

**Staff Report
on
Proposed Revisions to the 8-Hour Ozone
State Implementation Plan for the
Sacramento Federal Nonattainment Area**

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**Proposed 8-Hour Ozone State Implementation Plan Revisions
for the Sacramento Metropolitan
1997 8-Hour Ozone Federal Nonattainment Area**

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Executive Summary

Purpose

This 2013 State Implementation Plan (SIP) Revisions to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan (2013 Update) updates the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan State Implementation Plan that was adopted and submitted the U.S. Environmental Protection Agency (U.S. EPA) as a SIP revision in 2009 (2009 Plan). The 2009 Plan outlines a strategy for achieving the 1997 8-Hour Ozone National Ambient Air Quality Standard (NAAQS or 8-hour standard) in the Sacramento Metropolitan's 8-Hour Ozone Nonattainment Area (Sacramento Nonattainment Area). The 2013 Update incorporates updated emission inventories, regulations, and the effects of the recession not included in the 2009 Plan.

Staff's analysis indicates that actions taken by the local air districts and California's Air Resources Board (ARB or Board) since the 2009 Plan was submitted will provide the reductions needed to attain the ozone standard by the 2018 deadline. This update provides information needed to support U.S. EPA approval of the Sacramento region's plan for attainment of the 1997 8-hour ozone standard.

Attainment Demonstration and Other Requirements

State law assigns ARB the primary responsibility to ensure California's compliance with the federal Clean Air Act (CAA or Act). Traditionally, ARB shares that responsibility with local air districts through regulatory actions, incentive programs, and defined SIP commitments for further action to achieve emission reductions necessary for attainment. The State also has an expectation that the federal government will provide necessary emission reductions from sources under U.S. EPA's authority.

ARB and the five local air districts that make up the Sacramento Nonattainment Area made SIP commitments necessary to demonstrate attainment of the 8-hour ozone standard in the ARB 2007 State Strategy and in local SIP revisions. The 2013 Revision to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan shows that the regulations that have been adopted and submitted to U.S. EPA will, in 2018, provide the emission reductions called for in the 2013 updated attainment demonstration. The updated attainment demonstration allows fewer emissions in 2018.

The 2013 Update addresses several CAA planning requirements. The revised summer planning emission inventories account for the implementation of recently adopted control measures, the effects of the recession, and updated transportation activity projections provided by the Sacramento Area Organization of Governments (SACOG). The 2013 Update demonstrates attainment of the 8-hour ozone standard, by 2018, using these updated inventories. An updated reasonable further progress (RFP)

analysis uses the updated inventories. The updated, locally approved transportation conformity budgets incorporate the updated emission estimates and include conformity safety margins. An ozone vehicle miles traveled (VMT) offset demonstration included in this update is based on guidance issued by U.S. EPA in August, 2012. The update also includes an updated reasonable available control measure (RACM) analysis.

Staff Recommendation

Staff recommends that the Board adopt the Proposed Revisions to the “Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan 2013 SIP Revisions” as a revision to California’s SIP.

1. Implementing the 2009 Plan

The 2013 Update is a revision to the 2009 Plan. The 2009 Plan was adopted by the five districts that make up the Sacramento Nonattainment Area: the Sacramento Metropolitan Air Quality Management District (SMAQMD); the El Dorado Air Quality Management District (EDAQMD); the Feather River Air Quality Management District (FRAQMD); the Yolo-Solano Air Quality Management District (YSAQMD); and the Placer County Air Pollution Control District (PCAPCD). ARB adopted the 2009 Plan as a revision to the SIP and submitted it to U.S. EPA. The 2009 Plan included a request for the Sacramento Nonattainment Area to be reclassified from “Serious” to “Severe-15.” U.S. EPA finalized the reclassification, changing the attainment deadline from June 2013 to June 2019. However, U.S. EPA has not yet acted on the overall attainment demonstration, pending submittal of updated information. The 2013 Update incorporates the information necessary for U.S. EPA approval.

2007 State Strategy Implementation

The 2009 Plan relied in part on control measures and control measure commitments identified in ARB’s 2007 State Strategy for California’s SIP. ARB has adopted all but one of the 2007 State Strategy measures included in the 2009 Plan. Table A1 in Appendix A lists ARB measures adopted since 2007 and sent to U.S. EPA as revisions to the SIP, as requests for waivers under Clean Air Act (CAA) section 209(b), or for authorizations under CAA section 209(e)(2).

The Sacramento region’s ozone attainment strategy relies on reductions of both oxides of nitrogen (NOx) and volatile organic compounds (VOC) to meet the 8-hour ozone standards. Because mobile sources are the largest contributors to ozone-forming emissions, reducing emissions from passenger vehicles, trucks, and a variety of off-road engines is key to attaining the ozone standards. In developing the Sacramento Area SIP for meeting the 8-hour standard by 2018, the biggest challenge was cleaning up the existing fleets of diesel engines. This challenge was addressed by the adoption of ARB’s in-use fleet rules for on-road trucks and off-road equipment.

Tables 1 and 2 shows the impact of adopted State measures on projected 2018 emissions in the Sacramento Nonattainment Area. As a result of these adopted controls, 2018 emissions are now projected to be at or below the level needed to demonstrate attainment, as discussed in Section 2. This section describes the adopted measures and programs that are providing these reductions.

Table 1: Analysis of ARB's Implemented Regulations using Calendar Year 2018 NOx Summer Season Emissions (tpd)

Statewide SIP Measures	2009 SIP Summary			Current Estimate
	2018 Baseline	Expected Reductions	Remaining Emissions	Remaining Emissions
Passenger Vehicles	22.2	1.7	20.5	16.7
Smog Check Improvements (BAR)		1.4		
Expanded Vehicle Retirement	22.2	0.3	20.5	16.7
Modifications to Reformulated Gasoline Program		0.0		
Heavy-Duty Trucks	22.4	9.5	12.9	12.6
Cleaner In-Use Heavy-Duty Trucks	22.4	9.5	12.9	12.6
Goods Movement Sources	10.3	2.1	8.2	7.0
Accelerated Intro. Of Cleaner Line-Haul Locomotives	9.4	1.9	7.5	6.2
Clean Up Existing Harbor Craft	0.9	0.2	0.7	0.9
Off-Road Equipment	13.4	1.9	11.5	7.0
Cleaner In-Use Off-Road Equipment (over 25hp)	13.4	1.9	11.5	7.0
Other Off-road Sources	6.1	0.3	5.8	2.4
New Emission Standards for Recreational Boats	5.9	0.3	5.6	2.3
Expanded Off-Road Rec. Vehicle Emission Standards	0.1	0.0	0.1	0.1
Additional Evaporative Emission Standards	--	--	--	--
Areawide Sources	0.0	0.0	0.0	0.0
Consumer Products Program	0.0	0.0	0.0	0.0
2018 NOx Totals				
State SIP Measure Sources ¹	74	16	59	46
All Other State/Federal Source Categories ²	9	--	9	13
District Source Categories	17	2	15	12
Total Inventory	101	18	83	71
Emission Reduction Credits ²	3	--	3	3
Motor Vehicle Emission Budget Safety Margin	--	--	--	3
Total Inventory for the 2013 Update	104	18	86	77

¹ State SIP Measure Sources un-truncated. 2013 Plan uses truncated numbers.

² For the purposes of this table, ERCs are shown separately.

Table 2: Analysis of ARB's Implemented Regulations using Calendar Year 2018 VOC Summer Season Emissions (tpd)

Statewide SIP Measures	2009 SIP Summary			Current Estimate
	2018 Baseline	Expected Reductions	Remaining Emissions	Remaining Emissions
Passenger Vehicles	24.9	2.6	22.3	16.3
Smog Check Improvements (BAR)		1.3		
Expanded Vehicle Retirement	24.9	0.2	22.3	16.3
Modifications to Reformulated Gasoline Program		1.1		
Heavy-Duty Trucks	1.9	0.8	1.1	0.8
Cleaner In-Use Heavy-Duty Trucks	1.9	0.8	1.1	0.8
Goods Movement Sources	0.7	0.1	0.6	0.4
Accelerated Intro. Of Cleaner Line-Haul Locomotives	0.6	0.1	0.5	0.3
Clean Up Existing Harbor Craft	0.1	0.0	0.1	0.1
Off-Road Equipment	7.5	0.4	7.1	6.5
Cleaner In-Use Off-Road Equipment (over 25hp)	7.5	0.4	7.1	6.5
Other Off-road Sources	22.8	6.1	16.7	14.4
New Emission Standards for Recreational Boats		3.0		
Expanded Off-Road Rec. Vehicle Emission Standards	22.8	2.7	16.7	14.4
Additional Evaporative Emission Standards		0.4		
Areawide Sources	15.1	1.9	13.2	13.2
Consumer Products Program	15.1	1.9	13.2	13.2
2018 VOC Totals				
State SIP Measure Sources ¹	73	12	61	52
All Other State/Federal Source Categories	5	--	5	3
District Source Categories	40	3	36	39
Total Inventory	117	15	102	94
Emission Reduction Credits ²	4	--	4	4
Motor Vehicle Emission Budget Safety Margin	--	--	--	1
Total Inventory for the 2013 Update	121	15	106	99

¹ State SIP Measure Sources un-truncated. 2013 Plan uses truncated numbers.

² For the purposes of this table, ERCs are shown separately.

Clean New and In-Use Heavy-Duty Trucks

Increasingly stringent standards for new trucks are a central element of ARB's emission reduction strategy. New heavy-duty trucks sold since 2010 emit 98 percent less NOx and fine particulates (PM2.5) than new trucks sold in 1986. However, older, higher-emitting trucks with long service lives can stay on the road for many years. Because of this, emissions from existing "in-use" trucks must also be reduced in order to meet near-term air quality standards.

