6560-50-P

**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Part 52**

**[EPA-R09-OAR-2023-0263; FRL-10941-02-R9]**

# Air Quality State Implementation Plans; Approvals and Promulgations: California; 1997 Annual Fine Particulate Matter Serious and Clean Air Act Section 189(d) Nonattainment Area Requirements; San Joaquin Valley, CA

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Final rule.

**SUMMARY:** The Environmental Protection Agency (EPA or "Agency") is taking final action to approve portions of state implementation plan (SIP) revisions submitted by the State of California to meet Clean Air Act (CAA or "Act") requirements for the 1997 annual fine particulate matter ($PM_{2.5}$) national ambient air quality standards (NAAQS or "standards") in the San Joaquin Valley $PM_{2.5}$ nonattainment area. Specifically, the EPA is approving those portions of the submitted SIP revisions as they pertain to the Serious nonattainment area and CAA section 189(d) requirements for the 1997 annual $PM_{2.5}$ NAAQS, except for the requirement for contingency measures which will be addressed in a separate rulemaking. In addition, the EPA is approving the 2020 and 2023 motor vehicle emissions budgets and the trading mechanism for use in transportation conformity analyses for the 1997 annual $PM_{2.5}$ NAAQS.

**DATES:** This rule is effective on **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

**ADDRESSES:** The EPA has established a docket for this action under Docket ID No. EPA-R09-OAR-2023-0263. All documents in the docket are listed on the *https://www.regulations.gov* web site. Although listed in the index, some information is not publicly available, e.g., Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available

through *https://www.regulations.gov*, or please contact the person identified in the **FOR FURTHER INFORMATION CONTACT** section for additional availability information. If you need assistance in a language other than English or if you are a person with a disability who needs a reasonable accommodation at no cost to you, please contact the person identified in the **FOR FURTHER INFORMATION CONTACT** section.

**FOR FURTHER INFORMATION CONTACT:** Ashley Graham, Geographic Strategies and Modeling Section (AIR-2-2), EPA Region IX, 75 Hawthorne Street, San Francisco, CA 94105. By phone: (415) 972-3877 or by email at *graham.ashleyr@epa.gov*.

**SUPPLEMENTARY INFORMATION:** Throughout this document, "we," "us," and "our" refer to the EPA.

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## I. Summary of the Proposed Action

On July 14, 2023, in accordance with CAA section 110(k)(3), the EPA proposed to approve portions of SIP revisions submitted by the California Air Resources Board (CARB) to meet CAA requirements for the 1997 annual $PM_{2.5}$ NAAQS in the San Joaquin Valley $PM_{2.5}$ nonattainment area.[1] The San Joaquin Valley is classified as a Serious nonattainment area for the 1997 annual $PM_{2.5}$ NAAQS and is also subject to CAA section 189(d) requirements because of the failure of the area to attain the 1997 annual $PM_{2.5}$ NAAQS by the area's original Serious area attainment date (i.e., December 31, 2015). The EPA's determination that the area failed to attain

[1] 88 FR 45276.

by the original December 31, 2015 attainment date triggered the requirement for the State to submit the SIP revisions on which the EPA is taking final action in this document.[2]

The SIP revisions on which we proposed action are those portions of the "2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards" ("2018 $PM_{2.5}$ Plan")[3] and the "San Joaquin Valley Supplement to the 2016 State Strategy for the State Implementation Plan" ("Valley State SIP Strategy")[4] that pertain to the 1997 annual $PM_{2.5}$ NAAQS, and the "Attainment Plan Revision for the 1997 Annual $PM_{2.5}$ Standard" ("15 $\mu g/m^3$ SIP Revision").[5] CARB submitted the 2018 $PM_{2.5}$ Plan and Valley State SIP Strategy to the EPA as a revision to the California SIP on May 10, 2019, and submitted the 15 $\mu g/m^3$ SIP Revision on November 8, 2021. We refer to these three submissions collectively as the "SJV $PM_{2.5}$ Plan" or "Plan." The SJV $PM_{2.5}$ Plan was developed jointly by the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD or "District") and CARB and addresses Serious area nonattainment plan and CAA section 189(d) requirements for the 1997 annual $PM_{2.5}$ NAAQS in the San Joaquin Valley, except for the requirement for contingency measures. The Plan includes the State's demonstration that the area will attain the 1997 annual $PM_{2.5}$ NAAQS by December 31, 2023.

Following submittal of the SJV $PM_{2.5}$ Plan, CARB transmitted to the EPA two technical supplements providing additional information in support of the Plan. The first supplement, submitted on March 30, 2023, included documents titled "Ammonia: Supplemental Information for EPA in Support of 15 $\mu g/m^3$ Annual $PM_{2.5}$ Standard, March 2023" ("March 2023 Ammonia Supplement") and "Building Electrification Technical Supplement for the 1997 Annual $PM_{2.5}$ NAAQS" ("March 2023 Building Heating Supplement"). The second supplement was submitted on June 15, 2023, and included information on the State's consideration of Title VI of the Civil Rights Act of 1964 ("Title VI") in the context of SIP development to provide necessary

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[2] 81 FR 84481 (November 23, 2016).
[3] The 2018 $PM_{2.5}$ Plan was adopted by the San Joaquin Valley Unified Air Pollution Control District on November 15, 2018, and by CARB on January 24, 2019.
[4] The Valley State SIP Strategy was adopted by CARB on October 25, 2018.
[5] The "15 $\mu g/m^3$ SIP Revision" was adopted by the San Joaquin Valley Unified Air Pollution Control District on August 19, 2021, and adopted by CARB on September 23, 2021.

assurances for purposes of CAA section 110(a)(2)(E)(i) ("Title VI Supplement").[6]

The EPA proposed to approve the best available control measures/best available control technology (BACM/BACT) demonstration,[7] the five percent annual emissions reduction demonstration, the attainment demonstration (including air quality modeling), the reasonable further progress (RFP) demonstration, and the quantitative milestones demonstration in the SJV $PM_{2.5}$ Plan as meeting the Serious nonattainment area and CAA section 189(d) planning requirements for the 1997 annual $PM_{2.5}$ NAAQS. We also proposed to find that the previously approved[8] 2013 base year emissions inventories continue to satisfy the requirements of CAA section 172(c)(3) and 40 CFR 51.1008 for purposes of both the Serious area and the CAA section 189(d) attainment plans, and to find that the forecasted inventories for the years 2017, 2018, 2019, 2020, 2023, and 2026 provide an adequate basis for the BACM, RFP, five percent, and modeled attainment demonstration analyses. Finally, we proposed to approve the motor vehicle emissions budgets for 2020 and 2023 and the trading mechanism provided for use in transportation conformity analyses.[9]

Please see our July 14, 2023 proposed rulemaking for additional background and a detailed explanation of the rationale for our proposed action.

## II. Public Comments and EPA Responses

The public comment period for the proposed rulemaking opened on July 14, 2023, the date of its publication in the *Federal Register*, and closed on August 14, 2023. During this

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[6] Letter dated June 15, 2023, from Steven S. Cliff, Executive Officer, CARB, to Martha Guzman, Regional Administrator, EPA Region IX, with enclosures titled "Title VI of the Civil Rights Act of 1964: CARB Supplemental Information for EPA in Support of 15 µg/m$^3$ Annual $PM_{2.5}$ Standard" ("CARB Title VI Supplement") and "San Joaquin Valley Air Pollution Control District Write-Up on Title VI of the Civil Rights Act of 1964: Supplemental Information for EPA in Support of 15 µg/m$^3$ Annual $PM_{2.5}$ Standard" ("District Title VI Supplement").

[7] As discussed in Section III.B of the proposal, a section 189(d) plan must address any outstanding Moderate or Serious area requirements that have not previously been approved. Because we have not previously approved a subpart 4 RACM demonstration for the San Joaquin Valley nonattainment area, we also proposed to approve the BACM/BACT demonstration in the SJV $PM_{2.5}$ Plan as meeting the subpart 4 RACM/RACT requirement for the area. (88 FR 45276, 45322).

[8] On November 26, 2021, the EPA finalized a partial approval and partial disapproval of the 2018 $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS, including approval of the 2013 base year emissions inventory in the Plan. 86 FR 67329.

[9] An adequacy finding for the 2020 and 2023 motor vehicle emissions budgets was effective on February 25, 2022. (87 FR 7834, February 10, 2022).

period, the EPA received three comment submissions from the following entities: (1) a coalition of six environmental and community organizations (collectively referred to herein as "CCEJN"),[10] (2) a coalition of eight environmental and community organizations (collectively referred to herein as "CVAQ"),[11] and (3) a private citizen commenter.[12] We respond to the comments herein.

*A. Comments from Central California Environmental Justice Network (CCEJN)*

1. Necessary Assurances Required by CAA Section 110(a)(2)(E)

*Comment 1.A:* CCEJN questioned the EPA's proposed approval of the SJV $PM_{2.5}$ Plan because of concerns about the adequacy of the necessary assurances that the State provided in the Title VI supplement. The commenter contends that to comply with CAA section 110(a)(2)(E), a state's necessary assurances must relate to a state's nonattainment plan SIP submission itself, not merely the public processes carried out while preparing the plan or state laws and policies outside of the plan. The commenter claims that the Title VI Supplement fails to do this because it "has nothing to do with" the specific contents of the SJV $PM_{2.5}$ Plan. As an example, the commenter points to the State's lack of a Title VI analysis supporting its decision to not regulate ammonia as part of its $PM_{2.5}$ reduction strategy and contends that this example indicates that the State has failed to provide adequate necessary assurances. Additionally, CCEJN asserts that the EPA's analysis of the Plan must consider how the Plan itself complies with Title VI and that the EPA did not do so in its proposal.

[10] Comment letter dated and received August 11, 2023, including 36 attachments, addressed to Ashley Graham, EPA Region IX. The six environmental and community organizations, in order of appearance in the letter, are the Central California Environmental Justice Network, the Central Valley Air Quality Coalition, Earthjustice, the Leadership Counsel for Justice and Accountability, the National Parks Conservation Association, and Sierra Club – Kern-Kaweah Chapter.

[11] Comment letter dated and received August 14, 2023, addressed to Martha Guzman, Regional Administrator, EPA Region IX. The eight environmental and community organizations, in order of appearance in the letter, are the Central Valley Air Quality Coalition, Earthjustice, Sierra Club – Kern-Kaweah Chapter, the National Parks Conservation Association, the Central California Environmental Justice Network, Little Manila Rising, and Valley Improvement Projects.

[12] Comment letter dated and received August 14, 2023, from Richard Grow, to Docket ID No. EPA-R09-OAR-2023-0263.

*Response 1.A:* The EPA agrees with the commenter that CAA section 110(a)(2)(E)(i) requires that a state provide necessary assurances that implementing the SIP submission at issue would not be prohibited by Title VI. However, the EPA disagrees with the commenter that the necessary assurances provided by CARB, in conjunction with the substantive elements of the Plan itself, are insufficient to show that implementation of the Plan is not prohibited by Title VI, consistent with CAA section 110(a)(2)(E)(i). The EPA explained its rationale regarding its evaluation of the necessary assurances and CAA section 110(a)(2)(E)(i) in detail in our proposal.[13]

As a point of clarification, the commenter includes references to "compliance with Title VI" as the relevant inquiry for purposes of necessary assurances under CAA section 110(a)(2)(E)(i). The EPA does not agree with this characterization of its responsibilities under the CAA.[14] In the proposal action, the EPA clearly noted that "[t]he EPA's proposed SIP approval does not constitute a formal finding of compliance with Title VI or 40 CFR part 7."[15] The EPA further noted that "[a]pproval of this SIP submission for purposes of CAA 110(a)(2)(E)(i) does not affect the EPA's discretion to enforce Title VI and/or the EPA's civil rights regulations."[16] Without making a formal finding of compliance with Title VI, the EPA believes the analysis in the EPA's proposed approval and in this final rulemaking is consistent with CAA section 110(a)(2)(E)(i).[17]

With respect to the substance of the State's submission, the EPA disagrees with the commenter that the public processes surrounding the development and implementation of an

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[13] 88 FR 45276, 45319–45321.

[14] See *El Comité para el Bienestar de Earlimart et al. v. EPA*, 786 F.3d 688 (9th Cir. 2015) ("El Comité effectively contends the EPA should have evaluated California's assurances the same way the EPA would have to deal with a pending Title VI complaint setting forth allegations of a current violation. El Comité's argument fails because it misconstrues the EPA's burden regarding the 'necessary assurances' requirement. The EPA has a duty to provide a reasoned judgment as to whether the state has provided 'necessary assurances,' but what assurances are 'necessary' is left to the EPA's discretion.").

[15] 88 FR 45276, 45321.

[16] Id.

[17] See *El Comité para el Bienestar de Earlimart et al. v. EPA*, 786 F.3d 688 (9th Cir. 2015) ("Section 110(a)(2)(E) . . . does not require a state to 'demonstrate' it is not prohibited by Federal or State law from implementing its proposed SIP revision. Rather, this section requires a state to provide 'necessary assurances' of this.")

attainment plan have no bearing on necessary assurances under CAA section 110(a)(2)(E)(i). As stated in the proposal, "[w]hat is appropriate for purposes of necessary assurances can vary depending upon the nature of the issues in a particular situation. Thus, the EPA evaluates a state's compliance with CAA 110(a)(2)(E)(i) on a case-by-case basis."[18] Further, the EPA has discretion to determine what assurances are necessary and may require more or different information as needed in other SIP actions.[19] For example, in other contexts, the EPA has identified public participation as an established approach for recipients of EPA assistance to provide meaningful access to programs and activities.[20] Therefore, the EPA does not agree with the contention that methods of providing for public participation are not relevant to the analysis of necessary assurances under CAA section 110(a)(2)(E)(i).

In the Title VI Supplement, the State described the early and enhanced public engagement processes that CARB and the District undertook during the development and approval of the 2016 State SIP Strategy, Valley State SIP Strategy, 2018 $PM_{2.5}$ Plan, and 15 $\mu g/m^3$ SIP Revision, all of which formed the basis for the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS. It also described steps the State and District took to solicit and respond to public input following the local adoption of the Plan and to implement the control measures and strategy outlined in the Plan. These approaches are beyond minimum public notice and comment requirements and provide relevant information and important context of the necessary assurances under CAA section 110(a)(2)(E)(i) that the Plan was adopted and will be implemented into the future in a manner that is not prohibited by Title VI.

Similarly, the descriptions of State measures like Assembly Bill 617 ("AB 617") and the development of community air monitoring networks provide relevant context for the regulatory landscape in which the State will implement the Plan, as well as the intent of the regulators. The

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[18] 88 FR 45276, 45320.
[19] See id.
[20] See, e.g., *https://www.epa.gov/external-civil-rights/external-civil-rights-guidance*. Although information on this website is not specific to CAA section 110(a)(2)(E)(i) necessary assurances, it provides information regarding public participation and information provided to recipients of EPA assistance.

EPA believes the State initiatives to prevent or diminish potential health-related impacts to communities most impacted by air pollution also, in part, provide assurances that the implementation of the Plan is not prohibited by Title VI in a manner consistent with CAA section 110(a)(2)(E)(i). The State's Civil Rights Policy, too, provides additional support for the conclusion that implementation of the Plan would not be prohibited by Title VI. For example, the policy would allow for members of the public to notify and file a formal complaint with the State that an alleged violation of Title VI is occurring "during the administration of [the State's] programs."[21] Taken together, these various State processes and initiatives support the conclusion that the State provided necessary assurances that implementation of the plan would not be prohibited by Title VI.

The commenter points to one primary substantive deficiency in the Plan that they believe indicates the State has not demonstrated compliance with CAA section 110(a)(2)(E)(i): The commenter claims that ammonia is a major precursor of $PM_{2.5}$ and that the policy decision "to decline to regulate ammonia implicates disparate treatment and/or disparate impact, yet CARB provides no necessary assurances that this policy decision does not violate Title VI." The EPA's proposed and final actions, based upon the State's SIP submissions, reflect the EPA's agreement that ammonia is not a significant precursor of $PM_{2.5}$ for the purposes of the 1997 annual $PM_{2.5}$ NAAQS in the San Joaquin Valley. As described in more detail in Section II.A.3 of this document, this final determination comes following the EPA's review of the State's submittal and request for additional information to support the State's decision not to regulate ammonia for this NAAQS, as well as the EPA's review of the exhibits and attachments from the commenter. Included in the State's submittal and March 2023 Ammonia Supplement are estimates of the level of emissions reductions possible with a suite of potential ammonia control measures, justifications for why many of these measures are not feasible or are already being implemented in the area, and ultimately, why the State has chosen to focus on reducing direct $PM_{2.5}$ and $NO_X$

[21] Title VI Supplement, p. 8.

to reduce $PM_{2.5}$ concentrations in the San Joaquin Valley air basin. The EPA believes the technical information provided by the State to support its decision not to regulate ammonia for purposes of the 1997 annual $PM_{2.5}$ NAAQS provides adequate necessary assurances that the implementation of this Plan will not be prohibited by Title VI.

The EPA recognizes that the San Joaquin Valley area has previously struggled to attain the 1997 annual $PM_{2.5}$ NAAQS and that the Demographic Index analysis the EPA completed as a part of the proposed approval indicates the area includes communities of color and low-income populations above the national average. However, as explained in this response and in our proposal, the EPA believes the information in the record contains adequate necessary assurances consistent with CAA section 110(a)(2)(E)(i). This analysis is based in part on technical analyses such as that the modeling in the State's and District's Plan shows attainment for these NAAQS by the applicable attainment date and that the control strategy for $PM_{2.5}$ takes into consideration the unique atmospheric conditions in the San Joaquin Valley air basin in which the $PM_{2.5}$ response to reductions in ammonia emissions would be relatively small. Thus, based on the existing technical record before the EPA, we find that the State has adequately provided necessary assurances that the implementation of the Plan is consistent with CAA section 110(a)(2)(E)(i).

*Comment 1.B:* Next, CCEJN contends that the policies cited by CARB in its Title VI supplement to support its necessary assurances, e.g., AB 617, community air monitoring networks, and CARB's Civil Rights Policy, are not enforceable parts of the submitted Plan (pursuant to CAA section 110(a)(2)(A)), cannot lead to credited emissions reductions for SIP purposes, and thus cannot be relied upon as necessary assurances.

*Response 1.B:* The EPA disagrees that necessary assurances must themselves be enforceable parts of a plan. While in some instances a state may submit additional enforceable measures as a component of necessary assurances, the EPA believes that this is not a requirement. The commenter cites the CAA section 110(a)(2)(A) requirement that plans include

enforceable emissions limitations and other control measures as a basis for the assertion that necessary assurances must be enforceable and part of the plan. The EPA agrees that nonattainment plans must contain enforceable emissions limitations and other control measures – but this does not mean that CAA section 110(a)(2)(E)(i) necessary assurances must themselves be emissions limitations or control measures. The EPA interprets section 110(a)(2)(E)(i) as allowing an "assurance" to include an analysis of the plan. In this context, a state providing adequate information to the EPA to provide necessary assurances that the state is not prohibited by Title VI from carrying out the plan in the SIP submission is sufficient. In the proposal action, the EPA explained the rationale for this approach, including citing to relevant case law finding that "what assurances are 'necessary' is left to the EPA's discretion."[22] This is consistent with necessary assurances that the EPA requires when needed for other issues related to section 110(a)(2)(E)(i). For example, states also provide necessary assurances concerning the adequacy of personnel, funding, and state law authority to implement a SIP submission, and the EPA generally relies on facts, analyses, and other forms of assurances from the state for these purposes – not enforceable measures (that is, the EPA generally does not require SIP-approved rules that are incorporated by reference into the Code of Federal Regulations to provide such necessary assurances). There may be circumstances under which the EPA would expect a state to provide a state law provision for inclusion into the SIP in order to provide such necessary assurances for these other requirements, but this is not generally the case.

Where a necessary assurances analysis concludes that additional enforceable measures are needed, a state would also include such new measures in the SIP submission, but necessary assurances need not necessarily themselves constitute such measures, as the commenter suggests. In this case, the EPA has concluded that the information provided by the State concerning its

[22] 88 FR 45276, 45320. See also*, El Comité para el Bienestar de Earlimart et al. v. EPA*, 786 F.3d 688 (9th Cir. 2015).

existing policies and programs provides adequate necessary assurances that the State's implementation of the SIP submissions at issue would not be prohibited by Title VI.

2. Emissions Inventory

*Comment 2.A:* CCEJN states that the soil $NO_X$ emissions estimate of approximately 10 tons per day (tpd) used in the modeling emissions inventory was dubious when the State submitted the Plan in 2018 and that the estimate is clearly inaccurate based on more recent studies, which the commenter claims suggest soil $NO_X$ may contribute as much as 100 tpd to total $NO_X$ emissions. The commenter also asserts that studies suggest that soil $NO_X$ emissions are likely driven primarily by agriculture and therefore should be considered anthropogenic. To support these assertions, the commenter references Exhibit A to the letter ("Exhibit A"), which summarizes 10 studies from 2015–2023, from which the author concludes that 9 of the studies indicate that standard soil $NO_X$ parameterizations underestimate agricultural soil $NO_X$ emissions by a factor of 2 to 10.

CCEJN further states that "[t]he state has acknowledged that its existing inventory may be outdated, and it has begun the process of studying $NO_X$ emissions from soil in order to update the inventory for future submissions to EPA," but that its use of the existing inventory in the interim "… is unlawful because it is based exclusively on inertia, and 'the EPA cannot simply recite "scientific uncertainty" to evade its statutory duty to update regulations'" (citing *A Cmty. Voice v. EPA*, 997 F.3d 983, 994 (9th Cir. 2021)). The commenter suggests that "[i]nstead, the state must make an updated good faith estimate—if not a perfect estimate—of emissions, taking into account that the Clean Air Act is 'preventative' and 'precautionary' in nature," and asserts that such estimate would undoubtedly be higher than the estimate in the current inventory and would identify significant anthropogenic soil $NO_X$ emissions.

Based on its analysis, CCEJN concludes that the EPA must disapprove the inventory because it is neither "current" nor "accurate" and that failure to do so is arbitrary and capricious.

