

SUPPLEMENTARY INFORMATION: The Coast Guard will enforce a safety zone for the Crescent City Countdown Club/New Year's Celebration fireworks display from 11:30 p.m. on December 31, 2023, through 12:30 a.m. on January 1, 2024, to provide for the safety of life on the navigable waterways during this event. Our regulation for annual fireworks displays and other events in the Eighth Coast Guard District, 33 CFR 165.801 identifies this safety zone on the Lower Mississippi River MM 93.5–96.5, New Orleans, LA. During this enforcement period, as reflected in § 165.801(a) through (d), entry into this zone is prohibited unless authorized by the Captain of the Port or a designated representative.

In addition to this notification of enforcement in the **Federal Register**, the Coast Guard plans to provide notification of this enforcement period via Marine Safety Information Bulletin and Broadcast Notice to Mariners.

Dated: December 11, 2023.

K.K. Denning,

Captain, U.S. Coast Guard, Captain of the Port Sector New Orleans.

[FR Doc. 2023–27507 Filed 12–13–23; 8:45 am]

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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 January 16, 2024.

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> website. 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 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 µg/m³ 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 µg/m³ 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 µg/m³ Annual PM_{2.5} Standard, March

¹ 88 FR 45276.

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 µg/m³ 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.

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 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 approved⁸ 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 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.

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

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/m³ 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/m³ 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/RACM 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).

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 Grew, to Docket ID No. EPA–R09–OAR–2023–0263.

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.*

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 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 µg/m³ 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.

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.")

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.

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 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 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

²¹ Title VI Supplement, p. 8.

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 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 µg/m³ 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.

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

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 O₃ 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.

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).

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.

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 NO₂ (total amount of NO₂ 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 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 NO₂ 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.

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

high-temperature agricultural region. *Nat. Commun.*, 6:8753, doi:10.1038/ncomms9753.

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>.

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).

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>.

²⁹ Oikawa et al. (2015), Unusually high soil nitrogen oxide emissions influence air quality in a

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.

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 NO₂ was underpredicted by 25 percent relative to NO₂ 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 NO₂ and the NO₂ columns derived from surface-based measurements at the urban sites of Fresno and Bakersfield, where NO₂ 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-NO₂ rural sites is unlikely to be comparable to the NO_x emissions driving the high NO₂ 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 NO₂ 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 NO₂ 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 NO₂ and satellite column NO₂ in the central United States. This correlation is an important finding, implying soil NO_x emissions may be underestimated. However, it should be noted that in absolute terms, even without soil NO_x, the model simulation overpredicted the NO₂ 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 NO₂ 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 NO₂ 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 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 NO₂ 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 NO₂ and ground level measurements, and the role of lightning and soil NO_x in explaining spatial and temporal distributions of NO₂. 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 NO₂ 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 NO₂ with CMAQ air quality model predictions using soil

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.

³⁸ Wang et al (2023), Satellite NO₂ trends reveal pervasive impacts of wildfire and soil emissions across California landscapes, *Environ. Res. Lett.*, 18, doi:10.1088/1748-9326/accc5f.

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.

³² Id. at 60 and 63.

³³ Id. at 77.

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.aeaa.2020.100067.

³⁵ Wang et al (2021), Improved modelling of soil NO_x emissions in a high temperature agricultural region: role of background emissions on NO₂ trend over the US, *Environ. Res. Lett.*, 16, doi:10.1088/1748-9326/ac16a3.

³⁶ Id. at Figure 3.

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 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 et 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 NO₂ over agricultural areas and

modeled soil emissions, suggesting soil NO_x as a driver of NO₂ there. However, using correlations and ratios of NO_x to CO among monitoring sites, and satellite column NO₂ retrievals, Guo et al. (2020) found little difference between the diurnal and seasonal temporal variation at rural sites compared to urban sites, 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. 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

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

⁴¹ Sha et al. (2021), Impacts of soil NO_x emission on O₃ air quality in rural California, *Environmental Science & Technology*, 55(10), 7113–7122, doi:10.1021/acs.est.0c06834.

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.*

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 µg/m³ 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.

Given that the 15 µg/m³ 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 PM_{2.5} concentrations of 0.07 µg/m³ 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

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 µg/m³ Annual PM_{2.5} Standard for the San Joaquin Valley,” release date August 13, 2021.