To address this, ARB developed the Cleaner In-Use Heavy-Duty Truck Regulation. This measure leverages the benefits provided by new truck emission standards by accelerating introduction of the cleanest trucks. The "Truck and Bus Regulation" was adopted in December 2008, and amended in December 2010 to account for the reduced emissions resulting from the economic effects of the recession. The rule represents a multi-year effort to retrofit or replace engines in the older part of the fleet with the cleanest technology available.

Cleaner In-Use Off-Road Equipment

ARB has also adopted increasingly stringent standards for engines used in new off-road diesel equipment. As a result of these standards, new construction, mining, industrial and oil drilling equipment will become progressively cleaner. However, large diesel off-road equipment typically remains in use for many years, if not decades. As with heavy-duty trucks, this long life means that newer, lower-emitting engines would be introduced into fleets relatively slowly, making the emission reductions and associated health benefits from these cleaner engines would also be fairly slow to materialize.

To address this, the State Strategy for California's 2007 SIP included the Cleaner In-use Off-road Equipment Regulation, the "Off-Road Regulation." First approved in 2007, the Off-Road Regulation was amended in 2010 in light of the impacts of the economic recession. The off-road equipment affected by this regulation is used in construction, manufacturing, the rental industry, road maintenance, airport ground support, and landscaping. In December 2011, the Off-Road Regulation was modified to include on-road trucks with two diesel engines.

Advanced Clean Cars

ARB's Advanced Clean Cars (ACC) Program, approved in January 2012, is a set of pioneering regulations that address both ambient air quality needs and climate change. The ACC program combines the control of smog, soot causing pollutants, and greenhouse gas emissions into a single coordinated set of requirements for model years 2015 through 2025. The program assures the development of environmentally superior cars that will continue to deliver the performance, utility, and safety vehicle owners have come to expect.

The ACC Program will produce increasing benefits over time as new cleaner cars enter the fleet, displacing older and dirtier vehicles. Increasingly stringent fleet average composite emission standards for model years 2015 to 2025 ensure that the program

will continue to provide benefits, beyond the Sacramento Nonattainment Area's 2018 attainment deadline, as vehicles meeting the new standards replace older, higher-emitting vehicles.

Expanded Passenger Vehicle Retirement

Voluntary accelerated vehicle retirement or "car scrap" programs give vehicle owners monetary incentives to retire older, more polluting vehicles. California's updated voluntary vehicle retirement program is administered by the Bureau of Automotive Repair (BAR) and provides \$1,000 per vehicle and \$1,500 for low-income consumers for unwanted vehicles that have failed their last Smog Check test and meet eligibility guidelines.

Improvements and Enhancements to California's Smog Check Program

The following requirements were added to improve and enhance the Smog Check Program, and to include additional passenger vehicle categories:

- Low pressure evaporative test;
- More stringent pass/fail cutpoints;
- Visible smoke test; and
- Inspection of light- and medium-duty diesel vehicles.

AB 2289, adopted in October 2010, restructured California's Smog Check Program by streamlining and strengthening inspections, increasing penalties for technicians that conduct improper Smog Checks, and reducing costs to motorists. This new law takes advantage of diagnostic software installed on all vehicles manufactured since 2000 and directs vehicles without this equipment to high-performing stations to ensure compliance with current emission standards.

Accelerated Introduction of Cleaner Line-Haul Locomotives

California leads the nation with the most extensive efforts to reduce locomotive and rail yard emissions. The Union Pacific (UP) rail yard located in Roseville has benefitted from numerous programs targeting NOx and PM2.5 emissions. ARB utilized Proposition 1B funding for 15 Tier 2 "regional" line haul locomotives. UP also operates six ultra-low emitting genset switch locomotives within the Roseville rail yards. The UP 9900, an experimental Tier 3+ locomotive (Tier 4 PM, and Tier 3+ NOx), has been assigned to UP Roseville and operates primarily in Northern California.

Consumer Products

Under State law, ARB has regulatory responsibility for reducing VOC emissions from consumer products. ARB approved amendments to the Consumer Products regulations that established lower VOC emission limits for a wide variety of products, including

household cleaning and degreasing products, home and garden pesticides, aerosol paints, personal care products, and automotive maintenance products.

Local Strategy Implementation

Local air districts are responsible for controlling emissions from most stationary and areawide sources. Such sources include factories, power plants, gas stations, dry cleaners, residential water heaters, and managed burning. The five districts that make up the Sacramento Nonattainment Area have adopted a variety of control measures to control emissions from these sources. The local plan element includes implemented control measures and commitments to develop and adopt new measures. These measures target architectural coatings, automotive refinishing products, degreasing and solvent cleaning products, metal parts coatings, natural gas processing, portable asphalt dryers, water heaters and boilers, and stationary internal combustion engines. These district measures are expected to provide a total of 2.8 tons per day additional VOC reductions and 1.1 tons per day additional NOx reductions.

In coordination with local metropolitan planning organizations (MPO), the local air districts have also adopted several transportation control measures (TCM). Sacramento Emergency Clean Air & Transportation grant program (SECAT) is a joint project between SMAQMD and SACOG that provides grant funds to replace on-road heavy-duty diesel vehicles that have 1998–2006 model year engines with cleaner emission vehicles.

U.S. EPA has not yet acted on the 2009 Plan attainment strategy. In 2011, the local districts withdrew some of the local strategy commitments submitted as part of the 2009 Plan in light of the new information and cost estimates. This submittal contains the most recently adopted local strategy for approval by the U.S. EPA.

The emission inventories used in this update were developed in part for use in the Northern California regional air quality model. Because emission reduction credits are modeled as actual emissions for attainment demonstration purposes, the emission reduction credits that have been banked with the Sacramento Nonattainment Area districts were allocated across the stationary and area-wide source categories in the modeling inventory. For the purpose of the attainment, contingency and reasonable further progress demonstrations in this update, the credits are subtracted from the inventory outputs for those categories and shown as separate line items as they were in the original plan.

2. Attainment Demonstration

The 2009 Plan used photochemical modeling to demonstrate that the proposed emission reduction strategy would allow the Sacramento Nonattainment Area to attain the 1997 8-hour ozone standard by 2018, the attainment deadline for severe nonattainment areas. The 2013 Update uses more current inventories with significantly different estimates of both baseline and attainment year emission. An analysis of the attainment demonstration using the revised inventories confirms the original finding that the 2013 Update demonstrates attainment by 2018, and shows that the area has made significant progress towards meeting that goal because of adopted control. This section also addresses U.S. EPA requirements for ensuring that the plan will result in attainment throughout the nonattainment area.

SIP Emissions Targets

An attainment demonstration plan identifies emission targets, or “carrying capacities,” that represent the maximum emission levels that the nonattainment area can accommodate while attaining the standard. Air quality modeling is used to determine these emission targets. The modeling conducted for the 2009 Plan used the base and future year emission inventories that were available when the modeling for that plan started. The 2009 Plan showed that that the 2018 emissions targets would be met through a combination of adopted measures and new SIP measures.

The 2013 Update confirms that the Sacramento Nonattainment Area will attain the 1997 8-hour ozone standard by 2018.

This update uses new emission inventories as described in Section 3. Developing new SIP modeling that utilizes these new inventories in order to revisit the adopted attainment demonstration would be a multi-year process. Instead, the existing modeling results were updated using an analytical approach, described in this section, to demonstrate that the emission reductions achieved by the 2009 Plan, as updated in the 2013 SIP Revision, will result in attainment of the 8-hour ozone standard by 2018 deadline.

Updated Attainment Demonstration

The 2009 Plan used a photochemical air quality modeling to identify attainment goals. The air quality modeling, described in Appendix B of the 2009 Plan, used 2002 as the base year. It projected air quality in 2018 using forecasted emissions that include activity growth factors and the benefits of adopted controls, but no new SIP measures. In the Sacramento Nonattainment Area this projected ozone level was above the 8-hour ozone standard, indicating additional emission reductions were needed, beyond those that would result from the existing control program. To provide these additional reductions, the 2009 SIP included commitments for future actions by ARB and the air districts.

The revised inventories used in the 2013 Update, which include new growth forecasts and the reductions from actions taken since 2009, project emissions in 2018 that are below those needed for attainment. However the revised inventories changed both the base year and attainment year emission estimates. To be conservative, the 2013 Update attainment analysis re-calculates the attainment target by applying the percentage of NO_x and VOC emission reductions needed in the 2009 Plan to the updated inventory, resulting in new NO_x and VOC emission targets, expressed as tons per day. Those targets are then compared to the updated inventory, which includes the effects of rules adopted to date, to assess current progress toward attainment of the standard. The analysis is summarized in Table 3 and detailed in Appendix B. It shows that adopted controls will provide the new NO_x reductions needed, from 2002 levels, to attain the standard. The analysis shows that in 2018, existing rules will provide 108 percent of the needed VOC emission reductions. The 2013 Update also identifies additional control measures under development that will provide future NO_x reductions beyond those needed for attainment.

The air quality modeling prepared for the 2009 Plan and described in Appendix B of that plan supports the conclusion that adopted and committed controls will result in attainment by 2018. The modeling also suggested that as overall NO_x emissions decrease, each new ton of NO_x reductions will have an incrementally greater ozone benefit and cause ozone concentrations to decrease more rapidly, also supporting this revised attainment demonstration.

U.S. EPA requires that attainment demonstrations submitted as part of a SIP include an unmonitored area analysis. This analysis is intended to identify areas without routine air monitoring sites where future year design values may be greater than the standard. The unmonitored area analysis prepared for the 2013 update indicates that there will be no areas in 2018 where ozone concentrations exceed those predicted for the monitoring sites. A detailed discussion of the Sacramento Nonattainment Area unmonitored area analysis is included in Appendix F.

