

Staff Report

CARB Review of the Mojave Desert AQMD and Antelope Valley AQMD Federal 75 ppb Ozone Attainment Plans for the Western Mojave Desert Nonattainment Area

Release Date: April 21, 2017

Hearing Date: May 25, 2017

California Environmental Protection Agency

 **Air Resources Board**

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EXECUTIVE SUMMARY

This report presents the California Air Resources Board (CARB or Board) staff's assessment of the plan to meet the health-based 75 ppb 8-hour ozone standard for the Western Mojave Desert ozone nonattainment area (Western Mojave Desert) by 2026. The Western Mojave Desert includes a portion of the San Bernardino County (served by the Mojave Desert Air Quality Management District), and the Antelope Valley portion of Los Angeles County (served by the Antelope Valley Air Quality Management District). This report assesses two documents: 1) the *Mojave Desert Federal 75 ppb Ozone Nonattainment Plan for the Western Mojave Desert Nonattainment Area* (MD Ozone Plan) by the Mojave Desert AQMD, and 2) the *Antelope Valley Federal 75 ppb Ozone Nonattainment Plan for the Western Mojave Desert Nonattainment Area* (AV Ozone Plan) by the Antelope Valley AQMD. Together these two documents represent the Ozone Plan.

CARB staff has concluded that the Ozone Plan in combination with this document meet all requirements of the federal Clean Air Act (Act), as they include an analysis of reasonably available control measures, a reasonably available control technology demonstration, a reasonable further progress demonstration, an attainment demonstration, contingency measures for attainment, a vehicle miles traveled offset demonstration, and transportation conformity budgets. The Board is scheduled to consider the Ozone Plan on April 27, 2017. If approved, CARB will submit the Ozone Plan to the U.S. Environmental Protection Agency (U.S. EPA) as a revision to the California State Implementation Plan (SIP).

The Act requires U.S. EPA to set air quality standards and periodically review the latest health research to ensure those standards remain protective of public health. Based on research demonstrating adverse health effects at lower exposure levels, U.S. EPA has set a series of increasingly health-protective ozone standards, beginning with a 1-hour ozone standard in 1979. Subsequent health studies demonstrated the greater effects of exposure to ozone over longer time periods, resulting in U.S. EPA establishing an 8-hour ozone standard of 80 parts per billion (ppb) in 1997, and the 75 ppb standard in 2008. On May 21, 2012 U.S. EPA designated the Western Mojave Desert as Severe for the federal 2008 8-hour ozone standard¹, requiring attainment by July 20, 2027.

¹ 77 FR 30088, posted May 21, 2012 and effective July 20, 2012, "Air Quality designations for the 2008 Ozone National Ambient Air Quality Standards", <https://www.gpo.gov/fdsys/pkg/FR-2012-05-21/pdf/2012-11618.pdf>

CARB and the District have developed a series of SIPs which detail the actions needed to meet these standards. The SIP process established under the Act has been an effective, important driver for air quality progress in the Western Mojave Desert. The Western Mojave Desert has made significant progress in attaining the federal ozone standards. U.S. EPA determined on April 15, 2015 that the Western Mojave Desert attained the 1-hour ozone standard by its attainment date².

The Western Mojave Desert is also making steady progress towards the 80 ppb and 75 ppb 8-hour ozone standards. Between 1990 and 2015, the highest design values – the measurement of whether an area has met a standard – have decreased by approximately 40 percent in the Western Mojave Desert.

The Ozone Plan addresses the 2008 federal 8-hour ozone standard of 75 ppb, representing the next building block in planning efforts to meet increasingly health protective air quality standards. Since their formation in 1993, the Districts' ozone strategy has relied on concurrent reductions of oxides of nitrogen (NOx) and reactive organic gases (ROG) emissions from stationary and mobile sources. Continuing reductions in NOx and ROG emissions through implementation of current programs will provide for attainment of the ozone standard by the attainment deadline of 2027.

I. BACKGROUND

Ozone is a highly reactive gas that can damage the tissues of the respiratory tract, causing inflammation and irritation, and resulting in symptoms such as coughing, chest tightness, and worsening of asthma symptoms. Ozone exposure can also lead to decreased lung function.

The Act requires U.S. EPA to set air quality standards and periodically review the latest health research to ensure those standards remain protective of public health. Based on research demonstrating adverse health effects at lower exposure levels, U.S. EPA has set a series of increasingly health-protective ozone standards, beginning with a 1-hour ozone standard in 1979. Subsequent health studies demonstrated the greater effects of ozone exposure over longer time periods, resulting in U.S. EPA establishing an 8-hour ozone standard of 80 ppb in 1997, 75 ppb in 2008, and more recently, the 70 ppb in 2015.

Effective July 20, 2012³, U.S. EPA classified the Western Mojave Desert as a Severe nonattainment area, which requires the Districts to submit a SIP meeting Severe area requirements, with an attainment date of July 20, 2027.

² 80 FR 20166, posted April 15, 2015 and effective May 15, 2015, "Determination of Attainment of the 1-Hour Ozone National Ambient Air Quality Standard in the Southeast Desert Nonattainment Area in California", <https://www.gpo.gov/fdsys/pkg/FR-2015-04-15/pdf/2015-08582.pdf>

On February 27, 2017, the Mojave Desert AQMD adopted the MD Ozone Plan to address the 75 ppb standard. On March 21, 2017, the Antelope Valley AQMD adopted the AV Ozone Plan to address the 75 ppb standard. Together, these plans address Act requirements applicable to a Severe 8-hour ozone nonattainment area, consistent with U.S. EPA's 2015 Implementation Rule for the 2008 8-hour ozone standard (Implementation Rule).⁴

II. NATURE OF THE OZONE PROBLEM IN THE WESTERN MOJAVE DESERT

The Western Mojave Desert is part of the Mojave Desert Air Basin, which encompasses eastern Kern County, northeastern Los Angeles County, the northeastern majority of San Bernardino County, and the northeastern half of Riverside County. The Western Mojave Desert is downwind of the Los Angeles basin and, to a lesser extent, the San Joaquin Valley.

Mojave Desert AQMD

The Mojave Desert AQMD portion of the Western Mojave Desert includes the southwestern desert portion of San Bernardino County and the segment of eastern Riverside County commonly known as the Palo Verde Valley. Local communities include Phelan, Hesperia, Victorville, Apple Valley, Barstow, Joshua Tree, and Twentynine Palms. The Mojave Desert AQMD portion covers more than 20,000 square miles and had a population of approximately 555,000 in 2015. This region is characterized by hot, dry summers and cool winters, with little precipitation. The National Training Center at Fort Irwin, the Marine Corps Air Ground Combat Center, and portions of Edwards Air Force Base and the China Lake Naval Air Weapons Station are in the Mojave Desert AQMD. Also within the boundaries are the Mojave National Preserve and portions of Death Valley National Park and Joshua Tree National Park.

The primary roadways in the Mojave Desert AQMD are Interstate 15, Interstate 40, State Route 58, and U.S. Route 395. All of these highways carry a significant amount of heavy duty truck traffic, and since the area is a growing bedroom community of Los Angeles, Interstate 15 carries a substantial amount of daily commute traffic into the greater Los Angeles Basin. The area also includes railroad tracks connecting the Ports of Los Angeles and Long Beach with the rest of the continental United States, and includes many miles of large-diameter high-pressure natural gas pipelines which transport the majority of the natural gas consumed within the state.

³ 77 FR 30088, posted May 21, 2012 and effective July 20, 2012, "Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards", <https://www.gpo.gov/fdsys/pkg/FR-2012-05-21/pdf/2012-11618.pdf>

⁴ 80 FR 12264, posted March 6, 2015 and effective April 6, 2015, "Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements, <http://www.gpo.gov/fdsys/pkg/FR-2015-03-06/pdf/2015-04012.pdf>

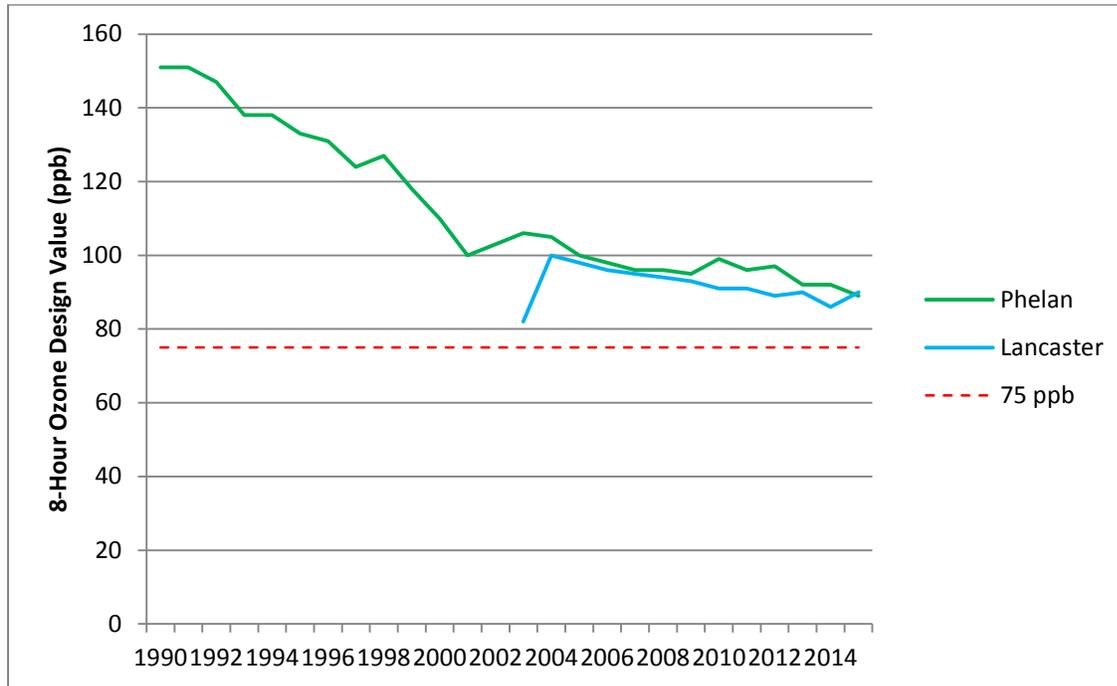
Antelope Valley AQMD

The Antelope Valley AQMD portion of the Western Mojave Desert includes the northeastern desert portion of Los Angeles County. The Antelope Valley covers more than 1,300 square miles and had a population of approximately 365,000 in 2015 that is centered within the local communities of Lancaster and Palmdale. The region is characterized by a wide, arid valley with very little precipitation and high summer temperatures. The primary roadways in the Antelope Valley are State Route 14 and State Route 18. Both of these arterial highways carry a substantial amount of daily commute traffic from the region into the Los Angeles Basin. Although the Antelope Valley is primarily a bedroom community of Los Angeles, it has significant aerospace development and manufacturing within the U.S. Air Force Plant 42 military base. National companies such as Boeing, Lockheed Martin, and Northrop Grumman currently lease large facilities on the base. Edwards Air Force Base is also a major employer in the area.

Elevated ozone levels occur in the Western Mojave Desert from late May through early October, when high temperatures and stable atmospheric conditions favor ozone formation. Ozone generally reaches peak levels by late afternoon and, along with ozone precursors, is often transported inland by the prevailing winds from the South Coast Air Basin, and to a lesser extent from the San Joaquin Valley Air Basin. As a result, the southeastern areas of the San Bernardino County that are closest to the South Coast Air Basin, such as Hesperia and Joshua Tree National Monument, have higher ozone levels and more days exceeding the federal ozone standard than the County's desert areas, such as Barstow and Blythe.

Over the last 15 years, ozone levels in the Western Mojave Desert have decreased substantially. Ozone levels have declined by over 40 percent at the Phelan monitor and by 10 percent at the Lancaster monitor. Design values are used to demonstrate an area's ozone compliance status in relation to the standard. The design value is the 4th high, 8-hour ozone value averaged over three years. The Western Mojave Desert has experienced a substantial reduction in maximum 8-hour ozone design values, as displayed in **Figure 1**. The Mojave Desert AQMD stations that are closest to the South Coast Air Basin (such as Phelan) have shown the highest historical ozone concentrations and continue to have a design value above the standard. The more distant stations such as Barstow show lower ozone concentrations. The Antelope Valley has also experienced a reduction in maximum 8-hour ozone concentrations at its single monitoring station in the city of Lancaster.

Figure 1. Annual Ozone Design Values at Western Mojave Desert Monitoring Sites (ppb)



III. DEMONSTRATING ATTAINMENT

SIPs must identify the magnitude of required reductions, and the actions necessary to achieve those reductions, as part of demonstrating attainment of the standard. The Districts have prepared an attainment demonstration for the 75 ppb 8-hour ozone standard. The attainment demonstration includes the benefits of CARB and District control programs that provide ongoing emission reductions. Continued implementation of these programs provides new emission reductions each year.

