Appendix B: District and ARB Comment Letters on Proposed EPA Plan Disapproval

On November 30, 2010 (75 *Federal Register* 74518-74543), The U.S. Environmental Protection Agency (EPA) proposed a limited approval and limited disapproval of the *2008 PM2.5 Plan*. The San Joaquin Valley Air District (District) and the California Air Resources Board (ARB) submitted extensive documentation and comments to EPA regarding the disapproval issues raised. The District believes that the collective comments from the District and the State of California fully address the issues EPA identified in its proposed disapproval. This Appendix presents the District's and ARB's written comments to EPA.

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

January 31, 2011

Docket No. EPA-R09-OAR-2010-0516
Frances Wicher
Office of Air Planning (AIR-2)
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105

Via internet : www.regulations.gov
Via email: wicher.frances@epa.gov

RE: Approval and Promulgation of Implementation Plans; State of California; 2008 San Joaquin Valley State Implementation Plan for Fine Particulate Matter; 2007 State Strategy; PM2.5; Proposed Rule (Docket Number: EPA-R09-OAR-2010-0516)

Dear Ms. Wicher:

The San Joaquin Valley Air Pollution Control District (District) hereby submits comments regarding the U.S. Environmental Protection Agency's (EPA) proposed partial approval and partial disapproval of the District's *2008 PM2.5 Plan* (Plan). We appreciate that EPA has approved major components of the Plan, including the emissions inventory, commitments to implement control measures, and specific aggregate emissions reductions. We believe that the information provided in response letters from the District and California Air Resources Board (ARB), along with recent regulatory actions by ARB, completely address the issues raised by EPA in its proposed disapproval. Disapproval of key elements of the *2008 PM2.5 Plan*, including the attainment date extension, would have a devastating impact on the San Joaquin Valley, a region that has been hard-hit by the national recession. We therefore urge you to carefully reconsider these issues based on the information submitted by the District and ARB. The following discussion presents the District's specific responses to the issues raised by EPA's proposed disapproval (75 FR 74518).

Modeling Documentation

EPA has proposed to disapprove the air quality modeling analysis of the Plan, suggesting the Plan does not currently include sufficient documentation and analysis for EPA to determine the modeling's adequacy. Since publication of EPA's proposed disapproval, ARB has submitted extensive modeling documentation to EPA. The

District is optimistic that EPA will be able to approve related elements of the Plan as a result of this documentation.

Enforceable Commitment Level

EPA proposed to disapprove the attainment demonstration for the reason that it relies too extensively on commitments for emissions reductions in lieu of fully adopted and submitted rules. More specifically, EPA states that it expects a 90% ratio between emissions reductions achieved versus committed before it will consider the Plan approvable.

ARB has recently submitted additional information on the adoption and implementation of state control measures that were included as commitments in the *2008 PM2.5 Plan*. In December 2010, ARB adopted amendments to its in-use heavy duty truck and off-road equipment rules. Taken together, these rules achieve the expected emissions targets identified in the 2007 State Strategy for these categories, utilizing a NOx-equivalent emissions metric. The District supports ARB comments related to state control measures.

That said, EPA stating that there is a 10% acceptable threshold for outstanding enforceable commitments is unreasonable in light of attainment plan and rule development timelines, the magnitude of reductions needed, and the types of new technology-driven programs that will become increasingly important.

In fact, the Clean Air Act (CAA) does not specifically define an acceptable threshold. EPA stated that the 10 percent threshold for outstanding enforceable commitments has been in practice historically for State Implementation Plan (SIP) evaluation to meet the former 1-hour federal ozone standard in other areas of California and Texas. EPA cites 40 CFR. §51.1007 as stating that an attainment demonstration should include "adopted" measures. However, there is no requirement that such measures be already approved by EPA at the time the SIP is approved (75 FR 74535).

First, it is fundamentally unfair to hold the Valley to having to include 90% or more of its reductions fully adopted and approved based on the fact that apparently Houston had done so when EPA acted on its plan. The unfairness results from the fact that Valley's PM2.5 Plan is being judged approximately 2 ½ years after it was due to EPA in April 2008, whereas the Houston plan was being considered in the year 2001, seven years after it was due to U.S. EPA in 1994. (42 U.S.C. §7511a(c)(2)). In addition, the percentage of reductions that may rely on "enforceable commitments" should not be a fixed absolute number, but should depend on factors such as the severity of the attainment problem in the area, the extent of control measures already adopted under previous Plans, whether the region's commitments represent expeditious implementation of additional controls, and whether it is feasible to accelerate the rule adoption schedule. Therefore, the 90 percent threshold cannot be applied to the Valley's *2008 PM2.5 Plan* because the lapse between our SIP submittal and proposed action is a much shorter time frame than has been allowed in prior practice.

To the extent EPA relies on its supposed "10%" criterion, it has effectively engaged in rulemaking without going through the required notice and comment process. Accordingly, such reliance is invalid. Finally, a plan submittal such as the present one, which includes many control measures that can only feasibly be adopted over a period of years, is fundamentally different from a plan submittal that deals specifically with just one identified control measure, which is the context underlying EPA's premise that reliance on enforceable commitments must be "limited."

The District has committed to one of the nation's the most aggressive rule development schedules to meet its *2007 Ozone Plan* and *2008 PM2.5 Plan* attainment goals. The *2008 PM2.5 Plan* adopted by the District Governing Board was a robust and comprehensive attainment plan that included a combination of technologically feasible and technology forcing measures. In fact, of the thirteen (13) District regulatory control measure commitments in the Plan, the District adopted eleven (11) to date and will finalize the remaining two regulatory control measures in the first half of this year. The District has also continued to implement incentive programs and other innovative strategies and programs described in the *2008 PM2.5 Plan*, including extensive public outreach and continued study of PM2.5 in the Valley.

Arbitrarily accelerating this rule development process for the purpose of meeting EPA's supposed 10% enforceable commitments target is ill-advised, and could lead to poorly crafted regulations that do not achieve emissions reductions goals while placing unnecessary additional burdens on the regulated community and local economy which have already been heavily regulated. In addition, rule development would have needed to be significantly underway for several proposed measures before the Governing Board had the opportunity to review and take action on the Plan. This effectively would have circumvented a portion of the public process.

EPA must re-evaluate this 10% enforceable commitment policy interpretation of the CAA, especially as the National Ambient Air Quality Standards (NAAQS) are getting more stringent and more areas need to develop and implement an attainment plan. Areas like the San Joaquin Valley have extensive air quality challenges ahead of them despite the significant progress in emissions reductions that have already been achieved. Current and future air quality plans are to continue to look for far-reaching and innovative strategies to generate additional air quality improvements. These plans by necessity will have to continue to rely on regulations that take time and effort to develop and implement.

VOCs as a PM2.5 precursor

Contrary to ARB's and District's finding, EPA has proposed to find that volatile organic compounds (VOCs) are a PM2.5 precursor in the Valley. The District maintains that the extensive scientific foundation of the *2008 PM2.5 Plan* does not support EPA's proposed position that VOCs are a significant PM2.5 precursor for the Plan. EPA's PM2.5 Implementation Rule does not require states to address VOCs, unless states

provide an appropriate technical demonstration showing that VOC emissions contribute significantly to PM2.5 concentrations, or EPA provides such a demonstration. However, U.S. EPA did not establish a quantitative test for determining what constitutes a significant contribution. District staff believes that the studies EPA referenced in the Technical Support Document (TSD) do not constitute a technical demonstration that VOC is a PM2.5 attainment plan precursor. ARB and District staff carefully evaluated the available science during the development of the *2008 PM2.5 Plan* and, as a result, the Plan did not specify VOCs as a significant precursor.

As expanded upon by ARB in their comment letter attachment, District and ARB staff have concluded that VOCs should not be considered a significant precursor in the San Joaquin Valley based upon review of the available science:

1. All the grid-based photochemical modeling studies show that NOx is the most effective precursor to reduce PM2.5 concentrations;
2. All studies show that large reductions of VOC emissions on the order 50% will reduce the ammonium nitrate component of PM2.5 by 10-15%;
3. However, determining whether VOCs are a significant PM2.5 precursor as intended in the PM2.5 Implementation Rule needs to be done in the context of real-world control programs; and
4. In this context, feasible incremental VOC emission reductions lead to either little benefit or even a disbenefit in PM2.5 concentrations.

These studies constitute the technical demonstration that VOCs are not a PM2.5 attainment plan precursor. The District fully endorses ARB's technical comments supporting these conclusions.