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 p.m.2.5 NAAQS attainment demonstration.xlsx,” EPA Region IX, May 1, 2023.

⁵⁷ Id.

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] 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.

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 Irrigated Residents (AIR) v. EPA*, 632 F.3d 584 (9th Cir. 2011) (amended and superseded by *Ass'n of Irrigated 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.

⁶⁰ Id. at 968 (citing *Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962)).

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 µg/m³ 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 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

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.

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, 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}

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.

⁶⁶ 81 FR 58010 (August 24, 2016).

⁶⁷ 40 CFR 51.1006; EPA's PM_{2.5} Precursor Demonstration Guidance.

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 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

⁶⁸Parrish, D. (2014), Synthesis of Policy Relevant Findings from the CalNex 2010 Field Study, Final Report to the Research Division of the California Air

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.

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

Resources Board, 2014, p. 63; available at <https://csl.noaa.gov/projects/calnex/synthesisreport.pdf>.

⁶⁹Kelly, J.T. et al. (2018), Modeling NH₄NO₃ over the San Joaquin Valley during the 2013 DISCOVER-AQ campaign. *Journal of Geophysical Research: Atmospheres*, 123, 4727–4745, doi:10.1029/2018JD028290.

⁷⁰Memorandum 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."

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 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-AQ⁷² 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 (“Weight of Evidence Analysis”) of the CARB Staff Report on the 2018 PM_{2.5} Plan⁷³ 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 acid⁷⁵ (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).

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 Association*, 56(12):1679–1693, doi: 10.1080/10473289.2006.10464573.

⁷⁵ Nitric acid (HNO₃) 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.

Consistent with CRPAQS, aircraft-borne measurements during the more recent 2013 DISCOVER-AQ⁷⁶ 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 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-AQ⁸⁰ 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

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>.

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, 12ff.; 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 NH₃ was 49 times greater than HNO₃ These results highlight that NH₃ was in excess, and NH₄NO₃ [ammonium nitrate] formation is likely limited by HNO₃ 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 NH₃ (g) mixing ratios were elevated . . . the observed HNO₃ (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

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>.

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.

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 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 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

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.

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).

⁸⁵ 88 FR 45276, 45288–45290.

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 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 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

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.

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.

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.climatechange.org.uk/media/1927/on-farm-technology_report.pdf.

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. 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.

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 NH₃ 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 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,

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.

⁹⁸ Gu, B. et al. (2023) Cost-effective mitigation of nitrogen pollution from global croplands. *Nature*, Vol. 613, pp. 77–84.

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 N₂O emissions, the use of these inhibitors may prolong the retention of NH₄ 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 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

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.

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>.

⁹⁵ March 2023 Ammonia Supplement, p. 92.

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 studies¹⁰⁷ 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 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 NH₃ 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 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

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.*

¹⁰⁸ 2018 PM_{2.5} Plan, Appendix C, pp. C-339 to C-341.

¹⁰⁹ March 2023 Ammonia Supplement, p. 92.

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.

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 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

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).

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,

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

¹¹¹ 2018 PM_{2.5} Plan, Appendix C, pp. C-312 to C-323.

¹¹² Id.; March 2023 Ammonia Supplement, pp. 25-26.

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.

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

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.

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/m³ cannot accurately describe 2023 conditions given that 2022 data show a design value well above 16 µg/m³. 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/m³ for 2024 and 0.27 µg/m³ 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/m³ 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 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 µg/m³ down to 0.12 µg/m³. (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 µg/m³ by using a NO_x emissions-based interpolation between the Plan's 2018 and 2023 design values, 16.3 and 14.7 µg/m³, 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 µg/m³, which is above the level of the 1997 annual PM_{2.5} NAAQS

¹²¹ PM_{2.5} Precursor Demonstration Guidance, p. 36.

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 µg/m³ SIP Revision, Appendix K, Table 33.

¹¹⁹ 88 FR 45276, 45293, fn. 184.

¹²⁰ Kelly, J.T. et al. (2018), op. cit.