The Act requires the use of air quality modeling to relate ozone levels to emissions in a region and simulate future air quality based on changes in emissions. The Western Mojave Desert is a small portion of the greater Southern California modeling domain. As described in the Ozone Plan, the model used in this plan covers the entire Southern California region and a portion of northern Mexico. The modeling effort has been performed as a joint effort by all of the air districts in the region and the South Coast Air Quality Management District.

The modeled attainment demonstration in the Ozone Plan was prepared using photochemical and meteorological modeling tools meeting U.S. EPA modeling guidelines⁵, and recommendations from air quality modeling experts. The photochemical model uses emission inventories, with measurements of meteorology and air quality, to establish the relationship between emissions and air quality. The modeling is used to identify the benefits of controlling ozone precursors and the most expeditious attainment date.

Results of the attainment demonstration modeling are shown in **Table 1**. To demonstrate attainment, 2026 design values must be at or below the 75 ppb standard. With emission reductions required for the South Coast Air Basin to achieve the 80 ppb 1997 8-hour ozone standard implemented in 2023, the design values for monitoring sites in the nonattainment area will have values that meet the 75 ppb standard by 2026. Further information on the modeled attainment demonstration is included in Chapter 4 and Appendix D of the MD and AV Ozone Plans.

Table 1. Modeled 8-Hour Ozone Design Values Demonstrating Attainment (ppb)

Station Name	2012 Base Year DV	2023 DV with Controls in the South Coast
Phelan	93	75
Joshua Tree	91	74
Hesperia	91	73
Lancaster	88	67
Victorville	84	71
Barstow	78	64

IV. CONTROL STRATEGY

The ongoing emission reductions from continued implementation of CARB and District control strategies developed to meet prior standards provide the control strategy for the Ozone Plan. Between 2012 and 2026 in the Western Mojave Desert, overall NOx emissions will decrease by 31 percent and ROG emission by 13 percent, as demonstrated in **Table 3**. The following sections highlight ongoing CARB control programs and District measures that provide emission reductions included in the attainment demonstration.

⁵ U.S. EPA, posted December 3, 2014, “Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5 and Regional Haze”, https://www.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf

A. CARB Control Program

Given the severity of California's air quality challenges, CARB has implemented the most stringent mobile source emission control program in the nation. CARB's comprehensive strategy to reduce emissions from mobile sources consists of emissions standards for new vehicles, in-use programs to reduce emissions from existing vehicles and equipment fleets, cleaner fuels, and incentive programs to accelerate market penetration of the cleanest vehicles beyond what is achieved by regulations alone. For example, new passenger vehicle, heavy duty truck, and equipment standards, along with cleaner fuel requirements, adopted over the past two decades have achieved reductions which have lead the Western Mojave Desert toward attainment of the 75 ppb standard. A detailed description of the mobile source control programs is included in Appendix F of the Ozone Plan, and a comprehensive list of California mobile source regulations is included in Appendix F of this report.

B. District Control Program

Consistent with its regulatory authority, the Districts have adopted rules for reducing emissions from a broad scope of stationary and areawide sources, as detailed in Chapter 3 of the Ozone Plan and under separate cover in the "2015 8-Hour Ozone Reasonably Available Control Technology (RACT) SIP Analysis for the Western Mojave Desert." These rules apply to many stationary and areawide sources, such as factories, power plants, chemical plants, landfills, gas stations, dry cleaners, coating operations, boilers, and furnaces. For example, several current District rules that achieve key reductions regulate Portland cement kilns, the transfer of gasoline into underground storage tanks, marine coating operations, and internal combustion engines. These rules are implemented through District permits that are specific to each facility or operation, and stipulate the conditions that must be met to ensure compliance. Periodic inspections at the facilities are also conducted by District staff to verify ongoing compliance.

V. CLEAN AIR ACT REQUIREMENTS

In addition to the elements related to the attainment demonstration, the Act also requires SIPs for Severe ozone nonattainment areas to address the following elements:

- Base year emission inventories and future year forecasts for manmade sources of ozone precursors;
- Demonstration that control measures meet the reasonably available control measures (RACM) level;
- Provisions that demonstrate reasonable further progress (RFP);
- Provisions for sufficient contingency measures for RFP and attainment;
- Transportation conformity emission budgets to ensure transportation projects are consistent with the SIP; and
- A vehicle miles traveled (VMT) growth offset demonstration.

Table 2 outlines the location of the SIP elements.

Table 2. SIP Elements, with Document and Location

<u>SIP Element</u>	<u>Document and Location</u>
Attainment Demonstration	MD (Page 31) and AV (Page 29) Ozone Plans
Weight of Evidence Analysis	CARB Staff Report, Appendix B
Existing Control Measures	RACT SIP MD (Page 19) and AV (Page 17) Ozone Plans, and Appendix F CARB Staff Report, Appendix F
Emissions Inventory and Documentation	CARB Staff Report, Appendix A
Emissions Statement Certification	CARB Staff Report, Appendices D-1 and E-1
Reasonably Available Control Measures	CARB Staff Report, Appendices D-2 and E-2, and MD and AV Ozone Plans, Appendix E
Reasonable Further Progress Demonstration	MD (Page 20) and AV (Page 18) Ozone Plans
Contingency Measures	MD (Page 20) and AV (Page 18) Ozone Plans
Transportation Conformity Budgets	MD (Page 23) and AV (Page 21) Ozone Plans
Vehicle Miles Traveled Offset Demonstration	CARB Staff Report, Appendix C and MD (Page 24) and AV (Page 23) Ozone Plans
Reasonably Available Control Technology	<i>Under Separate Cover, 2015 8-Hour Ozone Reasonably Available Control Technology SIP Analysis for the Western Mojave Desert (RACT SIP)</i>

A. Emission Inventory

An emissions inventory is a critical tool used to evaluate, control, and mitigate the precursors of air pollution. At its core, an emissions inventory is a systematic listing of the sources of air pollutants along with the amount of pollutants emitted from each source or category over a given time period. The planning emissions inventory is divided into three major categories: stationary, area-wide, and mobile sources. The summer season inventory is used for ozone planning because it reflects the activity levels and conditions presented when higher ozone levels occur in the Southern California region.

The Ozone Plan uses a 2012 baseline inventory; the inventory was calibrated to 2012 emissions and activity levels, and inventories for other years are back-cast or forecast from that base inventory. On-road motor vehicle emissions were generated using CARB’s mobile source emissions model, EMFAC2014. Off-road mobile source emissions were generated using CARB’s OFFROAD model. Both models were developed for use in the ozone SIP revisions, and represent significant improvements over models used in prior SIP updates. Further detail on the Western Mojave Desert’s emissions inventory is provided in Appendix A, *Emissions Inventory Documentation for the Western Mojave Desert Nonattainment Area*, of this staff report.

Table 3 summarizes the 2012 and 2026 emissions inventory for the Western Mojave Desert. Emissions of NOx are predicted to decline by 31 percent and ROG by 13 percent, with the largest reductions coming from on-road mobile sources. The 2012 values listed in **Table 3** do not correspond with Appendix A of the Ozone Plan, as the Districts used the annual emission inventory in their Ozone Plans. To be consistent with the summer emission inventory used in the reasonable further progress (RFP) analysis in this staff report, the summer inventory is also provided in Appendix A.

Table 3. Western Mojave Desert Base Year and Attainment Year Emissions
tons per day (tpd), summer planning inventory

Source Category	2012 NOx	2026 NOx	2012 ROG	2026 ROG
Stationary Sources	28.3	42.1	13.2	17.4
Areawide Sources	1.0	0.9	11.3	12.2
Mobile Sources (On-/Off-road)	69.6	25.5	22.3	11.0
TOTAL	98.9	68.5	46.8	40.5

Source: CARB Emissions Inventory External Adjustments
v1.05, http://outapp.arb.ca.gov/cefs/2016ozsip/fcmasterdetail_sip2016.php
Numbers may not add up due to rounding

The Act requires states to have an Emission Statement program that mandates stationary sources with emissions over 25 tons per year of NOx or ROG report and certify the accuracy of NOx and ROG emissions annually. Since this documentation was not included in the Ozone Plan, the Mojave Desert AQMD and Antelope Valley AQMD provided the documentation meeting the Act emission statement certification requirements, included in Appendices D and E, *Supplemental Documentation from the Mojave Desert AQMD and Supplemental Documentation from the Antelope Valley AQMD*, respectively.

B. Reasonably Available Control Measures Demonstration

As specified in the Act, the SIP shall provide for the implementation of RACM as expeditiously as practicable to provide for attainment of the ozone standard. RACM must also include emission reductions from existing sources that may be obtained through the adoption, at a minimum, of RACT. The U.S. EPA has interpreted RACM as those emission control measures that are technologically and economically feasible, and when considered in aggregate, would advance the attainment date by at least one year.

Chapter 3 of the Ozone Plan contains a RACM demonstration for State measures that demonstrate no new measures were identified that would in aggregate advance attainment before 2027. A RACM assessment of mobile source regulations is described in Appendix E of the Ozone Plan. For completeness, a comprehensive list of CARB measures used for the mobile source control program ozone RACM assessment is attached in Appendix F, *CARB Control Measures, 1985-2016*. Appendices D and E, *Supplemental Documentation from the Mojave Desert AQMD and Supplemental Documentation from the Antelope Valley AQMD*, respectively, include an addendum describing how the Western Mojave Desert meets RACM requirements. The Districts submitted the required RACT SIP to U.S. EPA in 2015 as discussed in Chapter 3 of the plan.

C. Reasonable Further Progress Demonstration

The Act and the Implementation Rule specify that each ozone nonattainment area must demonstrate ongoing emission reductions relative to the base year (2012). Federal law requires a three percent per year reduction in ROG emissions. Where both ROG and NOx emissions have been shown to contribute to high ozone levels, the Act allows NOx emission reductions to augment ROG emission reductions in order to demonstrate RFP.

Chapter 3 of the Ozone Plan includes an RFP demonstration that meets the Act's requirements. The analyses indicate that the adopted measures from CARB's mobile source program will provide emission reductions beyond those needed for Western Mojave Desert's RFP demonstration. As part of the RFP demonstration, the Districts will rely on a 42 percent reduction of forecasted ROG and NOx emissions (from existing control measures) that are projected to occur between 2012 and 2026. Both ROG and NOx emission reductions are necessary to meet the RFP reduction targets. Western Mojave Desert meets the RFP targets in the milestone years of 2018, 2021, 2024, and 2026 with a three percent contingency set-aside in 2018 and carried through to 2026.

D. Contingency Measures

The Act requires contingency measures to provide additional emission reductions in the event a nonattainment area fails to achieve RFP targets or attain by the deadline (Act sections 172(c)(9), 182(c)(9).) A recent Ninth Circuit decision, *Bahr v. U.S. EPA*, (9th Cir. 2016) 836 F.3d 1218, found that U.S. EPA approval of certain types of contingency measures in an Arizona particulate matter SIP were not consistent with the Act's contingency requirements.

ARB staff expects that U.S. EPA will revise its guidance on contingency requirements in light of the *Bahr* decision. The contingency measure described above meets U.S. EPA's existing guidance. ARB staff will work with the District and the U.S. EPA to provide any additional documentation or develop any needed SIP revisions to support U.S. EPA approval of the Ozone Plan.

For RFP contingency, U.S. EPA has interpreted this requirement to represent one year's worth of RFP, amounting to three percent of reductions from measures that are already in place or that would take effect without further rulemaking action. The Western Mojave Desert meets the RFP targets in the milestone years of 2018, 2021, 2024, and the attainment year of 2026 with a three percent contingency set aside in 2018 and carried through to 2026 per the requirements of the Rule.

In addition, the Mojave Desert AQMD commits to request implementation of the Enhanced Smog Check Program for the area should the need for an attainment contingency measure be triggered. The Enhanced Smog Check Program is already being implemented in the Antelope valley AQMD. Participation in the Enhanced Smog Check Program does not require adoption of additional regulations.

E. Transportation Conformity Budgets

Under section 176(c) of the Act, transportation plans, programs, and projects that receive federal funding or approval must be fully consistent with the SIP before being approved by a Metropolitan Planning Organization (MPO). U.S. EPA's transportation conformity rule⁶ details requirements for establishing motor vehicle emission budgets (budgets) in SIPs for the purpose of ensuring the conformity of transportation plans and programs with the SIP.

The Ozone Plan establishes county-level on-road motor vehicle emission budgets for the attainment year of 2027. These emission budgets will also apply to all subsequent transportation conformity years, per the federal transportation conformity regulation.