The District has already committed to adopting and implementing an aggressive VOC reduction strategy through the *2007 Ozone Plan.* However, requiring these VOC measures to be incorporated into the *2008 PM2.5 Plan* would generate resource-intensive ripple-effects throughout many portions of the Plan without providing a significant PM2.5 air quality benefit.

RACT/RACM
The RACT/RACM disapproval is linked to modeling documentation issues and the VOC issue. As these issues become resolved, the existing PM2.5 RACT/RACM demonstration should be deemed approvable by EPA.

Rate of Further Progress (RFP)
EPA acknowledges on pages 72-73 of the TSD that, "EPA believes that further reduction of these pollutants is challenging, because the State and local air pollution regulations already in place include most of the readily available PM2.5 and NOx control measures. ... we believe that it is not feasible at this time to accelerate the emissions reduction schedule for the State and Federal mobile source which must rely on fleet turnover over the years to ultimately deliver the anticipated emissions reductions. ...

EPA believes that the District and State are implementing these rules and programs as expeditiously as practicable."

The District maintains that, as stated in the RFP chapter of the *2008 PM2.5 Plan*, vast reductions will be achieved in the Valley by 2009 and 2012, ensuring continuous progress towards attainment in 2014. Extraordinary progress has been made thus far and there is steady progress reducing each PM2.5 pollutant category so that 100% of the necessary reductions are achieved by the attainment date. The District maintains that the RFP demonstration in the *2008 PM2.5 Plan* should be approvable as the most aggressive approach possible.

However, the District is investigating an alternative analysis approach to show how the Valley meets EPA's rigorous "milestone date fraction" analysis as described in 40 CFR 51.1009. As a result of the District's aggressive 1-hr Ozone and PM10 attainment strategies, the RFP baseline year inventory (2005) reported in the Plan already included the benefit of many tons of SIP-approved emissions reductions. As an alternative analysis, the RFP could be recalculated to take into account emissions reductions benefits resulting from control measures adopted prior to the 2005 RFP baseline year. This alternative approach would provide for a milestone date fraction demonstration that further demonstrates Reasonable Further Progress.

Contingency Measures

EPA's proposed disapproval indicates that the amount of contingency measures in the *2008 PM2.5 Plan* is insufficient. As discussed in the *2008 PM2.5 Plan*, nonattainment areas with significant attainment challenges have developed aggressive and far-reaching emission reduction measures to meet federal requirements, and reductions are usually not held in reserve to be used only if an area fails to meet a milestone. In fact, the Valley's *2007 Ozone Plan* attainment challenges necessitate "black box" reductions in addition to reductions from the District's extensive control measure analysis process. The issue of sufficient contingency measures will continue to present challenges to many nonattainment areas for future NAAQS, and EPA should work towards realistic and specific solutions in future implementation rules. While the purpose of contingency measures is valid, the current implementation of this requirement is impractical for areas like the Valley.

EPA noted the potential of SIP-creditable incentive programs to serve as contingency measures. The District stated in the Plan that the District was working on SIP-creditable incentive programs in time for RFP milestone years. These incentive program updates are currently in progress. EPA noted on TSD page 116 that the District should identify the incentive grant programs expected to generate SIP-creditable reductions and quantify the amount of these reductions for use to satisfy the contingency measure requirement. The District will continue to work with EPA to incorporate the District's incentive programs into the SIP-process.

Attainment Date Extension

As a result of the proposed disapproval of the attainment demonstration, EPA has also proposed to automatically deny the request to grant the Valley a five-year attainment date extension to 2015. The District contends that the denial of the 5-year extension should not be an automatic result of the proposed attainment demonstration disapproval. As discussed in throughout this comment letter, the District believes that EPA should fully approve the Plan. But if EPA concludes it cannot do so, it should at least conditionally approve the Plan. Section 172(c)(4) of the CAA provides the EPA Administrator flexibility to grant "conditional approval" of a plan revision: "The Administrator may approve a plan revision based on a *commitment of the State to adopt specific enforceable measures by a date certain,* but not later than 1 year after the date of approval of the plan revision."

The Plan clearly commits the District and ARB to adopt enforceable measures to achieve emissions reductions to meet the NAAQS. As noted above, the District has already adopted 11 out of 13 of its Plan control measure commitments. ARB adopted revisions to its on- and off-road rules on December 17, 2010. These actions to adopt enforceable measures satisfy the conditions specified in 172(c)(4) for conditional SIP approval, and should be applicable for approval of the attainment demonstration.

Extension of the attainment date to 2015 is essential for the success of the SIP. Implementation of the adopted control measures listed in the Plan has been structured to provide lead time for control technology to be developed and become commercially available for installation to a wide number of affected industries and mobile sources. Denial of the five-year extension will, as a practical matter, preclude the Valley from attaining the NAAQS in a timely manner.

The five-year extension is crucial to the technology development necessary to attain the NAAQS. For example, ultra low NOx burners for residential heating and many industrial applications are critical to reduce emissions from stationary sources. The District has partnered with other agencies to fund technology-forcing development of burner design, which has the promise to achieve substantial NOx emissions reductions. Implementation of the technology must demonstrate applicability and address safety considerations before becoming commercially available. As a consequence, rule development for the affected control measures has been modified provided lead time to evaluate the technology assessment and schedule implementation to meet industry's capacity to satisfy commercial demand.

Similarly, mobile sources rely on both fleet turnover and incentive programs to introduce cleaner burning engines into the impacted fleets. Newer Tier-4 truck engines meeting the most stringent federal standards are beginning to become commercially available but are scheduled to be phased in through 2015. While acceleration of the introductions of the cleaner technology is potentially viable, an immediate penetration of the technology to the targeted sources is not possible at the levels required, given the

extensive costs, which would be borne by fleet operators who would be required to prematurely replace their vehicles.

EPA notes on page 73 of the TSD that, "Given the severity of the PM2.5 nonattainment problem in the SJV, an extension of the attainment date would most likely be appropriate and approvable if it were supported by the necessary analysis and part of an attainment plan that meets the applicable statutory and regulatory requirements." Extension of the attainment date to 2015 is essential for the success of the Valley's Plan. The District is especially concerned about the timing of EPA's proposed disapproval of the attainment extension, published many months after the timeline specified in the Clean Air Act and at the close of the final year on which attainment would now be based. If this proposal is finalized, the Valley would experience severe sanctions and a transportation conformity lapse as a result of missing its attainment date. The potential ramifications are unreasonably and unnecessarily harsh for the Valley in light of EPA's delayed proposed disapproval and in light of EPA's comments suggesting that the attainment date extension is most likely appropriate.

Thank you for the consideration of our comments. We trust that the collective comments from the District and the State of California fully address the issues identified in your proposed disapproval.

Respectfully,

Seyed Sadredin
Executive Director/Air Pollution Control Officer

cc: J. Goldstene, ARB
D. Jordan, U.S. EPA

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January 31, 2011

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Attention: Docket No. EPA-R09-OAR-2010-0516

Dear Ms. Wicher:

The Air Resources Board (ARB or Board) is pleased to provide the following comments regarding the U.S. Environmental Protection Agency's (U.S. EPA) proposal, published on November 30, 2010, in the Federal Register, entitled *Approval and Promulgation of Implementation Plans; State of California; 2008 San Joaquin Valley State Implementation Plan for Fine Particulate Matter; 2007 State Strategy; PM2.5; Proposed Rule* (75 FR 74518-74543.) While U.S. EPA is proposing to approve in part the State Implementation Plan (SIP) revisions for PM2.5 in the San Joaquin Valley Air Basin, the proposed rule also includes a number of proposed disapprovals on the attainment demonstration and air quality modeling. The proposed disapprovals are a concern, and ARB is committed to working with U.S. EPA and the San Joaquin Valley Air Pollution Control District (District) to resolve the outstanding issues.

U.S. EPA has also proposed approval of certain elements of the 2008 San Joaquin Valley State Implementation Plan (Plan) including the emissions inventory and ARB's commitments to propose measures and achieve specific aggregate emission reductions necessary to attain the PM2.5 standards. These proposed approvals should be made final, and if U.S. EPA needs any further information, ARB is prepared to assist U.S. EPA staff.