Table 3: Attainment Demonstration Summary (tpd)

2009 Attainment and RFP Plan Inventory (CEFS 1.06¹)	NOx	VOC
A. 2002 Total Emissions	196	160
B. SIP Attainment Target	91	117
C. Attainment Emission Reductions Required from 2002 Baseline in tons/day [A-B]	105	43
D. Attainment Emission Reductions Required from 2002 Baseline in % [C/A]	54%	27%
2013 Inventory (adjusted CEPAM 2012²)		
E. 2002 Updated Emissions Inventory	165	147
F. Attainment Reductions Required in %	54%	27%
G. Attainment Emission Reduction in tons/day [E*F]	88	40
H. Updated Attainment Demonstration Target [E-G]	77	107
I. 2018 Emissions with Adopted Rules	77	99
Updated Inventory (adjusted CEPAM 2012²)		
J. Attainment Demonstration in % [H/I]	100%	109%

¹ California Emission Forecasting System

² California Emissions Projection Analysis Model

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3. Other Clean Air Act Planning Requirements

This section provides an overview of the revisions reflected in the emission inventories used in the 2013 Update. Several CAA requirements rely on the emission inventories and must be updated to reflect the revised inventories; this section also summarizes revisions to the reasonable further progress demonstration, transportation control conformity budgets, and a Reasonably Available Control Measure (RACM) analysis. In addition, a 2011 court ruling necessitated the adoption of a revised Vehicle Miles Traveled (VMT) offset demonstration that is also summarized in this section.

Emission Inventory

An emissions inventory is a critical tool used to develop air pollution control strategies and to evaluate progress in implementing adopted strategies. The emissions inventory is a systematic listing of the sources of air pollutants along with the amount of pollutants emitted from each source or category of sources over a given time period. The emission inventories used in the ozone plan are summer season inventories that reflect the activity levels and conditions present when higher ozone levels occur in Sacramento Nonattainment Area.

The air districts within the Sacramento Nonattainment Area initially adopted the 2009 Plan in February 2009. The inventories used in the 2009 Plan reflected the most up-to-date and accurate estimates of emission available at that time.

Since the 2009 Plan was adopted, both ARB and the Sacramento Nonattainment Area districts have continued to evaluate and update emission estimates for source categories under their respective authority. Several significant changes are reflected in the inventories used in this update:

- The inventories reflect effects of new local, State and federal regulations.
- The inventories reflect new information about activity and emission levels gained as ARB developed its mobile source regulations.
- Changes in growth and activity factors for some sectors reflect the impacts of the recession.
- The inventories use the most current SACOG transportation activity forecasts.
- The inventories reflect other improvements identified by the Sacramento Nonattainment Area districts.

The 2013 Update emission inventory is derived from California Emissions Projection Analysis Model (CEPAM). CEPAM 2012 uses a 2005 baseline inventory; the inventory was calibrated to 2005 emissions and activity levels, and inventories for other years are back-cast or forecast from that base inventory. The 2009 Plan used a 2002 base-year inventory.

CEPAM 2013 incorporates the results of a thorough review of the off-road mobile source inventory methodology, and updated many key factors used in estimating

emissions from off-road vehicles. This included new population and activity data reported to ARB, as well as new published studies and other data that evaluated emissions from off-road vehicles. Staff also evaluated new data that showed that the previous inventory overestimated certain off-road mobile source emissions. The resulting emission estimates show a 33 percent reduction in off-road baseline NOx emissions and a 17 percent reduction in off-road baseline VOC emissions as compared to the inventory used in the 2009 Plan.

The Sacramento Nonattainment Area districts' improvements include the use of the most recent transportation activity data provided by SACOG and updates to several local source categories subject to recent local rulemaking. SMAQMD identified several new facilities whose emissions are included in the updated inventory. The updated inventories also account for a transportation safety margin that provides room for unanticipated growth in on-road emissions.

Appendix C provides a detailed review of the emission inventory used in this update. In aggregate, the updated emission estimates show a 16 percent reduction in baseline NOx emissions and 9 percent reduction in regional baseline VOC emissions for 2002.

The emission reduction commitments in the 2007 State Strategy are based on estimates of reductions achieved from individual new measures. However, it is important to note that the overall commitment is to provide for attainment of the federal standards through aggregate emission reductions resulting from the implementation of the State Strategy. If an individual measure does not result in the expected emission reduction, the State still commits to attainment through other measures emission reductions. Likewise, if an individual measure results in greater than expected reductions, those additional reductions may be counted towards the State's aggregate emission reduction commitment.

Emission Reduction Credits

The inventory used in this update was developed in part for use in the Northern California regional air quality model. Because banked emission reduction credits are modeled as actual emissions for attainment demonstration purposes, the emission reduction credits were allocated across the stationary and area-wide source categories for the modeling inventory. For the purpose of the attainment, contingency and reasonable further progress demonstrations in this update, the credits are subtracted from the inventory outputs for those categories and shown as separate line items as they were in the original plan

Reasonable Further Progress Demonstration

To ensure that nonattainment areas make consistent progress towards attainment of the ozone standard, SIPs for these areas are required to show a three percent per year reduction in both VOC and NOx emissions, averaged over a three year period, up to the attainment year. The last milestone year for the Sacramento Nonattainment Area's reasonable further progress (RFP) demonstration is 2014. This milestone year is 12

years after the finalized amendment of the 1997 8-Hour Ozone standard, so a 36% reduction in VOC emissions is needed to demonstrate RFP.

The Sacramento Nonattainment Area is forecasting a shortfall of 9.9% VOC emission reductions in 2014. Section 182 (c)(2)(C) of the CAA provides the ability to substitute surplus NOx emission reductions to mitigate any VOC emission reduction shortfalls.

The RFP analysis shows sufficient NOx emission reductions to accommodate the VOC shortfall, and to provide a 3% contingency in each milestone year as required under sections 172(c)(9) and 182(c)(9) of the CAA.

The complete RFP analysis is provided in Appendix D.

Transportation Conformity Budgets

Under section 176(c) of the Act, transportation projects must be fully consistent with the SIP to receive federal funding or approval. U.S. EPA's transportation conformity rule details requirements for establishing motor vehicle emission budgets in SIPs for the purpose of addressing whether transportation plans and programs conform to the SIP.

The 2013 Update establishes on-road motor vehicle emission budgets for the 8-hour ozone standard. The on-road mobile inventories and the transportation conformity budgets are estimated using California's CEPAM2012 and EMFAC2011 on-road mobile emissions model. EMFAC2011 was approved by U.S. EPA on March 6, 2013. The latest activity from SACOG was used as inputs into the EMFAC 2011 model for this inventory. In Appendix C, Tables C1 and C2 shows all adjustments made to the default CEPAM2012 output used to develop the transportation conformity budgets.

Appendix E provides Sacramento's motor vehicle emission budgets for the upcoming milestone years of 2014, 2017, and 2018. The motor vehicle emission budgets are generated from EMFAC2011 using SACOG's 2013 MTIP activity data as described above.

A locally adopted safety margin is included in each of the updated conformity budgets to allow for unanticipated growth in on-road emissions.

Reasonably Available Control Measures Analysis

The CAA requires SIPs to provide for the implementation of all reasonable available control measures (RACM) as expeditiously as practicable, including at minimum reasonably available control technology (RACT). U.S. EPA interprets RACM to be those measures that are technologically and economically feasible, that when considered in aggregate would advance the attainment date by at least one year.

The District RACM/RACT demonstration includes a comparison of stationary source measures the District has implemented, or plans to implement, with measures implemented by other agencies within and outside of the State. For the majority of

stationary and area source categories, the District rules are the most stringent in California.

Based U.S. EPA guidance, the District concluded the 2013 Update meets the RACM/RACT requirements of the CAA. These requirements include a demonstration that no additional feasible measures could be identified that could, in aggregate, accelerate attainment by one year. The complete RACM and RACT for stationary and area-wide sources assessments are provided in Appendix H of the District's 2013 Update. The RACM analysis for TCM's is provided in Appendix A-2 of the District's 2013 Update.

California's comprehensive mobile source program continues to be RACM as it expands and further reduces emissions. Given the significant emission reductions needed for attainment in California, ARB has adopted the most stringent control measures nationwide for on-road and off-road mobile sources and the fuels that power them. These measures provide a significant portion of emission reductions needed for the Sacramento Nonattainment Area to attain the 8-hour ozone standard.

Ozone VMT Offset Demonstration

Section 182(d)(1)(A) of the Act requires that SIPs for areas classified as Severe and above include a demonstration that "identifies specific enforceable transportation control strategies and transportation control measures to offset any growth in emissions from growth in such area...." The 2009 Plan demonstrated this requirement was met, using a methodology that had been used in other SIPs approved by U.S. EPA. However, this methodology was subsequently invalidated in a 2011 ruling by the Ninth Circuit Court of Appeals. The 2013 Update includes a "Vehicle Miles Travelled Offset Demonstration" that complies with guidance U.S. EPA published in August 2012 in response to the court's ruling. The 2013 Update demonstrates that emission increases due to VMT growth are appropriately offset by transportation control strategies and transportation control measures using two alternative methodologies.

Staff Recommendations

ARB staff recommends that the Board approve the 2013 Revisions to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan as a revision to the California SIP. Staff further recommends that the Board direct the Executive Officer to submit the 2013 Revisions to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan to U.S. EPA as a revision to the California SIP.