*Response 2.A:* The EPA acknowledges the information provided by CCEJN in its comments and in the studies described in Exhibit A suggesting that soil $NO_X$ emissions may be higher than have typically been estimated in the past. The studies cited by the commenter rely on variants of several emissions estimation approaches, including efforts to achieve better agreement between air quality models and satellite measurements, and to correlate satellite measurements over croplands with the expected soil temperature and moisture dependence of soil $NO_X$ emissions. While most of the studies cited by the commenter were published after the State developed the emissions and conducted the modeling for the 2018 $PM_{2.5}$ Plan upon which the 15 $\mu g/m^3$ SIP Revision is based, the EPA would not characterize the studies as providing "updated" emissions that would make the estimates in the 2018 $PM_{2.5}$ Plan obsolete, as suggested by the commenter. Rather, as discussed further in the remainder of this response, we find that some recent studies provide evidence that soils are an important $NO_X$ source, and several provide alternative estimates of soil $NO_X$ emissions using various approaches.

The EPA agrees that there is evidence suggesting soil $NO_X$ emissions may be higher than previously estimated but disagrees with the characterization in Exhibit A that 9 out of the 10 studies conclude that California soil $NO_X$ is underestimated by a factor of 2 or more. That was the conclusion of two of the studies, those described in Almaraz et al. (2018)[23] and Sha et al. (2021).[24] Luo et al. (2022)[25] did not opine on how their estimate compares with prior estimates, though the authors did provide an estimate that the author of Exhibit A notes implies that prior estimates are largely underestimated. The other studies provide evidence consistent with soil $NO_X$ as an important source or suggest a stronger temperature dependence for soil $NO_X$ emissions compared to previous approaches.

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[23] Almaraz et al. (2018), Agriculture is a major source of $NO_X$ pollution in California, *Science Advances*, 4(1), 2018, doi:10.1126/sciadv.aao3477.
[24] Sha et al. (2021), Impacts of soil $NO_X$ emission on $O_3$ air quality in rural California, *Environmental Science & Technology*, 55(10), 7113–7122, doi:10.1021/acs.est.0c06834.
[25] Luo et al. (2022), Integrated Modeling of U.S. Agricultural Soil Emissions of Reactive Nitrogen and Associated Impacts on Air Pollution, Health, and Climate, *Environmental Science & Technology*, 56 (13), 9265–9276. doi:10.1021/acs.est.1c08660.

While there is evidence suggesting soil $NO_X$ emissions may be higher than previously estimated, there are conflicting conclusions in the literature. Because the inventories in the SJV $PM_{2.5}$ Plan reflect the State's best estimate based on the information available at the time the Plan was developed, the EPA does not believe a change in the soil $NO_X$ emissions estimation approach relied on in the SJV $PM_{2.5}$ Plan is warranted at this time. There is a need to reconcile the disagreement among studies by examining the differing assumptions, techniques, data sources, locations, and time periods covered. Such further examination may also help resolve the substantial uncertainty and variability of the proportion of soil $NO_X$ emissions that can be attributed to anthropogenic sources such as agricultural fertilizer application.

The EPA further disagrees with CCEJN's assertion that the State relies on the soil $NO_X$ emissions estimates in its existing inventory due to "inertia." As noted by the commenter, the State has effectively acknowledged that its methodology for estimating soil $NO_X$ emissions may need to be updated when it shared its plans to convene a subject matter expert review panel to assess the state of the science on soil $NO_X$ emissions and make recommendations for future estimates.[26] These efforts indicate that the State is taking the issue seriously and attempting to address it, as acknowledged by the commenter. However, in exploring possible improvements to its soil $NO_X$ estimation approach, the State is not disavowing the approach used in the SJV $PM_{2.5}$ Plan, nor is there a widely accepted soil $NO_X$ emissions inventory approach that the State is willfully refusing to use. Depending on the outcomes of the review panel's work, the State may find that its current approach provides the best estimate and retain such approach, or the State may determine that an alternative approach would provide a more accurate estimate and use such approach moving forward.

[26] SJVUAPCD, 2023 $PM_{2.5}$ Plan for Attainment of the Federal 2012 Annual $PM_{2.5}$ Standard, Public Workshop, slide 16, *http://www.valleyair.org/Workshops/postings/2023/05-11-23_PM25/presentation.pdf*. (A recording of the workshop is also cited in the comment letter in fn. 39).

For the SJV $PM_{2.5}$ Plan, the State used the DeNitrification-DeComposition model (DNDC) to estimate the 10 tpd of soil $NO_X$ emissions used in the modeling.[27] The approach is supported by research conducted in the same time frame as studies cited by the commenter and therefore the EPA does not consider the State's approach to be outdated. The emissions inventory in the Plan was among the work that led to the paper by Guo et al. (2020),[28] which was cited in Exhibit A as among the recent research on soil $NO_X$. Guo et al. (2020) did not find that soil $NO_X$ emissions are significantly underestimated in the State's emissions inventory. Rather, the study examined evidence from satellite retrievals and ground-based measurements that indicate that the State's approach provides an accurate emissions inventory for the San Joaquin Valley. The EPA believes that the DNDC-based soil $NO_X$ emissions used in the modeling are a good faith estimate consistent with the State's current view of the state of the science, and that the State's estimate is acceptable for use in the modeling emissions inventory in the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS.

The EPA acknowledges that there is evidence that soil $NO_X$ emissions have historically been underestimated, including evidence from some studies finding that satellite observations of column $NO_2$ (total amount of $NO_2$ in a vertical column of the atmosphere) indicate that soil $NO_X$ emissions are higher than predictions by photochemical models using emissions estimates from older soil $NO_X$ parameterizations. The commenter describes some of such evidence in Exhibit A. However, the case for soil $NO_X$ emissions being significantly underestimated in the San Joaquin Valley is not as settled as CCEJN's comment implies. The studies cited by the commenter differ in the questions they attempt to address, their assumptions and analytical approaches, their data

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[27] Email dated May 26, 2020, from Jeremy Avise, CARB, to Scott Bohning, EPA Region IX, Subject: "Soil $NO_X$ in ARB's modeling", with attached poster "Preliminary Assessment of Soil $NO_X$ Emissions from Agricultural Cropland in the San Joaquin Valley"; "Estimating Nitrogen Emissions from California's Agricultural Lands", March 5, 2019, presentation by Mike Fitzgibbon, CARB, at 2019 California Climate & Agriculture Summit, *https://calclimateag.org/2019summit/*.

[28] Guo et al. (2020), Assessment of Nitrogen Oxide Emissions and San Joaquin Valley $PM_{2.5}$ Impacts From Soils in California, Journal of Geophysical Research: Atmospheres, 125(24), doi:10.1029/2020JD033304. Note that a web document with a DOI or Digital Object Identifier, such as 10.1029/2020JD033304, may be found via prefixing doi.org/ to the doi, as in: *https://doi.org/10.1029/2020JD033304*.

analysis techniques and metrics, and in the differing environmental conditions in the locations and time periods they cover.

In the remainder of this response, we identify statements from the ten research papers listed in Exhibit A to show that their support for a substantially greater soil $NO_X$ emissions for the San Joaquin Valley is not definitive, and that there is not an agreed upon method to estimate a missing increment of emissions if one is in fact needed. Note that these points are not meant to discredit the work of the respective authors but rather to illustrate that there are varying factors that require greater investigation to determine the magnitude of soil $NO_X$ emissions in the San Joaquin Valley. Given these complicating factors and uncertainties, the EPA requests that CARB and the District continue their work to examine their current methodology for estimating soil $NO_X$ emissions, and as appropriate, revise their methodology based on the findings of the expert review panel and the latest available research.

Oikawa et al. (2015)[29] measured $NO_X$ emissions from sorghum plots after applying fertilizer, and explored the effect of higher soil $NO_X$ emissions on the performance of an air quality model by comparing the model results with satellite $NO_2$ column observations and surface measurements. The study authors concluded that soil $NO_X$ emissions would need to be 10 or more times higher to match observations. However, surface measurements were not consistently underestimated in the model, and increasing emissions in the model to match the satellite retrievals led to overestimates in emissions at the surface derived from measurements of soil $NO_X$ emissions fluxes. The paper also noted that global estimates of soil $NO_X$ emissions from other studies vary by a factor of three (ranging from 9 to 27 Tg per year), indicating a high level of uncertainty. The study conclusions suggest that soil $NO_X$ emissions are largely underestimated but the magnitude of the underestimate is not quantified.

[29] Oikawa et al. (2015), Unusually high soil nitrogen oxide emissions influence air quality in a high-temperature agricultural region. *Nat. Commun.*, 6:8753, doi:10.1038/ncomms9753.

Parrish et al. (2017)[30] focuses on understanding trends in ozone design values, noting a difference in the San Joaquin Valley trend in comparison with other California air basins. The authors note that the difference may partially be accounted for by the higher agricultural activity in the Valley, for which controls have not been implemented as extensively as for other anthropogenic sources. While this explanation could also hold for agricultural soil $NO_X$, that particular issue is not explored.

Exhibit A cites Kleeman et al. (2019)[31] as providing evidence of a missing source of $NO_X$ emissions that could help correct a "consistent underprediction" in nitrate concentrations. The EPA believes this underprediction was overstated. For the January average of the three model years reported, there was a modest underprediction of nitrate in the model base cases without soil $NO_X$ compared to a somewhat larger overprediction when soil $NO_X$ emissions were added; whereas for the 2010 model year, nitrate was overpredicted in the base case and the overprediction was worsened in the soil $NO_X$ case.[32] In the conclusion, the authors state that "further research is required to more accurately estimate winter emissions rates of soil $NO_X$ and to account for year-to-year variations driven by changes in meteorological conditions, fertilizer application rates, and irrigation practices," and that the tests conducted "do not definitely prove that the missing emissions source is indeed fertilized agricultural soils. Future measurements should be made in the rural portions of the SJV to further test the hypothesis that soil $NO_X$ emissions are a significant factor in the air quality cycles within the region."[33] The EPA interprets such conclusions as an acknowledgement that additional research is needed, with a focus on wintertime conditions when San Joaquin Valley $PM_{2.5}$ concentrations are highest.

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[30] Parrish et al. (2017), Ozone Design Values in Southern California's Air Basins: Temporal Evolution and U.S. Background Contribution. *J. Geophys. Res. Atmos.*, 122, 11166–11182, doi:10.1002/2016JD026329.
[31] Kleeman, M., A. Kumar, and A. Dhiman, "Investigative Modeling of $PM_{2.5}$ Episodes in the San Joaquin Valley Air Basin during Recent Years" (CARB Contract No. 15-301, 2019), available at *https://ww2.arb.ca.gov/sites/default/files/classic/research/apr/past/15-301.pdf*.
[32] Id. at 60 and 63.
[33] Id. at 77.

The author of Exhibit A summarizes a result from Chen et al. (2020),[34] noting acceptable $PM_{2.5}$ model performance despite overly low atmospheric mixing heights. But the author goes on to suggest that overly low mixing heights should have led to $PM_{2.5}$ overpredictions; the good performance therefore may imply that the $PM_{2.5}$ precursor emissions were too low. The study also found that rural site column $NO_2$ was underpredicted by 25 percent relative to $NO_2$ columns derived from surface-based measurements, suggesting that soil $NO_X$ emissions are underestimated. Thus, the study authors acknowledge that soil $NO_X$ emissions may need to be further examined. However, they also note good agreement between modeled column $NO_2$ and the $NO_2$ columns derived from surface-based measurements at the urban sites of Fresno and Bakersfield, where $NO_2$ is double that of the rural sites, and state that "it is unlikely that $NO_X$ emissions from croplands are comparable to mobile sources" (the main source of $NO_X$ emissions). That is, the $NO_X$ emissions increase that would be needed to increase the model predictions by 25 percent for the low-$NO_2$ rural sites is unlikely to be comparable to the $NO_X$ emissions driving the high $NO_2$ urban sites. This finding supports further exploration of soil $NO_X$ emissions, and a possible underestimate, but does not imply a large underestimate in soil $NO_X$ emissions.

Wang et al. (2021)[35] explored the relatively modest downward trend in satellite column $NO_2$ measurements after 2009, as compared to the steady decrease in anthropogenic $NO_X$ emissions, and the role of soil $NO_X$ emissions in this apparent discrepancy. They found better model agreement with satellite column $NO_2$ when they increased the temperature responsiveness of their soil $NO_X$ emissions estimates, especially at high temperatures. This change also improved the correlation between modeled column $NO_2$ and satellite column $NO_2$ in the central United States. This correlation is an important finding, implying soil $NO_X$ emissions may be

[34] Chen et al. (2020), Modeling air quality in the San Joaquin valley of California during the 2013 Discover-AQ field campaign, *Atmospheric Environment: X*, Volume 5, January 2020, 100067, doi:10.1016/j.aeaoa.2020.100067.
[35] Wang et al (2021), Improved modelling of soil NOx emissions in a high temperature agricultural region: role of background emissions on $NO_2$ trend over the US, *Environ. Res. Lett.*, 16, doi:10.1088/1748-9326/ac16a3.

underestimated. However, it should be noted that in absolute terms, even without soil $NO_X$, the model simulation overpredicted the $NO_2$ concentration relative to the satellite retrieval. The authors acknowledge that there are many reasons why the predictions might not match the observations. The authors cite an uncertainty of 35 percent in the satellite $NO_2$ columns, and the uncertainty in the satellite retrieval encompasses all of the results, from the zero soil $NO_X$ scenario to the increased soil $NO_X$ scenario.[36] The EPA views this as a large enough uncertainty to limit confidence in at least some of the study conclusions.

Wang et al. (2021) states that the downward trend in the satellite column $NO_2$ is smaller than the downward trend in anthropogenic $NO_X$ emissions, and that the discrepancy is greater for the central U.S. than for the eastern or western U.S. Since the San Joaquin Valley is in the west, the EPA interprets this result as indicating that there is less of a potential need for increases in soil $NO_X$ emissions estimates in the San Joaquin Valley relative to the central U.S. to resolve the discrepancy. The authors also cited another study in which the apparent discrepancy between the trends in modeled versus surface-level ambient measurements (as opposed to the satellite retrieval) was found to be within the bounds of the uncertainty of the ambient measurements. The study provides a strong impetus for exploring soil $NO_X$ emissions and their potential increased rate at higher temperatures but does not provide evidence that soil $NO_X$ emissions are significantly underestimated in the San Joaquin Valley.

To evaluate the human health and climate benefits of reducing reactive nitrogen emissions, Luo et al. (2022)[37] used the Fertilizer Emission Scenario Tool for CMAQ (FEST-C) to generate soil $NO_X$ emissions estimates for every U.S. county, including those counties in the San Joaquin Valley. Exhibit A notes that the FEST-C-derived San Joaquin Valley county total emissions of soil $NO_X$ is 100 tpd compared to CARB's emissions inventory for all anthropogenic

[36] Id. at Figure 3.
[37] Luo et al. (2022), Integrated Modeling of U.S. Agricultural Soil Emissions of Reactive Nitrogen and Associated Impacts on Air Pollution, Health, and Climate, *Environmental Science & Technology*, 2022, 56 (13), 9265–9276. doi:10.1021/acs.est.1c08660.

$NO_X$ which amounts to roughly 200 tpd. The study used a different emissions model than the model used by CARB, underscoring the need to explore why emissions models yield such different results. The study did not validate the model-derived $NO_2$ predictions using satellite retrievals or ground-based measurements, so it does not provide direct evidence that soil $NO_X$ emissions are underestimated for the San Joaquin Valley.

Wang et al. (2023)[38] explored trends in satellite column $NO_2$ and ground level measurements, and the role of lightning and soil $NO_X$ in explaining spatial and temporal distributions of $NO_2$. Among other results, they found that temperature and soil moisture, which are important drivers of soil $NO_X$ emissions, were highly correlated with satellite column $NO_2$ in rural areas of California, including crop lands. This suggests soil $NO_X$ is an important source of $NO_X$ near crop lands. The study examined trends in $NO_X$ over time rather than attempting to quantify soil $NO_X$ emissions and therefore does not provide direct evidence that soil $NO_X$ emissions are underestimated for the San Joaquin Valley.

Finally, three studies cited in Exhibit A, Almaraz et al. (2018), Guo et al. (2020), and Sha et al. (2021), provided estimates of soil $NO_X$ emissions in California. Almaraz et al. (2018)[39] estimated soil $NO_X$ emissions using a top-down approach based on aircraft measurements as well as the Integrated Model for the Assessment of the Global Environment (IMAGE) soil model. Guo et al. (2020)[40] compared satellite measurements of $NO_2$ with CMAQ air quality model predictions using soil $NO_X$ emissions from the DNDC soil model. Sha et al. (2021)[41] conducted a similar measurement-model comparison but using the Weather Research and Forecasting model coupled with Chemistry (WRF-Chem) air quality model and the Berkeley Dalhousie Iowa Soil NO Parameterization (BDISNP) soil model. The IMAGE and BDISNP models are empirical or

[38] Wang et al (2023), Satellite $NO_2$ trends reveal pervasive impacts of wildfire and soil emissions across California landscapes, *Environ. Res. Lett.*, 18, doi:10.1088/1748-9326/acec5f.
[39] Almaraz et al. (2018), Agriculture is a major source of $NO_X$ pollution in California, *Science Advances*, 4(1), 2018, doi:10.1126/sciadv.aao3477.
[40] Guo et al. (2020), op. cit.
[41] Sha et al. (2021), Impacts of soil $NO_X$ emission on $O_3$ air quality in rural California, *Environmental Science & Technology*, 55(10), 7113–7122, doi:10.1021/acs.est.0c06834.

parametric models. They rely on emissions factors that are derived from empirical measurements and that may vary by land use, precipitation, and temperature, but do not incorporate algorithms that reflect the underlying physical principles. The DNDC model used in Guo at al. (2020) and in the State's emissions inventory is a biogeochemical or mechanistic model. It also uses measurements for validation but includes detailed consideration of the individual physical and biological processes in soils that lead to $NO_X$ emissions and their dependence on factors like the soil's various nitrogen- and carbon-containing species, moisture, and temperature.

Comparisons between the results described in Almaraz et al. (2018), Guo et al. (2020), and Sha et al. (2021) show large disagreements.[42] Almaraz et al. (2018) estimated that soil $NO_X$ emissions from fertilized croplands account for 32 percent of California $NO_X$ emissions, Sha et al. (2021) estimated soil $NO_X$ emissions comprise 40.1 percent of California's total $NO_X$ emissions, while Guo et al. (2020) estimate that soil $NO_X$ emissions are only 1.1 percent of California anthropogenic $NO_X$ emissions. (As noted earlier in this response, the DNDC model emissions estimation work performed for the Guo et al. (2020) study was also the basis for the State's soil $NO_X$ emissions estimate.) The fraction of nitrogen applied as fertilizer released as $NO_X$ to the atmosphere was estimated by Almaraz et al. (2018) to be 15 percent, while 7 other studies reviewed by Guo et al. (2020) estimate it to be 2 percent or less. Furthermore, there is an additional possible discrepancy between the work described in Wang et al. (2021)[43] and Wang et al. (2023)[44], and the results in Guo et al. (2020). The former two found correlations between satellite-derived column $NO_2$ over agricultural areas and modeled soil emissions, suggesting soil $NO_X$ as a driver of $NO_2$ there. However, using correlations and ratios of $NO_X$ to CO among monitoring sites, and satellite column $NO_2$ retrievals, Guo et al. (2020) found little difference between the diurnal and seasonal temporal variation at rural sites compared to urban sites,

[42] The EPA also compared these studies in approving California's 2020 emissions inventory submittal. 87 FR 59015, 59017–59019 (February 9, 2022).
[43] Wang et al. (2021), op. cit.
[44] Wang et al. (2023), op. cit.

consistent with a larger contribution of emissions from urban sources rather than rural soils. Higher soil $NO_X$ emissions would increase summer emissions more in rural areas than in urban areas.

Despite widely differing estimates of the relative portion of California's $NO_X$ emissions inventories attributable to soil $NO_X$ in Almaraz et al. (2018), Sha et al. (2021), and Guo et al. (2020), each study reported high agreement between its modeled and its observed soil $NO_X$ emissions. Reconciling the differences in input data used in the models, such as fertilizer and irrigation amounts and timing; other inputs to the air quality models; and data analysis techniques would be necessary for a process-based understanding of the differences in the contribution and magnitude of soil $NO_X$ emissions estimates between models. There is also a need for additional measurements of soil $NO_X$ emissions fluxes for various locations and conditions to help develop and validate soil models.

The various authors acknowledge considerable uncertainty in their work. While Almaraz et al. (2018) suggest that soil $NO_X$ emissions may be significantly underestimated using current techniques, the study acknowledges the limited number of surface measurements that were available for purposes of validating the model results and that, where observations exist, there is a large range in observed values due to varying soil conditions (e.g., relating to temperature, moisture, and fertilizer application). The "top-down" $NO_X$ emissions estimates derived from aircraft measurements relied upon in the study also reflect a significant degree of uncertainty, reported at 190 tpd plus or minus 130 tpd, i.e., plus or minus 68 percent. The authors acknowledge the limited number of surface measurements that were available for purposes of comparing with the model results, the difficulty in comparing the model results with the observations, and the need for more field measurements. Guo et al. (2020) stated that obtaining an emissions factor correlating $NO_X$ emissions to fertilizer application from the presently available data in various studies (including Almaraz et al. (2018)) would be "difficult or

impossible" due to the sparseness of data collected in terms of sampling length, sampling frequency, and the episodic nature of nitrogen gases from soil.

Most of the discussion herein concerns the varying estimates of overall total soil $NO_X$ emissions. However, how those emissions are distributed in time and space are also of great importance for understanding the effect of $NO_X$ emissions on ambient $PM_{2.5}$ concentrations. $PM_{2.5}$ concentrations in the San Joaquin Valley are highest in the cool, moist winter, whereas soil $NO_X$ emissions are highest in the warm, dry summer. For modeling $PM_{2.5}$ concentrations, it is especially important that the soil $NO_X$ approach that is used performs well under wintertime conditions. Also important is how the approach reflects soil composition, soil management practices, and fertilizer application, each of which vary in time and space. Adopting a different soil $NO_X$ emissions estimation approach is not a matter of simply replacing one estimate of total soil $NO_X$ with another. Rather, it requires ensuring that the approach accurately reflects the spatial and temporal variation of the many factors affecting emissions and of the emissions themselves.

In light of the uncertainties and disagreements among studies, the EPA does not believe that the available research provides sufficient certainty about the magnitude and proportion of soil $NO_X$ emissions to warrant a revision to the State's inventory for purposes of the SJV $PM_{2.5}$ Plan.[45] The EPA is not convinced that any revised estimate developed by the State at this time would be verifiably more accurate than the inventory in the Plan. A revision to the State's inventory approach may be warranted in the future pending the State's ongoing work in this area and the most up-to-date understanding of soil $NO_X$ emissions, as discussed earlier in this response. The EPA encourages the State to continue its ongoing work to convene a subject matter expert review panel to assess the state of the science on soil $NO_X$ emissions, to keep abreast of the latest research, and to update its estimation methodologies, as appropriate.