⁶ Federal transportation conformity regulations are found in 40 CFR Part 51, subpart T "Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved under Title 23 U.S.C. of the Federal Transit Laws". Part 93, subpart A of this chapter was revised by the U.S. EPA on August 15, 1997.

Table 4 summarizes the motor vehicle emissions budget for transportation conformity purposes under a Severe federal 8-hour ozone classification. Emission budgets for NOx and ROG were calculated using EMFAC2014 and reflect summer average emissions. Once U.S. EPA approves the emission budgets established in the Ozone Plan, the budgets will serve as the conformity emissions budgets for future transportation conformity determinations in the Western Mojave Desert. Additional details on the on-road motor vehicle emission budgets are in Chapter 3 of the Ozone Plan.

Table 4. On-Road Motor Vehicle Emission Budgets for the Western Mojave Desert Nonattainment Area
(tpd, summer planning inventory)

Pollutant	2027 and Subsequent Years
ROG	7
NOx	11

F. Vehicle Miles Traveled Offset Demonstration

Section 182(d)(1)(A) of the Act requires that SIPs for Severe ozone nonattainment areas include a demonstration that identifies specific enforceable transportation control strategies and transportation control measures to offset any growth in VMT or number of vehicle trips.

Chapter 3 of the Ozone Plan includes a VMT offset demonstration and analysis prepared pursuant to the requirements of the Act and consistent with the August 2012 U.S. EPA guidance entitled “*Implementing Act section 182(d)(1)(A): Transportation Control Measures and Transportation Control Strategies to Offset Growth in Emissions Due to Growth in Vehicle Miles Traveled.*” The VMT offset analysis demonstrates that the identified transportation control strategies and measures are sufficient to offset the growth in emissions in Western Mojave Desert. For completeness, the key mobile source regulations and emission reduction programs that were used in the VMT offset demonstration and analysis is included in Appendix C, *Mobile Source Regulations for the VMT Offset Demonstration.*

VI. ENVIRONMENTAL IMPACTS

The California Environmental Quality Act (CEQA) requires that State and local agency projects be assessed for potential significant environmental impacts. An air quality plan is a “project” that is potentially subject to CEQA requirements. The Districts found that the Ozone Plan will not result in any potentially significant adverse effects on the environment and are exempt⁷ from CEQA under the provisions of section 15061 (b)(3) (the general rule that CEQA only applies to projects which have the potential for causing a significant effect on the environment) and section 15308 (actions taken by a regulatory agency for protection of the environment) of the CEQA Guidelines.

CARB has determined that its review and approval of the Ozone Plan submitted by the Districts for inclusion in the SIP is a ministerial activity by CARB for purposes of CEQA (14 CCR § 15268). A “ministerial” decision is one that involves fixed standards or objective measurements, and the agency has no discretion to shape the activity in response to environmental concerns. (14 CCR § 15369; San Diego Navy Broadway Complex Coalition v. City of San Diego (2010) 185 Cal.App.4th 924, 934.)

CARB’s review of the Ozone Plan is limited to determining if they meet all the requirements of the Act. CARB is prohibited from approving them or changing them unless CARB finds that they do not comply with the Act (HSC § 41650 and 41652). Since CARB lacks authority to not adopt the plans, or modify them, in response to environmental concerns raised through the CEQA process, CARB’s action on the plans is ministerial for purposes of CEQA.

VII. STAFF RECOMMENDATION

CARB staff recommends that the Board:

1. Adopt the Ozone Plan, and relevant portion of the CARB Staff Report, including the attainment demonstration, emission inventory, RACM demonstration, RFP demonstration, contingency measures, transportation conformity budgets, and VMT offset demonstration as revisions to the California SIP; and
2. Direct the Executive Officer to submit the Ozone Plan to U.S. EPA as revisions to the California SIP.

⁷ Notice of Exemption for Mojave Desert AQMD Federal Ozone Attainment Plan filed February 27, 2017, with San Bernardino County Clerk; Notice of Exemption for Antelope Valley AQMD Federal Ozone Attainment Plan filed March 21, 2017, with Los Angeles County Clerk.

APPENDIX A

WESTERN MOJAVE DESERT NONATTAINMENT AREA EMISSIONS INVENTORY

A-1) Emissions Inventory Documentation

A-2) Emissions Inventory (Summer)

Emissions Inventory Documentation for the Western Mojave Nonattainment Area 75 ppb 8-Hour Ozone State Implementation Plan

Emissions inventories are one of the fundamental building blocks in the development of a State Implementation Plan (SIP or Plan). In simple terms, an emissions inventory is a systematic listing of the sources of air pollution along with the amount of pollution emitted from each source or category over a given time period. This document describes the emissions inventory included in the 8-hour Ozone Plan for the Western Mojave Desert Nonattainment Area (MDAQMD), which includes the western portion of San Bernardino County in the Mojave Desert Air Quality Management District and the portion of Los Angeles County in the Antelope Valley Air Quality Management District (AVAQMD). It also summarizes the revisions and improvements made to the inventory as part of this Plan.

The California Air Resources Board (ARB), MDAQMD and AVAQMD have developed a comprehensive, accurate, and current emissions inventory consistent with the requirements set forth in Section 182(a)(1) of the federal Clean Air Act. ARB and District staff conducted a thorough review of the inventory to ensure that the emission estimates reflect accurate emission reports for point sources, and that estimates for mobile and areawide sources are based on the most recent models and methodologies.

ARB also reviewed the growth profiles for point and areawide source categories and updated them as necessary to ensure that the emission projections are based on data that reflect historical trends, current conditions, and recent economic and demographic forecasts. Growth forecasts for most point and areawide sources were developed by ARB.

Emissions Inventory Overview

Emissions inventories are estimates of the amount and type of pollutants emitted into the atmosphere by industrial facilities, mobile sources, and areawide sources such as consumer products and paint. They are fundamental components of an air quality plan, and serve critical functions such as:

- 1) the primary input to air quality modeling used in attainment demonstrations;
- 2) the emissions data used for developing control strategies; and
- 3) a means to track progress in meeting the emission reduction commitments.

The United States Environmental Protection Agency (U.S. EPA) regulations require that the emissions inventory contain emissions data for the two precursors to ozone formation: oxides of nitrogen (NO_x) and volatile organic compounds (VOC). The inventory included in this plan substitutes VOC with reactive organic gases (ROG), which in general represent a slightly broader group of compounds than those in U.S. EPA's list of VOCs.

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Agency Responsibilities

ARB, MDAQMD and AVAQMD staff worked jointly to develop the emissions inventory for the Western Mojave Ozone Nonattainment Area. The Districts worked closely with operators of major stationary facilities in their jurisdiction to develop the point source emission estimates. ARB staff developed the emission inventory for mobile sources, both on-road and off-road. The Districts and ARB shared responsibility for developing estimates for the nonpoint (areawide) sources such as consumer products and agricultural burning. ARB worked with several State and local agencies such as the Department of Transportation (Caltrans), the Department of Motor Vehicles (DMV), the Department of Pesticide Regulation (DPR), and the California Energy Commission (CEC) to assemble activity information necessary to develop the mobile and areawide source emission estimates.

Inventory Base Year

The base year inventory forms the basis for all future year projections and also establishes the emission levels against which progress in emission reductions will be measured. U.S. EPA regulations establish that the base year inventory should be preferably consistent with the triennial reporting schedule required under the Air Emissions Reporting Requirements (AERR) rule. However, U.S. EPA allows a different year to be selected if justified by the state. ARB worked with the local air districts to determine the base year that should be used across the State. Since the South Coast Air Quality Management District typically aligns their base year inventory with the data collection period for their Multiple Air Toxics Exposure Study, which was last conducted in 2012, ARB selected 2012 as the base year to maintain consistency across the various plans being developed in the State.

Forecasted Inventories

In addition to a base year inventory, U.S. EPA regulations also require future year inventory projections for specific milestone years. Forecasted inventories are a projection of the base year inventory that reflects expected growth trends for each source category and emission reductions due to adopted control measures. ARB develops emission forecasts by applying growth and control profiles to the base year inventory.

Growth profiles for point and areawide sources are derived from surrogates such as economic activity, fuel usage, population, housing units, etc., that best reflect the expected growth trends for each specific source category. Growth projections were obtained primarily from government entities with expertise in developing forecasts for specific sectors, or in some cases, from econometric models. Control profiles, which account for emission reductions resulting from adopted rules and regulations, are derived from data provided by the regulatory agencies responsible for the affected emission categories.

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Projections for mobile source emissions are generated by models that predict activity rates and vehicle fleet turnover by vehicle model year. As with stationary sources, the mobile source models include control algorithms that account for all adopted regulatory actions.

Temporal Resolution

Planning inventories typically include annual as well as seasonal (summer and winter) emission estimates. Annual emission inventories represent the total emissions over an entire year (tons per year), or the daily emissions produced on an average day (tons per day). Seasonal inventories account for temporal activity variations throughout the year, as determined by category-specific temporal profiles. Since ozone concentrations tend to be highest during the summer months, the emission inventory used in the Plan is based on the summer season (May through October).

Geographical Scope

The inventories presented in this Plan include emissions for the Western Mojave Ozone Nonattainment Area, which consists of the western portion of San Bernardino County in the MDAQMD and the entirety of the portion of Los Angeles County in the AVAQMD. Typically, emission inventories are developed at a county-level geographical resolution. The emissions for San Bernardino County were allocated to the nonattainment area using the approach described below.

Stationary Sources. Emissions from stationary sources were designated as being inside or outside the nonattainment area based on a GIS analysis of each facility's geographical coordinates (latitude and longitude) overlaid on a digitized map of the nonattainment area.

Areawide Sources. MDAQMD staff were consulted to determine the extent of emission activity occurring in the nonattainment area. Human population was set as the default surrogate.

On-Road Mobile Sources. Emissions from on-road mobile sources were estimated at the county level using California's on-road motor vehicle model, EMFAC2014. The allocation to the nonattainment area planning inventory was accomplished using activity data from the Southern California Association of Government's (SCAG) 2016 adopted Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS).

Off-Road Mobile Sources. As with areawide sources, MDAQMD staff were consulted to determine the extent of emission activity occurring in the nonattainment area. Human population was set as the default surrogate. Of the remaining off-road categories, more specific spatial surrogates were applied.

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Table 1 below specifies the methods ARB used to allocate emissions to the San Bernardino County portion of the nonattainment area.

**Table 1
Method for the Spatial Allocation of Emissions to the San Bernardino County Portion of
the Western Mojave Ozone Nonattainment Area**

Source Category	Subcategory	Allocation Method
Stationary Point Sources	All	GIS Analysis
Area Source Component of Stationary Sources	All	Human Population
Areawide Sources	All	Human Population
On Road Mobile Sources	All	SCAG 2016 RTP/SCS
Off-Road Mobile Sources	Aircraft	Ratio of Number of Airports
	Locomotives Road Hauling Switching	Estimation of Rail Miles Ratio Location of Rail Yard
	Recreational Boats	Estimate of Activity Ratio on Lake Silverwood
	Off-Road Recreational Vehicles	Human Population
	Off-Road Equipment Other than Transport Refrigeration Units Transport Refrigeration Units, All	Human Population Estimation of Highway Miles Ratio
	Farm Equipment	Human Population
	Fuel Storage and Handling	Human Population

Quality Assurance and Quality Control

ARB has established a quality assurance and quality control (QA/QC) process involving ARB, MDAQMD and AVAQMD staff to ensure the integrity and accuracy of the emissions inventories used in the development of air quality plans. QA/QC occurs at the various stages of SIP emission inventory development. Base year emissions are assembled and maintained in the California Emission Inventory Development and Reporting System (CEIDARS). ARB inventory staff works with MDAQMD and AVAQMD staff, who are responsible for developing and reporting point source emission estimates, to verify these data are accurate. The locations of point sources, including stacks, are checked to ensure they are valid. Areawide source emission estimates are reviewed by ARB, MDAQMD and AVAQMD staff before their inclusion in the emission inventory. Additionally, CEIDARS is designed with automatic system checks to prevent errors such as double counting of emission sources. The system also makes various reports available to assist staff in their efforts to identify and reconcile anomalous emissions.

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Future year emissions are estimated using the California Emission Projection Analysis Model (CEPAM), 2016 SIP Baseline Emission Projections, Version 1.05. Growth and control factors are reviewed for each category and year along with the resulting emission projections. Year to year trends are compared to similar and past datasets to ensure general consistency. Emissions for specific categories are checked to confirm they reflect the anticipated effects of applicable control measures. Mobile categories are verified with mobile source staff for consistency with the on-road and off-road emission models.

A summary of the information supporting the Western Mojave 8-hour Ozone Nonattainment Area Plan emissions inventory is presented in the sections below.