U.S. EPA's proposed disapproval of the attainment demonstration and other SIP elements suggests that the Plan relies too extensively on commitments to achieve emission reductions in lieu of adopted rules. In fact, the vast majority of the necessary emission reductions are being achieved as a result of adopted rules and not commitments. Including a mix of adopted rules and commitments to achieve further reductions are entirely appropriate for a planning document, and clearly necessary in California given the challenging nature of the air pollution problem.

U.S. EPA's proposed interpretation that the percentage of emission reductions arising from enforceable commitments is too high is problematic. ARB does not agree with U.S. EPA's proposal that California's commitments should not be approved because the enforceable commitments account for more than ten percent of the emission reductions needed for attainment. Contrary to U.S. EPA's current position, there is no firm rule dictating what percentage of emission reductions may be from enforceable commitments; the principal legal requirement regarding the allowable proportion of enforceable commitments is simply that it be "limited."

The majority of the emission reductions needed for attainment in the San Joaquin Valley comes from already adopted measures. As noted in the Federal Register proposal, ARB has already adopted and submitted to U.S. EPA for approval a number of the measures in the 2007 State Strategy. Recent ARB approvals of additional emission reduction measures that will be submitted to U.S. EPA shortly will further reduce the percentage of enforceable commitments. ARB believes that the proportion of enforceable commitments contained in the Plan clearly meets the definition of "limited", consistent with the legal requirement (see Attachment 1). In a comment letter on U.S. EPA's parallel action on the South Coast PM2.5 SIP, the South Coast Air Quality Management District provided a thorough analysis of this issue, which is consistent with ARB staff's legal and technical analysis.

Implementation Progress

The 2007 State Strategy includes a comprehensive set of emission reduction strategies designed to attain the federal PM2.5 air quality standards through a combination of technologically feasible, cost-effective, and far reaching measures. ARB has taken action to achieve the vast majority of the necessary emission reductions. A list of the State actions taken to implement the Plan is provided (see Attachment 2). ARB is on track to meet the aggregate emissions reduction commitment for attainment of the PM2.5 standard in the San Joaquin Valley by 2014.

A major milestone in meeting the 2014 emissions reduction commitment was the December 2010 ARB action on the rules for In-Use Heavy Duty Trucks and In-Use Off-Road Equipment. These rules represent critical elements of ARB's commitment to reduce emissions contributing to PM2.5 nonattainment. An explanation of the method for accounting for the benefits of these recent actions is provided (see Attachment 3). The amendments will ensure that with the benefits of the rule, the remaining emissions are consistent with the Plan attainment target. ARB will be submitting these rules to U.S. EPA for approval.

Air Quality Modeling

U.S. EPA also proposed that VOCs should be considered an attainment plan precursor and that additional documentation on the air quality modeling was needed. The Plan relied extensively on information developed as part of the California Regional Particulate Matter Air Quality Study (CRPAQS). This state-of-the-science effort significantly advanced our understanding of the nature of PM2.5 in the San Joaquin Valley, air quality modeling methods, and the control approach needed to provide for attainment of the federal standards. CRPAQS studies demonstrated that the most effective control strategy was reducing directly emitted PM2.5 and NOx emissions, and that VOC controls were not beneficial in expediting attainment after taking into consideration these PM2.5 and NOx reductions. Documentation on ARB's technical assessment that VOCs should not be considered a significant precursor is provided (see Attachment 4). On January 28, 2011 ARB sent to U.S. EPA the full modeling data documentation and results used in the 2008 PM2.5 SIP.

ARB staff is available to provide any additional information necessary to expedite full approval of the PM2.5 SIP revisions. If you need additional information, please contact Ms. Lynn Terry, Deputy Executive Officer, at (916) 322-2739 or lterry@arb.ca.gov.

Sincerely,

James N. Goldstene
Executive Officer

Attachments (4)

cc: Lynn Terry
Deputy Executive Officer

Seyed Sadredin
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Enforceable Commitment Level

U.S. EPA's proposed partial disapproval of the Plan is primarily based upon U.S. EPA's position that the Plan's attainment demonstration relies too heavily on enforceable commitments rather than on fully adopted measures. Specifically, U.S. EPA is proposing to disapprove the Plan because the percentage of emission reductions arising from enforceable commitments (i.e., 30%) is "too high and do[es] not represent a limited portion of the State's current estimate of total emissions reductions needed . . . ." (75 Fed.Reg. 74536 (Nov. 30, 2010).) U.S. EPA does not identify the maximum percentage that would be acceptable, but implies that it might be 10% by stating:

> Historically, EPA has approved SIPs with enforceable commitments in the range of 10 percent or less of the total needed for attainment. (*Id*. at p. 74535.)

The Federal Register notice does not contain any real analysis to justify the conclusion that 30% is "too high." Instead, U.S. EPA merely makes the above statement about its historical actions in approving other nonattainment area SIPs. There is in fact no firm rule dictating what percentage of emission reductions may be from enforceable commitments; the principal legal requirement regarding the allowable proportion of enforceable commitments is simply that it be "limited."

The language of the Clean Air Act (CAA) does not directly provide for the inclusion of enforceable commitments within a SIP. However, the CAA does state that a SIP may contain "means," "techniques," and/or "schedules and timetables for compliance." (42 U.S.C. § 7410(a)(2)(A).) The U.S. EPA and courts have interpreted this language to allow U.S. EPA to approve a SIP that relies on enforceable commitments if the commitments meet a three part test:

> (1) whether the commitment addresses a limited portion of the statutorily-required implementation plan; (2) whether the state is capable of fulfilling its commitment; and (3) whether the commitment is for a reasonable and appropriate period of time. (*BCCA Appeal Group v. U.S. EPA* (2003) 355 F.3d 817, 840.)

Here, the San Joaquin Valley Plan relies on enforceable commitments for approximately 30% of its required reductions. (75 Fed.Reg. 74536.) In applying the test set out above, U.S. EPA found that the Plan satisfied the second prong, i.e. that the state would be capable of fulfilling its commitments, but did not meet the first and third prongs. (*Id*. at pp. 74535-74536.)

Regarding the first prong, while 30% may be a larger portion of enforceable commitments than U.S. EPA has approved in the past, it is less than a third of the

overall commitment. Moreover, U.S. EPA's brief mention of what percentage has been approved in the past for different SIPs, under different circumstances, avoids any substantive analysis of why 30% is excessive in the context of this particular SIP revision. The failure to explain why 30% is "too high" is at odds with U.S. EPA's past practice in analyzing other SIPS that contain enforceable commitments.

Furthermore, we believe that there are unique circumstances that justify approving a higher percentage of enforceable commitments in this Plan. In this comment letter, we have explained the situation regarding ARB's in-use off-road equipment rule and in-use truck rule, which together account for a significant proportion of the emission reductions needed to demonstrate attainment. These rules do not represent vague future commitments; they have already been adopted and are in effect today. The only reason ARB has not already submitted them to U.S. EPA is that we are in the process of amending the rules to address the unique circumstances caused by the most serious recession to hit this country since the Great Depression. We have explained why ARB's proposed amendments to these rules continue to meet aggregate emission targets for these combined categories. Under these circumstances, we believe it is reasonable for U.S. EPA to accept a higher percentage of enforceable commitments than has been accepted in other SIPs where the circumstances were very different.

Finally, it is illogical for U.S. EPA to determine that California is capable of fulfilling its commitments (i.e. satisfying the second prong), while simultaneously finding that the size of those commitments is "too high" to approve the Plan. It is also incongruous that U.S. EPA commends California's "ambitious rule development, adoption, and implementation schedules" (*id*. at p. 74536) and states "we believe the State and District have provided reasonable and appropriate schedules for achieving their commitments" (*ibid*.) but then goes on to conclude that those schedules do not satisfy the third prong of the test.

We believe that the Plan should be fully approved for the reasons stated above.