Appendices

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Appendix A

ARB Rulemaking

Table A1: CARB Measures Adopted

Measure	Date of Adoption	Date Sent to U.S. EPA
Modifications to Reformulated Gasoline	Jun. 14, 2007	Feb. 03, 2009
Vapor Recovery for Above-Ground Storage Tanks	Jun. 21, 2007	Jun. 12, 2008
Clean Up Existing Harbor Craft	Nov. 15, 2007	Apr. 12, 2010
Ship Auxiliary Engine Cold Ironing and Clean Technology	Dec. 06, 2007	Aug. 02, 2010
Consumer Products Program --2008 amendment	Jun. 26, 2008	Feb. 16, 2010
--2009 amendment	Sep. 24, 2009	Jan. 28, 2011
Additional Evaporative Emission Standards	Sep. 25, 2008	May 02, 2011
Portable Outboard Marine Tanks	Sep. 25, 2008	May 02, 2011
Smog Check Improvements	Aug. 31, 2009	Oct. 28, 2009
Pesticides Element	Oct. 12, 2009	Aug. 02, 2011
Cleaner In-Use Heavy-Duty Trucks	Dec. 16, 2010	Sep. 21, 2011
Cleaner In-Use Off-Road Equipment	Dec. 17, 2010	Sep. 21, 2011
Port Truck Modernization	Dec. 17, 2010	Sep. 21, 2011
Cleaner Main Ship Engines and Fuel for Ocean-Going Vessels	Jun. 23, 2011	Sep. 21, 2011
Offroad Recreational Vehicles ¹	Jul. 25, 2013	Pending

¹ Benefits are not yet incorporated in the Emission Inventory

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Appendix B

Attainment Demonstration Analysis

This Appendix provides the analytic procedures used, in lieu of modeling, to assess the Sacramento Nonattainment Area attainment demonstration submitted as part of the original 2009 Plan in light of the revised emission inventories submitted as part of the 2013 Update. Table 3 presents the updated attainment demonstration. The emission reductions in the updated attainment demonstration result from adopted measures that have been submitted to the U.S. EPA. The 2013 Update also identifies additional control measures under development that will provide further reductions beyond those needed for attainment.

The inventories used in this update are derived from ARB's CEPAM 2012, with mobile source emissions estimated using ARB's EMFAC 2011 model and activity data provided by SACOG on January 23, 2013. However, ARB and the local districts identified additional refinements needed to bring these baseline inventories up to date for the purposes of assessing the attainment demonstration and progress towards attainment. The CEPAM 2012 inventory and baseline adjustments are summarized in Appendix C.

Synopsis of Attainment Demonstration in the 2009 Attainment and RFP Plan – Table B1

Table B1 presents the emission inventory in the 2009 Plan to calculate the percent reductions required from the 2002 Baseline to attain the ozone standard.

2013 Updated Attainment Demonstration Target – Table B2

Table B2 calculates the updated attainment demonstration target by applying the percent reductions required for attainment determined in Table B1 to the 2013 Update's emission inventory, following the procedures described in Chapter 2

2013 Updated Attainment Demonstration – Table B3

The 2013 Update's 2018 projected emission inventories are compared to the updated attainment demonstration target in Table B3. This demonstrates that adopted measures provide the emission reductions necessary to demonstrate attainment.

Attainment Contingency Measures Reductions – Table B4

Table B4 compares the updated 2019 emission inventory to the attainment target calculated in Table B2. Table B4 demonstrates that in aggregate already adopted measures reflected in the 2013 Update provide for at least three percent emission reductions in 2019, beyond those needed for attainment, as required by the Act's section 182(c)(9) contingency requirement. Please refer to Appendix C in the 2013 Update for additional details.

Additional Measures – Table B5

Table B5 lists State and local control measure commitments identified in the 2009 Plan that are under development and therefore are not yet reflected in the updated inventory, and the associated expected emission reductions. These additional measures are not necessary for attainment, reasonable further progress, or contingency, but will provide continuing emission reductions.

**Table B1: Synopsis of Attainment Demonstration
in the 2009 Attainment and RFP Plan (tpd)**

2009 Attainment and RFP Plan Inventory (CFS 1.06)	NOx	VOC
A. 2002 Total Emissions ¹	196	160
B. 2018 Total Emissions ¹	101	117
C. Emission Reduction Credits ²	3	4
D. Adjusted 2018 Total Emissions [B+C]	104	121
Baseline Attainment Emission Target		
E. Attainment Emission Reductions in 2018 in % ³	12.5%	3.3%
F. Attainment Emission Reduction in tons/day [D*E]	13	4
G. SIP Attainment Demonstration Target [D-F]	91	117
Baseline Attainment Ratio		
H. Attainment Emission Reductions Required from 2002 Baseline in tons/day [A-G]	105	43
I. Percent Emission Reductions Required from 2002 Baseline for Attainment [H/A]	54%	27%

¹ 2009 Plan - Tables 5-2 and 5-3.

² 2009 Plan - Tables A6-1 and A6-2.

³ 2009 Plan - Appendix B.

Table B2. 2013 Updated Attainment Demonstration Target (tpd)

Revised Inventory (adjusted CEPAM 2012)	NOx	VOC
A. 2002 Updated Emissions Inventory ¹	165	147
B. Reductions Required for Attainment in % ²	54%	27%
C. Attainment Emission Reduction in tons/day [A*B]	88	40
D. Adjusted SIP Emission Target [A-C]	77	107

¹ Table C1 and Table C2.

² Table B1.

Table B3. 2013 Updated Attainment Demonstration (tpd)

Revised Inventory (adjusted CEPAM 2012)	NOx	VOC
A. Adjusted 2018 Emission Inventory ¹	77	99
B. Updated Attainment Demonstration Target ²	77	107
C. Updated Attainment Demonstration in % [B/A]	100%	109%

¹ Table C1 and C2.

² Table B2.

Table B4: Attainment Contingency Measures Reductions (tpd)

Revised Inventory (adjusted CEPAM 2012)	NOx	VOC
A. Updated Attainment Demonstration Target ¹	77	107
B. Adjusted 2019 Emissions ²	74	100
2019 Total Reductions (tpd)		
C. 2019 Reductions From Emission Target [A-B]	2	7
D. Percent Reduction from SIP Emission Target [C/A]	3%	7%

¹ Table B2.

² Table C1 and Table C2.

Table B5: Additional Measures(tpd)¹

Statewide	NOx	VOC
A. Statewide Measure	0.3	3
New Emission Standards for Recreational Boats	0.3	3.0
Local Non-Regulatory Measures		
B. Total Local Non-Regulatory Measures	0.6	0.1
Regional Mobile Incentive Program - Onroad	0.5	0.0 ²
Regional Mobile Incentive Program - Offroad	0.0	0.0 ²
Spare the Air Program	0.0 ²	0.1
SMAQMD		
C. Total SMAQMD Measures	0.0	1.1
442 - Architectural Coatings	0.0	0.9
459 - Automotive Refinishing	0.0	0.1
461 - Natural Gas Production and Processing	0.0	0.1

EDCAQMD	NOx	VOC
D. Total EDCAQMD Measures	0.0²	0.2
215 - Architectural Coatings	0.0	0.2
239 - Large Water Heaters and Small Boilers	0.0 ²	0.0
FRAQMD		
E. Total FRAQMD Measures	0.0²	0.0²
3.15 - Architectural Coatings	0.0	0.0 ²
3.19 - Automotive Refinishing	0.0	0.0 ²
3.14 - Solvent Degreasing	0.0	0.0 ²
3.22 - Stationary Internal Combustion Engines (Non-Agricultural)	0.0 ²	0.0
3.23 - Large Water heaters and Small Boilers	0.0 ²	0.0
PCAPCD		
F. Total PCAPCD Measures	0.0²	0.3
218 - Architectural Coatings	0.0	0.2
234 - Automotive Refinishing	0.0	0.0 ²
CM2 - Large Water Heaters and Small Boilers	0.0 ²	0.0
CM3 - Miscellaneous Metal Parts and Products	0.0	0.0 ²
YSAQMD		
G. Total YSAQMD Measures	0.5	1.0
2.14 - Architectural Coatings	0.0	0.2
2.26 - Automotive Refinishing	0.0	0.1
2.24/2.31 - General Surface Preparation/Cleanup and Degreasing	0.0	0.8
2.29 - Graphic Arts	0.0 ³	0.0 ³
2.27 - Boilers, Steam Generators, and Process Heaters	0.3	0.0
2.37 - Large Water Heaters and Small Boilers	0.2	0.0

¹ These additional measures are under development. The emission reductions associated with these measures go beyond those needed for the attainment demonstration.

² Emissions <0.05 tpd.

³ No current estimate on emission reduction.

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Appendix C

Emission Inventory Update

Revised Emission Inventory

This appendix provides the unadjusted inventory that is derived from CEPAM2012. Tables C1 and C2 summarize the summer planning emission inventories for the Sacramento 8-Hour Federal Nonattainment Area (Sacramento Nonattainment Area).

This Appendix provides more detail about the emission inventories used in the 2013 Update, including a summary of the baseline inventory and subsequent refinements.

Baseline Inventory

CEPAM2012 is used for the baseline inventory for Stationary, Area-Wide and Off-Road Mobile sources. EMFAC2011 was used in January 2013, using the activity data provided by SACOG, to provide the On-Road Mobile sources.

Emission Inventory Adjustments

The emission inventories in C1 and C2 are adjusted to reflect updated stationary sources, new transportation activity data provided from SACOG, and the inclusion of the transportation conformity safety margin. These adjustments are detailed and summated in Tables C3 and C4.

Emission Reduction Credits

The emission reduction credits banked with the districts in the Sacramento Nonattainment Area are included in the unadjusted output of CEPAM2012. Table C5 identifies the ERCs within CEPAM, as well as ERC updates provided by the Sacramento Nonattainment Area districts.