[45] The EPA reached a similar conclusion in approving California's 2020 emissions inventory submittal. 87 FR 59015, 59017–59019 (February 9, 2022).

However, for purposes of the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS that is the subject of this action, we find that the State relied on a reasonable methodology that is supported by the research literature. Thus, we conclude that the State provided an accurate, up-to-date emissions inventory for $NO_X$.

*Comment 2.B:* Regarding the motor vehicle emissions modeling, CCEJN points to a previous statement from the EPA, saying that "it could approve an outdated inventory so long as the inventory was built using the 'latest EPA-approved' emission model 'at the time [the State] developed the submission.'" The commenter asserts that the EPA now "proposes to abandon both the statutory text and the already-lax requirement to use the most recent EPA-approved model," by allowing the State to rely on a model that is a decade old when two more recent models are available, one of which (EMFAC2017) shows higher attainment-year emissions of both $NO_X$ and $PM_{2.5}$. CCEJN contends that the State and the EPA speculate that the higher values would not affect the attainment demonstration. However, CCEJN asserts that the effect on the attainment demonstration is unknown and that it is also unknown what the effects would be on the precursor demonstration, which the commenter claims relies on low estimates of $NO_X$ in 2023 to conclude that the State need not regulate ammonia.

Finally, the commenter states that the "EPA's decision to abandon its recently adopted standard that inventories should be built using the 'latest EPA-approved' emission model is arbitrary and capricious," asserting that the EPA is "simply resistant to the idea that a current inventory must be used" and has lost litigation over this issue (citing *Sierra Club v. EPA*, 671 F.3d 955 (9th Cir. 2012)), and claiming that "…the agency is therefore bending over backwards to adopt whatever standard will allow the state to continue to use the outdated inventory."

*Response 2.B:* The EPA disagrees with CCEJN's claims that we are resistant to require, or have changed our position, that inventories must be developed using the latest EPA-approved emissions model available at the time the State developed the SIP submission and that our proposed action to reaffirm the base year inventory is arbitrary and capricious. As discussed in

our proposal, the SJV $PM_{2.5}$ Plan relies on much of the same technical information and analyses from the 2018 $PM_{2.5}$ Plan, including the emissions inventories.[46] The EPA previously found, for purposes of the 1997 annual $PM_{2.5}$ NAAQS as well as other $PM_{2.5}$ standards, that these inventories were based on the most current and accurate information available to the State and District at the time they were developing the 2018 $PM_{2.5}$ Plan and inventories, including the latest version of California's mobile source emissions model that had been approved by the EPA at the time, EMFAC2014.[47] Thus, as part of our prior action on the 2018 $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS, we approved the emissions inventories as meeting the Serious area and CAA section 189(d) requirements for the 1997 annual $PM_{2.5}$ NAAQS.[48]

In the EPA's final action approving the base year inventories in the 2018 $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS, the EPA addressed concerns raised by a commenter about the use of EMFAC2014.[49] The EPA discussed the timeline for the State's submittal of the emissions inventories in the 2018 $PM_{2.5}$ Plan relative to the EPA's approval of EMFAC2014 and EMFAC2017, explaining that EMFAC2014 was the most current mobile source model available for emissions inventory development purposes at the time the State was developing the plan. Nevertheless, at that time, we considered comparisons between EMFAC2014 and EMFAC2017 in the 2013 base year as provided by CARB in its "Staff Report, Proposed SIP Revision for the 15 $\mu g/m^3$ Annual $PM_{2.5}$ Standard for the San Joaquin Valley" ("CARB Staff Report").[50] Based on our review of the State's analysis, we concluded that the 2013 base year emissions inventories in the 2018 $PM_{2.5}$ Plan were comprehensive, accurate, and current, consistent with the requirements of CAA section 172(c)(3) and 40 CFR 51.1008.

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[46] 88 FR 45276, 45279.
[47] The EPA previously approved the emissions inventories in the 2018 $PM_{2.5}$ Plan as they pertain to the Serious area and 189(d) requirements for the 1997 annual $PM_{2.5}$ NAAQS (86 FR 67329, November 26, 2021), the Serious area and 189(d) requirements for the 1997 24-hour $PM_{2.5}$ NAAQS (87 FR 4503, January 28, 2022), the Serious area requirements for the 2006 24-hour $PM_{2.5}$ NAAQS (85 FR 44192, July 22, 2020), and the Moderate area planning requirements for the 2012 annual $PM_{2.5}$ NAAQS (86 FR 67343, November 26, 2021).
[48] 86 FR 67329.
[49] Id. at 67332–67334.
[50] CARB, "Staff Report, Proposed SIP Revision for the 15 $\mu g/m^3$ Annual $PM_{2.5}$ Standard for the San Joaquin Valley," release date August 13, 2021.

Given that the 15 μg/m$^3$ SIP Revision was submitted to the EPA by the State as an "administrative revision" to the 2018 $PM_{2.5}$ Plan and relies on much of the same technical information that was developed for the 2018 $PM_{2.5}$ Plan, the State continued to rely on the previously approved emissions inventories from the 2018 $PM_{2.5}$ Plan. However, to address the most up-to-date information available, in addition to the EMFAC2017 model results noted earlier in this response, the State provided to the EPA comparisons between the estimated annual $NO_X$ and $PM_{2.5}$ emissions developed for the 2018 $PM_{2.5}$ Plan using EMFAC2014 with those developed using the most recent EPA-approved version of EMFAC, EMFAC2021.[51] CARB's analysis included comparisons between all three EMFAC models for both the 2020 RFP year and the 2023 attainment year.[52] As the commenter correctly notes, model results from EMFAC2017 indicate higher $NO_X$ and $PM_{2.5}$ emissions in the 2023 attainment year than those derived for the same year using EMFAC2014. However, EMFAC2021, which was the most recent EPA-approved model at the time of the EPA's proposal,[53] indicates that $NO_X$ and $PM_{2.5}$ emissions in the 2023 attainment year are lower than those derived for the same year using EMFAC2014.

As discussed in the EPA's technical support document (TSD) for our proposal,[54] the differences in emissions estimates for mobile sources between the three EMFAC model versions correspond to differences of approximately two percent or less of the regional emissions inventories for $PM_{2.5}$ and $NO_X$ for the 2023 attainment year.[55] Using the sensitivity of the $PM_{2.5}$ design value per tpd of emissions modeled by the State, the EPA assessed the effects of the various EMFAC model version results on the attainment demonstration in the Plan.[56] Based on our technical analysis, we determined that although the $NO_X$ and $PM_{2.5}$ emissions estimates in the 2023 attainment year are higher in EMFAC2017 than in EMFAC2014, the effect on the

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[51] 88 FR 45276, 45284–45285.
[52] Id.
[53] The EPA approved the use of EMFAC2021 for use in SIP development on November 15, 2022 (87 FR 68483).
[54] EPA, "Technical Support Document, San Joaquin Valley $PM_{2.5}$ Plan Revision for the 1997 Annual $PM_{2.5}$ NAAQS," April 2023.
[55] Id. at 53.
[56] Spreadsheet "EMFAC update effect on annual 1997 $PM_{2.5}$ NAAQS attainment demonstration.xlsx," EPA Region IX, May 1, 2023.

$PM_{2.5}$ concentrations of 0.07 µg/m$^3$ is sufficiently small that the attainment demonstration remains valid.[57] Furthermore, more up-to-date emissions data from EMFAC2021 show lower emissions of $NO_X$ and $PM_{2.5}$ in the attainment year, indicating that the attainment modeling results in the Plan derived using EMFAC2014 are conservative. The same is true for the modeling for the precursor demonstration – the lower $NO_X$ estimates derived using EMFAC2021 would produce lower sensitivities of $PM_{2.5}$ to ammonia, since they would increase the abundance of ammonia relative to $NO_X$ (since particulate ammonium nitrate formation would be less limited by, and so less sensitive to, the amount of ammonia). Therefore, the State's conclusions based on their use of EMFAC2014 are conservative relative to if it had used the most up-to-date EPA-approved model, EMFAC2021. Thus, we disagree with the assertions that the effects of the various EMFAC versions on the attainment demonstration and precursor demonstration are unknown and find that reliance on the previously approved emissions inventories is acceptable.

Finally, we also disagree with the commenter's assertion (citing *Sierra Club*)[58] that the EPA has lost litigation over the issue that a current inventory must be used. In *Sierra Club*, the Ninth Circuit remanded the EPA's March 2010 approval of an ozone attainment plan for the San Joaquin Valley submitted in 2004, holding that the EPA's failure to consider new emissions data that the State had submitted in 2007 as part of a separate ozone plan rendered the EPA's action arbitrary and capricious under the Administrative Procedure Act.[59] The decision in that case rested on the unreasonableness of the EPA's failure to address the new emissions data. The court found the EPA's action arbitrary and capricious because of its "reliance on old data without meaningful comment on the significance of more current compiled data" and concluded that "it was unreasonable for EPA summarily to rely on the point of view taken [in longstanding policy]

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[57] Id.
[58] *Sierra Club v. EPA*, 671 F.3d 955 (9th Cir. 2012).
[59] Id. The court also noted that the EPA's action was inconsistent with the court's holding in *Ass'n of Irritated Residents (AIR) v. EPA*, 632 F.3d 584 (9th Cir. 2011) (amended and superseded by *Ass'n of Irritated Residents v. U.S. EPA*, 686 F.3d 668, 671 (9th Cir. 2012)), which "supports the proposition that if new information indicates to EPA that an existing SIP or SIP awaiting approval is inaccurate or not current, then, viewing air quality and scope of emissions with public interest in mind, EPA should properly evaluate the new information and may not simply ignore it without reasoned explanation of its choice." Id. at 967.

without advancing an explanation for its action based on 'the facts found and the choice made.'"[60]

For purposes of this action, the EPA has reviewed the emissions data derived using more recent versions of the EMFAC model provided by CARB, consistent with the holding in *Sierra Club*. Based on our technical analysis of the latest information available described earlier in this response, we determined that the precursor and attainment demonstrations are valid. Thus, we continue to find that the 2013 base year inventories in the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS satisfy the requirements of CAA section 172(c)(3) and 40 CFR 51.1008 for purposes of both the Serious area and the CAA section 189(d) attainment plan requirements, and to find that the forecasted inventories provide an adequate basis for the BACM, RFP, and the modeled attainment demonstration analyses in the Plan.

3. Ammonia Precursor Demonstration

*Comment 3:* CCEJN states that the EPA must disapprove the ammonia precursor demonstration based on considerations outlined in several specific comments (summarized in Comments 3.A through 3.D that follow), but also in several introductory remarks. In the introductory remarks, the commenter appears to refer to the precursor demonstration's modeled $PM_{2.5}$ responses to ammonia reductions for the 2020 analysis year, some of which are above the 0.2 $\mu g/m^3$ EPA-recommended contribution threshold for the 2012 annual $PM_{2.5}$ NAAQS in the EPA's "$PM_{2.5}$ Precursor Demonstration Guidance" ("$PM_{2.5}$ Precursor Demonstration Guidance")[61]. Based on these model results, the commenter asserts that the State tacitly acknowledges that ammonia assessments in previous $PM_{2.5}$ plans, finding that ammonia does not contribute significantly to $PM_{2.5}$ levels that exceed the 1997 annual $PM_{2.5}$ NAAQS, were incorrect. The commenter concludes that these results indicate that the State should have been

[60] Id. at 968 (citing *Burlington Truck Lines v. United States,* 371 U.S. 156, 168 (1962)).
[61] "$PM_{2.5}$ Precursor Demonstration Guidance," EPA–454/R–19–004, May 2019, including memorandum dated May 30, 2019, from Scott Mathias, Acting Director, Air Quality Policy Division and Richard Wayland, Director, Air Quality Assessment Division, Office of Air Quality Planning and Standards (OAQPS), EPA, to Regional Air Division Directors, Regions 1–10, EPA.

regulating ammonia in the recent past, and also that the State should err on the side of caution and regulate ammonia now. Finally, CCEJN contends that not regulating ammonia has led to greater ammonium nitrate $PM_{2.5}$, thereby implicating disparate treatment and disparate impacts, and that the State has failed to provide necessary assurances that the policy decision not to regulate ammonia complies with Title VI.

*Response 3:* The EPA disagrees with the commenter's premise that the modeled $PM_{2.5}$ responses for the 2020 analysis year indicate that ammonia contributed significantly to $PM_{2.5}$ levels in the past. Under the EPA's $PM_{2.5}$ Precursor Demonstration Guidance, a response above the recommended contribution threshold indicates a "contribution," but additional information can be considered in determining whether that response "contributes significantly."[62] Such information may include, but is not limited to, the amount by which the threshold is exceeded, studies to evaluate specific atmospheric chemistry in the area, trends in ambient speciation data and precursor emissions,[63] and the general facts and circumstances of the nonattainment area.[64] In concluding that ammonia does not contribute significantly, the State considered model responses for the 2024 analysis year in addition to 2020, as well as other additional information, as summarized in the EPA's February 2020 Precursor Technical Support Document.[65] We do not believe that viewing modeled responses to ammonia for specific years in isolation or out of context is an adequate method for determining whether a precursor contributes significantly to $PM_{2.5}$ levels.

Additionally, the EPA does not agree that prior precursor assessments should be considered erroneous based on the analysis in a newer plan, particularly when the more recent plan uses different criteria for assessing precursor significance. Previous plans for the 1997 annual $PM_{2.5}$ NAAQS in the San Joaquin Valley, like the ones mentioned by the commenter,

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[62] $PM_{2.5}$ Precursor Demonstration Guidance, pp. 17–19.
[63] Id.
[64] Id. at 14; 40 CFR 51.1006(a)(1)(ii).
[65] "Technical Support Document, EPA Evaluation of $PM_{2.5}$ Precursor Demonstration, San Joaquin Valley $PM_{2.5}$ Plan for the 2006 $PM_{2.5}$ NAAQS," February 2020.

predated the 2016 "Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements" ("$PM_{2.5}$ SIP Requirements Rule")[66] and the 2019 $PM_{2.5}$ Precursor Demonstration Guidance; therefore, they did not assess a modeled ammonia response relative to a contribution threshold but rather relied on the conclusions from modeling performed at the time and from past studies indicating that ammonium nitrate $PM_{2.5}$ is far more responsive to $NO_X$ reductions than to ammonia reductions. Following promulgation of the $PM_{2.5}$ SIP Requirements Rule, the EPA now requires that each precursor be evaluated individually by comparing modeled responses to the contribution threshold and considering additional information.[67] The State conducted its precursor analysis for the SJV $PM_{2.5}$ Plan in accordance with these requirements.

Regarding CCEJN's Title VI-related concerns, we address the comments regarding Title VI in Responses 1.A, 1.B, 5, and 7, which rely on supporting information discussed in Responses 3.A, 3.B.1 through 3.B.4, 3.C, and 3.D.

*Comment 3.A:* CCEJN's first specific stated concern with the precursor demonstration is that the State's conclusion that the San Joaquin Valley is $NO_X$-limited relies on low $NO_X$ estimates based on soil $NO_X$ emissions that are biased low. The commenter asserts that "…the state's estimates of soil $NO_X$ emissions are on the extreme low-end of those reported in the academic literature, and the state has acknowledged that it is unsure how much $NO_X$ is actually emitted from soil in the Valley." The commenter asserts that the State's only rationale for maintaining the current estimate is that it will take time to develop a new estimate, even though including anthropogenic soil $NO_X$ emissions has been a longstanding request by Valley advocates.

Additionally, CCEJN asserts that "[t]he state's reliance on very low estimates of soil $NO_X$ emissions is contrary to the presumption that precursors should be regulated and to the

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[66] 81 FR 58010 (August 24, 2016).
[67] 40 CFR 51.1006; EPA's $PM_{2.5}$ Precursor Demonstration Guidance.

overall 'preventative' and 'precautionary' tenor of the Act." The commenter asserts that even if there was not sufficient time to fully evaluate the scientific literature, a key question is what assumptions the State should rely on in the interim. The commenter proposes that the State should base its decision of whether to regulate ammonia on a median reasonable estimate of soil $NO_X$ emissions, if not the high-end estimate.

*Response 3.A:* We do not agree that the information provided by the commenter on soil $NO_X$ emissions undermines the State's conclusion that $PM_{2.5}$ formation in the San Joaquin Valley is $NO_X$-limited (i.e., much more sensitive to $NO_X$ emissions reductions than to ammonia emissions reductions). Three lines of evidence support the EPA's agreement with the State's conclusion. First, at this time, it is not clear that soil $NO_X$ emissions estimates are largely underestimated as the commenter suggests. Second, ammonia emissions are likely underestimated and so the response to an ammonia reduction is likely overestimated in the modeling. Third, ambient measurements strongly suggest that $PM_{2.5}$ concentrations would respond relatively little to ammonia emissions reductions. We discuss each of these lines of evidence in the paragraphs that follow.

We do not dispute that increasing $NO_X$ emissions in the model would be expected to decrease the modeled amount of ammonia relative to $NO_X$ and increase the modeled sensitivity of $PM_{2.5}$ concentrations to ammonia reductions. However, as discussed in detail in Response 2.A, further investigation is needed and merited regarding whether soil $NO_X$ emissions are underestimated or the magnitude of such underestimation. The magnitude of the difference, if any, could have an important effect on whether the model responses to ammonia reductions would be above the contribution threshold. Additionally, even if it is determined that soil $NO_X$ emissions are underestimated, proper updating of the model emissions inventory to address the relative abundance of ammonia and $NO_X$ could require updates to both the $NO_X$ and ammonia emissions inventories, and there is ample evidence that ammonia emissions are underestimated. Furthermore, independent of any emissions estimates or modeling, evidence from ambient

measurements imply that $PM_{2.5}$ concentrations would respond very little to ammonia reductions, and that the model responses in the precursor demonstration may be overestimated, as discussed further in the remainder of this response. Thus, the EPA disagrees with the commenter's assertions that the State's conclusion that the San Joaquin Valley is $NO_X$-limited (in the sense that it is much more sensitive to $NO_X$ reductions than to ammonia reductions) is based on biased soil $NO_X$ emissions estimates that compel the EPA to disapprove the ammonia precursor demonstration.

A second line of evidence is that multiple studies have suggested that ammonia emissions are underestimated in the San Joaquin Valley. These studies reached this conclusion by comparing ambient measurements and satellite retrievals to model results that incorporate estimates of ammonia emissions, and by comparing monitoring or modeling results to what would be expected based on the size(s) of the ammonia and $NO_X$ emissions inventories. For example, in a summary report for the CalNex air quality study, the authors concluded based on direct measurements of ammonia emissions flux that "[p]reliminary results indicate that within the San Joaquin Valley, [ammonia] emissions could be underestimated in inventories by about a factor of three."[68] This finding was confirmed in later modeling using monitored data from the DISCOVER-AQ field study.[69] Other studies identified in a literature search also suggest that ammonia emissions are underestimated, as discussed in the remainder of this response. If higher ammonia emissions were used in the modeling to correct the underestimation, then modeled ammonia would be more abundant relative to nitrate, and particulate nitrate formation would be more $NO_X$-limited. Thus, the modeled response to ammonia reductions would be lower than reported in the precursor demonstration in the SJV $PM_{2.5}$ Plan, and below the contribution threshold.

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[68] Parrish, D. (2014), Synthesis of Policy Relevant Findings from the CalNex 2010 Field Study, Final Report to the Research Division of the California Air Resources Board, 2014, p. 63; available at *https://csl.noaa.gov/projects/calnex/synthesisreport.pdf*.

[69] Kelly, J. T. et al. (2018), Modeling $NH_4NO_3$ over the San Joaquin Valley during the 2013 DISCOVER-AQ campaign, *Journal of Geophysical Research: Atmospheres*, 123, 4727–4745, doi:10.1029/2018JD028290.

A literature search conducted by the EPA found ample evidence that ammonia emissions may be underestimated in the San Joaquin Valley.[70] Most studies compared air quality model results with satellite retrievals; a few compared model results to measurements from aircraft. All of the studies reviewed concluded that ammonia emissions are underestimated by a factor of two to five. A factor of two is greater than the 20–51 percent increase in total $NO_X$ emissions estimated by Almaraz et al. (2018) and would more than offset the effect of an increase in soil $NO_X$ on the sensitivity of $PM_{2.5}$ concentrations to ammonia reductions. These studies collectively suggest that ammonia emissions are underestimated in the San Joaquin Valley. In turn, that implies that model estimates of the sensitivity in the precursor demonstration may be overestimated.

Note that such an underestimate does not imply that the emissions inventories in the SJV $PM_{2.5}$ Plan do not meet the requirements of CAA section 172(c)(3); rather it reflects that more work is needed to continue to improve ammonia emissions estimates. Studies may deduce that there is underestimation using a "top down" approach relying on ambient measurements or satellite observations; the measurements reflect the atmospheric sum of the contribution of many sources, possibly over an extended area. On the other hand, an emissions inventory developed for regulatory purposes is typically a "bottom-up" estimate, derived from compiling an inventory of stationary, area, mobile, and biogenic sources, with their associated emissions factors and activity rates. The emissions inventory is based on detailed knowledge and measurements of specific source types under particular conditions. It is impractical to measure every source under all environmental conditions or under all possible variations, and to know the exact mix of source types and of management practices in place. Thus, the emissions inventory depends on the basic assumption that information compiled for the subset of sources that it is practical to measure can be generalized to the full population of sources in an area. Characterizing ammonia

[70] Memorandum dated October 12, 2023, from Scott Bohning, EPA Region IX, to Docket EPA-R09-OAR-2023-0263, Subject: "Literature search finds evidence that ammonia emissions are underestimated."

emissions from the bottom up requires spatially and temporally resolved data, such as detailed farming practices including irrigation and fertilizer application, and how they affect emissions, which may vary depending on multiple factors. Such detailed data may not be available except at an enormous, impractical cost. A bottom-up emissions inventory may use the best available data and techniques, yet not match estimates made via top-down approaches. The discrepancy between the estimates from top-down and bottom-up approaches indicates the need for further research to better characterize the specific source types that contribute to the total.