Attachment 2

Implementation of State 2007 SIP Commitments

State Actions

- Smog Check Improvements (BAR)
  - Low Pressure Evaporative Test
  - Add Visible Smoke Test
  - More Stringent Cutpoints
  - Inspection of Light- and Medium-Duty Diesels
- Expanded Light Duty Vehicle Retirement
- Cleaner In-Use Heavy-Duty Trucks regulation, including Port Truck Modernization
- Modifications to Reformulated Gasoline Program
- Ocean Going Vessels Cleaner Main Ship Engines and Fuel Rule
- Ship Auxiliary Engine Cold Ironing & Clean Technology
- Harborcraft Engine Replacement Requirements
- In-Use Off-Road Equipment Fleet Rule
- Pesticides Regulation (DPR)
- Portable Outboard Marine Tanks Standards
- Vapor Recovery for Above Ground Storage Tanks
- Consumer Products Regulation Revisions

Ongoing Programs

- Accelerated Introduction of Cleaner Line-Haul Locomotive
- Mobile Source Incentive Programs, including SB 118 and Moyer

Attachment 3

2007 State Strategy
In-Use Heavy Duty Truck and Off-Road Equipment
Emission Reduction Commitment

THE ADOPTED 2007 STATE STRATEGY COMMITS TO ACHIEVE AGGREGATE EMISSIONS REDUCTIONS CONSISTENT WITH THE ATTAINMENT TARGET

The 2007 State Strategy describes ARB's aggregate emission reduction commitment as follows:

> "The total emission reductions from the new measures necessary to attain the federal standards are an enforceable State commitment in the SIP. While the State Strategy includes estimates of the emission reductions from each of the individual new measures, it is important to note that the commitment of the State Strategy is to achieve the aggregate emission reductions identified from the existing strategy and the adopted State Strategy. Therefore, if a particular measure does not get its expected emission reductions, the State still commits to achieving the total aggregate emission reductions, whether this is realized through additional reductions from the new measures, or from alternative control measures or incentive programs. If actual emission decreases occur that exceed the projections reflected in the emission inventories and the State Strategy, the actual emission decreases may be counted toward meeting ARB's total emission reduction commitments."
>
> April 2009 Revision to 2007 State Strategy, p.13

The Board-adopted 2007 State Strategy identifies emissions targets on a regional basis by source categories, with each regional target equal to the emissions levels needed to demonstrate attainment.

The South Coast Air Quality Management District applied the same emissions target approach (defined as "remaining emissions" or "carrying capacity") to the 1997/1999 Air Quality Management Plan for ozone which U.S. EPA approved as the air basin's attainment demonstration.

BOTH THE SOUTH COAST AND SAN JOAQUIN VALLEY PORTIONS OF THE STATE STRATEGY WILL MEET THE 2014 EMISSIONS TARGETS FOR IN-USE HEAVY DUTY TRUCKS AND OFF-ROAD EQUIPMENT

In December 2010, the Board adopted amendments to ARB's in-use heavy duty truck and off-road equipment rules which, taken together, achieve the expected emissions targets identified in the 2007 State Strategy for these categories.

To illustrate how the emissions targets are being met for the on-road truck and off-road equipment categories, ARB staff developed a three-step approach. First, staff aggregated the categories to determine the combined emission reduction benefits; then a conversion factor was applied to normalize NOx and PM2.5 emissions from these categories into a NOx equivalent emissions metric; in the third and final step, the SIP emissions target for these categories were compared with the emissions resulting from the regulations using the same NOx equivalent metric.

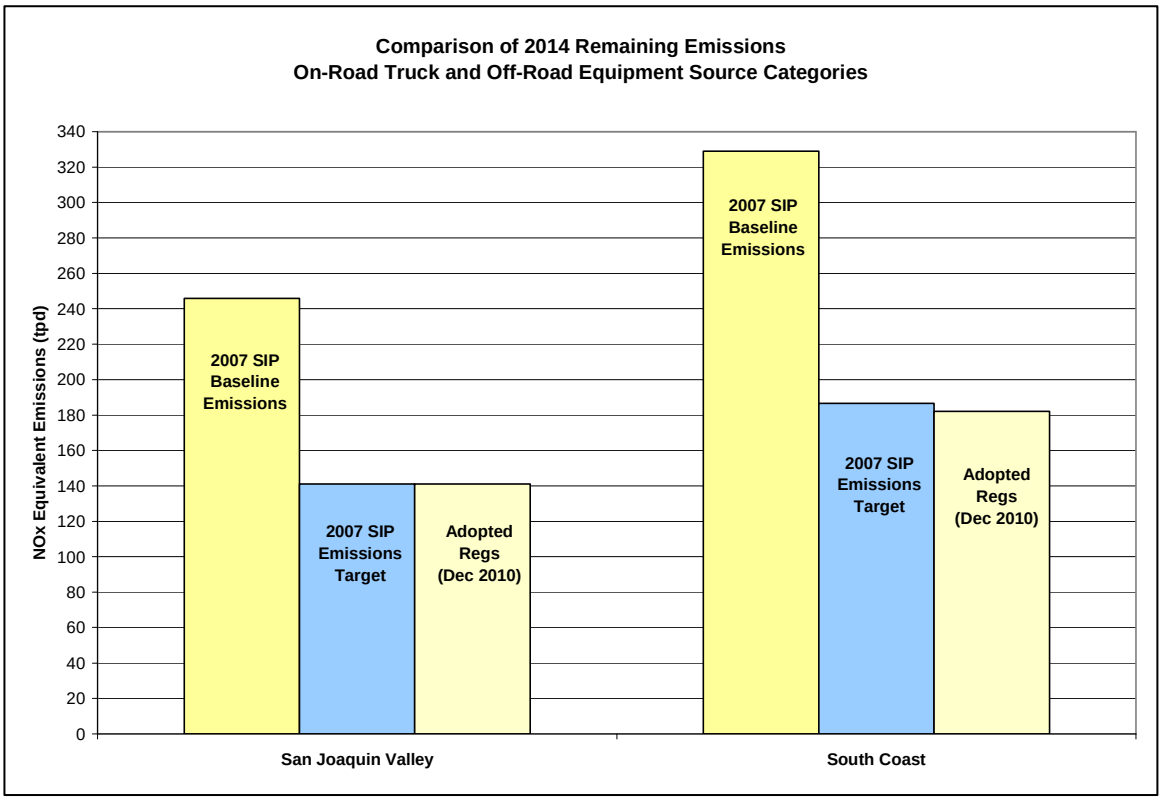
Applying this approach to the 2007 South Coast and San Joaquin Valley SIPs, ARB staff first converted the NOx and PM2.5 inventories for the 2014 baseline for on-road trucks and off-road equipment into NOx equivalents. In the South Coast, this resulted in a NOx equivalent baseline of 329 tons per day (tpd). In the San Joaquin Valley, the NOx equivalent baseline was 246 tpd.

Staff also converted into NOx equivalents the expected emission reductions in 2014 for the South Coast and San Joaquin Valley portions of the State Strategy, and subtracted the results from their respective SIP baselines. This calculation provides the NOx equivalent emissions target for both categories to support the attainment demonstration: 187 tpd in the South Coast and 141 tpd in the San Joaquin Valley.

Using the same NOx equivalent metric, staff then compared the amended truck and off-road equipment regulations (including inventory improvements) with their applicable emissions targets. In each case, the remaining emissions are lower than or identical to the aggregate emissions target: 182 tpd in the South Coast and 141 tpd in the San Joaquin Valley.

The chart below illustrates this comparison, and shows that in the aggregate the proposed regulations will meet the SIP commitments.

Attachment 3



Attachment 4

Air Resources Board comments on U.S. EPA's November 30, 2010 proposal that VOC be considered a significant PM2.5 precursor for the San Joaquin Valley 2008 PM2.5 State Implementation Plan (SIP)

In its November 30, 2010 Federal Register notice on the San Joaquin Valley's 2008 PM2.5 SIP, U.S. EPA has proposed to make a finding that volatile organic compounds (VOCs) are a significant PM2.5 precursor, which if made final, would impede California's ability to implement the most cost-effective regulations for attaining PM2.5 standards in this region. The California Air Resources Board (ARB) is providing comments which document the scientific weight of evidence showing that VOC emission reductions are ineffective in reducing PM2.5 at current ambient concentrations in the San Joaquin Valley. A review of the full set of peer reviewed studies of particulate matter in the San Joaquin Valley, the current ambient air monitoring data, the emissions anticipated in the attainment year from enforceable SIP measures, and the complete set of SIP modeling results all support the conclusion that VOC should not be considered a significant PM2.5 precursor in this instance.

U.S EPA's PM2.5 Implementation Rule (Rule) establishes a presumption that VOC is not an attainment plan precursor (40 CFR 51.1002 (c)(3)). The federal Rule also provides that either a state or U.S. EPA can provide an appropriate technical demonstration for a specific area showing that VOC emissions significantly contribute to PM2.5 concentrations. In the case of the San Joaquin Valley PM2.5 SIP, U.S. EPA has proposed such a demonstration suggesting that it is supported by the administrative record. However, U.S. EPA's proposal also indicates that the State of California should submit a demonstration to either support or reverse the presumption under the PM2.5 implementation rule that VOC is not an attainment precursor.