**Table C1: Summer Planning Emissions Inventory for
Nitrogen Oxides (NOx) in tons per day
Sacramento Nonattainment Area**

Stationary Sources	2002	2014	2017	2018	2019
ELECTRIC UTILITIES	1.115	2.878	3.071	3.118	3.164
COGENERATION	0.011	0.009	0.010	0.010	0.011
OIL AND GAS PRODUCTION (COMBUSTION)	0.274	0.215	0.202	0.197	0.195
MANUFACTURING AND INDUSTRIAL	3.070	2.079	2.052	2.042	2.052
FOOD AND AGRICULTURAL PROCESSING	4.024	2.585	1.442	1.374	1.341
SERVICE AND COMMERCIAL	2.165	2.642	2.652	2.651	2.670
OTHER (FUEL COMBUSTION)	0.765	0.746	0.616	0.616	0.623
SEWAGE TREATMENT	0.012	0.021	0.022	0.022	0.022
LANDFILLS	0.037	0.066	0.067	0.067	0.068
INCINERATORS	0.019	0.020	0.021	0.021	0.022
SOIL REMEDIATION	0.003	0.005	0.005	0.005	0.005
OTHER (WASTE DISPOSAL)	0.000	0.000	0.000	0.000	0.000
LAUNDERING	0.000	0.000	0.000	0.000	0.000
DEGREASING	0.000	0.000	0.000	0.000	0.000
COATINGS AND RELATED PROCESS SOLVENTS	0.007	0.020	0.021	0.021	0.022
PRINTING	0.014	0.016	0.017	0.018	0.018
ADHESIVES AND SEALANTS	0.000	0.000	0.000	0.000	0.000
OTHER (CLEANING AND SURFACE COATINGS)	0.000	0.000	0.000	0.000	0.000
OIL AND GAS PRODUCTION	0.008	0.000	0.000	0.000	0.000
PETROLEUM REFINING	0.000	0.006	0.006	0.006	0.006
PETROLEUM MARKETING	0.020	0.032	0.034	0.035	0.037
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.000	0.000	0.000	0.000	0.000
CHEMICAL	0.160	0.291	0.325	0.337	0.353
FOOD AND AGRICULTURE	0.018	0.044	0.047	0.048	0.050
MINERAL PROCESSES	0.435	0.240	0.267	0.278	0.285
METAL PROCESSES	0.000	0.005	0.005	0.005	0.005
WOOD AND PAPER	0.056	0.045	0.047	0.047	0.047
ELECTRONICS	0.000	0.000	0.000	0.000	0.000
OTHER (INDUSTRIAL PROCESSES)	0.002	0.005	0.007	0.008	0.008
Stationary Sources Subtotal	12.212	11.969	10.935	10.924	11.000
Area-Wide Sources	2002	2014	2017	2018	2019
CONSUMER PRODUCTS	0.00	0.00	0.00	0.00	0.00
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00	0.00	0.00	0.00
PESTICIDES/FERTILIZERS	0.00	0.00	0.00	0.00	0.00
ASPHALT PAVING / ROOFING	0.00	0.00	0.00	0.00	0.00
RESIDENTIAL FUEL COMBUSTION	2.53	2.74	2.56	2.50	2.45
FARMING OPERATIONS	0.00	0.00	0.00	0.00	0.00
CONSTRUCTION AND DEMOLITION	0.00	0.00	0.00	0.00	0.00
PAVED ROAD DUST	0.00	0.00	0.00	0.00	0.00
UNPAVED ROAD DUST	0.00	0.00	0.00	0.00	0.00
FUGITIVE WINDBLOWN DUST	0.00	0.00	0.00	0.00	0.00
FIRES	0.01	0.02	0.02	0.02	0.02
MANAGED BURNING AND DISPOSAL	0.53	0.58	0.57	0.57	0.57
COOKING	0.00	0.00	0.00	0.00	0.00
OTHER (MISCELLANEOUS PROCESSES)	0.00	0.00	0.00	0.00	0.00
Area-Wide Sources Subtotal	3.065	3.331	3.149	3.087	3.037

On-Road Mobile Sources	2002	2014	2017	2018	2019
LIGHT DUTY PASSENGER (LDA)	18.29	5.23	3.80	3.44	3.14
LIGHT DUTY TRUCKS - 1 (LDT1)	5.84	1.58	1.24	1.13	1.05
LIGHT DUTY TRUCKS - 2 (LDT2)	11.74	3.47	2.46	2.21	2.00
MEDIUM DUTY TRUCKS (MDV)	7.28	5.10	4.15	3.87	3.60
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	1.30	2.49	2.27	2.20	2.12
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.36	0.17	0.15	0.14	0.14
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.89	0.44	0.34	0.32	0.29
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.51	0.27	0.27	0.27	0.27
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	3.12	6.93	5.70	5.31	4.94
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	2.04	1.39	1.16	1.09	1.02
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	12.79	6.22	4.38	3.95	3.55
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	30.47	14.13	10.54	9.79	9.21
MOTORCYCLES (MCY)	0.32	0.58	0.59	0.60	0.60
HEAVY DUTY DIESEL URBAN BUSES (UB)	1.38	1.00	0.98	0.97	0.96
HEAVY DUTY GAS URBAN BUSES (UB)	0.12	0.11	0.11	0.10	0.10
SCHOOL BUSES - GAS (SBG)	0.06	0.03	0.03	0.03	0.03
SCHOOL BUSES - DIESEL (SBD)	0.52	0.37	0.37	0.34	0.33
OTHER BUSES - GAS (OBG)	0.17	0.18	0.15	0.15	0.14
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.73	0.36	0.24	0.21	0.19
ALL OTHER BUSES - DIESEL (OBD)	0.44	0.27	0.19	0.18	0.17
MOTOR HOMES (MH)	0.71	0.41	0.36	0.34	0.33
On-Road Mobile Sources Subtotal	99.062	50.756	39.486	36.642	34.172
Other Mobile Sources	2002	2014	2017	2018	2019
AIRCRAFT	1.68	2.50	2.79	2.85	2.90
TRAINS	12.10	7.21	7.20	7.09	7.00
OCEAN GOING VESSELS	0.15	0.08	0.08	0.08	0.07
COMMERCIAL HARBOR CRAFT	2.04	1.30	0.88	0.86	0.85
RECREATIONAL BOATS	2.36	2.30	2.29	2.28	2.28
OFF-ROAD RECREATIONAL VEHICLES	0.04	0.08	0.09	0.10	0.10
OFF-ROAD EQUIPMENT	19.08	8.90	7.96	7.30	6.86
FARM EQUIPMENT	12.98	7.33	5.80	5.32	4.88
FUEL STORAGE AND HANDLING	0.00	0.00	0.00	0.00	0.00
Other Mobile Sources Subtotal	50.436	29.710	27.097	25.871	24.934
Grand Total	2002	2014	2017	2018	2019
Grand Total	164.776	95.766	80.666	76.524	73.143

Base Year: 2005

Sacramento Ozone Nonattainment Area Ver. 1.02

Migration ID: 2012_SIP_V102_SAC_O3

AF Migration Table: AF_MASTER_SIP12SNOZ

**Table C2: Summer Planning Emissions Inventory for
Volatile Organic Compounds (VOC) in tons per day
Sacramento Nonattainment Area**

Stationary Sources	2002	2014	2017	2018	2019
ELECTRIC UTILITIES	0.168	0.402	0.420	0.425	0.426
COGENERATION	0.003	0.000	0.000	0.000	0.000
OIL AND GAS PRODUCTION (COMBUSTION)	0.154	0.083	0.078	0.076	0.075
MANUFACTURING AND INDUSTRIAL	0.070	0.123	0.123	0.123	0.122
FOOD AND AGRICULTURAL PROCESSING	0.355	0.195	0.115	0.110	0.106
SERVICE AND COMMERCIAL	0.221	0.262	0.266	0.266	0.266
OTHER (FUEL COMBUSTION)	0.089	0.044	0.033	0.033	0.033
SEWAGE TREATMENT	0.030	0.057	0.058	0.060	0.061
LANDFILLS	0.362	0.547	0.570	0.582	0.588
INCINERATORS	0.006	0.004	0.004	0.004	0.004
SOIL REMEDIATION	0.081	0.113	0.120	0.122	0.123
OTHER (WASTE DISPOSAL)	0.213	0.293	0.303	0.308	0.310
LAUNDERING	0.047	0.061	0.064	0.065	0.066
DEGREASING	2.464	2.133	2.197	2.217	2.231
COATINGS AND RELATED PROCESS SOLVENTS	3.019	4.102	4.309	4.397	4.453
PRINTING	1.219	1.494	1.573	1.599	1.620
ADHESIVES AND SEALANTS	0.827	0.889	0.884	0.880	0.877
OTHER (CLEANING AND SURFACE COATINGS)	0.003	0.018	0.019	0.019	0.019
OIL AND GAS PRODUCTION	0.799	0.568	0.531	0.519	0.507
PETROLEUM REFINING	0.000	0.000	0.000	0.000	0.000
PETROLEUM MARKETING	3.855	5.603	5.890	5.985	6.031
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.000	0.005	0.006	0.006	0.006
CHEMICAL	2.052	2.697	3.024	3.141	3.221
FOOD AND AGRICULTURE	0.518	0.581	0.617	0.630	0.641
MINERAL PROCESSES	0.218	0.181	0.201	0.209	0.212
METAL PROCESSES	0.000	0.000	0.000	0.000	0.000
WOOD AND PAPER	0.696	0.649	0.677	0.687	0.687
ELECTRONICS	0.006	0.023	0.025	0.025	0.027
OTHER (INDUSTRIAL PROCESSES)	0.002	0.049	0.070	0.080	0.083
Stationary Sources Subtotal	17.475	21.176	22.176	22.569	22.793
Area-Wide Sources	2002	2014	2017	2018	2019
CONSUMER PRODUCTS	14.760	12.575	12.999	13.160	13.281
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	8.449	8.827	9.176	9.291	9.380
PESTICIDES/FERTILIZERS	1.799	1.176	1.171	1.169	1.165
ASPHALT PAVING / ROOFING	0.821	0.908	0.917	0.920	0.921
RESIDENTIAL FUEL COMBUSTION	2.893	2.062	2.053	2.049	2.038
FARMING OPERATIONS	2.620	2.763	2.763	2.763	2.756
CONSTRUCTION AND DEMOLITION	0.000	0.000	0.000	0.000	0.000
PAVED ROAD DUST	0.000	0.000	0.000	0.000	0.000
UNPAVED ROAD DUST	0.000	0.000	0.000	0.000	0.000
FUGITIVE WINDBLOWN DUST	0.000	0.000	0.000	0.000	0.000
FIRES	0.036	0.046	0.048	0.049	0.049
MANAGED BURNING AND DISPOSAL	0.981	1.018	1.003	0.998	0.990
COOKING	0.111	0.137	0.142	0.143	0.144
OTHER (MISCELLANEOUS PROCESSES)	0.000	0.000	0.000	0.000	0.000
Area-Wide Sources Subtotal	32.470	29.511	30.271	30.541	30.722