In 2021, CARB reported comparisons between its own model predictions of ammonia to ambient data.[71] The SJV $PM_{2.5}$ Plan did not include an evaluation of model performance for ammonia per se (just for particulate ammonium), but in a supplemental transmittal, CARB described the results of two analyses confirming the likely underestimation of ammonia. CARB compared CMAQ model predictions of ammonia with the 2013 DISCOVER–AQ[72] aircraft measurements and found that near-ground ammonia was underpredicted by 50 percent at Fresno and 200 percent at Porterville. CARB also compared 2017 satellite observations of ammonia from the Infrared Atmospheric Sounding Interferometer to CMAQ model predictions and found that modeled ammonia concentrations were half of the magnitude of the satellite retrievals at some locations, and that the modeled average in the San Joaquin Valley was about 25 percent less than observed. CARB also noted that underprediction of ammonia would result in the modeled $PM_{2.5}$ response to ammonia reductions being overpredicted.

Finally, a third line of evidence supports the conclusion that $PM_{2.5}$ in the San Joaquin Valley is relatively insensitive to ammonia reductions. Evidence from ambient data is especially strong since it is independent of uncertainties in the emissions estimates and the modeling exercises. Appendix G ("Precursor Demonstration") of the 2018 $PM_{2.5}$ Plan and Appendix C

[71] Email dated April 26, 2021, from Laura Carr, CARB, to Scott Bohning, EPA Region IX, Subject: "RE: Ammonia update," with attachment "Ammonia in San Joaquin Valley".
[72] DISCOVER-AQ: "Deriving Information on Surface conditions from COlumn and VERtically Resolved Observations Relevant to Air Quality," *https://science.nasa.gov/mission/discover-aq*.

("Weight of Evidence Analysis") of the CARB Staff Report on the 2018 $PM_{2.5}$ Plan[73] describe previous research in support of the claim that ammonium nitrate $PM_{2.5}$ formation is $NO_X$-limited rather than ammonia-limited. That is, $PM_{2.5}$ concentrations in the San Joaquin Valley are expected to be sensitive to reductions in $NO_X$ emissions but much less sensitive to reductions in ammonia. Essentially, due to the abundance of ammonia, even with ammonia emissions reductions there would still be enough available ammonia to combine with $NO_X$ (in the form of nitric acid) to form about the same amount of particulate ammonium nitrate. This was the conclusion of Lurmann et al. (2006)[74] based on ambient measurements during the California Regional Particulate Air Quality Study (CRPAQS), an intensive field study during winter 2000–2001. Ammonia was almost always abundant relative to the amount of nitric acid[75] (derived from $NO_X$ and the immediate precursor to particulate nitrate), so the authors concluded that ammonium nitrate formation in the San Joaquin Valley was $NO_X$-limited. This conclusion was based on ambient data collected before the additional 60 percent reduction in $NO_X$ emissions that has occurred in the interim, which would be expected to have increased the degree of $NO_X$-limitation (i.e., particulate ammonium nitrate formation would be more limited by, and so more sensitive to, the amount of $NO_X$).

Consistent with CRPAQS, aircraft-borne measurements during the more recent 2013 DISCOVER-AQ[76] study led CARB to a similar conclusion, based on the large amount of "excess ammonia". This is defined as the amount of measured ammonia left over if all the nitrate and sulfate present combined with available ammonia to form particulate. The CARB December

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[73] CARB's "Staff Report, Review of the San Joaquin Valley 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards," release date December 21, 2018.

[74] Lurmann et al. (2006) Processes Influencing Secondary Aerosol Formation in the San Joaquin Valley during Winter, *Journal of the Air & Waste Management Associatio*n, 56(12):1679–1693, doi: 10.1080/10473289.2006.10464573.

[75] Nitric acid ($HNO_3$) is formed from $NO_X$ emissions; it combines with ammonium to form particulate ammonium nitrate. The relative amounts of nitric acid and ammonium indicate which is the limiting factor in ammonium nitrate formation.

[76] DISCOVER-AQ: "Deriving Information on Surface conditions from COlumn and VERtically Resolved Observations Relevant to Air Quality," *https://science.nasa.gov/mission/discover-aq*.

2018 Staff Report describes this in more detail,[77] and also lists results from multiple other recent studies with similar conclusions. Two studies with chemical modeling,[78,79] at temperature and humidity levels typical for the San Joaquin Valley and with ammonia and nitrate concentrations observed during DISCOVER-AQ, showed that over 90 percent of the nitrate is present as particulate rather than gas, consistent with abundance of ammonia and with low sensitivity to ammonia changes. Two other studies, one using data from DISCOVER-AQ[80] and one using data from the 2010 CalNex field campaign, [81] found measured ammonia to be 50–100 times as abundant as nitric acid, implying low sensitivity to ammonia emissions changes.[82] In summary, the ambient field study data that the EPA is aware of is consistent with a conclusion that $PM_{2.5}$ concentrations in the Valley are much more sensitive to $NO_X$ emissions reductions than to ammonia emissions reductions. This evidence is independent of the State's soil $NO_X$ emissions estimate and is an important basis for the EPA's determination that the responses to ammonia reductions for the 1997 annual $PM_{2.5}$ NAAQS that are slightly above the recommended contribution threshold are likely overestimated. Thus, the ambient evidence supports the EPA's determination that ammonia does not contribute significantly to $PM_{2.5}$ levels above the 1997 annual $PM_{2.5}$ NAAQS.

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[77] CARB, "Staff Report: Review of the San Joaquin Valley 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards," December 21, 2018, Appendix C, 12*ff*.; available at *https://ww2.arb.ca.gov/resources/documents/2018-san-joaquin-valley-pm25-plan*.

[78] Id. at 12 (presenting CARB analysis of ammonia impacts in the San Joaquin Valley).

[79] Prabhakar et al. (2017) Observational assessment of the role of nocturnal residual-layer chemistry in determining daytime surface particulate nitrate concentrations, Atmospheric Chemistry Physics, 17, 14747–14770. doi:10.5194/acp-17-14747-2017.

[80] Parworth et al. (2017) Wintertime water-soluble aerosol composition and particle water content in Fresno, California, *Journal of Geophysical Research, Atmosphere*., 122, 3155-3170. doi: 10.1002/2016JD026173, p. 3165. (noting that "The average mixing ratio of $NH_3$ was 49 times greater than $HNO_3$ .... These results highlight that $NH_3$ was in excess, and $NH_4NO_3$ [ammonium nitrate] formation is likely limited by $HNO_3$ availability in Fresno," i.e., about a factor of 50).

[81] CalNex, or California Research at the Nexus of Air Quality and Climate Change, was a NOAA-sponsored field study during summer 2010; *https://www.esrl.noaa.gov/csd/projects/calnex/*. Markovic et al., (2014), Measurements and modeling of the inorganic chemical composition of fine particulate matter and associated precursor gases in California's San Joaquin Valley during CalNex 2010, *Journal of Geophysical Research – Atmospheres*, 119, 6853–6866, doi:10.1002/2013JD021408, p. 6863 (noting that "... the observed $NH_3$ (g) mixing ratios were elevated... the observed $HNO_3$ (g) mixing ratios were 2 orders of magnitude lower," i.e. about a factor of 100).

[82] The CARB December 2018 Staff Report explains (in Appendix C, p. 14) that $NO_X$ is the limiting pollutant as shown by this relative abundance of ammonia, but that the expected low sensitivity to ammonia reductions does not mean zero response; the reduction necessarily shifts nitrate from particulate to gas to maintain chemical equilibrium. Thus, $NO_X$ being the limited pollutant does not contradict the modeled responses to 30–70 percent reductions.

*Comment 3.B.1:* CCEJN's second concern with the precursor demonstration relates to the State's conclusions regarding the level of ammonia reductions that could be achieved through potential control measures. The commenter asserts that "…the state repeatedly uses a lack of certainty about emission reduction potential to justify no regulation at all." As an example, they argue that the State acknowledges that research shows that ammonia emissions from manure-based fertilizer can be reduced by 50–90 percent through quick mixing or injection but that it declines to consider the measure feasible for synthetic fertilizers merely because the State does not know how effective it will be.

*Response 3.B.1:* We disagree with CCEJN's claim that the State relies primarily on a lack of certainty about potential emissions reductions to justify not regulating ammonia in the San Joaquin Valley. Rather, the State based its decision not to regulate ammonia for purposes of meeting the 1997 annual $PM_{2.5}$ NAAQS on the technical analyses it performed indicating that ammonia does not contribute significantly to $PM_{2.5}$ concentrations that exceed the 1997 annual $PM_{2.5}$ NAAQS.

Where the State identifies uncertainties about potential ammonia emissions reductions, it does so in the context of its controls analysis to support the ammonia precursor demonstration, which it conducted at the request of the EPA and in accordance with EPA guidance. As acknowledged by the commenter, under the $PM_{2.5}$ SIP Requirements Rule, a state may submit an optional precursor demonstration showing that a particular $PM_{2.5}$ precursor chemical species does not contribute significantly to $PM_{2.5}$ levels above the standard in the area.[83] If the EPA approves a precursor demonstration for a particular chemical species, the state is not required to control emissions of that precursor from existing sources in the relevant attainment plan.[84]

The EPA's July 2023 proposal includes a detailed summary of the precursor demonstration in the SJV $PM_{2.5}$ Plan and supporting March 2023 Ammonia Supplement, and of

[83] 81 FR 58010, 58021 (August 24, 2016); 40 CFR 51.1006 ("Optional $PM_{2.5}$ precursor demonstrations").
[84] 40 CFR 51.1006(a)(1)(iii) and 51.1010(a)(2)(ii).

the EPA's evaluation. We will not reiterate all of the State's conclusions herein except to highlight the key finding that modeled sensitivities for the 1997 annual $PM_{2.5}$ NAAQS of $PM_{2.5}$ concentrations to a 30 percent ammonia reduction are approximately at or below the contribution threshold used to determine significance. The $PM_{2.5}$ Precursor Guidance explains that in cases where the $PM_{2.5}$ response to a 30 percent reduction in precursor emissions is close to the contribution threshold, the EPA may require air agencies to identify and evaluate potential emissions controls in support of a precursor demonstration that relies on a sensitivity analysis. The response of ambient $PM_{2.5}$ to an actual assessment of the benefit from potential controls can be used to determine whether controlling ammonia would significantly affect $PM_{2.5}$ levels. In accordance with 40 CFR 51.1010(a)(2)(ii), the EPA required the State to provide an analysis of potential controls to aid the EPA in its evaluation of the precursor demonstration. The State provided such controls analysis in the March 2023 Ammonia Supplement, which built upon information previously provided in the 2018 $PM_{2.5}$ Plan.

As discussed in our proposal, the State's controls analysis included a review of ammonia emissions reductions achieved nationwide from 2011 to 2017, an evaluation of the main ammonia source categories in the San Joaquin Valley, a summary of existing control measures in the San Joaquin Valley that affect ammonia from these sources, a review of existing control measures implemented by other air districts, and an evaluation of additional mitigation options for ammonia sources in the Valley.[85] Based on the State's and District's analyses, they determined that significant ammonia emissions reductions are already being achieved by measures targeting VOC emissions and that the ammonia reductions achievable from additional controls are well below 30 percent.

In this action, we are finalizing our determination that the State has provided adequate support for its conclusion that available additional ammonia controls would yield less than a 30 percent reduction in ammonia emissions. We are finding that the District made a convincing case

[85] 88 FR 45276, 45288–45290.

that significant ammonia reductions have already been achieved through District Rule 4570 and that few additional mitigation measures could provide only modest further reductions from confined animal facilities (CAFs), which account for 58 percent of the total ammonia inventory. Similarly, the State has provided support for its assertion that additional reductions are not feasible from the fertilizer, composting, and other smaller source categories through its analysis of potential fertilizer controls and information regarding controls that are already in place for these source categories. As discussed in our proposal, we acknowledge the uncertainty in the reductions that are currently being achieved from the fertilizer source category but are finalizing our determination that even if ammonia reductions could be reduced by a very high percentage, such reductions added to the potential reductions from CAFs would amount to less than a 30 percent reduction in total ammonia emissions.

Given that the State's modeled sensitivities of $PM_{2.5}$ concentrations to a 30 percent ammonia reduction are approximately at or below the threshold used for identifying an impact that is significant for the 1997 annual $PM_{2.5}$ NAAQS, and that the potential additional reductions would be well below 30 percent, the response of $PM_{2.5}$ to an ammonia reduction of a percentage smaller than 30 percent would be below the contribution threshold, indicating that ammonia does not contribute significantly to ambient $PM_{2.5}$ concentrations for purposes of the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS. Based on these results, the State excluded ammonia controls from the SIP submission. Because the EPA is finalizing approval of the State's precursor demonstration as proposed, the State is not required to regulate ammonia for purposes of meeting the CAA requirements for the 1997 annual $PM_{2.5}$ NAAQS.

Regarding the example cited by the commenter of quickly mixing or injecting fertilizer into the soil, we do not disagree that research literature indicates that quick mixing or injection can reduce ammonia emissions from manure-based fertilizer. The State acknowledges in the March 2023 Technical Supplement that applying manure to the soil surface without incorporation can lead to significant ammonia emissions and includes an extensive discussion of

the various methods of incorporation as well as the related requirements for injection and incorporation of manure-based fertilizer in District Rule 4570. We disagree, however, with the commenter's assertions that because the measure is effective at reducing ammonia from manure-based fertilizers, the State should infer a similar magnitude of effectiveness for synthetic fertilizers. The studies cited by the commenter acknowledge uncertainties and highlight the importance of additional research to adapt a potential measure to local conditions.[86] For example, Ti et al. (2019), in a global meta-analysis of measures to reduce ammonia emissions from livestock and cropping systems, found that the effects of fertilizer application processes are highly dependent on crop type.[87] The paper further concludes that mitigation needs to be carefully planned and adapted to local conditions because ammonia emissions are dependent on environmental factors such as weather and soil conditions, that the applicability of measures depends strongly on farm structures, and that studies examining economic feasibility and the effects of combinations of measures are needed.[88] The State's March 2023 Ammonia Supplement draws similar conclusions about the need for additional research to assess the potential for ammonia emissions reductions, specifically as they relate to quick mixing and injection, under conditions representative of those in the San Joaquin Valley.[89] Given these uncertainties, we agree with the State's conclusion that additional research is needed and find that the State's decision not to assign ammonia reductions to such measure at this time to be reasonable.

In addition to helping to resolve the uncertainties related to the effectiveness of mitigation measures, additional research would also be beneficial for improving understanding of

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[86] Pan, B. et al. (2016). Ammonia volatilization from synthetic fertilizers and its mitigation strategies: A global synthesis. *Agriculture, Ecosystems & Environment*, Vol. 232, 283–289, doi:10.1016/j.agee.2016.08.019; Ti, C. et al. (2019). Potential for mitigating global agricultural ammonia emission: A meta-analysis. *Environmental Pollution*, Vol. 245, 141–148, doi:10.1016/j.envpol.2018.10.124.

[87] Ti et al. (2019) op cit., p. 146. For example, the paper notes that the effects of fertilizer application practices on reducing ammonia emissions from vegetable production are lower than in wheat and fruit production due in part to the smaller reduction in ammonia emissions from vegetable fields associated with more intensive irrigation.

[88] Id. at 147.

[89] March 2023 Ammonia Supplement, p. 94.

any potential disbenefits that may be specific to the area. The commenter appears to acknowledge the potential for disbenefits in a footnote to their comment, which notes that CCEJN does not endorse any specific approach for reducing ammonia emissions, including quick mixing or injection, and that "regulation of ammonia emissions cannot be permitted to exacerbate degradation of groundwater quality." These expressed concerns about the potential for adverse effects on water quality seem to align with the State's position that more research is needed. Such research may also inform other important considerations, such as the effects on greenhouse gas emissions.

*Comment 3.B.2*: CCEJN asserts that the State's evaluation of emissions from fertilizers is limited in that it is seemingly based on just two studies, and does not consider additional mitigation options identified in the literature such as using non-urea based fertilizers; using controlled release fertilizers; using fertilizers with nitrification inhibitors; irrigating immediately after fertilizer placement; or adding amendments to fertilizers, such as zeolite, pyrite, or organic acids. The commenter also points to a study on the field of precision agriculture as a resource on mechanisms to minimize fertilizer use,[90] as well as two studies examining how modeling can be used to predict ammonia volatilization, claiming that such studies undermine the State's position that emissions reductions cannot be calculated.[91]

*Response 3.B.2*: We disagree with CCEJN's characterization of the State's analysis of emissions from fertilizer as "extremely narrow." We infer that the commenter is referring to the State's analyses for synthetic fertilizer specifically, based on the numerous studies cited in the State's discussion of manure application-related measures,[92] and the commenter's assertion that the State's evaluation of fertilizers is seemingly based on the findings from just two studies and

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[90] Association of Equipment Manufacturers, The Environmental Benefits of Precision Agriculture in the United States, *https://newsroom.aem.org/download/977839/ environmentalbenefitsofprecisionagriculture-2.pdf*.
[91] Gurung, R.B. et al. (2021) Modeling ammonia volatilization from urea application to agricultural soils in the DayCent model. *Nutr Cycl Agroecosyst*, 119, 259–273. doi:10.1007/s10705-021-10122-z; Yang, Y. et al. (2022) Comprehensive quantification of global cropland ammonia emissions and potential abatement. *Science of The Total Environment*, 812, 151450, doi:10.1016/j.scitotenv.2021.151450.
[92] E.g., see March 2023 Ammonia Supplement pp. 74–75.

that Table 13 of the March 2023 Ammonia Supplement lists references for Guthrie et al. (2018)[93] and Eory et al. (2016) only.[94] However, we note that both Guthrie et al. (2018) and Eory et al. (2016) are compilation studies covering a range of mitigation options for organic and synthetic fertilizer application and that the State's March 2023 Ammonia Supplement cites numerous studies in addition to these two compilation studies. Furthermore, the State turned to the research literature only after reviewing how other California State agencies are engaged in fertilizer use and attempting to identify any existing rules or regulations in the nation controlling ammonia emissions from this source category.

Regarding the additional mitigation options identified by CCEJN, we appreciate that the commenter raises these potential strategies. We acknowledge the studies cited by the commenter finding that implementation of some of these strategies may help minimize ammonia emissions from agricultural systems around the globe. We encourage CARB and the District to keep abreast of research examining mitigation options for minimizing ammonia emissions from fertilizer application in support of future policy and management decisions, particularly as they may relate to reducing $PM_{2.5}$ exposure in the San Joaquin Valley. However, as discussed in the following paragraphs, in light of the absence of any SIP-approved requirements elsewhere in the nation, the regulations adopted by other California State agencies to control fertilizer application, and the uncertainties discussed in the studies cited by CARB and the commenters, the EPA continues to agree with the State's overall conclusions that more research is needed on potential mitigation measures to reduce ammonia emissions from fertilizer application in the San Joaquin Valley. We also agree that based on the information currently available, the additional reductions achievable are sufficiently low that the $PM_{2.5}$ response to such reduction would be below the contribution threshold, indicating that ammonia does not contribute significantly to ambient

[93] Guthrie, S. et al. (2018). Impact of ammonia emissions from agriculture on biodiversity: An evidence synthesis. Rand Europe, The Royal Society. *https://www.rand.org/pubs/research_reports/RR2695.html*.
[94] Eory, V. et al. (2016) ClimateXChange, On-farm technologies for the reduction of greenhouse gas emissions in Scotland. *https://www.climatexchange.org.uk/media/1927/on-farm_technology_report.pdf*.

$PM_{2.5}$ concentrations for purposes of the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS. As we emphasized in our proposal, this finding is specific to the facts and circumstances of this particular plan and does not pre-determine the outcome of significance determinations of precursors in the future.

In the March 2023 Ammonia Supplement, the State describes its efforts to identify any SIP-approved requirements limiting ammonia emissions from fertilizers that are being implemented in any other areas of the United States and explains that it has not identified any rules or regulations being implemented elsewhere. Thus, it describes regulations in place adopted by other California State agencies to control fertilizer application and its review of research studies examining techniques for reducing ammonia emissions from synthetic fertilizer application.

The State describes in Appendix C ("Stationary Source Control Measure Analyses") of the 2018 $PM_{2.5}$ Plan and in the March 2023 Ammonia Supplement the various State agencies responsible for ensuring environmentally safe use of fertilizer material. It describes requirements for commercial irrigated lands in the San Joaquin Valley to prepare a farm management plan (including an irrigation nitrogen management plan) that complies with waste discharge requirements in accordance with the Central Valley Irrigated Lands Regulatory Program established by the California State Water Resources Control Board. The nitrogen management plan is designed to ensure that the amount of nitrogen applied to agricultural lands is in reasonable balance with the needs of crops that are being grown. The State explains that the "4 R's" of nitrogen management ("Right source" of nitrogen at the "right rate," "right time," and "right place")[95] serve as guiding nitrogen efficiencies principles that growers are recommended to follow when developing their management plans, and that growers are required to employ enhanced strategies if it is determined that they are not optimizing fertilizer use, as determined by the fraction of nitrogen applied to nitrogen used.

[95] March 2023 Ammonia Supplement, p. 92.

Next, CARB discusses measures identified in the literature for reducing ammonia emissions from fertilizer application, which include optimizing fertilizer use, adding a urease inhibitor, mixing and injecting fertilizer into the soil quickly, and applying fertilizer during optimal weather conditions. Based on its review, the State finds that several of the strategies align with the 4 R's of nitrogen management but that more research is needed to determine the feasibility and effectiveness of such strategies in California due to the unique climate conditions and farming practices in the San Joaquin Valley, and to explore any potential adverse consequences. CARB cites studies linking weather conditions with ammonia emissions,[96] and states that it is unclear which environmental factors are the most important for different fertilizer types.

As discussed in Response 3.B.1, the studies cited by CCEJN similarly highlight the need for additional research to examine how the potential for ammonia emissions reductions varies with local conditions. These studies largely focused on the United Kingdom or were global in scale and none of them appear to address mitigation potentials in the western United States or San Joaquin Valley specifically. Thus, none of the studies reflect climate conditions or farming practices in the San Joaquin Valley, and likely also do not reflect efficiencies already achieved through local regulations in the Valley. Furthermore, several of the studies suggest that some of the measures have already been adopted in many areas, adding to the uncertainty about whether and where there are opportunities for significant reductions in ammonia. For example, Pan et al. (2016), notes that "[e]nhanced efficiency fertilizers have been widely adopted to minimize N[itrogen] loss, including $NH_3$ volatilization from agricultural systems."[97] Similarly, Gu et al. (2023), in a study examining the potential to mitigate nitrogen pollution from global cropland, concluded that the largest reduction of reactive nitrogen input and losses available were in East

[96] Venterea, R.T. et al. (2012) Challenges and opportunities for mitigating nitrous oxide emissions from fertilized cropping systems. *Frontiers in Ecology and the Environment*, 10:10, 562–570. doi:10.1890/120062; Grahmann, K., et al. (2013) Nitrogen use efficiency and optimization of nitrogen fertilization in conservation agriculture. *Cabi Reviews*, 8:053. doi:10.1079/PAVSNNR20138053.
[97] Pan et al. (2016) op. cit., p. 288.

and South Asia and Southeast Asia, which they attribute to an overuse of fertilizer in those areas.[98] They calculated a much lower reduction potential in the European Union, Australia, and North America, where they concluded that nitrogen use in croplands is "closer to the estimated optimal level."