ARB appreciates the opportunity to provide technical information which supports the presumption in the federal Rule that VOC is not a significant PM2.5 precursor. While the 2008 SIP relies on a very comprehensive set of peer reviewed studies, modeling, and air monitoring data, ARB staff agrees that additional documentation of the scientific findings will better inform U.S. EPA and the public.

On September 16, 2010, ARB provided U.S. EPA with information on the California Regional Particulate Matter Air Quality Study (CRPAQS) and the role it has played in the development of the 2008 PM2.5 SIP for the San Joaquin Valley. To date, over 60 papers have been published in peer-reviewed journals such as Atmospheric Environment, Environmental Science and Technology, and the Journal of Air and Waste Management. Over 50 presentations of CRPAQS results have been given at national and international conferences. Data collected at over 100 monitoring sites has resulted in a publically available database containing over 180,000,000 records and a comprehensive website provides study documentation and reports. A full study bibliography was

provided to U.S. EPA. CRPAQS study results have been previously been relied upon in U.S. EPA rulemakings for PM10, which in terms of the annual standard in the San Joaquin Valley is dominated by PM2.5.

On January 28, 2011 ARB sent to U.S. EPA the full modeling documentation and results used in the 2008 PM2.5 SIP. All of this information is part of the record for U.S. EPA's consideration of the San Joaquin Valley PM2.5 SIP. When the full weight of scientific evidence in the record is considered, U.S. EPA should reach the same conclusion about the efficacy of VOC controls as the Air Resources Board and San Joaquin Valley Air Pollution Control District.

U.S. EPA itself found that the state of the science on secondary organic aerosols does not support a finding of significant contribution to PM2.5. ARB agrees with U.S. EPA's finding on secondary organic aerosols. The other potential chemical mechanism by which VOC may contribute indirectly to PM2.5, is a series of reactions ultimately resulting in formation of ammonium nitrate. This is the chemical pathway that U.S. EPA cites as a basis for its proposal to overturn the negative presumption for VOC contained in its PM2.5 rule.

While ARB agrees that this chemical pathway exists, the weight of scientific evidence shows that it is not significant for PM2.5 attainment in the San Joaquin Valley. U.S. EPA states that with respect to nitrate formation the monitoring studies are not conclusive, and that early box modeling differed on whether VOC controls would significantly affect PM2.5. This leaves the more sophisticated photochemical grid based modeling as U.S. EPA's primary technical basis for its proposed finding that VOC controls are significant for reducing PM2.5 in the San Joaquin Valley.

ARB scientists have consulted with U.S. EPA's modeling staff in the Office of Air Quality Planning and Standards to better understand the basis for the agency's interpretation of the published photochemical modeling studies with respect to the contribution of VOC to nitrate formation. ARB staff agrees with U.S. EPA that the cited PM2.5 modeling study (Kleeman et. al 2005), shows a benefit of 50 percent VOC reductions at the higher emissions levels at the time of the 2000 field study. However, that same modeling study shows a very different result when attainment year emission levels are taken into account. Using this data, the modeling study cited by U.S. EPA does not show a significant benefit of further VOC reductions. In fact, once the regional reductions in NOx (oxides of nitrogen) emissions are taken into consideration, VOC emission reductions produce essentially no benefit and in some instances, may actually lead to an increase in PM2.5 nitrate concentrations (see page 7 of Technical Demonstration).

Additional PM2.5 modeling studies also reviewed by U.S. EPA show similar responsiveness to the 50 percent VOC reduction scenario done by Kleeman. However, the SIP submitted to U.S. EPA for approval reflects actual NOx and

VOC reductions in the San Joaquin Valley, rather than the theoretical scenario of an additional 50 percent reduction in VOC explored as part of the SIP development process. Such modeling sensitivity runs can be a preliminary step in the SIP process, but the actual emissions and reductions in the attainment year are the basis for the required attainment demonstration. U.S. EPA should reconsider its proposed VOC finding in light of the more refined analysis discussed below.

U.S. EPA's PM2.5 implementation rule appropriately directs SIP planning efforts and regulation to those pollutants generally known to significantly contribute to PM2.5 concentrations. In the implementation rule preamble U.S. EPA defines "significantly contribute" to mean a significant emission reduction in precursors which would result in a significant change in the PM2.5 concentration. The CRPAQS modeling shows that in the attainment year even a 30 to 50 percent further reduction in VOC would not significantly affect PM2.5 concentrations. Therefore it is essential that California has the ability to focus on the pollutants of most significance to attainment of air quality standards. States need the discretion to develop the best approach for a meeting an air quality standard in each nonattainment area taking into account the supporting science, technical feasibility of regulations, and the costs.

TECHNICAL DEMONSTRATION:

VOC emissions have the potential to contribute to the formation of two different components of PM2.5, secondary organic aerosols (SOA) and ammonium nitrate. While these components contribute to observed PM2.5 concentrations in the San Joaquin Valley to a small degree, the weight of evidence indicates that anthropogenic VOC is not a significant contributor to PM2.5.

Secondary Organic Aerosols (SOA)

On an annual average basis, secondary organic aerosols derived from anthropogenic VOC emissions account for only 1 percent to 2 percent of the annual total PM2.5 concentrations throughout the Valley. SOA form when intermediate molecular weight VOCs emitted by anthropogenic and biogenic sources react and condense in the atmosphere to become aerosols. In addition, lighter VOCs participate in the formation of atmospheric oxidants which then participate in the formation of SOA. As noted by U.S. EPA in the November 30, 2010 proposal, the processes of SOA formation are complex and have not been fully characterized.

ARB air quality modeling exercises conducted as part of the San Joaquin Valley 2008 PM2.5 SIP attainment demonstration analysis using the Community Multiscale Air Quality (CMAQ) model showed that primary PM2.5 emissions are the main contributor to organic aerosols and SOA contribute to only a small extent. Furthermore, as illustrated in Figure 1, SOA are mostly formed during the

summertime, when total PM2.5 concentrations are low, and are mainly derived from biogenic emission sources. On an annual average basis, SOA derived from anthropogenic VOC emissions are a small part of the organic aerosol concentrations (3 percent to 5 percent).

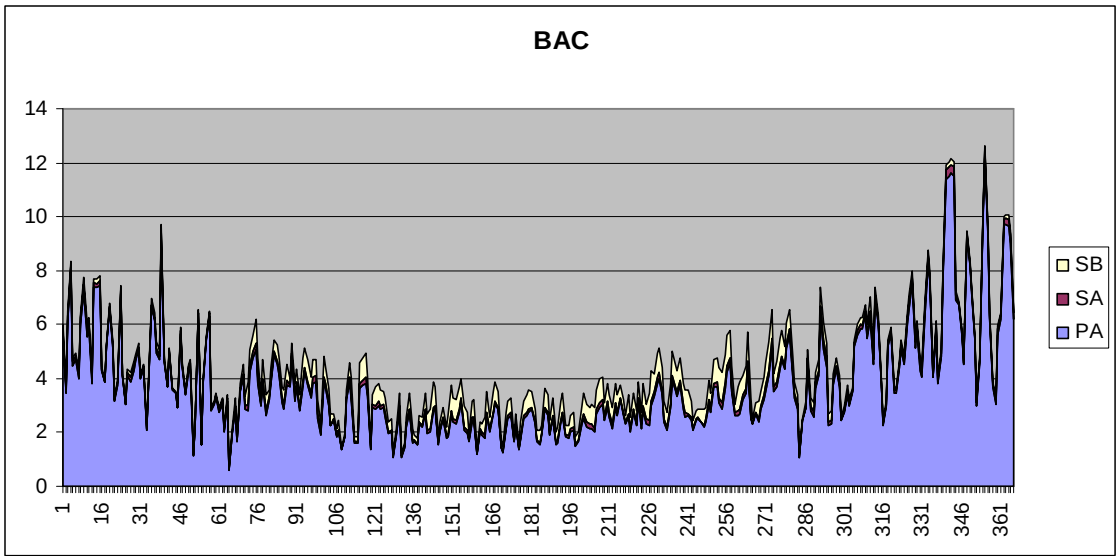


Figure 1. Daily contributions to organic aerosol concentrations in Bakersfield in 2000 modeled with CMAQ: Primary organic aerosols (PA), secondary aerosols formed from biogenic VOC emissions (SB) and secondary aerosols formed from anthropogenic source VOC emissions (SA). Units are µg/m^3.