Point Sources

The inventory reflects actual emissions from industrial point sources reported to MDAQMD and AVAQMD by the facility operators through calendar year 2012, in accordance with the requirements set forth in U.S. EPA's AERR rule. The data elements in the 2012 baseline inventory are consistent with the data elements required by the AERR rule. Estimation methods include source testing, direct measurement by continuous emissions monitoring systems, or engineering calculations.

Table 2 below lists the point source categories that occur in the ozone nonattainment area.

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**Table 2
Point Source Categories**

Source Category	Subcategory
Fuel Combustion	Electric Utilities
	Manufacturing and Industrial
	Food and Agricultural Processing
	Service and Commercial
	Other (Fuel Combustion)
Waste Disposal	Sewage Treatment
	Landfills
	Incinerators
	Soil Remediation
	Other (Waste Disposal)
Cleaning and Surface Coatings	Laundering
	Degreasing
	Coatings and Thinners
	Printing
	Adhesives and Sealants
	Other (Cleaning and Surface Coatings)
Petroleum Production and Marketing	Oil and Gas Production
	Petroleum Refining
	Petroleum Marketing
	Other (Petroleum Production and Marketing)
Industrial Processes	Chemical Manufacturing and Storage
	Food and Agriculture
	Mineral Processes
	Metal Processes
	Electronics
	Other (Industrial Processes)

The point source inventory includes emissions from stationary area sources, which are categories such as internal combustion engines and gasoline dispensing facilities that are not inventoried individually, but are estimated as a group and reported as an aggregated total. Estimates for the following categories were developed by ARB:

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Stationary Nonagricultural Diesel Engines

This category includes emissions from backup and prime generators and pumps, air compressors, and other miscellaneous stationary diesel engines that are widely used throughout the industrial, service, institutional, and commercial sectors. The emission estimates, including emission forecasts, are based on a 2003 ARB methodology derived from the OFFROAD model. Additional information on this methodology is available at: <https://www.arb.ca.gov/ei/areasrc/FULLPDF/FULL1-2.pdf>

Agricultural Diesel Irrigation Pumps

This category includes emissions from the operation of diesel-fueled stationary and mobile agricultural irrigation pumps. The emission estimates are based on a 2003 ARB methodology using statewide population and include replacements due to the Carl Moyer Program. Growth for this category is based on SCAG economic forecasts. Additional information on this category is available at: <https://www.arb.ca.gov/ei/areasrc/arbfuelcombagric.htm>

Degreasing

This category includes emissions from solvents in degreasing operations in the manufacturing and maintenance industries. The emissions estimates are based on a 2000 ARB methodology using survey and industry data, activity factors, emission factors and a user's fraction. Emissions are grown based on SCAG economic forecasts. Additional information on this methodology is available at: <https://www.arb.ca.gov/ei/areasrc/arbcleandegreas.htm>

Coatings and Thinners

This category includes emissions from coatings and related process solvents. Auto refinishing emissions estimates are based on a 1990 ARB methodology using production data and a composite emission factor derived from surveys. Estimates for industrial coatings emissions are based on a 1990 ARB methodology using production and survey data, and emission factors derived from surveys. Estimates for thinning and cleaning solvents are based on a 1991 ARB methodology, census data and a default emission factor developed by ARB. Growth for these categories is projected using SCAG economic forecasts. Additional information on these methodologies is available at: <https://www.arb.ca.gov/ei/areasrc/arbcleancoatproc.htm>

Adhesives and Sealants

This category includes emissions from solvent-based and water-based solvents contained in adhesives and sealants. Emissions are estimated based on a 1990 ARB methodology using production data and default emission factors. Growth for this category is based on SCAG economic forecasts. Additional information on this methodology is available at: <https://www.arb.ca.gov/ei/areasrc/arbcleanadhseal.htm>

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Gasoline Dispensing Facilities

ARB staff developed an updated methodology to estimate emissions from fuel transfer and storage operations at gasoline dispensing facilities (GDFs). The methodology addresses emissions from underground storage tanks, vapor displacement during vehicle refueling, customer spillage, and hose permeation. The updated methodology uses emission factors developed by ARB staff that reflect more current in-use test data and also accounts for the emission reduction benefits of onboard refueling vapor recovery (ORVR) systems. The emission estimates are based on 2012 statewide gasoline sales data from the California Board of Equalization that were apportioned to the county level using fuel consumption estimates from ARB's on-road mobile sources model (EMFAC). Additional information on this category is available at:

<https://www.arb.ca.gov/ei/areasrc/arbpetprodmarkpm.htm>

Areawide Sources

Areawide sources are categories such as consumer products, fireplaces, and agricultural burning (see Table 3) for which emissions occur over a wide geographic area. Emissions for these categories are estimated by both ARB and the local air districts using various models and methodologies.

**Table 3
Areawide Sources**

Source Category	Subcategory
Solvent Evaporation	Consumer Products
	Architectural Coatings and Related Solvents
	Pesticides/Fertilizers
	Asphalt Paving and Roofing
Miscellaneous Processes	Residential Fuel Combustion
	Farming Operations
	Fires
	Managed Burning and Disposal
	Cooking

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A summary of the areawide methodologies is presented below:

Consumer Products

The consumer products category reflects the four most recent surveys conducted by ARB staff for the years 2003, 2006, 2008, and 2010. Together these surveys collected updated product information and ingredient information for approximately 350 product categories. Based on the survey data, ARB staff determined the total product sales and total VOC emissions for the various product categories. The emission estimates include the benefits of the 2003 ARB Consumer Product Regulations and Amendments and the 2007 ARB Aerosol Coating Regulation. The growth trend for most consumer product subcategories is based on SCAG demographic forecasts, except for aerosol coatings. Staff determined that a no-growth profile would be more appropriate for aerosol coatings based on survey data that show relatively flat sales of these products over the last decade. Additional information on ARB's consumer products surveys is available at: <https://www.arb.ca.gov/consprod/survey/survey.htm>.

Architectural Coatings

The architectural coatings category reflects emission estimates based on a comprehensive ARB survey for the 2004 calendar year. The emission estimates include benefits of the 2000 and 2007 ARB Suggested Control Measures. These emissions are grown based on SCAG demographic forecasts. Additional information about ARB's architectural coatings program is available at: <https://www.arb.ca.gov/coatings/arch/arch.htm>

Pesticides

DPR develops month-specific emission estimates for agricultural and structural pesticides. Each calendar year, DPR updates the inventory based on the Pesticides Use Report, which provides updated information from 1990 to the most current data year available. The inventory includes estimates through the 2014 calendar year. Emission forecasts for years 2015 and beyond are based on the average of the most recent five years. Growth for agricultural pesticides is based on ARB projections of harvested acreage provided by the U.S. Department of Agriculture (USDA), National Agricultural Statistics Service (NASS). Growth for structural pesticides is based on Regional Economic Models, Inc. (REMI) projections of expenditures on structures.

Asphalt Paving/Roofing

Asphalt paving and roofing emissions were grown from 2000 estimates. Emissions are estimated based on tons of asphalt applied and a default emission factor for each type of asphalt operation. The growth profile for both categories is based on SCAG economic forecasts.

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Residential Wood Combustion

ARB staff updated the methodology to reflect 2005 fuel use, and more recent emission factors and calculation approaches. The emission estimates reflect emission factors from U.S. EPA's National Emission Inventory. No growth is assumed for this category. Additional information on this methodology is available at: <https://www.arb.ca.gov/ei/areasrc/arbmiscprocrsfuelcom.htm>

Farming Operations

ARB staff updated the Livestock Husbandry methodology to reflect livestock population data based on the USDA's 2007 Census of Agriculture, and ammonia emission factors for dairy support cattle. A seasonal adjustment was added to account for the suppression of dust emissions in months in which rainfall occurs. Based on an analysis of livestock population trends, no growth is assumed for livestock categories other than feedlot cattle. Additional information on ARB's methodology is available at: <https://www.arb.ca.gov/ei/areasrc/arbmiscproclivestock.htm>

Fires

Emissions from structural and automobile fires were estimated based on a 1999 ARB methodology using the number of fires and the associated emission factors. Estimates for structural fires are calculated using the amount of the structure that is burned, the amount and content of the material burned, and emission factors derived from test data. Estimates for automobile fires are calculated using the weight of the car and components and composite emission factors derived from AP-42 emission factors. Growth is based on SCAG economic forecasts. Additional information on this methodology is available at: <https://www.arb.ca.gov/ei/areasrc/arbmiscprocfires.htm>

Managed Burning & Disposal

ARB updated the emissions inventory to reflect burn data reported by MDAQMD for 2007 and by AVAQMD for 2012. Emissions are calculated using crop specific emission factors and fuel loadings. Temporal profiles reflect monthly burn activity. Growth for agricultural burning is based on ARB projection of NASS harvested acreage. No growth is assumed for burning associated with weed abatement. ARB's methodology for managed burning is available at: <https://www.arb.ca.gov/ei/areasrc/distmiscprocwstburndis.htm>
Additional background information is available here: <https://www.arb.ca.gov/ei/see/see.htm>

Commercial Cooking

The commercial cooking emissions were grown from a 1995 estimate. The emissions estimates were developed from the number of restaurants, the number and types of cooking equipment, the food type, and default emission factors. The growth profile reflects the latest SCAG economic forecasts.

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Point and Areawide Source Emissions Forecasting

Emission forecasts (2013 and subsequent years) are based on growth profiles that in many cases incorporate historical trends up to the base year or beyond. The growth surrogates used to forecast the emissions from these categories are presented below in Table 4.

**Table 4
Growth Surrogates for Point and Areawide Sources**

Source Category	Subcategory	Growth Surrogate
Electric Utilities	All	District forecast
Cogeneration	All	SCAG economic forecast
Manufacturing and Industrial	Natural Gas	District forecast
	Other Fuels	SCAG economic forecast
Food & Agricultural Processing	All	SCAG economic forecast
Service and Commercial	All	SCAG economic forecast
Other (Fuel Combustion)	All	SCAG economic forecast
Waste Disposal	All	SCAG economic forecast
Cleaning & Surface Coatings	All	SCAG economic forecast
Oil and Gas Production	All	SCAG economic forecast
Petroleum Refining	All	SCAG economic forecast
Petroleum Marketing	All	Fuel use from ARB EMFAC model
Other (Petroleum Production & Marketing)	All	SCAG economic forecast
Chemical Manufacturing & Storage	All	SCAG economic forecast
Food and Agriculture	All	REMI county economic forecast
Mineral Processes	All	REMI forecast combined with Annual Energy Outlook
Metal Processes	All	SCAG economic forecast
Electronics	All	SCAG economic forecast
Other (Industrial Processes)	All	SCAG economic forecast
Consumer Products	Consumer Products	SCAG demographic forecast
	Aerosol Coatings	No growth assumption
Architectural Coatings & Related Process Solvents	All	SCAG demographic forecast
Pesticides & Fertilizers	Agricultural Pesticides	Harvested acreage, ARB projection of USDA data
	Structural Pesticides	REMI forecast on spending on structures

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**Table 4
Growth Surrogates for Point and Areawide Sources**

Source Category	Subcategory	Growth Surrogate
Asphalt Paving / Roofing	All	SCAG economic forecast
Residential Fuel Combustion	Natural Gas	District forecast
	Woodstoves & Fireplaces - Wood	No growth
	Other Residential Fuels	SCAG demographic forecast
Farming Operations	All	No growth
Fires	All	No growth
Managed Burning & Disposal	Agricultural Burning, Prunings & Field Crops	Harvested acreage, ARB projection of USDA data
	Weed Abatement	No growth
	Other (Managed Burning & Disposal)	REMI county economic forecast
Cooking	All	SCAG economic forecast

Stationary Source Control Profiles

The emissions inventory reflects emission reductions from point and areawide sources subject to MDAQMD and AVAQMD rules and ARB regulations. The rules and regulations reflected in the inventory are listed below in Table 5.

**Table 5
Stationary Source Control Rules and Regulations Included in the Inventory**

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
MDAQMD	Mineral	NOX emissions from mineral processes	Mineral Processes
ARB	ARB_R003 & ARB_R003_A	Consumer Product Regulations and Amendments	Consumer products
ARB	ARB_R007	Aerosol Coating Regulation	Aerosol coatings
ARB	ARCH_SCM	Architectural Coatings 2000 Suggested Control Measure (SCM)	Architectural coatings
ARB	AC_SCM2007	Architectural Coatings 2007 SCM	Architectural coatings
ARB	GDF_HOSREG	Gasoline Dispensing Facilities - Hose Emission Regulation	Petroleum marketing
ARB	ORVR	Fueling emissions from ORVR vehicles	Petroleum marketing

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Mobile Sources

ARB uses the EMFAC model to assess emissions from on-road vehicles. Off-road mobile source emissions are estimated using a new modular approach for different source categories. On-road and off-road models account for the effects of various adopted regulations, technology types, and seasonal conditions on emissions.