In addition to the uncertainty in emissions reduction potentials, we note that studies suggest that one of the five mitigation options identified by CCEJN, using fertilizers with nitrification inhibitors, may lead to an increase in ammonia emissions. For example, Pan et al. (2016) noted that "[a]lthough nitrification inhibitors are designed to target $N_2O$ emissions, the use of these inhibitors may prolong the retention of $NH_4^+$ in the soil resulting in [ammonia] volatilization (Kim et al., 2012; Lam et al., 2016; Ni et al., 2014)."[99] Pan et al. (2016) concluded that nitrification inhibitors increase ammonia volatilization by 38.0 percent.[100] Similarly, Ti et al. (2019) found that nitrification inhibitors increased ammonia emissions by 42.6 percent,[101] whereas Newell Price et al. (2011) found that "[ammonia] emissions to air and ammonium/nitrite losses to water may be increased by a small amount."[102] While studies specific the San Joaquin Valley may show different results, based on the studies cited by the commenter, the research currently available does not indicate that use of fertilizers with nitrification inhibitors would reduce ammonia emissions in the San Joaquin Valley.

The studies that CCEJN points to on precision agriculture also note wide adoption of such practices while acknowledging some potential for additional environmental benefits. For example, in a 2021 report on the benefits of precision agriculture in the United States, the Association of Equipment Manufacturers discusses environmental improvements that have

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[98] Gu, B. et al. (2023) Cost-effective mitigation of nitrogen pollution from global croplands. Nature, Vol. 613, pp. 77–84.
[99] Pan et al. (2016) op. cit., p. 284
[100] Id. at p. 286
[101] Ti et al. (2019) op. cit., p. 143
[102] J. Newell Price, et al., (2011) An inventory of mitigation methods and guide to their effects on diffuse water pollution, greenhouse gas emissions and ammonia emissions from agriculture (Defra Project WQ0106). *http://randd.defra.gov.uk/Document.aspx?Document=MitigationMethodsUserGuideDecember2011FINAL.pdf*, p. 52.

already been achieved through adoption of precision agriculture technologies.[103] Whitmore (2019) notes that larger farms have been quicker to adopt precision agriculture techniques due to greater resources,[104] and Lowenberg-Deboer and Erickson (2019) note that "[t]he biggest gap in [precision agriculture] adoption is for medium and small farms in the developing world that do not use motorized mechanization," which they attribute to cost-effectiveness challenges.[105] Lowenberg-Deboer and Erickson (2019) also highlight the perception that adoption of precision agriculture has been slow, but state that "[s]ome aspects of [precision agriculture] were adopted as quickly and as widely as any technology in history, while others have lagged behind for technical and economic reasons."[106]

Taken together, the EPA finds that the studies cited by CCEJN highlight the uncertainties in the feasibility of the measures identified in its comment letter and suggest that more research is needed to estimate the additional reductions achievable in the San Joaquin Valley. Furthermore, while several studies suggest that there may be the potential for additional ammonia reductions from synthetic fertilizer application, they also indicate that such potential is not quantifiable with the information available at this time and may be lower in the San Joaquin Valley than in other locations around the globe.

Finally, regarding CCEJN's comment about the availability of modeling to predict ammonia volatilization, we acknowledge these additional studies[107] identified by the commenter describing models for estimating ammonia emissions. However, we disagree with the commenter that the output from these models compel certain policy decisions in the San Joaquin Valley at this time. Here again the commenter cites large-scale studies that do not reflect model performance under conditions representative of those in the Valley. Both studies cited by the

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[103] Association of Equipment Manufacturers, The Environmental Benefits of Precision Agriculture in the United States, *https://newsroom.aem.org/download/977839/environmentalbenefitsofprecisionagriculture-2.pdf*.
[104] Whitmore J. (2019) Precision Farming Comes into Its Own, Mich. St. Univ., *https://www.canr.msu.edu/news/precision-farming-comes-into-its-own*.
[105] Lowenberg-DeBoer, J. and Erickson, B. (2019) Setting the Record Straight on Precision Agriculture Adoption, *Agronomy J.*, p. 1565.
[106] Id. at 1552.
[107] Gurung et al. (2021) op. cit.; Yang et al. (2022) op. cit.

commenter note uncertainties due to crop type, meteorological conditions, and other factors, suggesting that research specific to the climate and farming practices in the Valley is needed. Furthermore, it is not clear that the models discussed in the studies are ripe for application in a regulatory context. For example, Gurung et al. (2021) concludes that additional research is needed before the models could be used to evaluate policy decisions for mitigating ammonia emissions from soils:

> In future research, DayCent can also be used to test "what if" scenarios for identifying best management practices (BMPs) given variation in the soil and climatic conditions. These scenarios could focus on adopting the 4R nutrient stewardship principles and identifying regional level BMPs associated with the addition of urea fertilization. Further model improvement would also allow for a broader set of options to be evaluated in support of policy and management decisions associated with mitigating of $NH_3$ volatilization from agricultural soils.

Thus, based on our review, we find the State's conclusions that further research is needed to explore ammonia reduction potentials in the San Joaquin Valley to be reasonable. We encourage the State and District to perform and keep abreast of research on quantifying the effects of mitigation measures on ammonia emissions and their implications for policy and management decisions.

*Comment 3.B.3*: CCEJN asserts that the State dismisses controls for fertilizers on the basis that there is no published literature on control effectiveness in the San Joaquin Valley specifically. The commenter contends that such justification is "sometimes absurd" and that it cannot be true that studies specific to the Valley are necessary to determine that minimizing the use of fertilizer will decrease ammonia emissions. The commenter asserts that "this bar for effectiveness makes meaningful regulation impossible, particularly when the state disincentivizes research in the Central Valley by insisting that ammonia need not be regulated." The commenter further notes that it is unfortunate that the State never mentions conducting any studies in the San Joaquin Valley.

*Response 3.B.3*: We disagree with CCEJN that the State claims that studies specific to the Valley are needed to discern that reducing fertilizer use will reduce ammonia emissions. In the

2018 $PM_{2.5}$ Plan, the State discusses the link between fertilizer application and both ammonia emissions and nitrate contamination in groundwater, and describes current State regulations aimed at optimizing fertilizer use to minimize emissions of ammonia to the atmosphere.[108] Additionally, in its discussion of optimizing or minimizing fertilizer use in the 2023 Ammonia Supplement, the State discuss the "4 R's" of nitrogen management (i.e., "applying the 'Right source' of nitrogen at the 'Right rate,' 'Right time,' and 'Right place'") and that minimizing fertilizer use is consistent with the right rate principle. CARB also notes that Guthrie et al. (2018) describes that minimizing the application of fertilizer to a level commensurate with optimal crop production can reduce ammonia emissions.[109] Thus, the State does acknowledge the potential benefits of minimizing fertilizer use on ammonia emissions. Where the State concludes that additional research is needed is in the context of how optimal fertilizer use can be achieved, which it notes is "not well described by both Guthrie et al. (2018) and the publications they referenced, nor were any specific regulations identified." Given that some level of reduction is already being achieved through existing regulations and current practices, and the importance of careful consideration of environmental factors for optimizing fertilizer use, we find the State's conclusion that additional research specific to the warm, dry climate conditions of the San Joaquin Valley is needed to determine whether additional strategies could further optimize fertilizer use and reduce ammonia emissions to be reasonable.

Regarding CCEJN's statement that the State dismisses controls for fertilizers based on a lack of information on control effectiveness in the Valley, as discussed in Responses 3.B.1 and 3.B.2, studies reviewed by the State, as well as studies cited by the commenter, emphasize that strategies to reduce ammonia emissions are highly dependent on local environmental factors and farm structures, and that more research is needed to examine these factors, as well as the effects of combinations of measures. The State concludes that specific mitigation strategies identified in

[108] 2018 $PM_{2.5}$ Plan, Appendix C, pp. C-339 to C-341.
[109] March 2023 Ammonia Supplement, p. 92.

the literature, such as optimizing fertilizer use, are already being implemented in the San Joaquin Valley because of regulations adopted by other California State agencies and co-benefits such as reduced cost to farmers. Based on the literature study findings regarding the importance of local information and the need to examine combinations of measures, the absence of existing rules or regulations in other areas controlling ammonia emissions directly, and the State's evaluation of the mitigation strategies already implemented through regulation by other State agencies, we maintain that it is reasonable that the State concludes that more research specific to the Valley is needed to assess the feasibility and effectiveness of additional measures for synthetic fertilizers.

We also disagree with CCEJN's assertions that needing additional studies specific to the conditions in the Valley makes meaningful regulation impossible and that the State disincentivizes research by concluding ammonia does not need to be regulated. Contrary to the commenter's claim that the State does not discuss any studies that it is conducting to assess the effectiveness of ammonia controls in the Valley, the State does include a discussion of recent and ongoing and research in Section 4 of the March 2023 Ammonia Supplement. CARB's work includes the development of a mobile measurement platform equipped with an ammonia monitor and other instrumentation to examine ammonia sources. The State notes that in fall 2018, CARB collaborated with researchers from the University of California, Davis to measure ammonia and other air pollutants near dairies in the San Joaquin Valley to evaluate the effectiveness of alternative manure management practices.[110] The State also mentions additional research to evaluate emissions from dairies, to use satellite and remote sensing data to evaluate ammonia emissions sources across the Valley, and to identify opportunities to reduce ammonia and other pollutant emissions from dairy manure lagoons specifically. These efforts may inform future decision-making regarding the regulation of ammonia in the San Joaquin Valley.

[110] March 2023 Ammonia Supplement, Figure 5 (showing that dairy cattle account for an estimated 67.2 percent of ammonia emissions from CAFs).

Moreover, the EPA's action herein to approve the precursor demonstration in the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS does not preclude the State from adopting controls for ammonia in the future. As discussed in our proposal, a consequence of this final action to approve the State's ammonia precursor demonstration is that the State is not required to implement BACM/BACT level controls for sources of ammonia for purposes of the SJV $PM_{2.5}$ Plan for 1997 annual $PM_{2.5}$ NAAQS. Under 40 CFR 51.1006(b), such precursor demonstration approval applies only to the SJV $PM_{2.5}$ Plan that is the subject of this final action. For any new $PM_{2.5}$ attainment plan that the State is required to submit in accordance with 40 CFR 51.1003 for purposes of any $PM_{2.5}$ NAAQS, the EPA may determine that ammonia contributes significantly to $PM_{2.5}$ levels that exceed the NAAQS and that the State is required to implement controls for sources of ammonia for purposes of such attainment plan.

*Comment 3.B.4*: Regarding the District's current rules, CCEJN asserts that the State assumes that farmers are already adopting the most efficient practices (e.g., feeding the most efficient amount of protein, incorporating manure quickly) but "provides little support for these assumptions, even though it is well established that farmers do not always adopt the most efficient practices." The commenter proposes that the precursor analysis should err on maintaining the presumption that precursors should be regulated and thereby err on the side of high estimates of potential effectiveness and that because the State does not do so, its analysis is arbitrary and capricious. The commenter asserts that the State relies on "biased assumptions," assuming low potential effectiveness from measures not being implemented, high reductions from Rule 4570, and that making optional measures mandatory would have no impact. The commenter further contends that if Rule 4570 is effective, the State should make its most effective requirements mandatory where feasible and possibly increase the stringency, and that the EPA should require the State to conduct further analysis of the rule.

*Response 3.B.4*: We disagree with CCEJN's assertions that the State provides little support for its estimates of ammonia reductions that have been achieved by existing regulations

and that the assumptions it makes to arrive at those estimates are biased. As discussed in our proposal, the District discusses in detail in Appendix C of the 2018 $PM_{2.5}$ Plan how Rule 4570 is structured, the control menu requirements for each of the CAF operations/sources, and research papers that support its estimates of ammonia emissions reductions from the measures.[111] As the District explains, some of the measures in Rule 4570 are required to be implemented but the rule also requires that additional measures be selected from a menu of options. The menu-based approach was developed to allow facilities flexibility to select measures that are the most practical and effective for their design and operation.[112]

For those measures that are required to be selected from a menu of options, the District presents its rationale in Appendix C of the 2018 $PM_{2.5}$ Plan and Appendix F of the staff report for Rule 4570 for its assumptions about which measure a farmer will select and the resulting effects on ammonia emissions.[113] The District references research studies to support many of its assumptions, and where there is greater uncertainty about which measures may be selected or the corresponding ammonia reductions that can be achieved, the District explains how its assumptions are conservative. CCEJN has not provided any evidence to refute the District's analysis or conclusions. Therefore, based on the information presented, the EPA believes that the District relied on its expertise and the best information available and applied that information reasonably.

Regarding CCEJN's statement that the State should err on the side of high estimates of potential reductions from additional measures, given the uncertainties discussed in Responses 3.B.1 and 3.B.2, we find that the potential emissions reductions achievable in the San Joaquin Valley from many of the measures are not quantifiable at this time and that the State drew reasonable conclusions based on the information it evaluated. While the EPA appreciates that the

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[111] 2018 $PM_{2.5}$ Plan, Appendix C, pp. C-312 to C-323.
[112] Id.; March 2023 Ammonia Supplement, pp. 25–26.
[113] 2018 $PM_{2.5}$ Plan, Appendix C, pp. C–311 to C–323; SJVUAPCD, "Final Draft Staff Report, Proposed Re-Adoption of Rule 4570 (Confined Animal Facilities)," June 18, 2009, at Appendix F, "Ammonia Reductions Analysis for Proposed Rule 4570 (Confined Animal Facilities)," June 15, 2006 (discussing various assumptions underlying the District's calculation of ammonia emissions factors).

commenter raises additional research studies not identified by the State in its analysis, as discussed in Responses 3.B.1 and 3.B.2, we have reviewed the studies and find that they do not contradict the State's conclusions. Thus, we find that the State's analysis of potential ammonia emissions reductions is neither arbitrary nor capricious.

We also find that CCEJN's claim that it is well-established that farmers do not adopt the most efficient practices is not well supported. To back this claim, the commenter cites two studies discussing the rates of adoption of precision agriculture technologies.[114] However, these studies do not appear to indicate any reluctance on the part of farmers to adopt the most efficient practices. As discussed in Response 3.B.2, these papers discuss widespread adoption of precision agriculture technology while also acknowledging areas where there are opportunities for increased adoption, such as for specific crop types or farm sizes and for specific precision agriculture technologies, such as variable rate technology.[115] Where adoption has been slower, the studies point to feasibility constraints and the need for more research. For example, Lowenberg-DeBoer and Erickson (2019) emphasize that precision agriculture has been widely adopted and that in cases where technologies have been adopted at a slower pace, the authors attribute it to technological and economic feasibility challenges.[116] The study authors also note that the studies they reviewed hypothesize that more reliable decision rules that account for the effects of moisture, temperature, soil organic matter, and other factors on nitrogen response may be needed to increase variable rate technology adoption.[117] Whitmore (2019) similarly notes the complexity and high cost of new equipment as barriers to wider adoption of precision technology.[118] CCEJN does not provide any evidence related to other measures in its letter or other measures in the State's analysis to support its claim.

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[114] Whitmore (2019) op. cit.; Lowenberg-DeBoer and Erickson (2019) op. cit.
[115] Variable rate technology refers to the use of data and automation to optimize application of fertilizer, soil amendments, seed, or plant protection chemicals to optimize crop performance, save time and money, and reduce environmental impacts.
[116] Lowenberg-DeBoer and Erickson (2019) op. cit., p. 1552.
[117] Id. at 1564–1565.
[118] Whitmore (2019) op. cit.

Finally, we disagree with CCEJN's assertion that if Rule 4570 is effective, the State must consider making its optional requirements mandatory. As discussed earlier in this response, if the EPA approves a state's precursor demonstration showing that a particular $PM_{2.5}$ precursor chemical species does not contribute significantly to $PM_{2.5}$ levels above the standard in the area, the state is relieved of the obligation to control emissions of that precursor from existing sources in the relevant attainment plan.

*Comment 3.C:* Regarding the State's reliance on 2024 modeling results for its precursor analysis, CCEJN asserts that the State should not have relied on modeling of 2024, which is after the 2023 attainment deadline, and which nevertheless shows ammonia contributions that are above the contribution threshold. CCEJN further asserts that the use of 2024 modeling "violates the Act in three ways."

First, the commenter asserts that the approach ignores the requirement to demonstrate attainment as expeditiously as practicable because it does not consider ammonia reductions that may have resulted in attainment before 2023. They note that the State claimed it was close to attaining in 2020 and that meaningful reductions in ammonia would have most likely resulted in attainment earlier (i.e., in 2021 or 2022).

Second, the commenter notes that the State relies not only on a future year but a year after the attainment deadline. Because $NO_X$ emissions are expected to be lower in 2024 than 2023, the commenter suggests that the impacts of ammonia reductions would be less in 2024 than in 2023 and that the impacts of ammonia reductions in 2023 are unknown. The commenter also claims that the EPA makes assumptions about how the State conducted its analysis and recommends that the EPA seek clarification from the State about whether the analysis relied on emissions projected from baseline (i.e., existing) control measures or baseline measures plus measures committed to in the plan. If the State did not conduct the analysis "with numbers that are comparable to what are expected in 2023," the commenter contends that the EPA must require the State to redo the analysis.

Third, CCEJN asserts that the State's model indicating a design value of 12.03 μg/m$^3$ cannot accurately describe 2023 conditions given that 2022 data show a design value well above 16 μg/m$^3$. They conclude that the "EPA's approval of a precursor analysis that relies on such unrealistic modeling is therefore arbitrary and capricious and contrary to law."

*Response 3.C:* While the State relied on 2024 modeled sensitivities of $PM_{2.5}$ to ammonia reductions, it is important to note that the EPA also considered the 2023 model responses via a $NO_X$-based interpolation between the State's model results for 2020 and 2024. The highest estimated response was at the Hanford site, 0.26 μg/m$^3$ for 2024 and 0.27 μg/m$^3$ for 2023, and did not change the EPA's conclusions regarding the ammonia precursor demonstration.[119] In determining that ammonia does not contribute significantly in the San Joaquin Valley despite the Hanford response being above the 0.25 μg/m$^3$ contribution threshold that the State derived for the 1997 annual $PM_{2.5}$ NAAQS, we continue to rely on the abundant ambient evidence of excess ammonia relative to $NO_X$. This evidence includes evidence specific to the Hanford area, where mobile laboratory observations during the DISCOVER-AQ study showed ambient concentrations of ammonia that were approximately five times higher than those that were modeled.[120] These factors led the EPA to conclude that the model responses were likely overestimated and did not represent a significant contribution of ammonia to $PM_{2.5}$ levels.

We further disagree with the commenter's assertion that the State's approach ignores the requirement for expeditious attainment. The CAA requirement for expeditious attainment is not directly relevant for evaluating a precursor demonstration, which is mainly concerned with whether $PM_{2.5}$ in the atmosphere is sensitive to emissions reductions of the precursor. For that purpose, the $PM_{2.5}$ Precursor Demonstration Guidance provides for the use of modeled sensitivities of $PM_{2.5}$ to a reduction in precursor emissions evaluated in the base year or a future year, noting that there are many considerations in choosing the appropriate year to model.[121] The

[119] 88 FR 45276, 45293, fn. 184.
[120] Kelly, J. T. et al. (2018), op. cit.
[121] $PM_{2.5}$ Precursor Demonstration Guidance, p. 36.

key factor for the State's use of a future year was the fact that sizable $NO_X$ emissions reductions were projected to occur over time and would change the atmospheric chemistry in the San Joaquin Valley. The reductions are mainly due to the existing motor vehicle control program and would occur independent of any controls in, or EPA action on, the Plan.[122] The sensitivity of $PM_{2.5}$ concentrations to ammonia reductions decreases with decreasing $NO_X$ emissions. Between 2020 and 2024, the modeled response to a 30 percent ammonia emissions reduction declines by 50 percent at the design value monitoring site, Bakersfield-Planz, from 0.24 $\mu g/m^3$ down to 0.12 $\mu g/m^3$. (The corresponding decline is 37 percent for the average over all monitoring sites.) Thus, much of the benefit of ammonia controls applied in 2020 would be lost by 2023 and 2024.

With regard to whether ammonia emissions reductions could have resulted in earlier attainment, the EPA used results from the Plan's attainment demonstration to assess the effect of a 30 percent ammonia reduction in 2022 and found that it would not have resulted in attainment in that year.[123] We estimated the 2022 design value as 15.4 $\mu g/m^3$ by using a $NO_X$ emissions-based interpolation between the Plan's 2018 and 2023 design values, 16.3 and 14.7 $\mu g/m^3$, respectively.[124] Similarly we estimated the 2022 sensitivity to ammonia from the State's modeled sensitivities for 2020 and 2024. Applying a 30 percent ammonia reduction for 2022 resulted in a design value of 15.2 $\mu g/m^3$, which is above the level of the 1997 annual $PM_{2.5}$ NAAQS (i.e., 15.0 $\mu g/m^3$). Thus, we conclude that ammonia emissions reductions would not have resulted in attainment before the Plan's projected 2023 attainment date.