As part of the CRPAQS study, simulations of a wintertime episode conducted using CMAQ-Madrid, a model with an enhanced secondary organic aerosol formation mechanism, also found that organic aerosol concentrations were dominated by directly emitted ("primary") emissions. The study found that, because of the dominance of primary PM2.5 organic matter, overall, a 50 percent reduction in anthropogenic VOC emissions has limited effects on the modeled PM2.5 organic matter (Pun, et al., 2009).

These study results show that for secondary organic aerosols, further VOC reductions would have very limited effectiveness in reducing PM2.5 concentrations. U.S. EPA's proposal acknowledges the state of the science on secondary organic aerosols, and indicates that the overall considerations presented in the 2008 PM2.5 SIP are not enough to find VOC as a significant PM2.5 SIP precursor for SOA in the San Joaquin Valley.

Ammonium Nitrate

While VOCs can influence the formation of ammonium nitrate, in the San Joaquin Valley this effect is minor. U.S. EPA cited ten references as part of their technical demonstration. Four were monitoring studies conducted as part of CRPAQS that suggested that VOCs could under some conditions be important in

the formation of secondary ammonium nitrate. However, as U.S. EPA noted, the studies differed in their assessment of the overall role of VOCs, and they cannot be used to evaluate whether VOC controls would reduce ammonium nitrate concentrations. The six remaining studies used differing types of air quality modeling to quantitatively assess the expected change in ammonium nitrate to hypothetical VOC reductions. The two earliest studies used photochemical box modeling. This simplified type of modeling approach does not fully capture atmospheric dynamics and reflect older chemical mechanisms and levels of emissions. Thus these studies provide limited usefulness in assessing VOC responsiveness under current conditions. ARB focused the SIP evaluation on the more recent modeling studies which used more robust photochemical grid modeling. These studies provide a more appropriate basis for evaluating the complex NOx and VOC interactions that occur in the atmosphere under real-world emissions control scenarios.

There are two primary pathways through which ammonium nitrate can form. During the day, NO_2 is oxidized to nitric acid. Nitric acid then reacts with ammonia to form ammonium nitrate. This daytime pathway involves sunlight, VOCs, and background ozone. During the night, nitric acid is formed through oxidation of NO_2 (via N_2O_5) by background ozone, which then also reacts with ammonia to form ammonium nitrate. Studies by Pun et al. (1998, 2004) suggested that the daytime pathway may be important and therefore the formation of ammonium nitrate would be sensitive to changes in VOC emissions. However, other studies (Lurmann et al., 2006), suggest that on average, daytime production of nitric acid in the San Joaquin Valley is relatively slow and that nighttime production of ammonium nitrate aloft, which then mixes to the surface after sunrise could explain the observed homogeneous patterns of ammonium nitrate in the Valley. Ying et al. (2009) also theorized that the ozone concentration aloft in the San Joaquin Valley is predominantly due to the regional background and does not vary significantly with surface-level VOC emissions. Therefore, nighttime ammonium nitrate formation in the San Joaquin Valley would not be sensitive to VOC reductions.

ARB agrees with U.S. EPA that while the monitoring studies cited above provide evidence that the VOC pathway may be important at times, these studies do not provide quantitative information about the overall role and cannot be used to evaluate the benefits of VOC controls. Rather, modeling studies are more appropriate to assess the overall impact of precursor controls.

Staff reviewed the results of seven modeling studies containing information on the significance of VOC controls in reducing ammonium nitrate in the SJV. While the results of the earliest studies were mixed, later studies provide generally consistent results regarding the role of VOCs. In assessing the potential benefits of VOC controls it is important that significance be interpreted in the context of California's overall control program with its strong focus on NOx control to achieve benefits for both PM2.5 and ozone. ARB staff's review of whether VOCs

should be considered a significant precursor was examined in the context of two key considerations:

1) Whether further VOC reductions would provide significant benefits to expedite attainment beyond the existing NOx control program; and
2) The feasible magnitude of any potential VOC reductions beyond ARB's already rigorous VOC control program.

Two early studies used simplified box modeling to explore the sensitivity of ammonium nitrate to VOC and NOx reductions. One of the two studies simulated a typical winter episode (Stockwell et al., 2000) and found that decreases in VOC emissions had little effect. The second study (Pun and Seigneur, 2001) simulated winter conditions during the 1996 CRPAQS pilot study around the Fresno area. The study found that ammonium nitrate formation decreased with VOC emission reductions, but increased with NOx reductions. Pun and Seigneur (2001) theorized that reducing NOx could lead to higher concentrations of OH and increase the overall rate of nitrate production, despite the reductions in NOx. However, the box modeling approach has a number of limitations, including lack of transport into/out of the box, robust vertical transport, and use of an older chemical mechanism. In addition, the VOC emissions were increased by a factor of two to improve model performance. As such, the box modeling did not fully represent the complete scope of atmospheric variations and has limited usefulness in assessing the responsiveness to VOC controls.

Subsequent modeling sensitivity studies for the same winter episode were conducted with the UCD/CIT model, an advanced research grade modeling system (Kleeman et al., 2005). The authors concluded that NOx emission controls are more effective in reducing PM2.5 nitrate concentrations in the San Joaquin Valley. Summary study results indicate that on average, large reductions in VOC emissions (on the order of 50 percent) reduced PM2.5 nitrate concentrations by approximately 17 percent. However, to evaluate the significance and effectiveness of VOC controls in the context of control strategy design, the study's isopleths of PM2.5 nitrate response to combined NOx/VOC emission reductions provide more in-depth information.

Figures 2(a) and 3(a) show that, based on the shapes of the graphs, NOx controls are the most effective approach to reduce PM2.5 nitrate concentrations at Fresno and at the location with the highest modeled PM2.5 nitrate concentration (grid location -85 km Northing, 90 km Easting) respectively. Once NOx controls are taken into consideration, VOC emission reductions produce essentially no benefit and in some instances, may actually lead to an increase in PM2.5 nitrate concentrations. For example, as illustrated in Figure 2(a) for Fresno, after considering an approximately 60 percent reduction in NOx emissions resulting from existing and proposed controls, reductions in VOC emissions to any level would not decrease PM2.5 nitrate concentrations. Furthermore, at grid location -85 km Northing, 90 km Easting, any level of VOC

emission reductions would actually cause an increase in nitrate concentrations. Nitrogen-containing molecules such as PAN can act as temporary sinks for NO_2. When VOCs are controlled, the reduced availability of certain radicals which are generated from VOCs reduces the amount of NO_2 that is sequestered, thereby increasing the availability of NO_2 and enhancing ammonium nitrate formation (Meng et al., 1997)