On-Road Mobile Sources

Emissions from on-road mobile sources, which include passenger vehicles, buses, and trucks, were estimated using outputs from ARB's EMFAC2014 model. The on-road emissions were calculated by applying EMFAC2014 emission factors to the transportation activity data provided by SCAG from their 2016 RTP/SCS.

EMFAC2014 includes data on California's car and truck fleets and travel activity. Light-duty motor vehicle fleet age, vehicle type, and vehicle population were updated based on 2012 DMV data. The model also reflects the emissions benefits of ARB's recent rulemakings such as the Pavley Standards and Advanced Clean Cars Program, and includes the emissions benefits of ARB's Truck and Bus Rule and previously adopted rules for other on-road diesel fleets.

EMFAC2014 utilizes a socio-econometric regression modeling approach to forecast new vehicle sales and to estimate future fleet mix. Light-duty passenger vehicle population includes 2012 DMV registration data along with updates to mileage accrual using Smog Check data. Updates to heavy-duty trucks include model year specific emission factors based on new test data, and population estimates using DMV data for in-state trucks and International Registration Plan (IRP) data for out-of-state trucks. Additional information and documentation on the EMFAC2014 model is available at: <https://www.arb.ca.gov/msei/categories.htm#emfac2014>

Off-Road Mobile Sources

Emissions from off-road sources were estimated using a suite of category-specific models or, where a new model was not available, the OFFROAD2007 model. Many of the newer models were developed to support recent regulations, including in-use off-road equipment. The sections below summarize the updates made to specific off-road categories.

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Cargo Handling Equipment (CHE)

The emissions inventory for the Cargo Handling Equipment category has been updated to reflect new information on equipment population, activity, recessionary impacts on growth, and engine load. The new information includes regulatory reporting data which provide an accounting of all the cargo handling equipment in the State including their model year, horsepower and activity. Background and supporting documents for the Cargo Handling Equipment Regulation are available here: <https://www.arb.ca.gov/ports/cargo/cheamd2011.htm>

Pleasure Craft and Recreational Vehicles

A new model was developed in 2011 to estimate emissions from pleasure craft and recreational vehicles. In both cases, population, activity, and emission factors were re-assessed using new surveys, registration information, and emissions testing. Additional information is available at: https://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles

In-Use Off-Road Equipment

ARB developed this model in 2010 to support the analysis for amendments to the In-Use Off-Road Diesel Fueled Fleets Regulation. Staff updated the underlying activity forecast to reflect more recent economic forecast data, which suggests a slower rate of recovery through 2024 than previously anticipated. Additional information is available at: https://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles

Locomotives

In 2016, ARB updated California's Class I and Class II line-haul locomotive model. The new model provides the following updates: age and model year distribution based on 2011 and 2014 rail company data, activity based on FAF data, fuel growth based on Board of Equalization historical rail data, and new locomotive populations, survival rates, and Tier distributions. To estimate emissions, ARB used duty cycle, fuel consumption and activity data reported by the rail lines in 2011. These results were combined with the Class III locomotive emissions inventory from previous SIPS, that were incorporated in the 2006 locomotive inventory, to create an overall California line-haul locomotive emissions inventory for the SIP. More information may be found at https://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

Transport Refrigeration Units (TRU)

This model reflects updates to activity, population, growth and turn-over data, and emission factors developed to support the 2011 amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units. Additional information is available at: https://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles

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Fuel Storage and Handling

Emissions for fuel storage and handling were estimated using the OFFROAD2007 model. Additional information is available at: https://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles

Diesel Agricultural Equipment

The inventory for agricultural diesel equipment (such as tractors, harvesters, combines, sprayers and others) was revised based on a voluntary survey of farmers, custom operators, and first processors conducted in 2009. The survey data, along with information from the 2007 USDA Farm Census, was used to revise almost every aspect of the agricultural inventory, including population, activity, age distribution, fuel use, and allocation. This updated inventory replaces general information on farm equipment in the United States with one specific to California farms and practices. The updated inventory was compared against other available data sources such as Board of Equalization fuel reports, USDA tractor populations and age, and Eastern Research Group tractor ages and activity, to ensure the results were reasonable and compared well against outside data sources. Agricultural growth rates through 2050 were developed through a contract with URS Corp. Additional information is available at: https://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles

Mobile Source Forecasting

Table 6 below summarizes the data and methods used to forecast future-year mobile source emissions by broad source category groupings.

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**Table 6
Growth Surrogates for Mobile Sources**

Category	Growth Methodology
On-Road Sources	
All	Match total vehicle miles traveled (VMT) projections provided by Metropolitan Planning Organizations
Off-Road Gasoline Fueled Equipment	
Lawn & Garden	Household growth projection
Off-Road Equipment	Employment growth projection
Recreational Boats	Housing starts (short-term) and human population growth (long-term)
Recreational Vehicles	Housing starts (short-term) and human population growth (long-term)
Off-Road Diesel-Fueled Equipment	
Construction and Mining	California construction employment data from U.S. Bureau of Labor Statistics
Farm Equipment	2011 study of forecasted growth by URS Corp.
Industrial Equipment	California construction employment data from Bureau of Labor Statistics
Trains (line haul)	Freight Analysis Framework (FAF) 2015 growth projections and historical Bureau of Transportation Statistics locomotive fuel trends (1990-2013 data)
Transport Refrigeration Units (TRU)	Projection of historical Truck/Trailer TRU sales from ACT Research, adjusted for recession.

NOx Emission Inventory (Summer)

CEPAM: EXTERNAL ADJUSTMENT REPORTING TOOL
Emission Projections by Summary Category
(Includes approved external emission adjustments)
Season: Summer
Oxides of Nitrogen (NOx)
Base Year: 2012

West Mojave NAA 2016 Ozone Ver 1.05

STATIONARY SOURCES					
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
FUEL COMBUSTION					
ELECTRIC UTILITIES	1.693	1.336	1.341	1.454	1.483
COGENERATION	0.000	0.000	0.000	0.000	0.000
MANUFACTURING AND INDUSTRIAL	4.197	4.703	5.040	5.080	5.087
FOOD AND AGRICULTURAL PROCESSING	0.122	0.080	0.080	0.084	0.085
SERVICE AND COMMERCIAL	1.425	1.973	2.425	2.798	3.061
OTHER (FUEL COMBUSTION)	0.709	0.744	0.758	0.803	0.836
* TOTAL FUEL COMBUSTION	8.146	8.835	9.644	10.219	10.552
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
WASTE DISPOSAL					
SEWAGE TREATMENT	0.000	0.000	0.000	0.000	0.000
LANDFILLS	0.019	0.023	0.026	0.029	0.031
INCINERATORS	0.058	0.072	0.080	0.087	0.093
SOIL REMEDIATION	0.000	0.000	0.000	0.000	0.000
OTHER (WASTE DISPOSAL)	0.000	0.000	0.000	0.000	0.000
* TOTAL WASTE DISPOSAL	0.077	0.095	0.106	0.115	0.124
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
CLEANING AND SURFACE COATINGS					
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	0.001	0.001	0.001	0.001	0.001
PRINTING	0.000	0.000	0.000	0.000	0.000
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
* TOTAL CLEANING AND SURFACE COATINGS	0.001	0.001	0.001	0.001	0.001
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
PETROLEUM PRODUCTION AND MARKETING					
OIL AND GAS PRODUCTION	0.000	0.000	0.000	0.000	0.000
PETROLEUM REFINING	0.000	0.000	0.000	0.000	0.000
PETROLEUM MARKETING	0.001	0.002	0.002	0.003	0.003

OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.000	0.000	0.000	0.000	0.000
* TOTAL PETROLEUM PRODUCTION AND MARKETING	0.001	0.002	0.002	0.003	0.003
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
INDUSTRIAL PROCESSES					
CHEMICAL	0.008	0.007	0.007	0.007	0.008
FOOD AND AGRICULTURE	0.000	0.000	0.000	0.000	0.000
MINERAL PROCESSES	17.954	23.090	26.521	28.211	29.316
METAL PROCESSES	0.479	0.471	0.471	0.507	0.545
WOOD AND PAPER	0.000	0.000	0.000	0.000	0.000
GLASS AND RELATED PRODUCTS	0.000	0.000	0.000	0.000	0.000
ELECTRONICS	0.000	0.000	0.000	0.000	0.000
OTHER (INDUSTRIAL PROCESSES)	1.601	1.423	1.318	1.407	1.526
* TOTAL INDUSTRIAL PROCESSES	20.041	24.991	28.317	30.132	31.395
** TOTAL STATIONARY	28.267	33.924	38.070	40.470	42.076
AREAWIDE SOURCES					
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
SOLVENT EVAPORATION					
CONSUMER PRODUCTS	0.000	0.000	0.000	0.000	0.000
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.000	0.000	0.000	0.000	0.000
PESTICIDES/FERTILIZERS	0.000	0.000	0.000	0.000	0.000
ASPHALT PAVING / ROOFING	0.000	0.000	0.000	0.000	0.000
* TOTAL SOLVENT EVAPORATION	0.000	0.000	0.000	0.000	0.000
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
MISCELLANEOUS PROCESSES					
RESIDENTIAL FUEL COMBUSTION	0.670	0.554	0.550	0.539	0.533
FARMING OPERATIONS	0.000	0.000	0.000	0.000	0.000
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	0.005	0.005	0.005	0.005	0.005
MANAGED BURNING AND DISPOSAL	0.374	0.376	0.378	0.381	0.384
COOKING	0.000	0.000	0.000	0.000	0.000
OTHER (MISCELLANEOUS PROCESSES)	0.000	0.000	0.000	0.000	0.000
* TOTAL MISCELLANEOUS PROCESSES	1.048	0.935	0.933	0.925	0.922
** TOTAL AREAWIDE	1.048	0.935	0.933	0.925	0.922
MOBILE SOURCES					
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
ON-ROAD MOTOR VEHICLES					
LIGHT DUTY PASSENGER (LDA)	3.285	2.044	1.488	1.166	0.940

LIGHT DUTY TRUCKS - 1 (LDT1)	0.943	0.497	0.329	0.238	0.175
LIGHT DUTY TRUCKS - 2 (LDT2)	2.162	1.216	0.795	0.585	0.452
MEDIUM DUTY TRUCKS (MDV)	2.450	1.628	1.151	0.779	0.555
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.860	0.606	0.518	0.417	0.342
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.090	0.067	0.056	0.045	0.038
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.197	0.118	0.090	0.068	0.057
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.070	0.044	0.041	0.041	0.045
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	3.597	2.618	2.157	1.650	1.249
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	1.054	0.701	0.529	0.361	0.232
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	1.791	1.131	0.786	0.425	0.493
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	18.516	9.901	8.490	4.279	4.485
MOTORCYCLES (MCY)	0.383	0.332	0.312	0.303	0.293
HEAVY DUTY DIESEL URBAN BUSES (UB)	1.028	0.646	0.451	0.328	0.234
HEAVY DUTY GAS URBAN BUSES (UB)	0.094	0.072	0.057	0.046	0.037
SCHOOL BUSES - GAS (SBG)	0.018	0.007	0.005	0.004	0.003
SCHOOL BUSES - DIESEL (SBD)	0.249	0.239	0.198	0.164	0.130
OTHER BUSES - GAS (OBG)	0.055	0.036	0.027	0.021	0.017
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.051	0.035	0.027	0.009	0.010
ALL OTHER BUSES - DIESEL (OBD)	0.052	0.027	0.023	0.010	0.011
MOTOR HOMES (MH)	0.167	0.109	0.078	0.054	0.038
* TOTAL ON-ROAD MOTOR VEHICLES	37.109	22.070	17.607	10.990	9.836
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
OTHER MOBILE SOURCES					
AIRCRAFT	1.359	1.360	1.369	1.410	1.460
TRAINS	28.422	23.553	19.412	16.360	12.537
RECREATIONAL BOATS	0.073	0.064	0.060	0.057	0.054
OFF-ROAD RECREATIONAL VEHICLES	0.034	0.038	0.042	0.045	0.048
OFF-ROAD EQUIPMENT	2.495	2.465	2.160	1.772	1.522
FARM EQUIPMENT	0.141	0.117	0.103	0.088	0.075
FUEL STORAGE AND HANDLING	0.000	0.000	0.000	0.000	0.000
* TOTAL OTHER MOBILE SOURCES	32.525	27.598	23.146	19.732	15.696
** TOTAL MOBILE	69.633	49.668	40.752	30.722	25.531

GRAND TOTAL FOR WEST MOJAVE NAA 2016 OZONE VER 1.05	2012	2017	2020	2023	2026
	98.948	84.527	79.755	72.117	68.528

ROG Emission Inventory (Summer)

CEPAM: EXTERNAL ADJUSTMENT REPORTING TOOL
Emission Projections by Summary Category
(Includes approved external emission adjustments)
Season: Summer
Reactive Organic Gas (ROG)
Base Year: 2012