Regarding the use of 2024 modeled sensitivities in lieu of modeled sensitivities for 2023, the EPA finds that our conclusions would be the same for the purposes of our evaluation of the precursor demonstration. We estimated 2023 responses to ammonia emissions reductions by interpolating between the responses for available 2020 and 2024 modeling; the interpolation used

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[122] 2018 $PM_{2.5}$ Plan, Appendix B. $NO_X$ emissions decrease 27 percent between 2020 and 2024 due to baseline measures.
[123] Spreadsheet "Estimated 2023 annual $PM_{2.5}$ ammonia sensitivity and 2022 DV.xlsx," "2023 vs. 2024 response to 30% ammonia reduction," EPA Region IX, October 20, 2023.
[124] 15 $\mu g/m^3$ SIP Revision, Appendix K, Table 33.

projected $NO_X$ emissions for 2020, 2023, and 2024 and found the estimated 2023 response to be only 0.01 μg/m$^3$ higher than in 2024.[125] While there are several differences between 2020 and 2024 modeled emissions for the various $PM_{2.5}$ precursors and direct $PM_{2.5}$, the key difference for assessing the change in the sensitivity of $PM_{2.5}$ to ammonia reductions is $NO_X$ emissions levels. The modeling for 2020 and 2024 represent $PM_{2.5}$ design values for the $NO_X$ emissions levels in 2020 and 2024, and their respective responses to a 30 percent ammonia emissions reduction. To estimate the $PM_{2.5}$ response to ammonia reductions in other years or for other control scenarios, only the $NO_X$ emissions level is needed. The estimate does not depend on $NO_X$ emissions differences between 2023 and 2024 calculated for baseline, controlled, or other scenarios, only on the resulting 2023 emissions level being evaluated.

The commenter states that it is unclear whether the precursor demonstration analysis relied on a baseline emissions inventory, or an inventory considering the controls in the plan. While this is not documented prominently in the submittal materials, the precursor demonstration modeling performed by the State used baseline projections,[126] that is, emissions expected with existing control measures and without new control measures from the 2018 $PM_{2.5}$ Plan or the 15 μg/m$^3$ SIP Revision.[127] Notably, the EPA's conclusions for the precursor demonstration do not depend on which of the two inventories is used. For the interpolation to 2023, the EPA relied on controlled $NO_X$ emissions levels (150.6 tpd) to estimate the 2023 response to 30 percent reduction to be 0.265 μg/m$^3$ (reported as 0.27 μg/m$^3$). Using baseline $NO_X$ emissions (153.6 tpd), the estimated 2023 response is 0.275 μg/m$^3$, which is about 0.01 μg/m$^3$ higher. Thus, the

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[125]Spreadsheet "Estimated 2023 annual $PM_{2.5}$ ammonia sensitivity and 2022 DV.xlsx," "Whether 30% ammonia reduction could attain early," EPA Region IX, October 20, 2023.

[126] 2018 $PM_{2.5}$ Plan, Appendix K, Section 5.6 "$PM_{2.5}$ Precursor Sensitivity Analysis", p. 70: "To evaluate the impact of reducing emissions of different $PM_{2.5}$ precursors on $PM_{2.5}$ DVs, a series of model sensitivity simulations were performed, for which anthropogenic emissions of the precursor species were reduced by a certain percentage from the baseline emissions;" email dated September 19, 2019, from Jeremy Avise, CARB, to Scott Bohning, EPA Region IX, Subject: "FW: SJV species responses," with attachments, in which the attached tables have titles like "Difference in Annual $PM_{2.5}$ mass and species between the 2024 baseline run and the 30% PM reduction precursor run."

[127] In comparison to potential modeling of controlled emissions, the $NO_X$ emissions for projected baseline years 2020 and 2024 are higher, ammonia would be less abundant relative to $NO_X$, and the responses to ammonia reductions would be higher. Relying on baseline rather than controlled $NO_X$ emissions levels was therefore conservative for purposes of the ammonia precursor demonstration.

difference between using the baseline or controlled emissions for assessing the sensitivity to ammonia emissions reductions is negligible.

Finally, the EPA disagrees that a monitored 2022 design value being "well above" the modeled 2023 design value invalidates the modeling for purposes of the precursor demonstration. As discussed in the EPA's modeling TSD for the 2018 $PM_{2.5}$ Plan,[128] the State determined that the model performance was excellent, and the EPA found the results to be adequate for attainment demonstration modeling. The modeling used a 2013 base year, i.e., the specific meteorological and emissions conditions of 2013, not those of 2022 (nor of the 2018 monitored value used in scaling the modeling results from the 2018 $PM_{2.5}$ Plan). Even when the modeling itself is valid, the model-predicted design value can differ from a recent monitored design value due to different meteorological conditions than in 2013 base case, emissions variability, and atypical events that affect the monitored value, but that are not necessarily reflected in the modeling because they are inherently unpredictable.[129] The greater uncertainty in the precursor demonstration, which supports the EPA's conclusion in this final action, is that the modeling seems to conservatively overestimate the sensitivity of $PM_{2.5}$ concentrations to ammonia reductions compared to what would be expected based on ambient measurements of ammonia and nitrate, as discussed in Response 3A.

*Comment 3.D:* CCEJN's fourth concern with the precursor analysis is that it believes that "[t]he State improperly adopts a lax contribution threshold of 0.25 $\mu g/m^3$." The commenter acknowledges that the State's approach of using a 0.25 $\mu g/m^3$ threshold is consistent with the EPA's guidance but contends that the guidance is arbitrary and capricious and that the EPA should reject it in this rulemaking. To support their assertion, the commenter reasons that

> [t]he result of the state's approach is that an area, like the San Joaquin Valley, that is failing to meet multiple successively rigorous standards for the same measurement of the

[128] EPA, "Technical Support Document, EPA Evaluation of Air Quality Modeling, San Joaquin Valley $PM_{2.5}$ Plan for the 2006 $PM_{2.5}$ NAAQS," February 2020.

[129] The issue of how model predictions may not match monitor observations despite a well-performing model, and how that does not in itself invalidate the precursor demonstration is discussed in more detail in the EPA's proposed disapproval of the 2018 $PM_{2.5}$ Plan portion addressing the 1997 annual $PM_{2.5}$ NAAQS. 86 FR 67329, 67335 (November 26, 2021).

> same pollutant, may need to regulate a precursor only for purposes of the more rigorous standard. This is a senseless result because the failure to meet an already-outdated standard only highlights the necessity of taking all feasible regulatory steps, including regulating relevant precursors.

The commenter concludes that there is no advantage of two distinct thresholds because the area will need to apply the lower threshold eventually, and states that the "EPA's failure to grapple with this arbitrary result means that it has failed to provide a reasoned explanation for its guidance, and the guidance – or at least its application in this case – is arbitrary and capricious." For areas not meeting both the 1997 and 2012 annual $PM_{2.5}$ NAAQS, the commenter proposes that the EPA should require states to apply the threshold for the 2012 NAAQS for purposes of evaluating a precursor contribution for both NAAQS.

*Response 3.D:* The EPA disagrees that the same contribution threshold must be used regardless of the level of the NAAQS being examined. The EPA believes that applying a threshold that is proportional to the level of the NAAQS is appropriate and consistent with the Act; i.e., 0.2 $\mu g/m^3$ is appropriate for the 2012 annual $PM_{2.5}$ NAAQS of 12.0 $\mu g/m^3$, and 0.25 $\mu g/m^3$ is appropriate for the 1997 annual $PM_{2.5}$ NAAQS of 15.0 $\mu g/m^3$.

The contribution thresholds the EPA derived in the $PM_{2.5}$ Precursor Demonstration Guidance represent a change in air quality that is statistically indistinguishable from the inherent variability in the measured atmospheric concentrations. A contribution threshold that is proportional to, or scales with, the level of the NAAQS may also be termed a "relative" approach, since the size of the threshold is relative to the level of the NAAQS. The contribution thresholds in the $PM_{2.5}$ Precursor Demonstration Guidance were derived from a relative variability estimate multiplied by the NAAQS level for the 2006 24-hour $PM_{2.5}$ NAAQS and 2012 annual $PM_{2.5}$ NAAQS. Notably, the $PM_{2.5}$ Precursor Demonstration Guidance states:[130]

> As described in the Technical Basis Document, the monitoring site variability is first calculated as a percentage of the measured $PM_{2.5}$. Then the median percent variability from all sites is multiplied by the level of the NAAQS to get the threshold concentrations. Therefore, these thresholds represent a percentage of the 2006 24-hour NAAQS (35

[130] $PM_{2.5}$ Precursor Demonstration Guidance, p. 17, fn. 20.

μg/m$^3$) and the 2012 annual NAAQS (12 μg/m$^3$). Different thresholds may be applicable to other levels and/or forms of the NAAQS (either past or future).

The Technical Basis Document[131] referred to in the guidance explains that relative variability (concentration changes as a fraction of total concentration) was found to be more stable than absolute variability (concentration changes in μg/m$^3$), and notes that this "indicates that a central tendency value for the relative variability in the DV [design value]. Therefore, a representative value can be multiplied by the level of that NAAQS to obtain a value in concentration units (μg/m$^3$ for $PM_{2.5}$) that is appropriately used to characterize variability."[132] The Technical Basis Document also explains that the "relative variability was fairly consistent across the range of design values, suggesting a commonality in the relative variability across a wide range of geographic regions, chemical regimes, and baseline air quality levels."[133] Thus, a concentration amount that is relative, or proportional, to the NAAQS level is a better basis than a fixed concentration number for determining the size of a concentration change that is within the inherent variability of monitored concentrations. The superiority of the relative variability approach that was the basis of the $PM_{2.5}$ Precursor Demonstration Guidance contribution threshold of 0.2 μg/m$^3$ for the 2012 annual $PM_{2.5}$ NAAQS makes it appropriate to scale that value according to the NAAQS level to arrive at 0.25 μg/m$^3$ for the 1997 annual $PM_{2.5}$ NAAQS.

Moreover, the EPA does not agree that it is arbitrary or contrary to the Act to apply a lower contribution threshold or to potentially regulate a precursor only for a more stringent NAAQS—it is reasonable to expect that achieving lower $PM_{2.5}$ concentrations may require regulation of additional sources of direct $PM_{2.5}$ and/or $PM_{2.5}$ precursors. This is true even if an area is nonattainment for both the higher and lower NAAQS and the EPA will ultimately be applying the lower contribution threshold for a subsequent plan to attain the more stringent

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[131] EPA, "Technical Basis for the EPA's Development of the Significant Impact Thresholds for $PM_{2.5}$ and Ozone," EPA-454/R-18-001R-18-001, EPA OAQPS, April 2018, available at *https://www.epa.gov/nsr/significant-impact-levels-ozone-and-fine-particles*, *https://www.epa.gov/sites/default/files/2018-04/documents/ozone_pm2.5_sils_technical_document_final_4-17-18.pdf*.
[132] Technical Basis Document, p. 26.
[133] Id. at 39.

NAAQS. Indeed, the $PM_{2.5}$ SIP Requirements Rule at 40 CFR 51.1000 defines a precursor demonstration to mean analyses showing that precursor emissions do not contribute significantly to $PM_{2.5}$ levels that exceed *the relevant $PM_{2.5}$ standard*" [emphasis added]. Applying a lower threshold for the 1997 annual $PM_{2.5}$ NAAQS because the area is in nonattainment for a more stringent NAAQS could presume that the modeling and precursor demonstration in a future plan will show responses to ammonia reductions above the lower threshold and that ammonia will be determined to be significant, such that ammonia would need to be controlled. The EPA does not believe it is appropriate to prejudge the analyses for a potential future plan.

4. BACM/MSM Demonstration

*Comment 4:* Regarding the BACM demonstration, CCEJN notes that the EPA's proposed approval does not address the CAA requirement for most stringent measures (MSM), asserting that such analysis is required for a 189(d) plan under 40 CFR 51.1010(c)(2)(i) and (c)(4), and 88 FR 45280, 45297, 45322. The commenter claims that it appears that the State acknowledges that the MSM requirement applies in its submittal and asserts that the EPA cannot approve the Plan until it reviews the State's control measures under the MSM standard.

The commenter also states that "[t]he state's control measures meet neither the BACM nor MSM standards." They note that in previous letters to the EPA (as summarized in a previous letter attachment included as Exhibit B), Valley groups have identified numerous weaknesses and presented ways the District could strengthen its regulations. The commenter asserts that the EPA's technical support document accompanying the proposed action addresses few of these weaknesses, and advises that "[t]o the extent EPA has not considered whether the suggestions in the letter constitute BACM or MSM for purposes of the 1997 annual standard, it should do so." Specifically, the commenter notes that "[o]ne particularly glaring shortfall in the state's submission is its failure to contain any analysis of potential control measures to minimize soil $NO_X$ emissions," and suggests that the EPA must require the State to analyze the measures in

Exhibit A to CCEJN's comment letter (citing control measures described on pages 5 and 6), including measures to reduce soil $NO_X$ emissions from fertilized farmlands.

*Response 4:* We disagree with CCEJN's assertion that the EPA must review the State's control measures analysis under the MSM standard. As outlined in the $PM_{2.5}$ SIP Requirements Rule, the CAA requirement for MSM is tied to a specific trigger in the act – an extension of the Serious area deadline under CAA section 188(e).[134] The EPA addressed the relevance of MSM to a 189(d) plan as part of our discussion of the control strategy for such plan in the technical support document accompanying the final rule:[135]

> In addition to meeting the 5 percent emission reduction requirement for $PM_{2.5}$ or any $PM_{2.5}$ plan precursor, for any Serious nonattainment area that fails to attain by the Serious area attainment date, the state is required to update its control measures analysis in the section 189(d) plan. In the event the area previously had received an extension of the Serious area attainment date pursuant to section 188(e), the reevaluation of control measures referenced in section 51.1010(c)(2) should include a reevaluation of MSM. (For this reason, section 51.1010(c)(2)(i) refers to the reevaluation of MSM "as applicable.") If, however, the area did not previously request and receive an extension of the Serious area attainment date under section 188(e), the MSM requirement does not apply.

Thus, we noted in the summary of the requirements for Serious $PM_{2.5}$ areas that fail to attain in our proposed action that MSM is applicable only if the EPA granted an extension of the attainment date under CAA section 188(e) for the area for the NAAQS at issue.[136]

As discussed in our proposal, California's Serious area plan for the 1997 $PM_{2.5}$ NAAQS submitted in 2015 included a request under CAA section 188(e) to extend the attainment date for the 1997 annual $PM_{2.5}$ NAAQS by five years to December 31, 2020.[137] However, after considering public comments, the EPA denied California's request for an extension of the attainment date and subsequently determined that the area failed to attain by the December 31, 2015 Serious area attainment date, triggering the requirement for the 189(d) plan. Consequently, because the San Joaquin Valley area did not receive an extension of the Serious area attainment

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[134] 81 FR 58010, 58094.
[135] EPA, "Response to Comments on the Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements," July 29, 2016.
[136] 88 FR 45276, 45280, fn. 57.
[137] Id. at 45277.

date under CAA section 188(e), the MSM requirement does not apply for purposes of the 1997 annual $PM_{2.5}$ NAAQS.

Regarding the commenter's claim that the State appears to acknowledge in its submission that MSM applies, we note that the State's controls analysis in the 2018 $PM_{2.5}$ Plan was developed to address multiple $PM_{2.5}$ NAAQS, including the 2006 $PM_{2.5}$ NAAQS for which the State requested an attainment date extension under CAA section 188(e), triggering the MSM requirement for those NAAQS. Any assertion by the State in the SJV $PM_{2.5}$ Plan that a particular measure meets the MSM standard may not necessarily indicate that the State believes that the requirement applies for the 1997 annual $PM_{2.5}$ NAAQS. Regardless, regarding CCEJN's comment that the State's control measures do not meet the BACM or MSM standards, given that the MSM standard does not apply to the 1997 annual $PM_{2.5}$ NAAQS, as discussed earlier in this response, we are responding only to the commenter's assertion regarding BACM.

We also disagree with the commenter's assertion that the control measures in the Plan do not meet the requirement for BACM for the 1997 annual $PM_{2.5}$ NAAQS. As discussed in our proposed rule, in our review of the State's and District's BACM demonstration, we considered our evaluation of the State's and District's rules, supporting information provided in the SJV $PM_{2.5}$ Plan, and our prior evaluations of the BACM and MSM demonstrations in the 2018 $PM_{2.5}$ Plan for other $PM_{2.5}$ NAAQS.[138] These prior evaluations include those to support our approval of the demonstration for BACM (including BACT) for the 1997 24-hour $PM_{2.5}$ NAAQS,[139] our approval of the demonstrations for BACM and MSM for the 2006 24-hour $PM_{2.5}$ NAAQS,[140] and our proposed disapproval of the demonstration for BACM for the 2012 annual $PM_{2.5}$ NAAQS.[141] The EPA's prior actions for the 1997 24-hour, 2006 24-hour, and 2012 annual $PM_{2.5}$ NAAQS are relevant to our evaluation for this final rulemaking because the State relied on a

[138] Id. at 45305–45306.
[139] 87 FR 4503 (January 28, 2022).
[140] 85 FR 44192 (July 22, 2020).
[141] 86 FR 74310 (December 29, 2021).

common analysis for each of the $PM_{2.5}$ standards. The EPA conducted a thorough analysis of the State's BACM demonstration for purposes of these prior actions, and updated the analysis for certain source categories, as appropriate, for purposes of our proposed approval of the BACM demonstration in the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS.

Regarding the EPA's prior approval of the BACM demonstration in the 2018 $PM_{2.5}$ Plan as meeting the CAA requirements for the 2006 24-hour $PM_{2.5}$ NAAQS, we note that on September 17, 2020, a group of five environmental, public health, and community groups petitioned the Ninth Circuit Court of Appeals ("Ninth Circuit") for review of the EPA's final rulemaking approving the 2018 $PM_{2.5}$ Plan's demonstration of BACM, BACT, and MSM for emissions sources of direct $PM_{2.5}$ and $NO_X$ for purposes of the 2006 $PM_{2.5}$ NAAQS.[142] On April 13, 2022, the Ninth Circuit denied the petitioners' challenge with respect to the EPA's approval of the Plan's BACM/MSM demonstration, upholding such approval for those NAAQS.

Following approval of the State's BACM and MSM demonstrations for the 2006 24-hour $PM_{2.5}$ NAAQS, on December 29, 2021, the EPA proposed to approve portions of the 2018 $PM_{2.5}$ Plan as meeting the Serious area requirements for the San Joaquin Valley for the 2012 annual $PM_{2.5}$ NAAQS, including the requirement that the plan include BACM. However, after considering public comments, on October 5, 2022, the EPA proposed to disapprove portions of the District's BACM demonstration, including the evaluations of ammonia emissions sources and building heating sources.[143] We proposed to disapprove the BACM demonstration for ammonia sources based in part on our on proposed disapproval of the State's ammonia precursor analysis for the 2012 annual $PM_{2.5}$ NAAQS,[144] as well as the State's control measure analysis for ammonia.[145] We proposed to disapprove the BACM demonstration for building heating sources

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[142] See *Medical Advocates for Healthy Air v. EPA, Case No. 20–72780, Dkt. #58–1 (9th Cir., April 13, 2022).* The five environmental, public health, and community organizations, in order of appearance in the petition, are Medical Advocates for Healthy Air, National Parks Conservation Association, Association of Irritated Residents, and Sierra Club.

[143] 87 FR 60494.

[144] Based on our proposed disapproval of the precursor demonstration for the 2012 annual $PM_{2.5}$ NAAQS, we proposed to determine that ammonia remained a regulated precursor for that NAAQS in the San Joaquin Valley.

[145] 87 FR 60494, 60509.

based on recent control measure developments and the time horizon of the 2012 annual $PM_{2.5}$ NAAQS portion of the SJV $PM_{2.5}$ Plan, which raised questions about the feasibility of implementing additional controls for such sources for BACM purposes in the San Joaquin Valley.[146] Notably, we did not re-propose action on any other portions of the State's and District's BACM demonstration that we had previously proposed to approve.

In response to the EPA's proposed disapproval of portions of the BACM demonstration for the 2012 annual $PM_{2.5}$ NAAQS, CARB and the District developed and submitted additional information to support the ammonia precursor demonstration and building heating BACM demonstration for purposes of meeting the Serious area and CAA section 189(d) requirements for the 1997 annual $PM_{2.5}$ NAAQS. Our proposal and accompanying "Technical Support Document, San Joaquin Valley $PM_{2.5}$ Plan Revision for the 1997 Annual $PM_{2.5}$ NAAQS," April 2023 ("EPA's 1997 Annual $PM_{2.5}$ TSD") summarize the additional information provided by the State and District and the EPA's evaluation. Based on our review, we determined that the additional information provided by the State and District addressed the deficiencies identified in the proposed disapproval of the 2018 $PM_{2.5}$ Plan for the 2012 annual $PM_{2.5}$ NAAQS as they pertained to the 1997 annual $PM_{2.5}$ NAAQS. Thus, considering our prior approvals of the State's and District's BACM analysis for the 1997 24-hour $PM_{2.5}$ NAAQS, BACM and MSM analysis for the 2006 $PM_{2.5}$ NAAQS (which was upheld by the Ninth Circuit), and the supplemental information provided to update the SJV $PM_{2.5}$ Plan based on the latest information available, we proposed to approve the BACM demonstration for the 1997 annual $PM_{2.5}$ NAAQS.

Regarding the measures in Exhibit B to CCEJN's comment letter, the EPA has reviewed and considered the recommendations for improvements to the District's $PM_{2.5}$ control strategy as outlined in the two letters in Exhibit B sent by environmental groups to the EPA in 2021[147] and

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[146] Id. at 60511–60512.

[147] Letter dated October 22, 2021, from environmental organizations to Michael S. Regan, Administrator, EPA, Subject: "Meeting Request to Discuss PM-2.5 Crisis in the San Joaquin Valley."

2022.[148] A detailed summary of our evaluation of the feasibility of these measures, as well as numerous others, is provided in Sections III and IV of the "EPA Source Category and Control Measure Assessment and Reasoned Justification Technical Support Document" ("Control Measure Assessment TSD") [149] accompanying our proposed action to promulgate a federal implementation plan for contingency measures for the 1997 annual $PM_{2.5}$ NAAQS, the 2006 24-hour $PM_{2.5}$ NAAQS, and the 2012 annual $PM_{2.5}$ NAAQS.[150] The EPA determined that the recommended measures are either not technologically feasible or not economically feasible within the two year timeframe for implementation as contingency measures discussed in the EPA's draft guidance.[151] Given that by statute, contingency measures are additional requirements that go beyond attainment planning requirements, and the shorter timeframe of the attainment plan for the 1997 annual $PM_{2.5}$ NAAQS (i.e., by December 31, 2023), we similarly conclude that these measures are not feasible for purposes of the BACM requirement for the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS.

