40 CFR 51.308(i)(3), States, in developing their implementation plans, are required to include a description of how they addressed FLMs' comments.

In development of its SIP submittal, Ohio participated with the FLMs in an early engagement process as well as a formal consultation process, sharing drafts of its SIP submission, reviewing information provided by the FLMs, and meeting to discuss the development of Ohio's proposed Regional Haze plan. On May 12, 2020, and October 2, 2020, Ohio received lists of sources recommended for four-factor analyses by NPS and USFS, respectively, which are included as Appendices K2 and K3 in Ohio's SIP submission. On October 8, 2020, Ohio EPA shared an early draft of its Regional Haze plan with USFS, FWS, and NPS for their review and comments. Following this early engagement process, Ohio initiated a formal consultation process with the FLMs on January 6, 2021, providing another draft of its Regional Haze plan and offering an opportunity for consultation in person. Ohio EPA initiated the early engagement process more than 120 days before the first public comment period on Ohio's plan and began the formal consultation process at least 60 days prior to the first public comment period on Ohio's plan as required by 40 CFR 51.308(i)(2). On February 10, 2021, USFS shared their comments on the draft plan with Ohio EPA, and NPS shared their comments with Ohio EPA on February 17, 2021, both of which are contained in Appendices L1, L2, L3 of Ohio's SIP submission. Ohio EPA's response to the FLM's comments from February 2021 are included as Appendix L4 of Ohio's SIP submittal as required by 40 CFR 51.308(i)(3).

On May 10, 2021, Ohio announced its initial public comment period and public hearing regarding the State's proposed SIP submittal for the second implementation period on Ohio EPA's Regional Haze website,⁵⁸ in the Ohio EPA Weekly Review,⁵⁹ and through electronic mailing lists to interested parties, including FLMs. The public notice included FLM's comments and Ohio EPA's response in the proposed SIP submission. The initial public comment period took place from May 10, 2021, through June 28, 2021, being extended beyond the original 30-day period by an additional two weeks, and a virtual and in-person public hearing was held on June 14, 2021. Following the public comment period, Ohio submitted its SIP revision to EPA on July 30, 2021.

Subsequently, in 2023 and 2024, Ohio EPA re-engaged with the FLMs on a proposed supplement to its July 30, 2021, SIP submission. As discussed above, Ohio EPA shared a proposed supplement with the FLMs that included an analyses and proposed emission limits for General James M. Gavin Power Plant, Cardinal Power Plant, and Ohio Valley Electric Corp.—Kyger Creek Station. For the proposed supplement, Ohio EPA provided a 45-day FLM consultation period from January 16, 2024, to March 1, 2024, that ran concurrently with an extended public comment period from January 16, 2024, to March 18, 2024, during which Ohio made the FLM comments available to the public on its website by March 5, 2024. A virtual and in-person public hearing on Ohio EPA's proposed supplement was held on March 18, 2024.

Following the second public comment period, Ohio EPA again re-engaged with the FLMs on proposed DFFOs that would effectuate the emissions limitations contained within the proposed supplement. After Ohio EPA and the FLMs agreed on a shortened FLM consultation period from May 3, 2024, to May 31, 2024, Ohio provided a third public comment period regarding draft DFFOs effectuating the proposed emission limitations from June 3, 2024, through July 8, 2024, and a virtual and in-person public hearing was held on July 8, 2024. Ohio EPA considered input from FLMs and the public provided during each of the three FLM consultation periods and three

public notice periods when finalizing this SIP revision.

As required by 40 CFR 51.308(i)(4), Ohio committed to continue consultation with States and FLMs on the development and review of any future plan revisions and progress reports, as well as other programs having the potential to contribute to visibility impairment in the mandatory Class I areas, including NSR sources that might impact visibility in Class I areas. Given Ohio EPA's actions recounted above, EPA proposes to find that Ohio has satisfied the requirements of 40 CFR 51.308(i) to consult with the FLMs on its regional haze SIP for the second implementation period.

V. Proposed Action

EPA proposes to approve Ohio's July 30, 2021, SIP submission, as supplemented on August 6, 2024, as satisfying the regional haze requirements for the second implementation period contained in 40 CFR 51.308(f).

VI. Statutory and Executive Order Reviews

Under the CAA, the Administrator is required to approve a SIP submission that complies with the provisions of the CAA and applicable Federal regulations. 42 U.S.C. 7410(k); 40 CFR 52.02(a). Thus, in reviewing SIP submissions, EPA's role is to approve State choices, provided that they meet the criteria of the CAA. Accordingly, this action merely proposes to approve State law as meeting Federal requirements and does not impose additional requirements beyond those imposed by State law. For that reason, this proposed action:

- Is not a "significant regulatory action" subject to review by the Office of Management and Budget under Executive Orders 12866 (58 FR 51735, October 4, 1993) and 14094 (88 FR 21879, April 11, 2023);
- Does not impose an information collection burden under the provisions of the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*);
- Is certified as not having a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*);
- Does not contain any unfunded mandate or significantly or uniquely affect small governments, as described in the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4);
- Does not have Federalism implications as specified in Executive Order 13132 (64 FR 43255, August 10, 1999);

- Is not subject to Executive Order 13045 (62 FR 19885, April 23, 1997) because it approves a State program;
- Is not a significant regulatory action subject to Executive Order 13211 (66 FR 28355, May 22, 2001); and
- Is not subject to requirements of Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) because application of those requirements would be inconsistent with the CAA.

In addition, the SIP is not approved to apply on any Indian reservation land or in any other area where EPA or an Indian Tribe has demonstrated that a Tribe has jurisdiction. In those areas of Indian country, the rule does not have Tribal implications and will not impose substantial direct costs on Tribal governments or preempt Tribal law as specified by Executive Order 13175 (65 FR 67249, November 9, 2000).

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 FR 7629, February 16, 1994) directs Federal agencies to identify and address "disproportionately high and adverse human health or environmental effects" of their actions on communities with environmental justice (EJ) concerns to the greatest extent practicable and permitted by law. EPA defines EJ as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." EPA further defines the term fair treatment to mean that "no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative environmental consequences of industrial, governmental, and commercial operations or programs and policies."

Ohio EPA did not evaluate EJ considerations as part of its SIP submittal; the CAA and applicable implementing regulations neither prohibit nor require such an evaluation. EPA did not perform an EJ analysis and did not consider EJ in this action. Due to the nature of the action being taken here, this action is expected to have a neutral to positive impact on the air quality of the affected area. Consideration of EJ is not required as part of this action, and there is no information in the record inconsistent with the stated goal of E.O. 12898 of achieving environmental justice for communities with EJ concerns.

⁵⁸The Ohio EPA Regional Haze website is available at <https://epa.ohio.gov/divisions-and-offices/air-pollution-control/state-implementation-plans/state-implementation-plan-sip-regional-haze>.

⁵⁹The Ohio EPA Weekly Review is available at <https://epa.ohio.gov/about/media-center/public-notices>.

List of Subjects in 40 CFR Part 52

Environmental protection, Air
pollution control, Incorporation by

reference, Nitrogen dioxide, Ozone,
Particulate matter, Sulfur oxides.

Dated: August 21, 2024.

Debra Shore,

Regional Administrator, Region 5.

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