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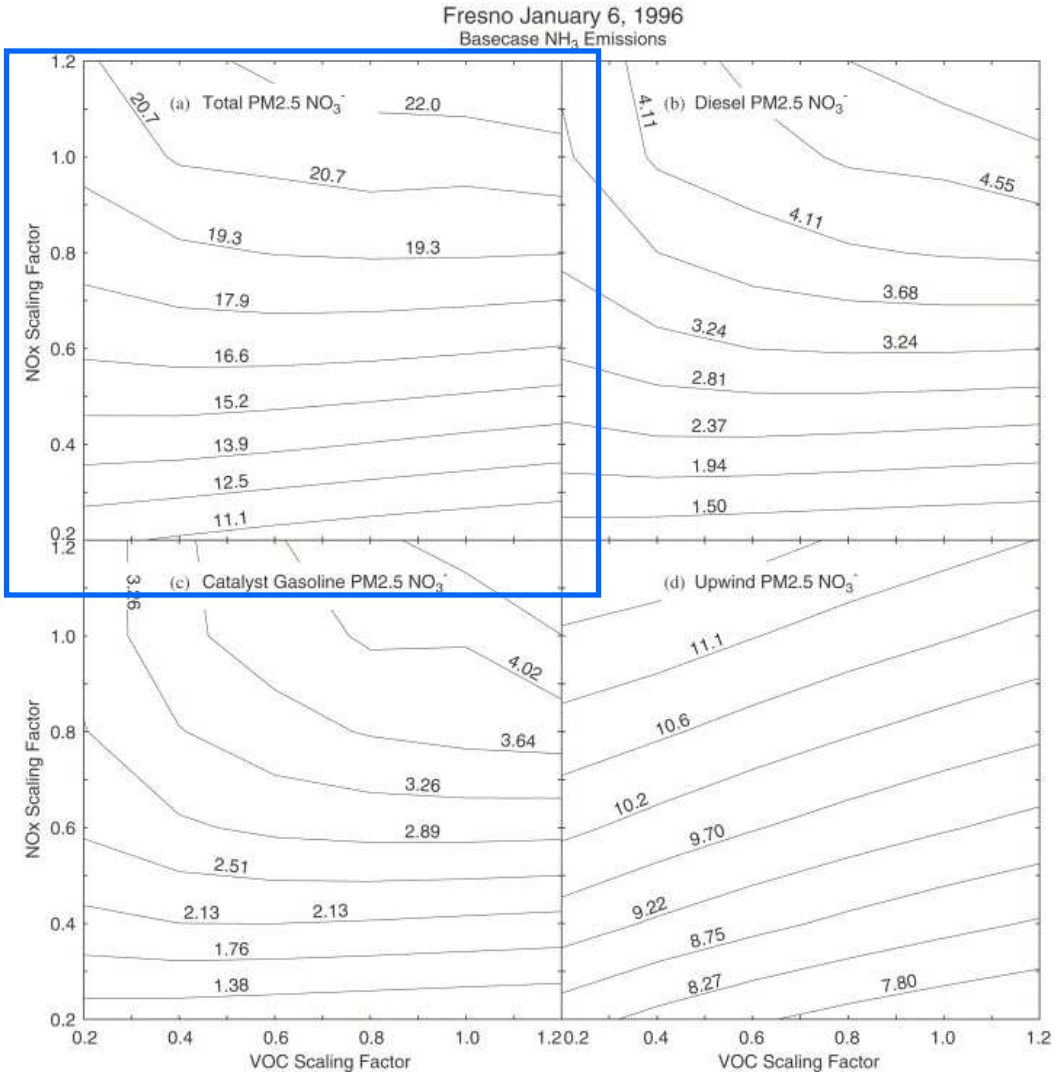

Figure 2. 24-h average NOx/VOC particulate nitrate isopleths at Fresno for (a) all sources, (b) diesel engines, (c) catalyst equipped gasoline engines, and (d) upwind sources of nitrate. Units are µg/m^3. (Source: Kleeman et al., 2005, Figure 3 pg 5333).

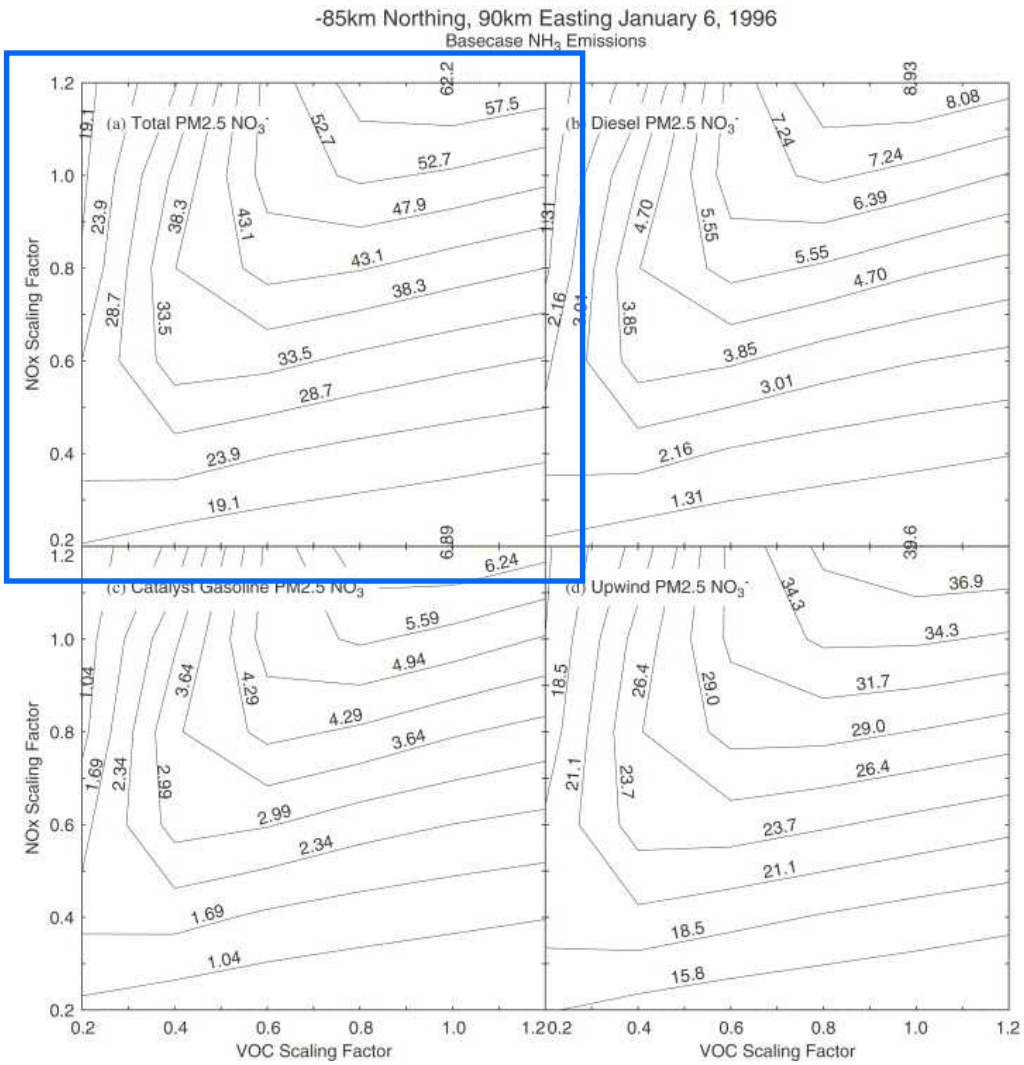

Figure 3. 24-h average NOx/VOC particulate nitrate isopleths at grid location -85 km Northing, 90 km Easting for (a) all sources, (b) diesel engines, (c) catalyst equipped gasoline engines, and (d) upwind sources of nitrate. Units are µg/m^3. (Source: Kleeman et al., 2005, Figure 5 pg 5335).

Four additional modeling studies investigated the more recent two-week winter episode of 2000-2001 that occurred during the CRPAQS field study.

In the first study, preliminary data from modeling of this CRPAQS winter episode conducted using the Lagrangian form of the UCD/CIT model qualitatively confirm that NOx control is the most efficient method to reduce nitrate concentrations (Kleeman, M.J., personal communication, May 2008). Figure 4 illustrates the response of PM2.5 nitrate concentrations to NOx and VOC emission reductions at a rural (Angiola) and an urban (Fresno) site on December 31, 2000. Again, based on their shapes, these graphs show that NOx controls are the most effective approach to reduce PM2.5 nitrate concentrations. Once NOx controls are taken into consideration (approximately 60 percent reduction in NOx emissions), reductions in VOCs of up to 30 percent produce basically no benefit

(Fresno). Futhermore, at some locations (Angiola) any VOC emission reductions may actually lead to an increase in PM2.5 nitrate concentrations.