Lastly, we disagree with CCEJN's assertion that the EPA must require the State to analyze the control measures for soil $NO_X$ emissions outlined in Exhibit A in order to approve the BACM demonstration for the 1997 annual $PM_{2.5}$ NAAQS. The EPA previously addressed the issues of soil $NO_X$ emissions and of analyzing potential controls for such emissions in the context of the 2018 $PM_{2.5}$ Plan in the EPA's "Response to Comments Document for the EPA's Final Action on the San Joaquin Valley Serious Area Plan for the 2006 $PM_{2.5}$ NAAQS," June 2020 ("EPA's 2020 Response to Comments").[152] More recently, the EPA also addressed the issue of soil $NO_X$ emissions from the use of fertilizers and pesticides in the context of our final

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[148] Letter dated May 18, 2022, from environmental organizations to Michael S. Regan, Administrator, Environmental Protection Agency, Subject: "Meeting Request to Discuss PM-2.5 Crisis in the San Joaquin Valley."
[149] EPA Region IX, "EPA Source Category and Control Measure Assessment and Reasoned Justification Technical Support Document, Proposed Contingency Measures Federal Implementation Plan for the Fine Particulate Matter Standards for San Joaquin Valley, California," July 2023.
[150] 88 FR 53431 (August 8, 2023).
[151] EPA, Office of Air Quality Planning and Standards, Air Quality Policy Division, "DRAFT: Guidance on the Preparation of State Implementation Plan Provisions that Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter" ("Draft Guidance"), March 16, 2023, p. 41.
[152] EPA's 2020 Response to Comments, pp. 148–156, Comments and responses 6.P-1 and 6.P-2.

rulemaking approving CARB's submission of emissions inventories for VOC and $NO_X$ for the 2015 ozone NAAQS for areas in California ("2015 Ozone Inventory Final Rule").[153]

In both the EPA's 2020 Response to Comments and the 2015 Ozone Inventory Final Rule, the EPA acknowledged the studies cited by commenters finding that soil $NO_X$ emissions from fertilizer and pesticide use contribute to atmospheric $NO_X$ levels in California.[154] Particularly, the EPA acknowledged the growing body of research surrounding the identification and quantification of soil $NO_X$ emissions from fertilizer application in agricultural soils. However, in light of the uncertainties and disagreements among the studies regarding the contribution of fertilized cropland soils to $NO_X$ emissions in California, the EPA found that CARB's emissions inventories met the applicable requirements of the CAA notwithstanding the absence of soil $NO_X$ emissions from fertilizer or pesticide use.[155] Furthermore, for purposes of our final action on the San Joaquin Valley Serious Area Plan for the 2006 $PM_{2.5}$ NAAQS, we determined that there was not sufficient information available to require a controls evaluation for soil $NO_X$ emissions for purposes of the BACM analysis for those NAAQS.[156]

Upon reviewing the studies cited by CCEJN in its comment letter, we similarly find that the information provided is not sufficient to compel a revision to the emissions inventories in the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS, given the large uncertainties in the emissions estimates. As discussed in Response 2.A, the magnitude of soil $NO_X$ emissions varies based on temperature; agricultural practices, such as the timing and amount of fertilizer application and irrigation; crop type; and other factors. Additionally, soil $NO_X$ is not directly emitted and involves numerous natural emissions sources and processes. Thus, soil $NO_X$ emissions are inherently difficult to estimate and model. Likewise, given that the production of $NO_X$ in the soil is complex, it may also be challenging to estimate the effects of potential controls. Due to the

[153] 87 FR 59015 (September 29, 2022).
[154] Id. at 59018.
[155] Id. at 59018–59020.
[156] EPA's 2020 Response to Comments, p. 156.

complexity of estimating soil $NO_X$ emissions, the partially natural source of the emissions, and the uncertainties in the effectiveness of potential control measures, the EPA concludes that there is not sufficient information available at this time to warrant an evaluation of potential controls for soil $NO_X$ emissions in the San Joaquin Valley for purposes of the BACM analysis for the 1997 annual $PM_{2.5}$ NAAQS. We encourage CARB and the District to continue their ongoing efforts to resolve the uncertainties in soil $NO_X$ emissions and examine any implications for air quality modeling and planning.

5. Public Process

*Comment 5:* CCEJN asserts that the EPA must disapprove portions of the attainment plan for the 1997 annual $PM_{2.5}$ NAAQS because the State did not provide public notice and the opportunity to comment on portions of the Plan.

The commenter identifies two submissions made by CARB in March 2023 and June 2023 to provide additional information relevant to the original SIP submissions comprising the Plan: the March 2023 Ammonia Supplement and the March 2023 Building Heating Supplement, discussing the ammonia precursor demonstration and the BACM requirement for building electrification, and the Title VI Supplement, addressing necessary assurances under CAA section 110(a)(2)(E). CCEJN notes that CAA section 110(a)(2) requires "[e]ach implementation plan submitted by a State under this chapter shall be adopted by the State after reasonable notice and public hearing." The commenter states that the supplements are "required contents of such plans" and notes that the EPA's supplemental proposal for the 2012 annual $PM_{2.5}$ NAAQS indicated the EPA's expectation that any Title VI necessary assurances would go through state-level notice and comment along with the remainder of the Plan.

Because CARB submitted these supplements directly to the EPA without first going through additional public process and after CARB had formally submitted the Plan, the commenter asserts that the EPA cannot rely upon these supplements to approve the State's

precursor demonstration, BACM demonstration, or necessary assurances under CAA section 110(a)(2)(E)(i).

*Response 5:* Generally, the EPA agrees with CCEJN that SIP submissions must meet the reasonable notice and public hearing requirements of CAA section 110(a)(2). This is a basic requirement for SIP submissions that appears in section 110(a)(1), section 110(a)(2), and section 110(l), as well as EPA regulations pertaining to the completeness of SIP submissions in 40 CFR part 51, Appendix V. However, the EPA does not agree that this requirement necessarily applies to all information of any type that a state may provide to the EPA. This includes such instances as when the state is providing additional information to supplement a SIP submission that did previously meet notice and public hearing process requirements, particularly when the EPA has requested that the state provide such additional information to clarify an ambiguity in the original SIP submission or to aid the EPA in evaluating adverse comments raising an issue related to the original SIP submission.[157] The EPA considers it appropriate to rely on such supplemental information, even if it is not in the form of a formal SIP submission that underwent full notice and public hearing process, when it expands on and confirms information presented in the state's original SIP submission or addresses potential deficiencies in the pre-existing data.[158] In such situations, the EPA considers the relevant question to be whether the state provided reasonable notice and public hearing with respect to the issue as part of the original SIP submission. It would be illogical to require a state to restart the entire SIP development process and would delay the EPA's action on a SIP submission, thereby potentially delaying needed emissions reductions, were the Agency to interpret CAA section 110(a)(2) notice and public hearing requirements to apply to any and all supplemental information provided by state. Thus, the EPA disagrees with CCEJN's assertion that it is inappropriate for the Agency to rely on the additional

[157] The EPA has previously explained that it may be appropriate to rely on a supplemental letter from a state to resolve ambiguities in a SIP submission. See 80 FR 33840, 33888 (June 12, 2015).
[158] See 80 FR 33840, 33888 ("It is the EPA's practice to neither require a state to resubmit a SIP submission nor repropose action on the submission, so long as the clarification provided in the interpretive letter is a logical outgrowth of the proposed SIP provision.").

information provided by CARB in the two supplements in its analysis of the SJV $PM_{2.5}$ Plan because it would violate the requirement under section 110(a)(2) that plans submitted to the EPA for inclusion in the SIP must go through "reasonable notice and public hearing."

With respect to the 2023 Ammonia Supplement and the 2023 Building Heating Supplement, the EPA believes the information contained therein falls within the EPA's discretion to accept as a supplement, as it expands upon and confirms information provided in the State's previously submitted SIP submissions that did undergo the full notice and public hearing process. CARB submitted the supplement to "support action on the attainment plan" and the supplement was intended as "clarifying information" rather than a formal SIP revision.[159] Also, CARB submitted this information in reaction to prior comments related to the EPA's proposed action on the SIP submissions with respect to the 2012 annual $PM_{2.5}$ NAAQS, and in anticipation of receiving those same comments in this action. In this respect, CARB provided additional information that it anticipated the EPA would request to help evaluate the issues raised in such comments.

In the ammonia context, the 2018 $PM_{2.5}$ Plan and 15 $\mu g/m^3$ SIP Revision present the fundamental elements of the State's demonstration that ammonia does not contribute significantly to exceedances of the 1997 annual $PM_{2.5}$ NAAQS, including research that supports its conclusion that ammonium nitrate $PM_{2.5}$ formation in the San Joaquin Valley is $NO_X$-limited rather than ammonia-limited;[160] evidence that the area's measures targeting VOC reductions are already reducing ammonia;[161] and an analysis of how the District's control measures compare with other state's rules and regulations.[162] Upon initial review of the State's submission, and in light of related comments received on attainment plans for other $PM_{2.5}$ NAAQS for the San Joaquin Valley, the EPA requested clarifying information and additional analysis to support the

[159] Letter dated March 29, 2023, from Steven S. Cliff, Executive Officer, CARB, to Martha Guzman, Regional Administrator, EPA Region 9, with enclosures.
[160] 2018 $PM_{2.5}$ Plan, Appendix G, pp. 9–10; CARB December 2018 Staff Report, Appendix C, pp. 12–15; Attachment A to CARB's May 9, 2019, submittal letter.
[161] 2018 $PM_{2.5}$ Plan, Appendix C, Section C-25.
[162] Id.

State's conclusions in the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS.[163] The information and analysis the State provided in the March 2023 Ammonia Supplement does not deviate from or fundamentally alter the analysis in the SJV $PM_{2.5}$ Plan; rather, it provides a wide array of potential controls and analyses to support the fundamental conclusions in the submitted SIP. The EPA believes that CARB provided reasonable notice and public hearing on its position with respect to the ammonia precursor issue in the initial SIP submission, and the additional information in the March 2023 Ammonia Supplement merely expands upon that position. Moreover, by taking into account the information that CARB provided in that supplement during this rulemaking action, the EPA itself has provided the commenters with the opportunity to address that supplemental information now.

Similarly, the building heating BACM demonstration in the 2018 $PM_{2.5}$ Plan provides the foundations and analysis for CARB's conclusions that the State is implementing BACM with respect to building heating appliances. As discussed in Section II.A.4, in 2020, the EPA approved this demonstration as meeting BACM for the 2006 24-hour $PM_{2.5}$ NAAQS.[164] However, given comments concerning this same issue on an EPA proposal related to the 2018 $PM_{2.5}$ Plan with respect to 2012 annual $PM_{2.5}$ NAAQS, the EPA requested that the State support its conclusion with more up-to-date, additional analysis.[165] Like the supplemental information for the ammonia precursor demonstration, the March 2023 Building Heating Supplement merely provides additional support for the State's original analysis and determination that it is implementing BACM for this source category in the San Joaquin Valley area. The EPA believes

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[163] 40 CFR 51.1010 authorizes the EPA to require supplemental information on potential controls when the EPA deems it necessary to evaluate the comprehensive precursor demonstration. The regulations and EPA guidance do not instruct on what state-level processes this supplemental information should go through in being submitted to the EPA. See $PM_{2.5}$ Precursor Demonstration Guidance, p. 31.

[164] 85 FR 44192 (July 22, 2020).

[165] 87 FR 60494 (October 5, 2022); Comment letter dated and received January 28, 2022, from Brent Newell, Public Justice, et al., to Rory Mays, EPA Region IX, including Exhibits 1 through 47. We note, however, that there is no Exhibit 23; so, there are 46 exhibits in total. Email dated February 1, 2022, from Brent Newell, Public Justice, to Rory Mays, EPA Region IX. The 13 environmental, public health, and community organizations are Public Justice, Central Valley Environmental Justice Network, Association of Irritated Residents, Central Valley Air Quality Coalition, Leadership Counsel for Justice and Accountability, Valley Improvement Projects, The LEAP Institute, Little Manila Rising, Center for Race, Poverty, and the Environment, Central California Asthma Collaborative, Animal Legal Defense Fund, National Parks Conservation Association, and Food and Water Watch.

that CARB provided reasonable notice and public hearing on its position with respect to the building heating and electrification issue during the development of initial SIP submission, and the additional information in the March 2023 Building Heating Supplement merely expands upon that position.

Thus, the EPA believes the State provided reasonable notice and opportunity for public engagement with respect to its conclusions in the ammonia precursor demonstration and building heating BACM elements of the SIP and satisfied the reasonable notice and public hearing requirements of the CAA.[166]

With respect to the Title VI Supplement, the EPA acknowledges that it provides additional information related to an issue that the State did not expressly address during the development of the SJV $PM_{2.5}$ Plan, i.e., the State did not previously engage in public process specifically with respect to CAA section 110(a)(2)(E) necessary assurances that implementation of the Plan would not be prohibited by Title VI. However, in this instance, the issue of necessary assurances arose in adverse comments on a related EPA proposed action on the same 2018 $PM_{2.5}$ Plan with respect to the 2012 $PM_{2.5}$ NAAQS.[167] In order to address the concerns raised by the commenter, the EPA sought additional information from the State to supplement the SJV $PM_{2.5}$ Plan by providing necessary assurances and CARB provided that information in the Title VI Supplement to do so.

In light of prior comments, and the responsiveness of the Title VI Supplement to the prior comments, the EPA considers it appropriate to rely on the additional information provided by CARB in this way. Going forward, as part of developing new SIP submissions, the EPA requests that CARB and the District include consideration of issues related to compliance with Title VI as part of that process, in order to ensure public awareness and engagement. The public notice and

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[166] The EPA notes that a review of the State's records submitted with the SIP indicates that the public did identify these two elements prior to and during the public hearing held on the State's approval of the SIP in 2021.

[167] 86 FR 74310 (December 29, 2021). Some of the environmental and community organizations that contributed to the adverse comments related to necessary assurances on the EPA's proposed SIP action for the 2012 annual $PM_{2.5}$ NAAQS are among the organizations that provided the adverse comments on the EPA's proposal for the 1997 annual $PM_{2.5}$ NAAQS discussed herein.

comment process required for development of SIP submissions provides an opportunity for an air agency to share its position on necessary assurances publicly, and to develop the record supporting their analysis of CAA section 110(a)(2)(E)(i) as it pertains to a particular SIP submission. Through this process, the EPA expects states to develop adequate necessary assurances so that they can be reviewed during the air agency-level public comment process and subsequently by the EPA.[168]

*B. Comments from Central Valley Air Quality Coalition (CVAQ)*

*Comment 6:* CVAQ's comments cover many of the same issues as the comments from CCEJN. In summary, they assert that the State's plan "improperly relies upon faulty emission inventories and modeling data, fails to regulate key $PM_{2.5}$ precursors like ammonia and soil $NO_X$, does not analyze the most stringent measures needed for attainment, and does nothing to prove State compliance with Title VI of the Civil Rights [Act] (Title VI)." The commenter also notes that the two CARB-submitted supplements did not go through the State's public process, and that the EPA had an obligation to issue a federal implementation plan in January 2021 and has failed to do so.

*Response 6:* The EPA has addressed CVAQ's concerns about the emissions inventory and modeling data in Response 2.B; ammonia in Responses 3.A through 3.D; soil $NO_X$ in Responses 2.A and 4; MSM in Response 4; Title VI in Responses 1.A and 1.B, Response 5, and in Response 7 that follows; and the State's public process in Response 5 of this document.

Regarding the EPA's federal implementation plan (FIP) obligation, we do not dispute that the EPA has had an obligation to implement a FIP for the San Joaquin Valley for the 1997 annual $PM_{2.5}$ NAAQS due to a prior finding of failure to submit the required attainment plan. As

[168] The EPA notes that the content of the Title VI Supplement is substantially similar to recent submissions of necessary assurances from the State on the attainment plan for the 2015 ozone NAAQS (see "Staff Report, CARB Review of the San Joaquin Valley 2022 Plan for the 70 ppb 8-Hour Ozone Standard" (release date: December 16, 2022), pp. 21–23). The plan for the 2015 ozone NAAQS, which was submitted after the EPA's supplemental proposal on the plan for the 2012 annual $PM_{2.5}$ NAAQS, was made available for public review during the State's public comment processes (see CARB's "Notice of Public Meeting to Consider Proposed San Joaquin Valley 70 parts per billion Ozone State Implementation Plan," dated December 16, 2022).

we explained in the proposed rule, as a result of the EPA's December 6, 2018 determination effective January 7, 2019, that California had failed to submit the required attainment plan for the 1997 annual $PM_{2.5}$ NAAQS, among other required SIP submissions for the San Joaquin Valley, the EPA became subject to a statutory deadline to promulgate a FIP for this purpose no later than two years after the effective date of that determination – i.e., by January 7, 2021.[169] However, as a result of this final rulemaking approving all but the contingency measure requirement of the submitted Serious area and section 189(d) plan for the 1997 annual $PM_{2.5}$ NAAQS, the only outstanding deficiency for these NAAQS relates to contingency measures. We note that CARB has submitted three SIP submissions to address the CAA contingency measure requirements for the 1997 annual $PM_{2.5}$ NAAQS (as well as other $PM_{2.5}$ NAAQS) in the San Joaquin Valley, including (1) the "$PM_{2.5}$ Contingency Measure State Implementation Plan Revision," submitted to the EPA on June 8, 2023;[170] (2) amendments to District Rule 8051 ("Open Areas"), submitted to the EPA on October 16, 2023;[171] and (3) the state-wide "California Smog Check Contingency Measure for the State Implementation Plan," submitted to the EPA on November 13, 2023.[172] The EPA will act on the contingency measure SIP revisions, and/or promulgate a FIP for the contingency measure requirement for the 1997 annual $PM_{2.5}$ NAAQS and other NAAQS, in a separate rulemaking.

*C. Comments from a Private Individual*

*Comment 7:* The private citizen commenter believes that the State's plan contains "aspirational and misleading 'assurances' of compliance with the Civil Rights Act" and that the "EPA has missed an opportunity to live up to the commitments of the Biden administration and EPA Administrator Regan to prioritize environmental justice and civil rights."

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[169] 88 FR 45276, 45278.
[170] Letter dated June 7, 2023, from Steven S. Cliff, Executive Officer, CARB, to Martha Guzman, Regional Administrator, EPA Region IX.
[171] Letter dated October 13, 2023, from Steven S. Cliff, Executive Officer, CARB, to Martha Guzman, Regional Administrator, EPA Region IX.
[172] Letter dated November 13, 2023, from Steven S. Cliff, Executive Officer, CARB, to Martha Guzman, Regional Administrator, EPA Region IX.

In addition, the commenter notes the length of time that has passed since the EPA committed to put out guidance on what would constitute "necessary assurances" under the Act and its failure to do so prior to accepting the necessary assurances demonstration in the SJV $PM_{2.5}$ Plan for the 1997 annual $PM_{2.5}$ NAAQS. The commenter recommends that a simple interim guidance could include: (1) "some sort of equity or environmental justice assessment," and (2) "consideration of alternative measures to lessen or eliminate any potentially discriminatory burdens revealed by that assessment."

The commenter provides a short summary of the interaction between CAA section 110(a)(2)(E) and Title VI at the EPA, including identifying a SIP rulemaking in 1997 where the connection between section 110(a)(2)(E) and Title VI was raised and a 2012 rulemaking pertaining to the San Joaquin Valley on which the EPA received comments about the same issue.

The commenter generally recommends that the EPA exercise its discretion in determining what constitutes necessary assurances to require more from the State in favor of a more rigorous posture as to what constitutes necessary assurances. In doing so, the commenter disputes the EPA's distinction in its proposal between necessary assurances under CAA section 110(a)(2)(E) and a formal finding of compliance with Title VI.

Next, the commenter outlines the contents of CARB's Title VI supplement. In particular, the commenter alleges that CARB's Civil Rights and Discrimination Process does not have processes or procedures for handling a complaint originating from outside of CARB, that the policy has been rarely used, and was adopted prior to complaints filed at the EPA against CARB for procedural deficiencies in the State's policy. Additionally, the commenter believes that neither the EPA nor CARB has demonstrated that the State's policy will be implemented in a systemic manner to avoid disproportionate effects.

The commenter asserts that the EPA's approval of the necessary assurances conflates the concrete statutory requirements of Title VI with policy-based programs and policies of environmental justice. The commenter believes that relying on the policy-based environmental

justice initiatives does not rise to the level of the systematic and defined methods of Title VI compliant laws.

The commenter then describes many of the environmental justice resources available to CARB and the EPA in developing and determining the adequacy of necessary assurances. The commenter acknowledges that the EPA identified many of these resources in its proposal but believes the necessary assurances discussion should demonstrate that these resources were considered and used in determining whether there is a disproportionate effect in a particular SIP-based action.

Ultimately, based on 2013 EPA guidance on compliance with CAA section 110(a)(2)(E) and the terms of conditions under Title VI for CARB receiving funding from the EPA, the commenter does not believe that CARB submitted a sufficient demonstration that the required Title VI compliance programs exist under CARB's purview. In their conclusion, the commenter notes that the EPA could conditionally approve the Plan, accompanied by an enforceable condition requiring CARB and the District to bring their programs into demonstrated compliance with Title VI.

*Response 7:* To the extent the comment letter is providing input to the EPA on content for a forthcoming guidance document for CAA section 110(a)(2)(E)(i) with respect to Title VI, such considerations are outside the scope of this action.

As we noted in our proposal, the EPA has discretion with regard to what may constitute necessary assurances under CAA section 110(a)(2)(E)(i). For this action, we believe the State has provided adequate necessary assurances to support approval, under these specific facts and circumstances. The EPA notes that what constitutes necessary assurances for purposes of Title VI for a given SIP submission depends upon the facts and circumstances of the Plan, and the Agency may require more or different information as needed in other SIP actions. This finding does not limit the Agency to review for different factors in the future.

Importantly, as explained in the proposal action, the EPA's evaluation of necessary assurances pertains to CAA section 110(a)(2)(E)(i) compliance with respect to a specific SIP submission, and not to Title VI compliance more broadly.[173] Formal findings of compliance with Title VI follow procedures outlined in the CFR after administrative complaints are filed with the EPA alleging discrimination prohibited by Title VI and the other civil rights laws,[174] or if the EPA initiates an affirmative compliance review.[175] Section 110(a)(2)(E)(i), in contrast, requires a state to provide necessary assurances that the state's implementation of the SIP submission at issue is not prohibited by federal law, including Title VI. As an additional point of clarification, this necessary assurances analysis concerning Title VI is distinct from considerations of environmental justice more broadly. Title VI involves specific considerations of federal law as it pertains to individuals on the basis of race, color, or national origin. The language at issue in CAA section 110(a)(2)(E)(i) is specific to implementation of the SIP submissions and prohibitions under Title VI.