West Mojave NAA 2016 Ozone Ver 1.05

STATIONARY SOURCES					
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
FUEL COMBUSTION					
ELECTRIC UTILITIES	0.064	0.051	0.051	0.056	0.057
COGENERATION	0.000	0.000	0.000	0.000	0.000
MANUFACTURING AND INDUSTRIAL	0.291	0.354	0.396	0.419	0.434
FOOD AND AGRICULTURAL PROCESSING	0.008	0.007	0.007	0.007	0.008
SERVICE AND COMMERCIAL	0.190	0.277	0.347	0.406	0.448
OTHER (FUEL COMBUSTION)	0.066	0.068	0.069	0.073	0.076
* TOTAL FUEL COMBUSTION	0.619	0.756	0.870	0.961	1.021
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
WASTE DISPOSAL					
SEWAGE TREATMENT	0.115	0.136	0.149	0.160	0.171
LANDFILLS	0.159	0.168	0.173	0.184	0.194
INCINERATORS	0.004	0.006	0.007	0.007	0.008
SOIL REMEDIATION	0.000	0.000	0.000	0.000	0.000
OTHER (WASTE DISPOSAL)	0.051	0.054	0.056	0.059	0.061
* TOTAL WASTE DISPOSAL	0.330	0.364	0.385	0.410	0.435
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
CLEANING AND SURFACE COATINGS					
LAUNDERING	0.000	0.000	0.000	0.000	0.001
DEGREASING	3.411	4.374	5.068	5.692	6.184
COATINGS AND RELATED PROCESS SOLVENTS	1.790	2.214	2.516	2.759	2.946
PRINTING	0.034	0.046	0.054	0.064	0.073
ADHESIVES AND SEALANTS	0.074	0.094	0.109	0.121	0.131
OTHER (CLEANING AND SURFACE COATINGS)	0.008	0.009	0.010	0.011	0.012
* TOTAL CLEANING AND SURFACE COATINGS	5.317	6.737	7.756	8.646	9.347
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
PETROLEUM PRODUCTION AND MARKETING					
OIL AND GAS PRODUCTION	0.001	0.001	0.002	0.002	0.003
PETROLEUM REFINING	0.001	0.001	0.001	0.001	0.002
PETROLEUM MARKETING	5.860	5.868	5.627	5.331	4.996

OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.000	0.000	0.000	0.000	0.000
* TOTAL PETROLEUM PRODUCTION AND MARKETING	5.862	5.871	5.631	5.335	5.000
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
INDUSTRIAL PROCESSES					
CHEMICAL	0.491	0.626	0.723	0.784	0.816
FOOD AND AGRICULTURE	0.013	0.015	0.016	0.017	0.017
MINERAL PROCESSES	0.342	0.420	0.471	0.500	0.522
METAL PROCESSES	0.000	0.000	0.000	0.000	0.000
WOOD AND PAPER	0.000	0.000	0.000	0.000	0.000
GLASS AND RELATED PRODUCTS	0.000	0.000	0.000	0.000	0.000
ELECTRONICS	0.008	0.012	0.014	0.018	0.020
OTHER (INDUSTRIAL PROCESSES)	0.181	0.159	0.151	0.161	0.173
* TOTAL INDUSTRIAL PROCESSES	1.035	1.232	1.375	1.479	1.548
** TOTAL STATIONARY	13.163	14.960	16.017	16.831	17.351
AREAWIDE SOURCES					
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
SOLVENT EVAPORATION					
CONSUMER PRODUCTS	4.486	4.337	4.468	4.678	4.885
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	2.810	2.318	2.449	2.574	2.698
PESTICIDES/FERTILIZERS	0.111	0.113	0.114	0.114	0.114
ASPHALT PAVING / ROOFING	0.320	0.454	0.533	0.585	0.641
* TOTAL SOLVENT EVAPORATION	7.728	7.222	7.565	7.951	8.339
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
MISCELLANEOUS PROCESSES					
RESIDENTIAL FUEL COMBUSTION	0.123	0.117	0.117	0.116	0.116
FARMING OPERATIONS	2.064	2.064	2.064	2.064	2.064
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	0.015	0.015	0.015	0.015	0.015
MANAGED BURNING AND DISPOSAL	0.943	0.949	0.954	0.961	0.968
COOKING	0.445	0.521	0.567	0.608	0.650
OTHER (MISCELLANEOUS PROCESSES)	0.000	0.000	0.000	0.000	0.000
* TOTAL MISCELLANEOUS PROCESSES	3.589	3.665	3.717	3.764	3.812
** TOTAL AREAWIDE	11.317	10.887	11.281	11.714	12.152
MOBILE SOURCES					
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
ON-ROAD MOTOR VEHICLES					
LIGHT DUTY PASSENGER (LDA)	5.299	3.226	2.415	2.043	1.812

LIGHT DUTY TRUCKS - 1 (LDT1)	1.716	1.000	0.718	0.576	0.470
LIGHT DUTY TRUCKS - 2 (LDT2)	2.273	1.501	1.129	0.967	0.861
MEDIUM DUTY TRUCKS (MDV)	1.965	1.634	1.347	1.096	0.933
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.745	0.581	0.524	0.452	0.403
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.066	0.049	0.039	0.029	0.024
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.139	0.059	0.045	0.037	0.034
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.038	0.013	0.009	0.007	0.007
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.091	0.075	0.066	0.054	0.044
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.027	0.021	0.017	0.013	0.010
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.091	0.047	0.023	0.007	0.009
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	1.065	0.229	0.194	0.142	0.162
MOTORCYCLES (MCY)	1.485	1.323	1.251	1.214	1.163
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.073	0.047	0.034	0.024	0.017
HEAVY DUTY GAS URBAN BUSES (UB)	0.045	0.034	0.027	0.022	0.013
SCHOOL BUSES - GAS (SBG)	0.018	0.003	0.003	0.002	0.003
SCHOOL BUSES - DIESEL (SBD)	0.018	0.005	0.003	0.003	0.003
OTHER BUSES - GAS (OBG)	0.016	0.012	0.010	0.009	0.008
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.003	0.001	0.001	0.000	0.000
ALL OTHER BUSES - DIESEL (OBD)	0.003	0.001	0.000	0.000	0.000
MOTOR HOMES (MH)	0.039	0.021	0.012	0.008	0.005
* TOTAL ON-ROAD MOTOR VEHICLES	15.212	9.881	7.868	6.707	5.980
SUMMARY CATEGORY NAME	2012	2017	2020	2023	2026
OTHER MOBILE SOURCES					
AIRCRAFT	1.470	1.464	1.472	1.512	1.559
TRAINS	1.776	1.026	0.701	0.606	0.486
RECREATIONAL BOATS	0.380	0.293	0.249	0.211	0.178
OFF-ROAD RECREATIONAL VEHICLES	0.987	0.844	0.783	0.725	0.684
OFF-ROAD EQUIPMENT	1.911	1.713	1.668	1.697	1.753
FARM EQUIPMENT	0.039	0.028	0.024	0.020	0.018
FUEL STORAGE AND HANDLING	0.530	0.410	0.368	0.336	0.313
* TOTAL OTHER MOBILE SOURCES	7.092	5.777	5.265	5.106	4.991
** TOTAL MOBILE	22.304	15.659	13.133	11.813	10.971

GRAND TOTAL FOR WEST MOJAVE NAA 2016 OZONE VER 1.05	2012	2017	2020	2023	2026
	46.783	41.506	40.431	40.358	40.474

APPENDIX B

WEIGHT OF EVIDENCE ANALYSIS

Western Mojave Nonattainment Area Weight of Evidence

Introduction

The Western Mojave Nonattainment Area (Western Mojave) includes the southwestern Mojave Desert Air Basin portion of San Bernardino County, which is under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD), and the northeastern Antelope Valley portion of Los Angeles County, which is under the jurisdiction of the Antelope Valley Air Quality Management District (AVAQMD). Western Mojave is currently classified as a severe nonattainment area for the 0.075 parts per million (ppm) 8-hour federal ozone standard with a 2026 attainment deadline. Photochemical modeling is a required element of the Western Mojave State Implementation Plan (SIP) to determine whether existing and future additional control strategies provide the reductions needed to meet the federal standard by the attainment deadline. To address the uncertainties inherent to modeling assessments, U.S. Environmental Protection Agency (U.S. EPA) guidance recommends that supplemental analyses accompany all model attainment demonstrations (U.S. EPA, 2014).

To complement regional photochemical modeling analyses included in the Western Mojave SIP, the following Weight Of Evidence (WOE) demonstration includes detailed analyses of anthropogenic emissions, measured ozone data, and population exposure trends. Analyses of air mass transport mechanisms and meteorological patterns coincident with elevated ozone concentrations in Western Mojave are also included.

Air quality analyses indicate that progress towards attainment is being made at all Western Mojave sites. However, in 2015, all regulatory sites in Western Mojave exceeded the 0.075 ppm standard by 5 to 20 percent. Photochemical modeling analyses for Western Mojave indicate that the area will not be able to meet the 0.075 ppm standard by the 2026 attainment deadline with currently adopted regulations. However, with the inclusion of additional control measures targeting attainment needs in the upwind South Coast Air Basin (South Coast), photochemical modeling projects that Western Mojave can meet the 0.075 ppm standard by the 2026 attainment date.

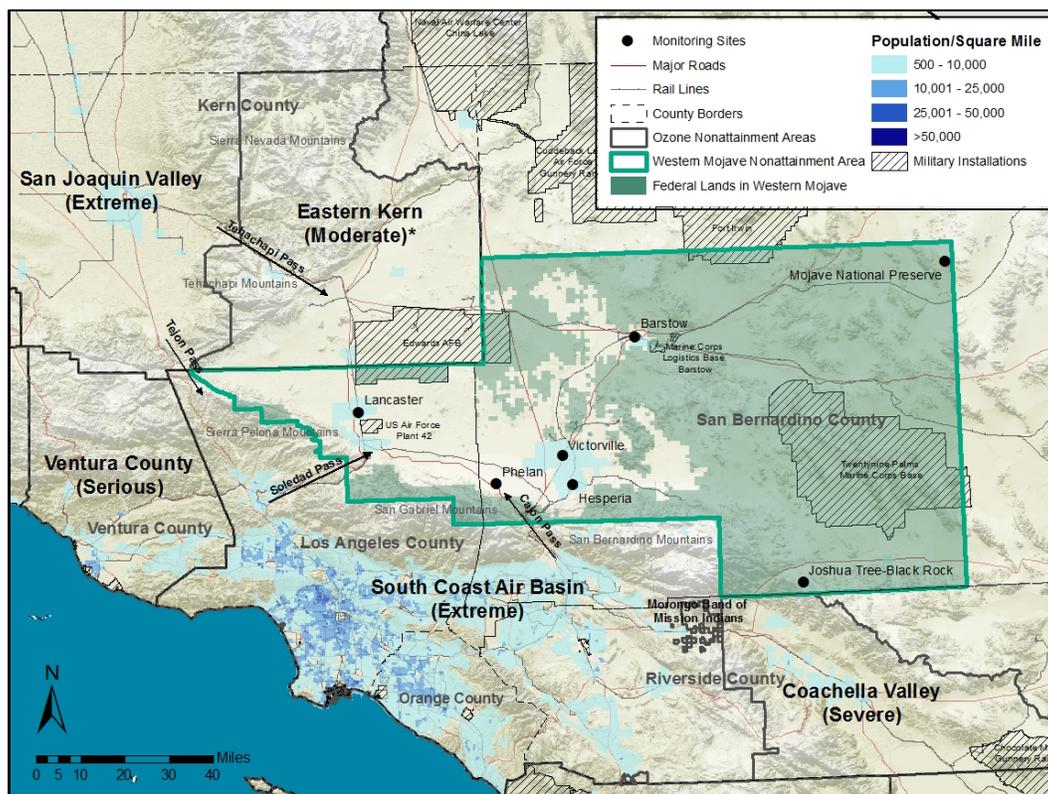
Area Description

Western Mojave is considered a high desert climate. Terrain elevations range from 2,000 to 5,000 feet and the amount of average annual precipitation ranges from four to six inches. The Sierra Pelona, San Gabriel, and San Bernardino Mountains are located to the southwest and separate the South Coast from the Western Mojave

Nonattainment Area. The Tehachapi and southern Sierra Nevada Mountains are located in Kern County to the northwest and separate the San Joaquin Valley from the Eastern Kern Nonattainment Area, which borders Western Mojave to northwest.