On-Road Mobile Sources	2002	2014	2017	2018	2019
LIGHT DUTY PASSENGER (LDA)	22.904	6.956	4.805	4.260	3.851
LIGHT DUTY TRUCKS - 1 (LDT1)	7.561	2.566	1.989	1.840	1.748
LIGHT DUTY TRUCKS - 2 (LDT2)	8.342	3.250	2.533	2.361	2.230
MEDIUM DUTY TRUCKS (MDV)	3.988	3.757	3.461	3.375	3.289
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	1.040	1.532	1.360	1.309	1.260
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.718	0.100	0.078	0.071	0.066
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	1.256	0.323	0.214	0.182	0.162
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.458	0.104	0.068	0.057	0.052
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.126	0.418	0.371	0.355	0.339
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.080	0.081	0.075	0.073	0.070
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.712	0.324	0.228	0.216	0.205
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	1.610	0.683	0.627	0.639	0.651
MOTORCYCLES (MCY)	2.409	2.204	2.161	2.172	2.180
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.060	0.046	0.046	0.045	0.045
HEAVY DUTY GAS URBAN BUSES (UB)	0.079	0.042	0.040	0.040	0.040
SCHOOL BUSES - GAS (SBG)	0.084	0.034	0.028	0.027	0.026
SCHOOL BUSES - DIESEL (SBD)	0.038	0.008	0.008	0.006	0.006
OTHER BUSES - GAS (OBG)	0.127	0.070	0.064	0.061	0.059
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.037	0.011	0.010	0.011	0.011
ALL OTHER BUSES - DIESEL (OBD)	0.034	0.013	0.006	0.006	0.006
MOTOR HOMES (MH)	0.281	0.058	0.040	0.035	0.032
On-Road Sources Subtotal	51.944	22.580	18.210	17.140	16.327
Other Mobile Sources	2002	2014	2017	2018	2019
AIRCRAFT	0.543	0.653	0.614	0.622	0.630
TRAINS	0.636	0.402	0.357	0.340	0.325
OCEAN GOING VESSELS	0.006	0.004	0.003	0.003	0.003
COMMERCIAL HARBOR CRAFT	0.132	0.105	0.093	0.093	0.093
RECREATIONAL BOATS	20.284	13.742	12.325	11.888	11.464
OFF-ROAD RECREATIONAL VEHICLES	2.430	2.543	2.535	2.540	2.547
OFF-ROAD EQUIPMENT	10.877	7.499	6.792	6.589	6.437
FARM EQUIPMENT	2.672	1.410	1.086	0.987	0.902
FUEL STORAGE AND HANDLING	3.078	1.564	1.409	1.372	1.337
Other Mobile Sources Subtotal	40.658	27.923	25.213	24.433	23.737
	2002	2014	2017	2018	2019
Grand Total	142.547	101.190	95.869	94.683	93.580

Base Year: 2005
Sacramento Ozone Nonattainment Area Ver. 1.02
Migration ID: 2012_SIP_V102_SAC_O3
AF Migration Table: AF_MASTER_SIP12SNOZ

**Table C3: Emissions Inventory Adjustments for
Nitrogen Oxides (NOx) in tons per day
Sacramento Nonattainment Area**

CEPAM 2012	2002	2014	2017	2018	2019
A. Unadjusted Emission Inventory	164.78	95.77	80.67	76.52	73.14
Updated Stationary/Area-Wide Sources					
B. Total Stationary/Area-Wide Source Adjustment	0.00	-0.03	-0.03	-0.03	-0.02
C. Implementation of PCAPCD 242 ¹	0.00	-0.03	-0.03	-0.03	-0.02
Updated On-Road Mobile Inventory					
D. Total On-Road Mobile Inventory Adjustment	0.00	-2.21	-0.97	0.03	0.96
E. Updated EMFAC2011 Emissions ²	0.00	-5.21	-2.97	-2.97	-2.04 ³
F. Transportation Safety Margin ⁴	0.00	3.00	2.00	3.00	3.00
Updated Incentives					
G. Total Incentive Adjustment	0.00	-1.71	-0.45	-0.49	-0.54
H. Carl Moyer	0.00	-1.64	-0.38	-0.42	-0.47
I. Prop 1-B	0.00	-0.07	-0.07	-0.07	-0.07
Updated Emission Reduction Credits					
J. Total Emission Reduction Credit Adjustment	0.00	0.73	0.81	0.81	0.82
K. 2008 Emission Reduction Credits	0.00	2.27	2.19	2.19	2.18
L. Current Emission Reduction Credits ⁵	0.00	3.00	3.00	3.00	3.00
Emission Inventory Adjustment					
M. Total [A+B+D+G+K]	164.78	92.55	80.02	76.86	74.36

¹ Appendix F - Table F5

² Emissions updated using SACOG's 2013 MTIP and Solano's MTC Activity data received 11/30/12.

³ The EMFAC 2011 output for 2019 emissions are not adjusted for emission reductions from the Carl Moyer and Prop1B incentive programs, or the regulatory programs of RFG, Smog Check, AB1493 or ACC.

⁴ Data provided by SMAQMD, Brigitte Tollstrup e-mail 12-05-12.

⁵ Appendix C - Table C3 Line A and B

Table C4: Emissions Inventory Adjustments for Volatile Organic Compounds (VOC) in tons per day Sacramento Nonattainment Area

CEPAM 2012	2002	2014	2017	2018	2019
A. Unadjusted Emission Inventory	142.55	101.19	95.87	94.68	93.58
Updated Stationary/Area-Wide Sources					
B. Total Stationary/Area-Wide Source Adjustment	4.11	4.01	3.99	3.99	3.98
C. Added Heritage Dairy (Yolo-Solano) ¹	0.00	0.11	0.11	0.11	0.11
D. Added Jepson Composting (Yolo-Solano) ¹	4.11	4.11	4.11	4.11	4.11
E. Implementation of FRAQMD 3.20	0.00	0.00	0.00	0.00	0.00
F. Implementation of PCAPCD 243 ¹	0.00	-0.21	-0.22	-0.23	-0.23
Updated On-Road Mobile Inventory					
G. Total On-Road Mobile Inventory Adjustment	0.00	0.22	-0.61	-0.65	1.50
H. Updated EMFAC2011 Emissions ²	0.00	-1.78	-1.61	-1.65	0.50 ³
I. Transportation Safety Margin ⁴	0.00	2.00	1.00	1.00	1.00
Updated Incentives					
J. Total Incentive Adjustment	0.00	-0.19	-0.03	-0.01	0.00
K. Carl Moyer	0.00	-0.19	-0.03	-0.01	0.00
Updated Emission Reduction Credits					
L. Total Emission Reduction Credit Adjustment	0.00	0.74	0.72	0.71	0.70
M. 2008 Emission Reduction Credits	0.00	3.26	3.28	3.29	3.30
N. Current Emission Reduction Credits ⁵	0.00	4.00	4.00	4.00	4.00
Emission Inventory Adjustment					
O. Total [A+B+G+J+L]	146.66	105.96	99.94	98.72	99.77

¹ Appendix F - Table F5

² Emissions updated using SACOG's 2013 MTIP and Solano's MTC Activity data received 11/30/12.

³ The EMFAC 2011 output for 2019 emissions are not adjusted for emission reductions from the Carl Moyer and Prop1B incentive programs, or the regulatory programs of RFG, Smog Check, AB1493 or ACC.

⁴ Data provided by SMAQMD, Brigette Tollstrup e-mail 12-05-12.

⁵ Appendix C - Table C3 Line A and B

**Table C5: Emission Reduction Credits Added to the
Emission Inventory Forecasts**

Updated NOx ERC Emissions in tons/day ¹		2002	2014	2017	2018	2019
A.	Total Sacramento Nonattainment Area NOx ERCs	0.00	3.00	3.00	3.00	3.00
CEPAM 2012 NOx ERC Emissions in tons/day						
B.	Total ERCs	0.00	2.27	2.19	2.19	2.18
	El Dorado	0.000	0.000	0.000	0.000	0.000
	Placer County	0.000	0.403	0.403	0.403	0.404
	Sacramento	0.000	1.188	1.153	1.146	1.140
	Sutter	0.000	0.071	0.058	0.057	0.056
	Yolo/Solano	0.000	0.610	0.581	0.579	0.578
ERC NOx Correction						
C.	ERC Correction Value [A-B]	0.00	0.73	0.81	0.81	0.82
Updated VOC ERC Emissions in tons/day¹						
A.	Total Sacramento Nonattainment Area VOC ERCs	0.00	4.00	4.00	4.00	4.00
CEPAM 2012 VOC ERC Emissions in tons/day						
B.	Total ERCs	0.00	3.26	3.28	3.29	3.30
	El Dorado	0.000	0.000	0.000	0.000	0.000
	Placer County	0.000	0.541	0.544	0.545	0.546
	Sacramento	0.000	2.139	2.154	2.160	2.165
	Sutter	0.000	0.061	0.060	0.060	0.060
	Yolo/Solano	0.000	0.523	0.524	0.525	0.526
ERC VOC Correction						
C.	ERC Correction Value [A-B]	0.00	0.74	0.72	0.71	0.70