The EPA separately reviewed information related to environmental justice considerations and those considerations are addressed in Section IV of this document. The EPA reiterates that in our proposed approval of the Plan, the EPA completed a Demographic Index analysis of the area subject to the Plan, identifying environmental burdens and susceptible populations in disadvantaged communities in the San Joaquin Valley nonattainment area. As explained in more detail in Section II.A.1 of this document, we believe the State has provided the necessary assurances, including information that through its initial implementation that the State has meaningfully considered input from the public through public outreach that is beyond the minimum legal requirements for public comment during SIP development, and that the Plan submission complies with CAA section 110(a)(2)(E)(i).

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[173] 88 FR 45276, 45320.
[174] 40 CFR 7.120.
[175] 40 CFR 7.115.

With respect to the "EPA's processing prior (to this 2023 action but subsequent to the 2016 policy) complaints against CARB and in which it had noted several procedural deficiencies," the EPA is not aware of any complaints filed against CARB within that time period regarding CARB's Civil Rights and Discrimination Complaint Process, and no complaint was specifically cited to by the commenter.[176] The EPA notes that it publishes all external civil rights complaints and compliance reviews online.[177]

## III. Motor Vehicle Emissions Budgets and Transportation Conformity

The EPA previously determined that the 2020 and 2023 motor vehicle emissions budgets in the 15 $\mu g/m^3$ SIP Revision were adequate for use in transportation conformity findings. In a letter dated February 1, 2022, the EPA notified CARB and other agencies involved in the interagency consultation process in the San Joaquin Valley that we had reviewed the 2020 RFP and 2023 attainment year budgets in the 15 $\mu g/m^3$ SIP Revision and found that they are adequate for transportation conformity purposes.[178] The EPA announced the availability of the budgets and notified the public of the adequacy finding via a *Federal Register* notice on February 10, 2022.[179] This adequacy finding became effective on February 25, 2022 and the budgets have been used in transportation conformity determinations in the San Joaquin Valley area since that date.

The EPA proposed approval of these same budgets, shown in Table 1 of this document,

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[176] On June 6, 2016, the EPA resolved a civil rights complaint filed against CARB and the Bay Area Air Quality Management District. After an investigation by the EPA's Office of Civil Rights (OCR), the Agency found "insufficient evidence of current non-compliance with Title VI or EPA' s Title VI regulation" and closed the complaint. In the letter closing the complaint, the EPA notes that "OCR has provided technical assistance to CARB to improve the elements of its non-discrimination program," including improvements to CARB's Civil Rights and Discrimination Complaint Process. The closure letter specifically found "CARB has also adopted a grievance procedure that is contained in the Civil Rights Policy and Discrimination Complaint Process that provides complainants a prompt and impartial investigation of and response to complaints filed with CARB alleging discrimination in CARB's programs or activities prohibited by the federal non-discrimination statutes." The EPA does not believe this complaint resolution and the conclusions therein conflicts with the determinations in this final action. *https://www.epa.gov/sites/default/files/2016-06/documents/2r-00-r9_carb_resolution_letter.pdf*.

[177] EPA, External Civil Rights Docket, *https://www.epa.gov/external-civil-rights/external-civil-rights-docket-2014-present*.

[178] Letter dated February 1, 2022, from Matthew Lakin, Acting Director, Air and Radiation Division, EPA Region IX, to Richard Corey, Executive Officer, CARB.

[179] 87 FR 7834 (February 10, 2022).

on July 14, 2023.[180,181] The Plan establishes separate direct $PM_{2.5}$ and $NO_X$ subarea budgets, based on EMFAC2014, for each county, and partial county (for Kern County), in the San Joaquin Valley.[182] The EPA discussed the State's evaluation of the significance/insignificance factors for ammonia, $SO_2$, and VOC, and re-entrained road dust emissions in the proposed rule.[183] In this action, the EPA is finalizing approval of the State's demonstration that emissions of ammonia, $SO_2$, and VOCs do not contribute significantly to $PM_{2.5}$ levels that exceed the 1997 annual $PM_{2.5}$ NAAQS in the San Joaquin Valley. Therefore, consistent with the transportation conformity regulation,[184] motor vehicle emissions budgets are not required for transportation-related emissions of ammonia, $SO_2$, and VOC for purposes of the 1997 annual $PM_{2.5}$ NAAQS in the San Joaquin Valley. In addition, since neither the State nor the EPA has made a finding that re-entrained road dust emissions are significant, under 40 CFR 93.103(b)(3) and 93.122(f), re-entrained road dust emissions are not required to be included in the budgets for 1997 annual $PM_{2.5}$ NAAQS in the San Joaquin Valley.

**Table 1 – Motor Vehicle Emissions Budgets for the San Joaquin Valley for the 1997 annual $PM_{2.5}$ NAAQS (annual average, tons per day)**

| County | 2020 (RFP Year) | | 2023 (Attainment Year) | |
|---|---|---|---|---|
| | $PM_{2.5}$ | $NO_X$ | $PM_{2.5}$ | $NO_X$ |
| Fresno | 0.9 | 25.3 | 0.8 | 15.1 |
| Kern | 0.8 | 23.3 | 0.7 | 13.3 |
| Kings | 0.2 | 4.8 | 0.2 | 2.8 |
| Madera | 0.2 | 4.2 | 0.2 | 2.5 |
| Merced | 0.3 | 8.9 | 0.3 | 5.3 |
| San Joaquin | 0.6 | 11.9 | 0.6 | 7.6 |
| Stanislaus | 0.4 | 9.6 | 0.4 | 6.1 |
| Tulare | 0.4 | 8.5 | 0.4 | 5.2 |

Source: 15 µg/m$^3$ SIP Revision, Appendix D, Table 18. Budgets are rounded up to the nearest tenth of a ton.

[180] 88 FR 45276, 45322.
[181] The EPA did not receive any comments related to our proposed approval of the motor vehicle emissions budgets during the 30-day comment period.
[182] 40 CFR 93.124(c) and (d).
[183] 88 FR 45276, 45316–45317.
[184] 40 CFR 93.102(b)(2)(v).

For the reasons discussed in Sections IV.D and IV.E of the proposed rule, the EPA is approving the attainment, RFP, and 5 percent demonstrations, respectively, in the SJV $PM_{2.5}$ Plan. The 2020 RFP and 2023 attainment year budgets are consistent with these demonstrations, are clearly identified and precisely quantified, and meet all other applicable statutory and regulatory requirements including the adequacy criteria in 40 CFR 93.118(e)(4) and (5). For these reasons, the EPA is finalizing approval of the 2020 and 2023 budgets listed in Table 1 of this document.

The Plan also included budgets for direct $PM_{2.5}$ and $NO_X$ emissions for 2017 (RFP milestone year) and 2026 (post-attainment quantitative milestone year). We are not approving the 2017 budgets[185] or the post-attainment year 2026 budgets at this time. Although the post-attainment year quantitative milestone is a required element of the Serious area plan, it is not necessary to demonstrate transportation conformity for 2026 or to use the 2026 budgets in transportation conformity determinations until such time as the area fails to attain the 1997 annual $PM_{2.5}$ NAAQS. Therefore, the EPA is not taking action on the submitted budgets for 2026 in the SJV $PM_{2.5}$ Plan at this time. However, if the EPA determines that the San Joaquin Valley has failed to attain the 1997 annual $PM_{2.5}$ NAAQS by the applicable attainment date, the EPA would begin the budget adequacy and approval processes under 40 CFR 93.118 for the 2026 post-attainment year budgets concurrent with such determination that the area failed to attain.

Conformity Trading Mechanism

Also on July 14, 2023, the EPA proposed to approve a trading mechanism for transportation conformity analyses that would allow the MPOs in the area to use future decreases in $NO_X$ emissions from on-road mobile sources to offset any on-road increases in direct $PM_{2.5}$

[185] We are not approving the 2017 budgets because such budgets would not be used in any future transportation conformity determination because the Plan includes budgets for 2020.

emissions as allowed for under 40 CFR 93.124(b).[186,187] As described in the proposed rule, the EPA reviewed the trading mechanism and found it is appropriate for transportation conformity purposes in the San Joaquin Valley for the 1997 annual $PM_{2.5}$ NAAQS.[188] The methodology for estimating the trading ratio for conformity purposes is essentially an update (based on newer modeling) to the State's approach, approved in the previous plan, to model the effect of areawide direct $PM_{2.5}$ and $NO_X$ emissions reductions on ambient $PM_{2.5}$, and to express the ratio of these modeled sensitivities as an inter-pollutant trading ratio.

In a previous action on the 2018 $PM_{2.5}$ Plan for the 2012 annual $PM_{2.5}$ NAAQS, we found that the State's approach is a reasonable method to use to develop ratios for transportation conformity purposes and approved the 6.5 to 1 $NO_X$ to $PM_{2.5}$ trading mechanism as an enforceable component of the transportation conformity program for the San Joaquin Valley for the 2012 $PM_{2.5}$ NAAQS.[189] Here, we similarly find that the State's approach is reasonable and are approving the 6.5 to 1 $NO_X$ for $PM_{2.5}$ trading mechanism as enforceable components of the transportation conformity program for the San Joaquin Valley for the 1997 annual $PM_{2.5}$ NAAQS. This trading ratio replaces the 9 to 1 $NO_X$ to $PM_{2.5}$ trading ratio approved for the San Joaquin Valley for analysis years after 2014 for the 1997 annual $PM_{2.5}$ NAAQS.[190]

## IV. Environmental Justice Considerations

As described in detail in our proposal, the EPA reviewed environmental and demographic data for the San Joaquin Valley using the EPA's environmental justice (EJ) screening and mapping tool ("EJSCREEN"),[191,192] and compared the data to the corresponding data for the

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[186] 88 FR 45276, 45322.
[187] The EPA did not receive any comments related to our proposed approval of the trading mechanism for transportation conformity during the 30-day comment period.
[188] 88 FR 45276, 45318–45319.
[189] See 86 FR 49100, 49128 (September 1, 2021) (proposed rule) and 86 FR 67343, 67346 (November 26, 2021) (final rule).
[190] 76 FR 69896.
[191] EJSCREEN provides a nationally consistent dataset and approach for combining environmental and demographic indicators. EJSCREEN is available at *https://www.epa.gov/ejscreen/what-ejscreen.* The EPA used EJSCREEN to obtain environmental and demographic indicators representing each of the eight counties in the San Joaquin Valley. These indicators are included in EJSCREEN reports that are available in the rulemaking docket for this action.
[192] EPA Region IX, "EJSCREEN Analysis for the Eight Counties of the San Joaquin Valley Nonattainment Area," August 2022.

United States as a whole. The results of the analysis are provided for informational and transparency purposes.

This final action approves the State's plan for attaining the 1997 annual $PM_{2.5}$ NAAQS. Information on the 1997 annual $PM_{2.5}$ NAAQS and its relationship to health impacts can be found at 62 FR 38652 (July 18, 1997). We expect that this action and resulting emissions reductions will generally be neutral or contribute to reduced environmental and health impacts on all populations in the San Joaquin Valley, including people of color and low-income populations. At a minimum, this action would not worsen existing air quality and is expected to ensure the area is meeting requirements to attain and/or maintain air quality standards. Further, there is no information in the record indicating that this action is expected to have disproportionately high or adverse human health or environmental effects on a particular group of people.

## V. Final Action

For the reasons discussed in this final rule, the proposed rule, and the related technical support documents, under CAA section 110(k)(3), the EPA is approving the portions of the SJV $PM_{2.5}$ Plan as meeting CAA requirements for implementation of the 1997 annual $PM_{2.5}$ NAAQS as follows:

(1) We are finding that the 2013 base year emissions inventories continue to satisfy the requirements of CAA section 172(c)(3) and 40 CFR 51.1008 for purposes of both the Serious area and the CAA section 189(d) attainment plans, and to find that the forecasted inventories for the years 2017, 2018, 2019, 2020, 2023, and 2026 provide an adequate basis for the BACM, RFP, five percent, and modeled attainment demonstration analyses;

(2) We are approving the following elements as meeting the Serious nonattainment area planning requirements:

   a) the BACM/BACT demonstration as meeting the requirements of CAA section 189(b)(1)(B) and 40 CFR 51.1010(a);

b) the demonstration (including air quality modeling) that the Plan provides for attainment as expeditiously as practicable as meeting the requirements of CAA sections 179(d) and 189(b) and 40 CFR 51.1011(b);

c) the RFP demonstration as meeting the requirements of CAA sections 172(c)(2) and 171(1) and 40 CFR 51.1012; and

d) the quantitative milestone demonstration as meeting the requirements of CAA section 189(c) and 40 CFR 51.1013;

(3) We are approving the following elements as meeting the CAA section 189(d) planning requirements:

a) the BACM/BACT demonstration as meeting the requirements of CAA sections 189(a)(1)(C)[193] and 189(b)(1)(B) and 40 CFR 51.1010(c);

b) the demonstration that the Plan will, at a minimum, achieve an annual five percent reduction in emissions of $NO_X$ as meeting the requirements of CAA section 189(d) and 40 CFR 51.1010(c);

c) the demonstration (including air quality modeling) that the Plan provides for attainment as expeditiously as practicable as meeting the requirements of CAA sections 179(d) and 189(d) and 40 CFR 51.1011(b);

d) the RFP demonstration as meeting the requirements of CAA sections 172(c)(2) and 171(1) and 40 CFR 51.1012; and

e) the quantitative milestone demonstration as meeting the requirements of CAA section 189(c) and 40 CFR 51.1013;

(4) We are approving the motor vehicle emissions budgets for 2020 and 2023 as shown in Table 1 of this final rulemaking because they are derived from approvable RFP and attainment

[193] As discussed in Section III.B of the proposal, a section 189(d) plan must address any outstanding Moderate or Serious area requirements that have not previously been approved. Because we have not previously approved a subpart 4 RACM demonstration for the San Joaquin Valley nonattainment area, we also proposed to approve the BACM/BACT demonstration in the SJV $PM_{2.5}$ Plan as meeting the subpart 4 RACM/RACT requirement for the area (88 FR 45276, 45322).

demonstrations and meet the requirements of CAA section 176(c) and 40 CFR part 93, subpart A; and

(5) We are approving the trading mechanism provided for use in transportation conformity analyses for the 1997 annual $PM_{2.5}$ NAAQS, in accordance with 40 CFR 93.124(b).

As discussed in Section I.B of the proposal, on November 26, 2021, the EPA partially approved and partially disapproved portions of the 2018 $PM_{2.5}$ Plan that addressed attainment of the 1997 annual $PM_{2.5}$ NAAQS in the San Joaquin Valley nonattainment area. The elements that the EPA disapproved include the attainment demonstration, comprehensive precursor demonstration, five percent annual emissions reductions demonstration, BACM demonstration, RFP demonstration, quantitative milestones, motor vehicle emissions budgets, and contingency measures. This disapproval was effective on December 27, 2021. In a separate final partial approval and partial disapproval action, also effective December 27, 2021, the EPA disapproved the contingency measure element of the 2018 $PM_{2.5}$ Plan as it relates to the requirements for the Serious area plan 2006 24-hour $PM_{2.5}$ NAAQS and the Moderate area plan for the 2012 annual $PM_{2.5}$ NAAQS.[194]

In our November 26, 2021 final disapprovals, we noted that offset and highway sanctions under CAA sections 179(b)(2) and 179(b)(1), respectively, would not apply if California submits, and the EPA approves, a SIP submission that corrects all of the deficiencies identified in our final actions prior to the imposition of sanctions.[195] Through this final approval action, we find that California has corrected the deficiencies associated with the Serious area and CAA section 189(d) SIP elements for the 1997 annual $PM_{2.5}$ NAAQS for the San Joaquin Valley (except for the contingency measures element). Thus, upon the effective date of this final rule, all sanctions and any sanctions clocks associated with the Serious area and CAA section 189(d) SIP elements for the 1997 annual $PM_{2.5}$ NAAQS for the San Joaquin Valley (except the contingency

[194] 86 FR 67343.
[195] 86 FR 67329.

measures element) will be permanently terminated.

This final action does not address the prior disapprovals of the contingency measure elements for the 1997 annual $PM_{2.5}$ NAAQS, the 2006 24-hour $PM_{2.5}$ NAAQS, and the 2012 annual $PM_{2.5}$ NAAQS. Therefore, all sanctions and any sanctions clocks associated with the disapprovals of the contingency measure elements for those standards will continue to apply in the San Joaquin Valley as outlined in the November 26, 2021 final disapprovals unless or until the EPA approves a SIP submission or submissions meeting the outstanding contingency measure requirements for these NAAQS. As discussed in Response 6, CARB has submitted three SIP submissions to address the CAA contingency measure requirements for the 1997 annual $PM_{2.5}$ NAAQS, the 2006 24-hour $PM_{2.5}$ NAAQS, and the 2012 annual $PM_{2.5}$ NAAQS in the San Joaquin Valley. The EPA will act on these submissions and determine the effects on the sanctions, if any, in accordance with 40 CFR 52.31 through one or more separate rulemaking actions.

## VI. Statutory and Executive Order Reviews

Under the Clean Air Act, the Administrator is required to approve a SIP submission that complies with the provisions of the Act and applicable federal regulations. 42 U.S.C. 7410(k); 40 CFR 52.02(a). Thus, in reviewing SIP submissions, the EPA's role is to review state choices, and approve those choices if they meet the minimum criteria of the Act. Accordingly, this final action merely approves State law as meeting federal requirements and does not impose additional requirements beyond those imposed by State law. For that reason, this 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 (Public Law 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 Clean Air Act.

In addition, the SIP is not approved to apply on any Indian reservation land or in any other area where the 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, Feb. 16, 1994) directs federal agencies to identify and address "disproportionately high and adverse human health or environmental effects" of their actions on minority populations and low-income populations to the greatest extent practicable and permitted by law. The EPA defines environmental justice (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." The 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."

The State did not evaluate environmental justice considerations as part of its SIP submittal; the CAA and applicable implementing regulations neither prohibit nor require such an evaluation. The EPA's evaluation of environmental justice is described in the section of this document titled, "Environmental Justice Considerations." The analysis was done for the purpose of providing additional context and information about this rulemaking to the public, not as a basis of the 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. In addition, there is no information in the record upon which this decision is based that is inconsistent with the stated goal of E.O. 12898 of achieving environmental justice for people of color, low-income populations, and Indigenous peoples.

This action is subject to the Congressional Review Act, and the EPA will submit a rule report to each House of the Congress and to the Comptroller General of the United States. This action is not a "major rule" as defined by 5 U.S.C. 804(2).

Under section 307(b)(1) of the Clean Air Act, petitions for judicial review of this action must be filed in the United States Court of Appeals for the appropriate circuit by **[Insert date 60 days after date of publication in the *FEDERAL REGISTER*]**. Filing a petition for reconsideration by the Administrator of this final rule does not affect the finality of this action for the purposes of judicial review nor does it extend the time within which a petition for judicial review may be filed, and shall not postpone the effectiveness of such rule or action. This action may not be challenged later in proceedings to enforce its requirements. (See section 307(b)(2).)

**List of Subjects in 40 CFR Part 52**

Environmental protection, Air pollution control, Incorporation by reference, Particulate matter, Reporting and recordkeeping requirements.

**Authority: 42 U.S.C. 7401 et seq.**

Dated: December 5, 2023.

Martha Guzman Aceves,
*Regional Administrator,*
*Region IX.*

Part 52, chapter I, title 40 of the Code of Federal Regulations is amended as follows:

**PART 52–APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS**

1. The authority citation for Part 52 continues to read as follows:

**Authority:** 42 U.S.C. 7401 *et seq.*

**Subpart F–California**

2. Section 52.220 is amended by adding paragraphs (c)(537)(ii)(A)(*9*) and (*10*) and (c)(537)(ii)(B)(*7*), (*8*), and (*9*) to read as follows:

**§52.220 Identification of plan—in part.**

* * * * *

(c) * * *

(537) * * *

(ii) * * *

(A) * * *

(*9*) CARB Resolution No. 21-21, September 23, 2021, submitted as a revision to the 2018 $PM_{2.5}$ Plan on November 8, 2021, by the Governor's designee.

(*10*) "Staff Report, Proposed SIP Revision for the 15 μg/$m^3$ Annual $PM_{2.5}$ Standard for the San Joaquin Valley," August 13, 2021, submitted as a revision to the 2018 $PM_{2.5}$ Plan on November 8, 2021, by the Governor's designee.

(B) * * *

(*7*) 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards ("2018 $PM_{2.5}$ Plan"), adopted November 15, 2018 (portions pertaining to the 1997 annual $PM_{2.5}$ NAAQS only, and excluding Chapter 4 ("Attainment Strategy for $PM_{2.5}$"), Chapter 5 ("Demonstration of Federal Requirements for 1997 $PM_{2.5}$ Standards"), Chapter 6 ("Demonstration of Federal Requirements for 2006 $PM_{2.5}$ Standards"), Chapter 7 ("Demonstration of Federal Requirements for 2012 $PM_{2.5}$ Standards"), Appendix D ("Mobile Source Control Measure Analyses"), Appendix H ("RFP,

Quantitative Milestones, and Contingency"), and Appendix K ("Modeling Attainment Demonstration")).

(*8*) "Attainment Plan Revision for the 1997 Annual $PM_{2.5}$ Standard," August 19, 2021, excluding Appendix H, section H.3 ("Contingency Measures"), submitted as a revision to the 2018 $PM_{2.5}$ Plan on November 8, 2021, by the Governor's designee.

(*9*) SJVUAPCD Governing Board Resolution No. 21–08–13, August 19, 2021, submitted as a revision to the 2018 $PM_{2.5}$ Plan on November 8, 2021, by the Governor's designee.

* * * * *

3. Section 52.237 is amended by revising paragraph (a)(11) to read as follows:

**§ 52.237 Part D disapproval.**

(a) * * *

(11) The contingency measures portion of the 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards ("2018 $PM_{2.5}$ Plan"), adopted November 15, 2018, are disapproved for San Joaquin Valley with respect to the 1997 annual $PM_{2.5}$ NAAQS because they do not meet the requirements of Part D of the Clean Air Act.

* * * * *

4. Section 52.244 is amended by adding paragraph (f)(4) to read as follows:

**§ 52.244 Motor vehicle emissions budgets.**

* * * * *

(f) * * *

(4) San Joaquin Valley, for the 1997 annual $PM_{2.5}$ NAAQS only (years 2020 and 2023 budgets only), approved [**INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER***].

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