(*i.e.*, 15.0 $\mu\text{g}/\text{m}^3$). 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 projected NO_x emissions for 2020, 2023, and 2024 and found the estimated 2023 response to be only 0.01 $\mu\text{g}/\text{m}^3$ higher than in 2024.¹²⁵ While there are several differences between 2020 and 2024 modeled emissions for the various $\text{PM}_{2.5}$ precursors and direct $\text{PM}_{2.5}$, the key difference for assessing the change in the sensitivity of $\text{PM}_{2.5}$ to ammonia reductions is NO_x emissions levels. The modeling for 2020 and 2024 represent $\text{PM}_{2.5}$ 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 $\text{PM}_{2.5}$ 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 $\text{PM}_{2.5}$ Plan or the 15 $\mu\text{g}/\text{m}^3$ 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 $\mu\text{g}/\text{m}^3$ (reported as 0.27 $\mu\text{g}/\text{m}^3$). Using baseline NO_x emissions (153.6 tpd), the estimated 2023 response is 0.275 $\mu\text{g}/\text{m}^3$, which is about 0.01 $\mu\text{g}/\text{m}^3$ higher. Thus, the 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 $\text{PM}_{2.5}$ 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 $\text{PM}_{2.5}$ 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 $\text{PM}_{2.5}$ 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 $\mu\text{g}/\text{m}^3$." The commenter acknowledges that the State's approach of using a 0.25 $\mu\text{g}/\text{m}^3$ 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 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 $\text{PM}_{2.5}$ 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 $\mu\text{g}/\text{m}^3$ is appropriate for the 2012 annual $\text{PM}_{2.5}$ NAAQS of 12.0 $\mu\text{g}/\text{m}^3$, and 0.25 $\mu\text{g}/\text{m}^3$ is appropriate for the 1997 annual $\text{PM}_{2.5}$ NAAQS of 15.0 $\mu\text{g}/\text{m}^3$.

The contribution thresholds the EPA derived in the $\text{PM}_{2.5}$ 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 $\text{PM}_{2.5}$

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

¹²⁶ 2018 $\text{PM}_{2.5}$ Plan, Appendix K, Section 5.6 "PM_{2.5} Precursor Sensitivity Analysis", p. 70: "To evaluate the impact of reducing emissions of different $\text{PM}_{2.5}$ precursors on $\text{PM}_{2.5}$ 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 $\text{PM}_{2.5}$ 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.

¹²⁸ EPA, "Technical Support Document, EPA Evaluation of Air Quality Modeling, San Joaquin Valley $\text{PM}_{2.5}$ Plan for the 2006 $\text{PM}_{2.5}$ 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 $\text{PM}_{2.5}$ Plan portion addressing the 1997 annual $\text{PM}_{2.5}$ NAAQS. 86 FR 67329, 67335 (November 26, 2021).

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 µg/m³) and the 2012 annual NAAQS (12 µg/m³). Different thresholds may be applicable to other levels and/or forms of the NAAQS (either past or future).

The Technical Basis Document¹³¹ 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/m³), 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/m³ 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/m³ 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/m³ 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 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

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

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.

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.

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 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 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 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}

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 Irrigated 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.

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 2021¹⁴⁷ and 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

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."

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."

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).

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 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 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

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.

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.

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 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 µg/m³ 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 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

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.

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.

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 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

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 Irrigated 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.

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.

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.")

¹⁵⁹ Letter dated March 29, 2023, from Steven S. Cliff, Executive Officer, CARB, to Martha Guzman,

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 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

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.

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).

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 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,"

¹⁶⁹ 88 FR 45276, 45278.

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."

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

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.

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).

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 µg/m³ 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 µg/m³ 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**

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.

¹⁷³ 88 FR 45276, 45320.

¹⁷⁴ 40 CFR 7.120.

¹⁷⁵ 40 CFR 7.115.

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, 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, SO₂, 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, SO₂, 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, SO₂, 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/m³ SIP Revision, Appendix D, Table 18. Budgets are rounded up to the nearest tenth of a ton.

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 budgets¹⁸⁵ 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} 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

¹⁷⁹ 87 FR 7834 (February 10, 2022).

^{180 181} 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).

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.

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).

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 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 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 measures element) will be permanently terminated.

This final action does not address the prior disapprovals of the contingency measure elements for the 1997 annual

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.

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/RACM requirement for the area (88 FR 45276, 45322).

¹⁹⁴ 86 FR 67343.

¹⁹⁵ 86 FR 67329.