¹ ERCs as of 09/19/2013, provided by SMAQMD

Appendix D

Reasonable Further Progress

**Table D1: Sacramento Nonattainment Area
Reasonable Further Progress Demonstration**

	2002	2014	2017	2018
Baseline ROG	146.7	106.0	99.9	98.7
CA MVCP/RVP Adjustment	0.0	10.9	11.9	12.2
RACT Corrections	0	0	0	0
Adjusted 2002 Baseline ROG in milestone year	146.7	135.8	134.8	134.5
RFP commitment for ROG reductions from new measures	0	0	0	0
Future Year ROG with existing and proposed measures		106.0	99.9	98.7
Required % change since previous milestone year (ROG or NOx) compared to 2002		9%	9%	3%
Target ROG levels		91.5	82.3	79.5
Apparent shortfall in ROG		14.5	17.6	19.2
Apparent shortfall in ROG, %		10.7%	13.0%	14.3%
ROG shortfall previously provided by NOx substitution, %		0.0%	10.7%	13.0%
Actual ROG shortfall, %		10.7%	2.3%	1.2%
Baseline NOx	164.8	92.6	80.0	76.9
CA MVCP Adjustment	0.0	10.4	11.0	11.2
Adjusted 2002 Baseline NOx in milestone year	164.8	154.4	153.8	153.6
RFP commitment for NOx reductions from new measures	0	0	0	0.0
Change in NOx since 2002		61.8	73.8	76.7
Change in NOx since 2002, %		40.0%	48.0%	49.9%
NOx reductions since 2002 already used for RFP substitution and contingency through last milestone year, %		0.0%	13.7%	16.0%
NOx reductions since 2002 available for RFP substitution and contingency in this milestone year, %		40.0%	34.3%	33.9%
Change in NOx since 2002 used for ROG substitution in this milestone year, %		10.7%	2.3%	1.2%
Change in NOx since 2002 available for contingency in this milestone year, %		3.0%	3.0%	3.0%
Change in NOx since 2002 surplus after meeting substitution and contingency needs in this milestone year, %		26.3%	31.9%	32.6%
RFP shortfall, if any		0.0%	0.0%	0.0%
RFP Met?		YES	YES	YES
Contingency Met?		YES	YES	YES

Note: ROG and NOx baseline emissions have been rounded to 1 decimal point.

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Appendix E

Transportation Conformity Baseline Adjustments Attributed to Statewide Measures

**Table E1: Sacramento Nonattainment Area NOx Motor
Vehicle Baseline Emissions Adjustments in tons per day**

	2014	2017	2018
Adjustments to Baseline	-2.15	-0.60	-0.66
RFG	0.00	0.00	0.00
Prop 1B	-1.70	0.00	0.00
Moyer	-0.08	-0.04	-0.05
AB1493	-0.01	-0.01	-0.01
Smog Check	-0.37	-0.37	-0.33
ACC	0.00	-0.18	-0.28

**Table E2: Sacramento Nonattainment Area VOC Motor
Vehicle Baseline Emissions Adjustments in tons per day**

	2014	2017	2018
Adjustments to Baseline	-2.63	-2.37	-2.26
RFG	-1.87	-1.47	-1.31
Prop 1B	0.00	0.00	0.00
Moyer	0.00	0.00	0.00
AB1493	-0.11	-0.21	-0.25
Smog Check	-0.64	-0.57	-0.55
ACC	0.00	-0.12	-0.15

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Appendix F

Unmonitored Area Analysis

Unmonitored Area Analysis for Ozone in Sacramento Nonattainment Area

Overview

The U.S. Environmental Protection Agency (U.S. EPA) requires that attainment demonstrations submitted as part of a State Implementation Plan (SIP) include an unmonitored area analysis (UAA). The UAA is intended to identify unmonitored areas where future year design values may be greater than the national ambient air quality standard (NAAQS). Since a simple spatial interpolation of observational data cannot identify unmonitored areas with concentrations higher than those measured at monitors, the U.S. EPA recommends a UAA that combines both observations and modeling. Although modeling is only as accurate as the emissions, meteorology, and representation of chemistry in the chemical mechanism, the model does explicitly account for the transport and formation of ozone over the entire modeling domain. Consequently, modeling can provide information about ozone concentration gradients between monitors that would not be accounted for in an analysis that includes only observational data.

Summary of Results

The monitoring network within the Sacramento 8-Hour Ozone Federal Nonattainment Area (Sacramento Nonattainment Area) was found to adequately capture elevated ozone levels within a 15-km radius of the monitors, and no peak concentrations were found outside of the network's spatial coverage. Therefore, the UAA has identified no unmonitored areas with concentrations higher than those predicted at the monitors in the nonattainment year. Please note that a valid ozone design value in Solano County was not available for this analysis.

Methodology

Following U.S. EPA guidance, this analysis used the Modeled Attainment Test Software (MATS), developed by the U.S. EPA, in the UAA. For this analysis, MATS was used with the default configuration. The default configuration in MATS involves using at least 5 days that have model-simulated, reference year ozone concentrations greater than or equal to 70 ppb in each grid cell in order to calculate the RRF for each grid cell. If the model simulation does not produce concentrations of 70ppb or higher in a certain grid cell, then the RRF and the concentration in that grid cell are both set to -9 (plotted as white color in Figure 3 and Figure 4).

Using MATS, the UAA is comprised of four steps:

1. Interpolate ambient design value data to create a set of spatial fields.

Ambient 8-hour Ozone Design Value (DV) concentrations from within the modeling domain are input into MATS, which creates a gridded set of DV spatial fields based on ambient data. The same design values that were used in the monitor based model attainment test are used for the UAA (DVs for years 2000-2002, 2001-2003, and 2002-2004). Note that these three datasets are centered on the 2002 reference year for modeling and RRF development.

2. Adjust the spatial fields using 2002 reference year gridded model output gradients (2002, reference year values).

For the 2007 SV 8-hr ozone SIP, two five-day 'base case' ozone episodes were simulated (Base case episode days: July 9 – July 13, 1999 and July 29 – August 2, 2000). Reference year (2002) modeling was conducted using a projected 2002 emissions inventory along with episode-specific, base case meteorology for both of these episodes. The daily maximum 8-hr ozone concentration for 2002 was calculated for each day and each model grid cell, resulting in a total of ten daily spatial gradient distributions, each representing the daily maximum 8-hr ozone field for the respective modeled day. Eight days of data that met base case model performance criteria were then input into MATS to generate a single gradient- adjusted DV spatial field.

3. Apply gridded RRFs to the gradient adjusted spatial fields.

In addition to the DVs and reference year simulated ozone, MATS requires future year simulated ozone. The methodology of calculating the daily maximum 8-hr ozone for the reference year (Step 2) was also used in this step to calculate a total of eight daily spatial gradient distributions for the future year, 2018. The MATS software uses the reference year (2002) and future year (2018) simulated ozone in each grid cell to calculate an average RRF for each grid cell. The future year gradient adjusted concentration is then calculated as the product of the RRF and base year gradient adjusted concentration.

4. Determine if any unmonitored areas are predicted to exceed the NAAQS in the future.

Results from Step 3 are analyzed to determine if any unmonitored regions are in violation of the NAAQS based on the future year gradient adjusted concentration.

Results

Results associated with each step of the UAA method described above are presented below (Figures 1-4). By default in the MATS analysis, a 'monitored area' is defined as a 7-by-7 grid of 4km grid cells surrounding a monitoring station. This is intended to be consistent with the 15km radius of representativeness for ambient monitoring stations that is used in the modeled attainment test.

An analysis of the gradient adjusted future year concentrations for 2018 (Figure 4) shows that the monitoring network in the SV provides adequate coverage over the regions which experience elevated ozone levels within the valley. In particular, the network adequately captures elevated ozone levels within a 15-km radius of the monitors and no peak concentrations are found outside of the network's spatial coverage. Therefore, the UAA has identified no unmonitored areas with concentrations higher than those predicted to occur at the monitors in the attainment year.

1. Interpolate reference year ambient data to create a set of spatial fields.

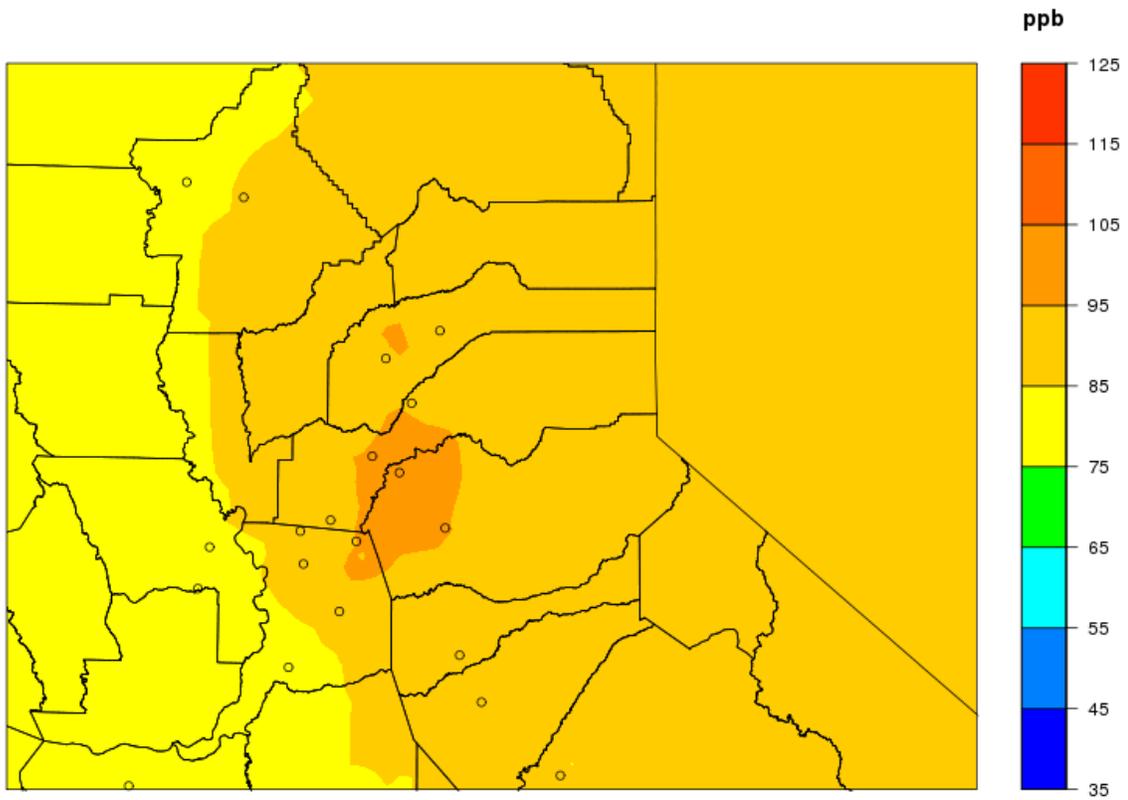


Figure 1 - Interpolated ambient concentrations (DV) from MATS for 2002.