Western Mojave includes more than 8,000 square miles (Figure 1). The majority of the land is under the jurisdiction of the federal government and managed by the National Park Service (NPS), U.S. Forest Service, and Bureau of Land Management. Western Mojave includes portions of Joshua Tree National Park and the Mojave National Preserve, federally protected areas renowned for diverse ecology and striking landscapes. Portions of several military installations also lie within the Western Mojave Nonattainment Area. The largest installations include Twentynine Palms Marine Corps Base and Edwards Air Force Base.

Figure 1: Area Map of Western Mojave and Surrounding Areas



Classifications of the surrounding nonattainment areas are show in parentheses.

**The classification of the Eastern Kern Ozone Nonattainment Area is expected to be bumped up to Serious.*

Western Mojave is home to more than 700,000 people. Most of the population is concentrated in a handful of moderate sized cities. Lancaster, in Los Angeles County, and Victorville, in San Bernardino County, are the largest cities in Western Mojave. Locally, the primary industries include aerospace, cement production, agriculture, mining, and healthcare. However, a significant fraction of the Western Mojave workforce commutes to jobs in urban Los Angeles and the greater San Bernardino area.

The area serves as a major transit corridor between southern California and Las Vegas, with several major highways running through Western Mojave, including Interstate-15, Interstate-40, and State Highway 395. The city of Barstow, in the northern portion of the nonattainment area, is a major hub for the multiple rail lines that traverse the high desert. Infrastructure related to resource distribution, including electricity transmission lines and water, oil, and gas pipelines run throughout the high desert area. The area has also garnered a great deal of attention in recent years due to the emergence of solar and wind energy developments.

The Los Angeles County portion of Western Mojave is under the jurisdiction of the Antelope Valley Air Quality Management District (AQMD), whereas the San Bernardino portion of Western Mojave is under the jurisdiction of the Mojave Desert AQMD. Collectively, Antelope Valley AQMD and Mojave Desert AQMD operate five ozone monitoring sites in Western Mojave. The NPS operates two monitors in Western Mojave: Joshua Tree-Black Rock and Mojave National Preserve. The Joshua Tree-Black Rock monitor is considered regulatory and is operated year-round; whereas, the Mojave National Preserve monitor is considered non-regulatory and is operated seasonally, typically between May and October. Since the Mojave National Preserve monitor is non-regulatory, the data are not considered for attainment determinations. However, the data are useful for regional analyses and are consistent with the spatial patterns indicated by the data from regulatory monitoring sites in Western Mojave. The number of exceedance days and the annual fourth highest ozone concentrations at the Mojave National Preserve site were similar to Barstow, albeit generally a little lower, which is consistent with its far downwind location.

Ozone concentration data indicate a spatial gradient among the monitors in Western Mojave. The highest concentrations are typically measured at monitors in the southwest portion of the nonattainment area, particularly at sites in closest proximity to the mountain ranges that separate Western Mojave from the South Coast. The lowest concentrations are typically measured at the far downwind sites of Barstow and Mojave National Preserve, in the northern/northeastern portions of the nonattainment area.

As shown in Table 1, ozone design values are generally similar at Lancaster, Victorville, Phelan, Hesperia, and Joshua Tree; and ranged from 0.087 to 0.090 ppm in 2015. The lowest design values are typically measured at Barstow, where the 2015 design value was 0.079 ppm. Lancaster is currently the design value site for Western Mojave; however, Phelan and Hesperia have been design value sites in past years. Photochemical modeling analyses indicate that Phelan will be the design value site in the years leading up to the attainment deadline and represents the greatest challenge for attainment in Western Mojave.

Table 1: Ozone Design Values at Western Mojave Monitoring Sites

			District	2014 Design Value (ppb)	2015 Design Value (ppb)	Percent of NAAQS
Lancaster	060379033	Los Angeles	Antelope Valley AQMD	0.086	0.090	120%
Barstow	060710001	San Bernardino	Mojave Desert AQMD	0.080	0.079	105%
Hesperia	060714001	San Bernardino	Mojave Desert AQMD	0.087	0.087	116%
Phelan	060710012	San Bernardino	Mojave Desert AQMD	0.092	0.089	119%
Victorville	060710306	San Bernardino	Mojave Desert AQMD	0.086	0.089	119%
Joshua Tree-Black Rock	060719002	San Bernardino	National Park Service	0.090	0.086	115%
Mojave National Preserve*	060711001	San Bernardino	National Park Service	0.078	0.078	104%

* Data are non-regulatory

Conceptual Model

Weather in Western Mojave is dominated by mostly sunny days, warm to hot temperatures, and light to moderate midday winds during the summer months. These conditions are conducive to the formation and buildup of ozone. However, limited local emissions sources, relative to neighboring ozone nonattainment areas to the south and west, are not adequate to produce the magnitude of peak ozone concentrations and the quantity of ozone exceedance days observed in Western Mojave. The transport of emissions from the South Coast, and to a lesser extent the San Joaquin Valley, is the predominant cause of high ozone concentrations and exceedances in Western Mojave. The meteorology, terrain, distribution of emissions, and transport mechanisms are the key factors for understanding the ozone challenges in Western Mojave.

Meteorology and Terrain

In Western Mojave, ozone exceedance days are most common in the late spring and early summer months. Conditions in the high desert at this time of year are routinely characterized by sunny, hot, and dry conditions. Clear sky conditions coupled with low humidity lead to rapid surface heating and the warming of the air above the ground, which promote deep convective mixing as evidenced by large mixing heights in high desert areas (cf. Whiteman, 2000). Research has indicated that these large mixing heights are conducive to entrainment of layers aloft into the near-surface air sampled by monitors in Western Mojave (cf. VanCuren 2015). The high elevation of Western

Mojave, combined with routinely large mixing heights, can allow pollution derived from a wide range of sources and transported aloft to mix down into the surface layer (cf. Langford et al., 2012, Lin et al., 2012a, Lin et al., 2012b).

The high desert area, where Western Mojave is situated, is a convergence zone for air flowing out of the South Coast and the San Joaquin Valley, the only extreme ozone nonattainment areas in the U.S. High temperatures and low humidity promote the development of a thermal low, a non-frontal area of low pressure, which contributes to routine development of a deep mixing layer in the high desert. Development of this thermal low routinely establishes a surface pressure differential between the high desert and upwind areas, which promotes transport from the South Coast and the San Joaquin Valley into the high desert.

In the South Coast, a persistent temperature inversion and confining terrain limit dispersion of air and emissions. Prevailing onshore winds are deflected by the complex terrain that flanks the edge of the coastal plain and air subsequently converges at the foot of the mountains that separate the South Coast from the high desert. The Soledad Pass and Cajon Pass in the San Gabriel and San Bernardino Mountains, respectively, serve as major transport corridors for air moving from the South Coast to the high desert.

Similar to the South Coast, air masses within the San Joaquin Valley are largely confined by a persistent temperature inversion and the complex terrain on the western, southern, and eastern sides of the San Joaquin Valley. Local, terrain-forced winds, which parallel the axis of the valley floor and generally flow from north to south in the summer months, cause air to converge in the southern San Joaquin Valley. The primary route for air to exit the San Joaquin Valley is through mountain gaps and over minor passes at the southern end of the San Joaquin Valley (cf. Beaver and Palazoglu, 2009). The Tehachapi Pass, located at the foot of the San Joaquin Valley in the Tehachapi Mountains and to the northwest of Western Mojave, is the primary conduit for air to move from the San Joaquin Valley to the high desert.

Regional Transport

Due to the meteorological and terrain effects discussed above, the air flow and transport of emissions from the South Coast is the major source of ozone in Western Mojave. Similar impacts from the San Joaquin Valley are also evident, but they are less frequent and severe.

In addition to the terrain-following, near-surface transport of air masses, research has shown that the air masses moving through mountain gaps and passes in southern California contain multiple, distinct pollutant layers at various altitudes (cf. Smith and Edinger, 1983). These filamentous layers of pollution are the result of the interaction of

spatially distributed emission sources, prevailing meteorology, and complex terrain in the upwind air basins. Terrain and meteorological conditions promote the lofting of surface derived pollution, which results in horizontal pollutant transport across multiple altitudes.

As air moves through the mountain gaps and passes, it warms and accelerates. Upon exiting the gaps and passes, the accumulated momentum is depleted causing air masses to slow and disperse. As these layers disperse, transported pollution may become entrained in the near-surface air of downwind areas.

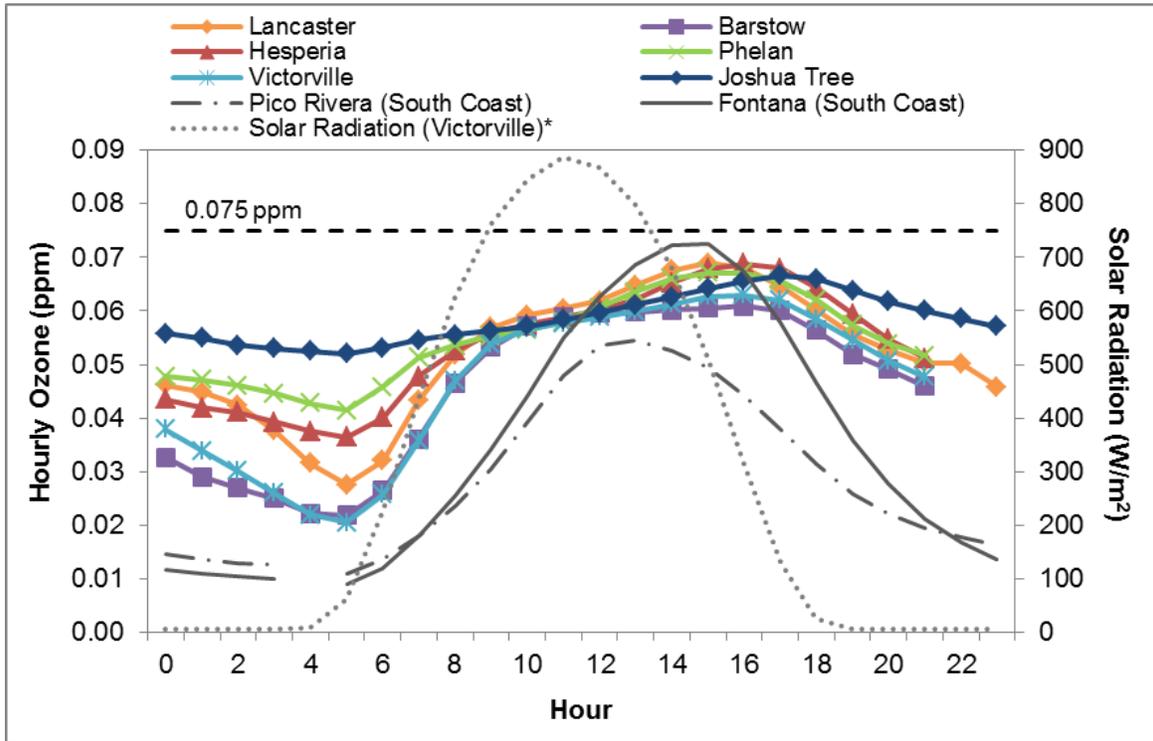
To illustrate the routine contribution of transport to ozone measured at Western Mojave sites, Figure 2 shows the average diurnal pattern in ozone between April and September at regulatory monitoring sites. The diurnal patterns at select sites in the South Coast are also included in Figure 2 to illustrate typical patterns for photochemical production of ozone from local sources. In particular, because production of ozone occurs through photochemical reactions, ozone derived from local pollution sources generally increases with available solar radiation.

For instance, the diurnal ozone pattern at Pico Rivera, a regulatory monitoring site located in an urban area of the South Coast, is indicative of ozone production from local emission sources. The local ozone production regime is characterized by a predawn minimum concentration near zero followed by a persistent increase in concentrations between sunrise and midday. Peak concentrations are typically reached shortly after midday, but tend to be brief, and then decrease as solar insolation diminishes later in the day.

The diurnal ozone pattern at Fontana is also indicative of ozone production from local sources, but illustrates a distance-weighted time lag in peak concentration, due to the location of Fontana, a short distance downwind of Pico Rivera. Relative to Pico Rivera, peak concentrations at Fontana are generally an hour later and tend to reach higher concentrations than those at Pico Rivera. The higher concentrations at Fontana are also typical of a near-downwind site. Emissions from nearby, upwind areas have undergone more photochemical processing, with limited dilution by the time they are intercepted by the near-downwind monitor, resulting in higher peak ozone concentrations.

The smooth, bell-shaped curve of the diurnal ozone plots at both South Coast sites shown in Figure 2 is consistent with the pattern expected for urban sites impacted by photochemically derived ozone. As discussed earlier, the pattern is characterized by a persistent gradual increase in ozone throughout the morning hours, followed by a brief but notable peak shortly after solar insolation reaches peak intensity, followed by a persistent gradual decrease throughout the evening hours.