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 (Pub. L. 104–4);
- Does not have federalism implications as specified in Executive Order 13132 (64 FR 43255, August 10, 1999);

- Is not subject to Executive Order 13045 (62 FR 19885, April 23, 1997) because it approves a State program;
- Is not a significant regulatory action subject to Executive Order 13211 (66 FR 28355, May 22, 2001); and
- Is not subject to requirements of Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) because application of those requirements would be inconsistent with the 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 February 12, 2024. 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/m³ 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.

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■ 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.

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

§ 52.244 Motor vehicle emissions budgets.

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(f) * * *

(4) San Joaquin Valley, for the 1997 annual PM_{2.5} NAAQS only (years 2020

and 2023 budgets only), approved January 16, 2024.

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DEPARTMENT OF TRANSPORTATION

Maritime Administration

46 CFR Part 298

[Docket Number MARAD-2023-0086]

RIN 2133-AB98

Amendment to the Federal Ship Financing Program Regulations; Financial Requirements

AGENCY: Maritime Administration, Department of Transportation.

ACTION: Final rule.

SUMMARY: This document serves to inform interested parties and the public that the Maritime Administration (MARAD) is amending its regulations implementing the Federal Ship Financing Program's (Title XI Program) financial requirements. This action is necessary to implement statutory changes and update the existing financial requirements imposed on Title XI Program obligors to align with more up-to-date vessel financing and federal credit best practices.

DATES: This rule will be effective January 16, 2024.

FOR FURTHER INFORMATION CONTACT: David M. Gilmore, Director, Office of Marine Financing, at (202) 366-5737, or via email at marinefinancing@dot.gov. You may send mail to Mr. Gilmore at Department of Transportation, Maritime Administration, Office of Marine Financing, 1200 New Jersey Avenue SE, Washington, DC 20590. If you have questions on viewing the Docket, call Docket Operations, telephone: (800) 647-5527.

SUPPLEMENTARY INFORMATION:

Background

The Secretary of Transportation, through MARAD, is authorized to provide guarantees of debt (obligation guarantees) to finance all types of vessel construction and shipyard modernization and improvement, except for fishing vessels. The Title XI Program is a loan guarantee program, administered by MARAD, which was established under Title XI of the Merchant Marine Act, 1936, Public Law 74-835, codified at 46 U.S.C. Chapter 537, as amended (the "Act"). Title XI provides for the full faith and credit of the United States, acting by and through

the Maritime Administrator, for the payment of debt obligations for: (1) U.S. shipowners for the purpose of financing or refinancing U.S. flag vessels constructed, reconstructed, or reconditioned in U.S. shipyards; and (2) U.S. shipyards for the purpose of financing advanced shipbuilding technology and modern shipbuilding technology of a privately-owned shipyard facility located in the U.S. As the Title XI Program guarantees full payment of the obligation's unpaid principal and interest in the event of a default by the borrower, both the statute and regulations contain several criteria and requirements intended to reduce the risk of a loan default. Though the Title XI Program regulations have been amended over the years, the current financial requirements and limitations remain substantially the same as when MARAD introduced them in 1978. As lending practices have evolved, MARAD's regulatory standards have not changed to reflect modern lending practices for vessel financing. For example, when the regulations were implemented, certain leases were not included as an expense under generally accepted accounting principles (GAAP), but today GAAP requires that all leases be included as an expense. Today, retained earnings are also expected to be included in any calculation of equity or net worth pursuant to GAAP.

Accordingly, the modifications to the regulations will eliminate confusion and align the Title XI Program regulations with modern accounting standards.

Prior to execution of a guarantee, MARAD is bound by statute to, among other things, make determinations of economic soundness of the project and the financial and operating capability of the applicant. To that end, the Title XI regulations currently require each borrower, and operator if applicable, to have and maintain: (1) working capital of at least \$1; (2) at least 90 percent of its equity as shown on the last audited balance sheet; and (3) long-term debt not to exceed twice its equity. By this amendment, MARAD is modernizing its financial review process by removing static financial covenants and loan thresholds and replacing them with a review and evaluation of the creditworthiness of each borrower based on revenue metrics based on federal credit and maritime lending best practices. The use of these revenue metrics is intended to improve the quality of MARAD financial requirements applied to new borrowers. As part of its regular programmatic evaluation process, MARAD frequently seeks feedback from potential applicants