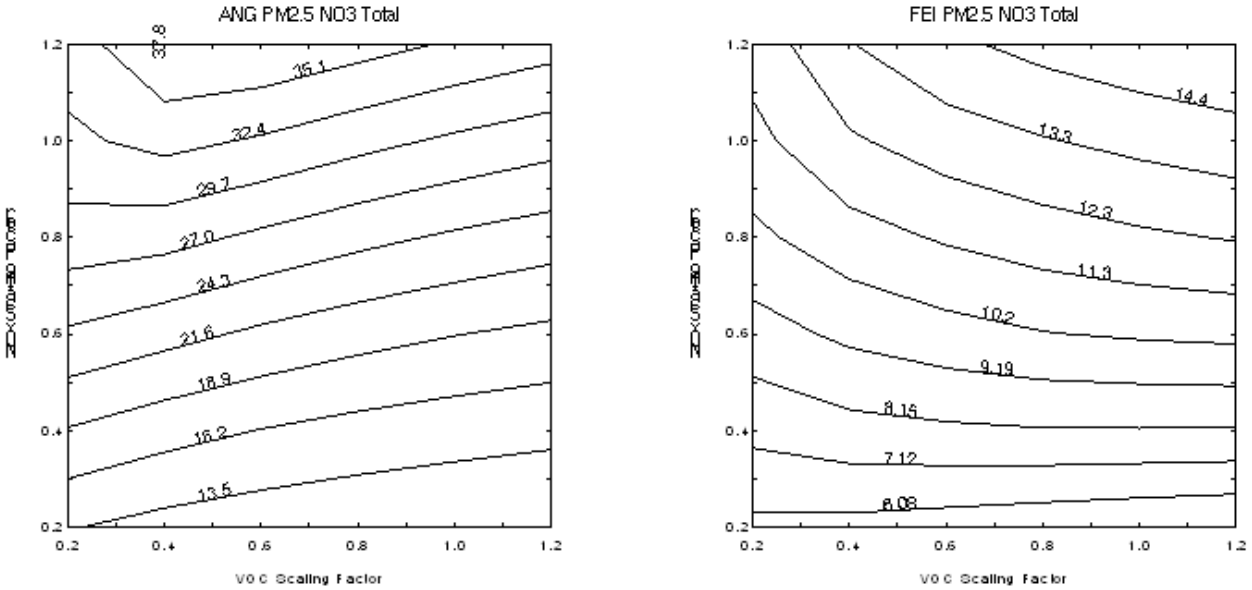

Figure 4. The isopleths plot of PM2.5 nitrate with emission control of NOx and VOC at Angiola (ANG) and Fresno (FEI) after a 5-day back trajectory simulation for December 31, 2000. Units are in $\mu g/m^3$. (Source: Kleeman, M.J., personal communication, May 2008)

A second study conducted simulations of the two-week CRPAQS episode with the CMAQ photochemical model (Livingston, et al., 2009). The study consisted of two simulations. The first was a baseline scenario using a preliminary emissions inventory. This simulation showed that 50 percent reductions in anthropogenic VOC and NOx emissions had similar effects in reducing ammonium nitrate (about 20 percent each). A second simulation was conducted using an updated emission inventory representing a more accurate spatial distribution of total ammonia emissions (referred to as "Vehicle NH_3" scenario, per Livingston, P., personal communication, January 19, 2011). This second 50 percent VOC reduction simulation showed a much lower response to VOC controls. The response was lowered to a 12 percent reduction in ammonium nitrate, with a corresponding increase in responsiveness to NOx control of 38 percent. These results are consistent with those found by Kleeman et al., 2005.

In a third analysis, the San Joaquin Valley Air District (District) in a PM2.5 SIP appendix included a bounding sensitivity analysis on the responsiveness to VOC controls. Based on this hypothetical scenario the appendix included a finding that VOC reduction is effective for the annual standard and the winter episode for reduction of total carbon secondary particulates. This analysis used preliminary results from CMAQ modeling, namely that a 50 percent reduction in VOC emissions led to a 10 percent reduction in particulate nitrate. This is basically the same level of responsiveness reported from the studies by Livingston et al.,

2009 and Pun et al., 2009. However, as previously discussed, a hypothetical scenario of 50 percent reduction should not replace an analysis using actual emissions and SIP reductions. Overall 2008 PM2.5 SIP concluded that VOC is not a significant precursor to PM2.5.

A fourth study modeled one-week of the CRPAQS episode using a version of CMAQ with a more advanced chemical mechanism (CMAQ-Madrid) (Pun et al, 2009). In contrast to the earlier Pun study using a simplified box modeling approach, this later work found that on average, nitrate was most sensitive to reductions in NOx emissions. While isopleths were not provided, the time evolution of nitrate and PM2.5 mass to VOC response illustrated in Figure 5 provides further detail regarding the efficacy of VOC control. The response of nitrate to a 50 percent reduction in VOC emissions increased as PM2.5 levels rose during the episode. In urban areas, a 50 percent reduction in anthropogenic VOC emissions caused small reductions in nitrate, on the order of 10 percent on the modeled days when 24-hour PM2.5 concentrations measured over 100 $\mu g/m^3$ at urban sites and above 65 $\mu g/m^3$ in rural areas.

The difference in the VOC response on the days with the higher PM2.5 concentrations as compared to those days with lower concentrations may be due to a difference in the chemical formation regime for nitrate. In general, there is sufficient background ozone to generate enough free radicals to initiate and propagate the chemistry of nitrate formation (Ying et. al, 2009). However, on days with high PM2.5 concentrations, the daytime photochemistry may have contributed to a rapid increase in nitrate, resulting in higher VOC and NOx sensitivity. It does not appear that VOCs contributed significantly to the free radical budget on the simulated days mainly because rapid increases in ozone were not observed. The effect of VOC levels on nitrate formation may also have a diurnal pattern since the hydroxyl and hydroperoxyl radical levels are high during the daytime and negligible at night. In addition, more reactive VOCs react quickly during the day and there is a minimal carry over to the next day. Therefore, it is reasonable to assume that the higher response to VOC and NOx at higher PM2.5 concentrations may be due the nitrate formation mechanism rather than to PM2.5 accumulation due to the length of the episode.

Overall, nitrate was only responsive to a 50 percent reduction in VOCs at PM2.5 concentration levels that are no longer reached in the San Joaquin Valley. Currently, the 24-hour PM2.5 design value in the Valley is 70 $\mu g/m^3$ recorded at Bakersfield and the rest of the Valley records 24-hour design values between 50 $\mu g/m^3$ and 60 $\mu g/m^3$. Given the current levels of PM2.5, we believe the Valley is now in a nitrate chemical formation regime that is less responsive to VOC controls.

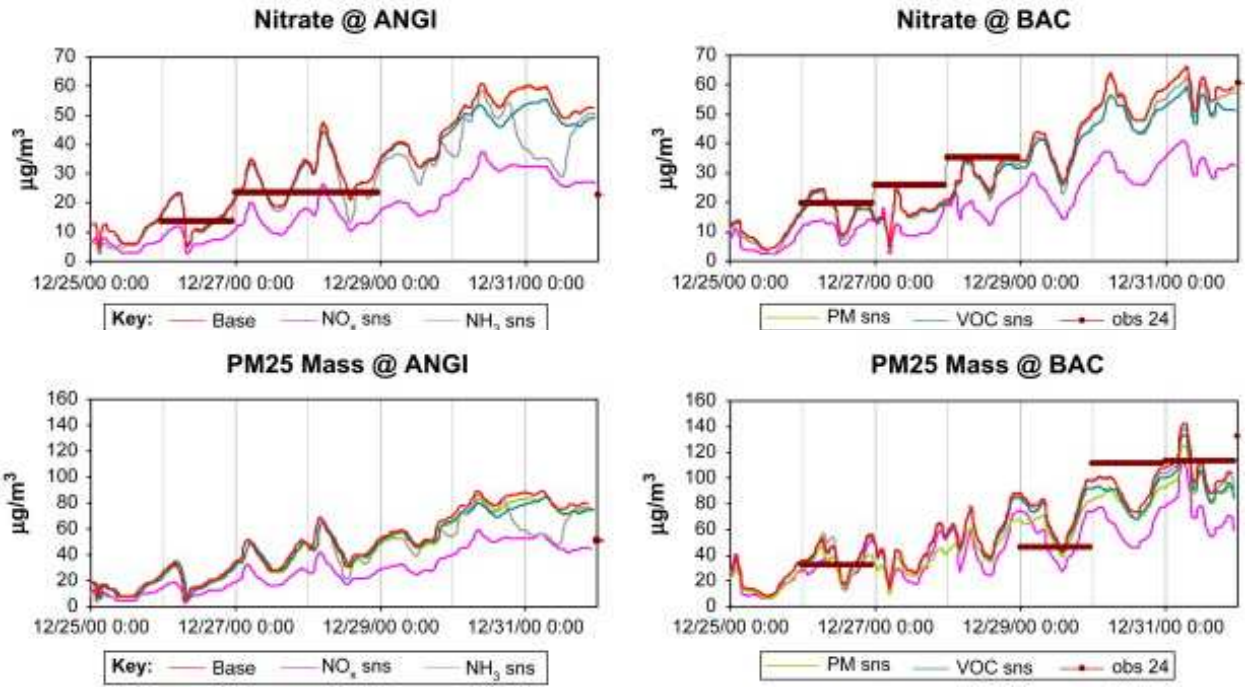

Figure 5. Time series with daily observations, base case simulation results and results from the sensitivity cases of (a) nitrate and (b) PM2.5 at Angiola (left) and Bakersfield (right). (Source: Pun et al., 2009, excerpt from Figure 2, pg 406)

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