2. Adjust the spatial fields using gridded model output gradients (reference year values).

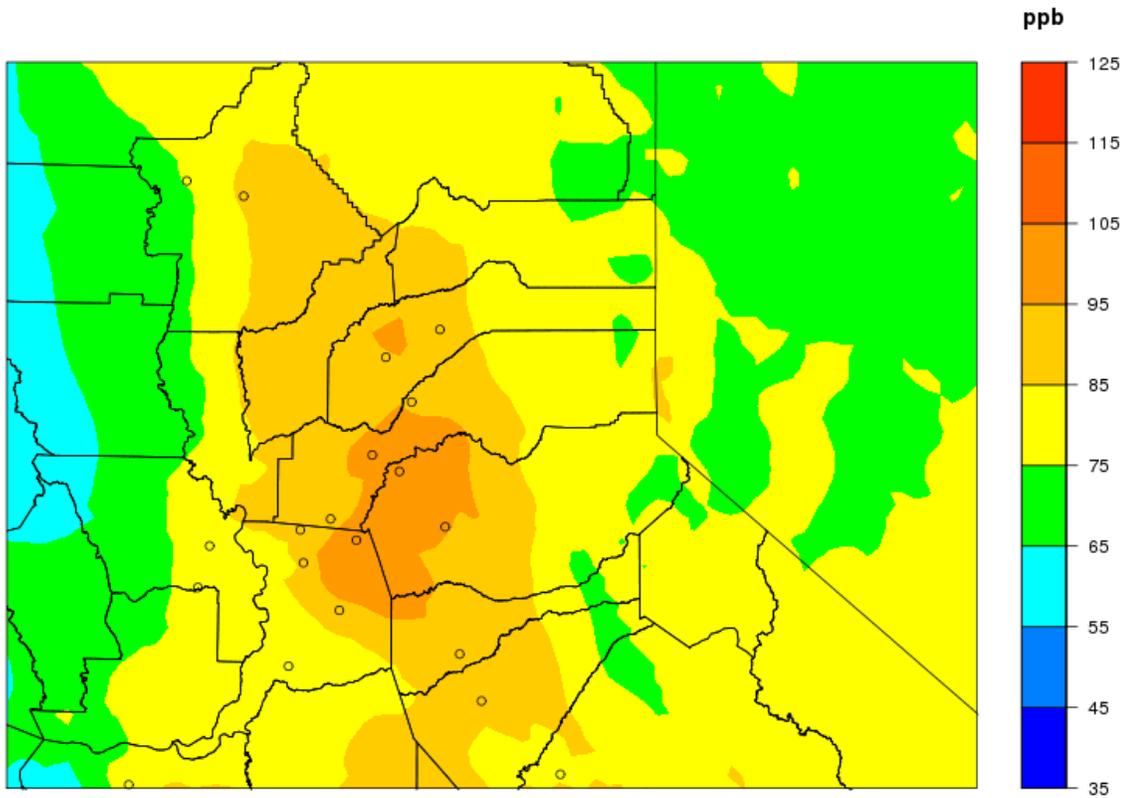


Figure 2 - . Interpolated gradient adjusted reference year concentration from MATS for 2002.

3. Apply gridded model RRFs to the gradient adjusted spatial fields.

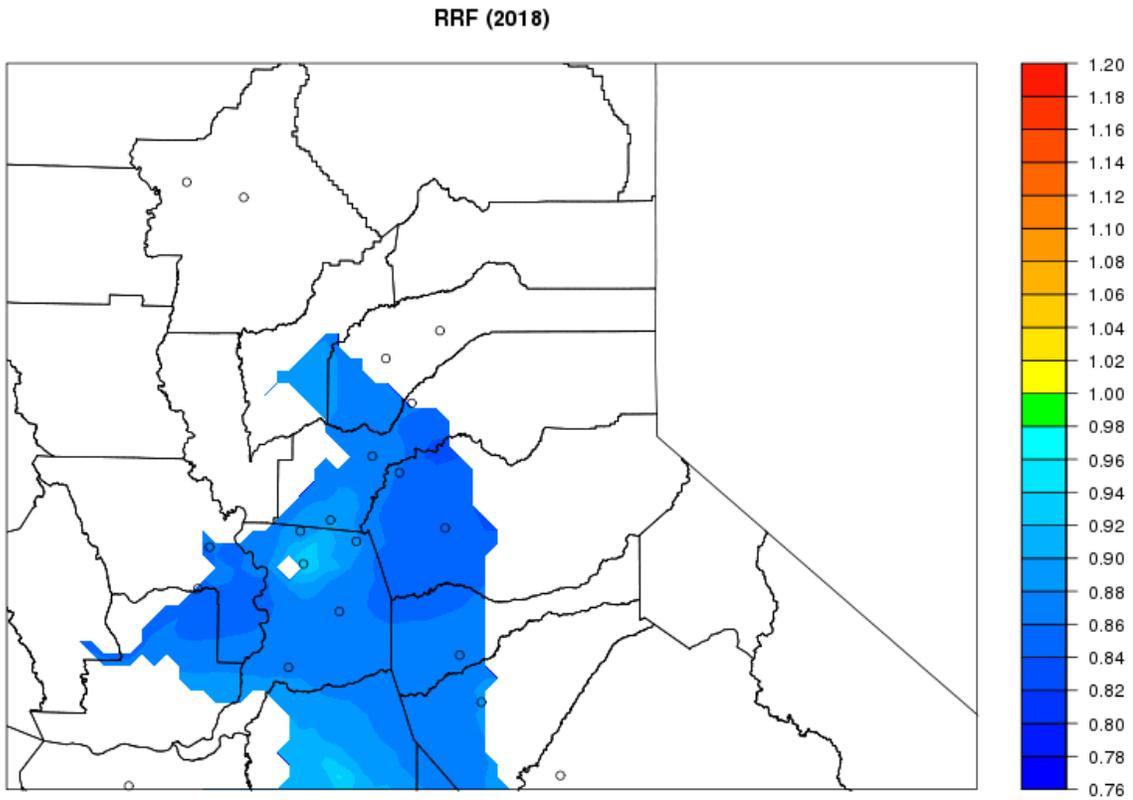


Figure 3 - Relative Response Factor from MATS for 2018.

4. Determine if any unmonitored areas are predicted to exceed the NAAQS in the future.

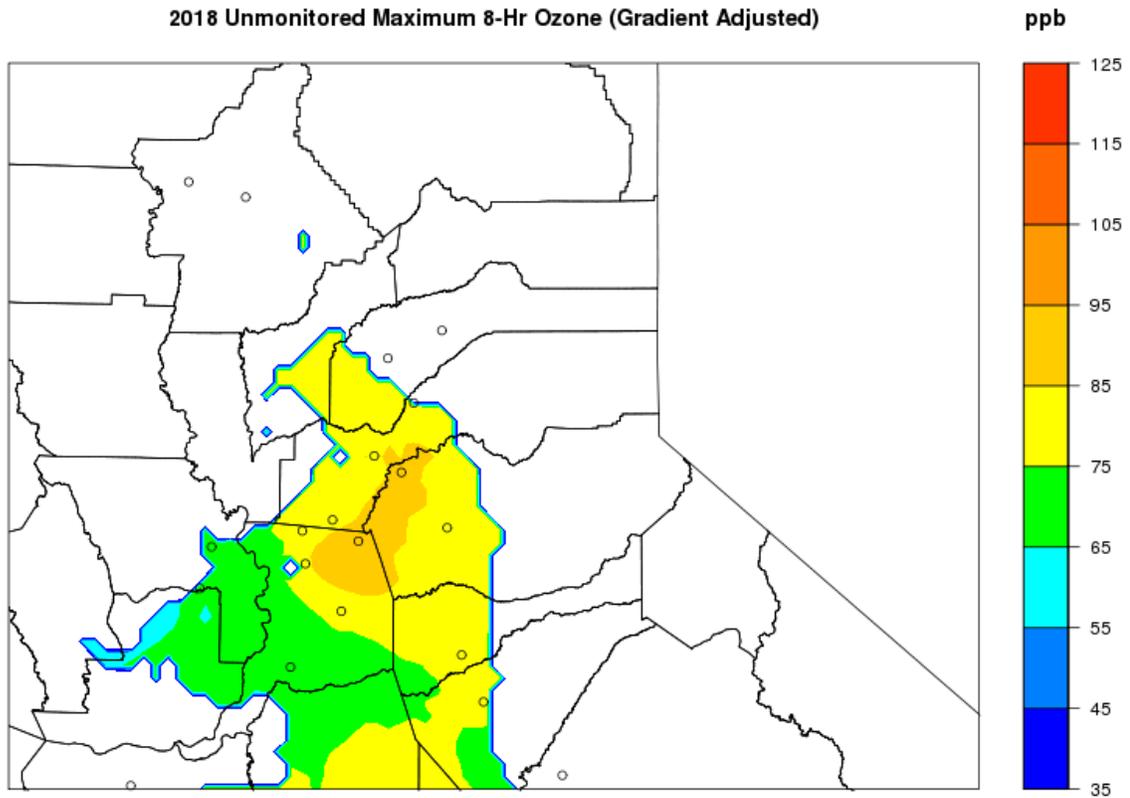


Figure 4 - Interpolated gradient adjusted future year concentration from MATS for 2018.