Figure 2: Average Diurnal Pattern in Hourly Ozone Concentrations during April-September in 2011-2015



**2013-2015 only; 2011-2012 data were not available. Complete records of solar radiation data from South Coast sites were also not available for 2011-2015.*

In contrast to the South Coast sites, ozone at Western Mojave sites steadily increases between sunrise and 0900 then plateaus until just after midday. During this time period, ozone concentrations typically reach their lowest point at all of the sites, but there is a difference between the average lowest concentrations across the sites of up to nearly 0.035 ppm. This difference can largely be explained by the proximity of each site to direct NO_x emissions, which break down ozone, especially in the absence of sunlight. This titration of ozone is most evident at Victorville and Barstow, while the most rural site, Joshua Tree, experiences little to no titration and the decrease is more likely attributable to deposition and interaction with other molecules in the air. However, as soon as the sun rises, emissions, which transported into the area the previous day and are derived from local sources, quickly convert to ozone and a shallow temperature inversion typically confines the near-surface layer to several hundred feet, leading to a rapid rise in concentrations. Once temperatures are warm enough, the inversion dissipates and the atmosphere mixes vertically. This mixing dilutes the ozone that had already formed, but because additional ozone continues to form, ozone concentrations plateau, as evidenced by the nearly flat portion of the diurnal profile during the last morning hours.

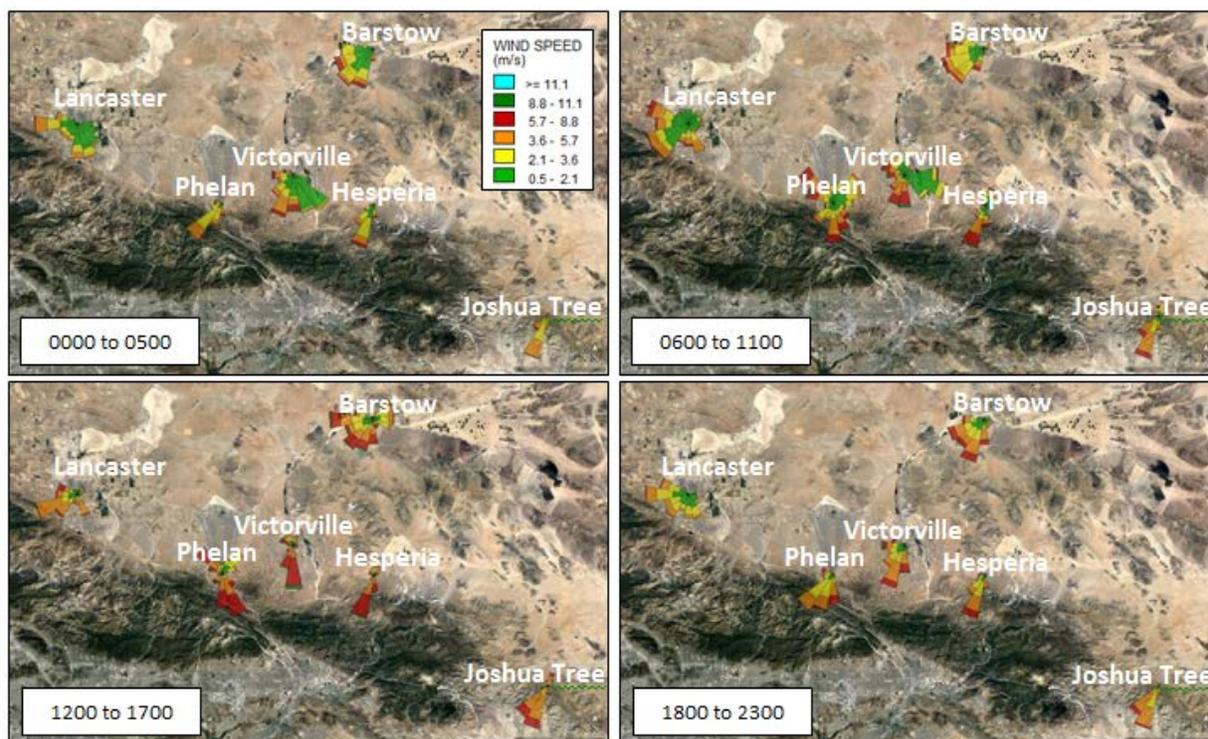
Between 1300 and 1500, ozone steadily increases again and peaks between 1500 and 1600. At this time of the day, surface winds are generally from the south and transport emissions from the South Coast into Western Mojave. The largest increases and highest peak concentrations are at Lancaster, Phelan, Hesperia, and Joshua Tree, the sites in closest proximity to the mountain ranges between the South Coast and Western Mojave. The increase between the midday plateau and secondary afternoon peak at these sites amounts to 0.006 to 0.009 ppm, which suggests that regional transport could account for 9 to 13 percent of the hourly peak ozone concentrations at these sites on an average summertime day. The transport could be near the surface and/or aloft, which would reach the surface through vertical mixing in the atmosphere during the afternoon hours.

The coincident timing of peak concentrations at Western Mojave sites suggests that the primary mechanism for regional transport may be through top down entrainment rather than near-surface transport (VanCuren 2015). Mixing heights in Western Mojave are generally higher than those in South Coast, thus pollutants from upwind areas will undergo more dilution and measured peak concentrations will typically be lower than those in the upwind source areas.

Average peak hourly ozone concentrations at Barstow and Victorville (Figure 2) are generally lower than peak concentrations at the other Western Mojave sites. Dilution, resulting from longer transit from upwind urban areas, and titration resulting from local emissions of oxides of nitrogen (NO_x) likely contribute to reduced peak concentrations at Barstow and Victorville, respectively.

The diurnal patterns in ozone at Western Mojave sites, shown in Figure 2, are likely reflective of ozone transport from surrounding areas. Wind data measured at regulatory ozone monitoring stations indicate that the increased speed of prevailing winds is largely coincident with peak afternoon/evening ozone concentrations (Figure 3), which is further indicative of a transport dominated ozone regime. Furthermore, wind directions depicted by the wind roses also show the dominance of transport from the South Coast.

Figure 3: Patterns in Prevailing Winds at sites in the Mojave Nonattainment Area



Available wind data varied slightly among sites. For the above figure, data for April through September from 2012 to 2013 were included in the wind analyses at all sites except Joshua Tree. Data from 2013 to 2016 were included for Joshua Tree.

Analyses of Air Mass Trajectories on Exceedance Days

To gain further insight into the potential source areas and transport corridors that may contribute to ozone on exceedance days in Western Mojave, back trajectories were computed using the web-based version of the National Oceanographic and Atmospheric Administration’s (NOAA) Air Resources Laboratory HYbrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT) model (<http://ready.arl.noaa.gov/HYSPLIT.php>; Rolph, 2016 and Stein et al., 2015). The HYSPLIT model was run for all exceedance days in 2015 at the regulatory ozone monitoring sites in Western Mojave using the NAM12 meteorological model data.

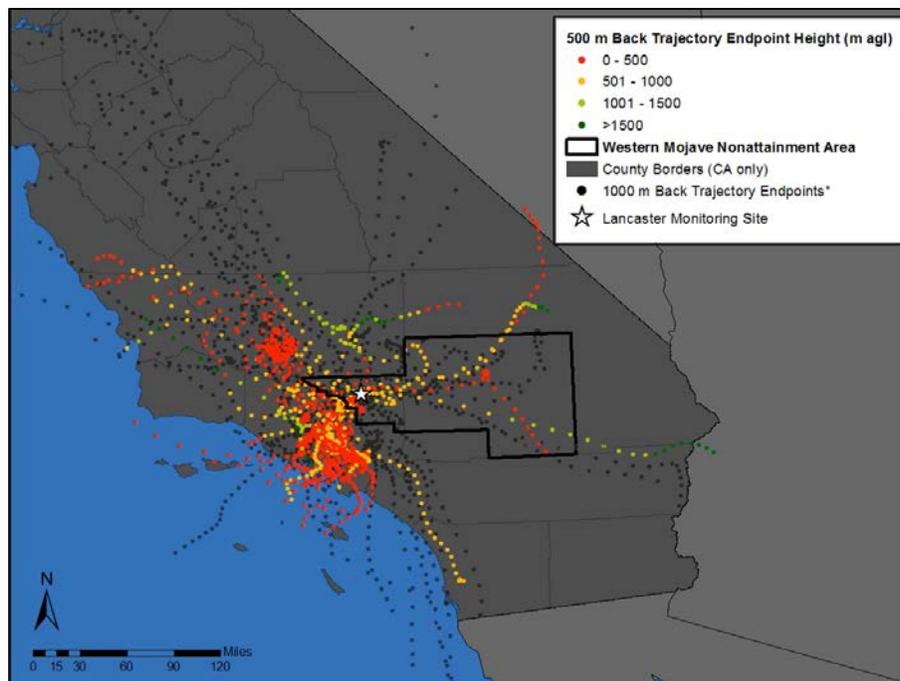
Research has indicated that pollutant transport may occur at a range of altitudes, not just in near-surface air masses. Given that large mixing heights are expected for the high desert area during much of the high ozone season, back trajectories were initiated from the monitoring sites at 500 m above ground level (agl) and 1000 m agl at the peak hour for each exceedance day. Maps of the 24-hour back trajectories initiated from 500 and 1000 m agl are shown in Figures 4 through 9. The height of each hourly endpoint is shown for trajectories initiated from 500 m agl at the monitoring since. The heights of the hourly endpoints for trajectories initiated from 1000 m agl are not shown;

however, the endpoints (without height color coding) are included in the figures to provide a visual representation of the geographic extent of potential source areas on exceedance days.

The maps of the back trajectories initiated from 500 m agl indicate fairly well-defined transport corridors to each site, which are consistent with well-established terrain following wind flow patterns. The maps of the back trajectories initiated from 1000 m agl indicate a broad regional potential source area, extending through the South Coast and the San Joaquin Valley, for ozone on 2015 exceedance days in Western Mojave.

Back trajectories initiated from 500 m agl at Lancaster (Figure 4) indicate a well-defined transport corridor from South Coast through the Soledad Pass. The back trajectories initiated from 1000 m show a potential routine contribution from the San Joaquin Valley. Studies have indicated that, while the depth of the mixed layer in the San Joaquin Valley is fairly shallow, mixing heights increase in the southern end of the valley due to convergence of air in an area surrounded by confining terrain (cf. Beaver and Palazoglu, 2009; Trousdell et al., 2016). Air masses from the San Joaquin Valley could subsequently be lofted over the southern Sierra Nevada Mountains or exit through gaps and passes en route to Lancaster.

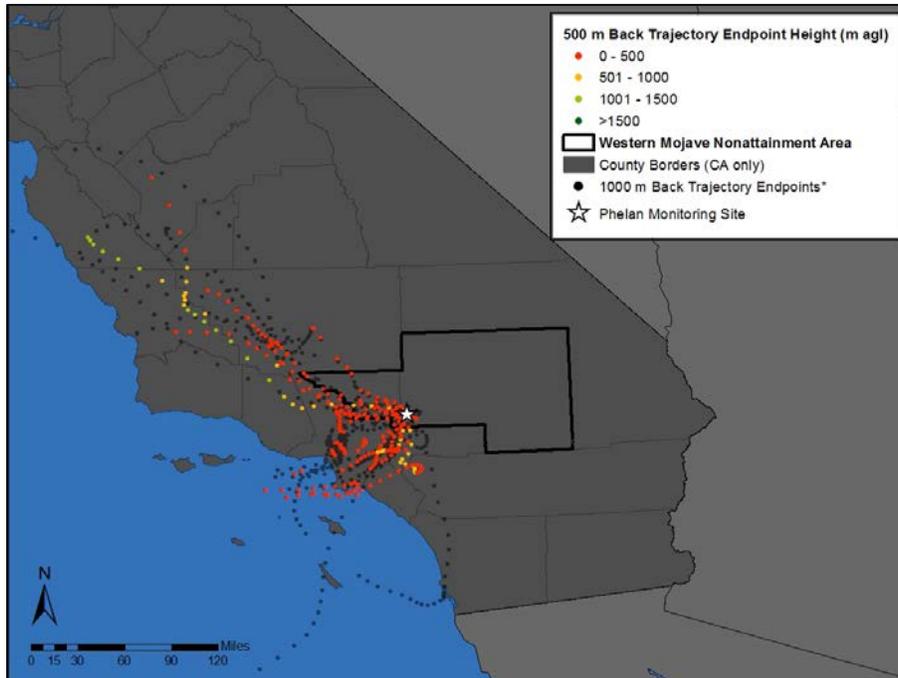
Figure 4: Back Trajectories for 2015 Exceedance Days at Lancaster



Back trajectories initiated from Phelan (Figure 5) indicate two well defined corridors between the South Coast and Phelan. The trajectories initiated from 500 m agl suggest that air masses intercepted at Phelan traveled, in near equal frequency, through the

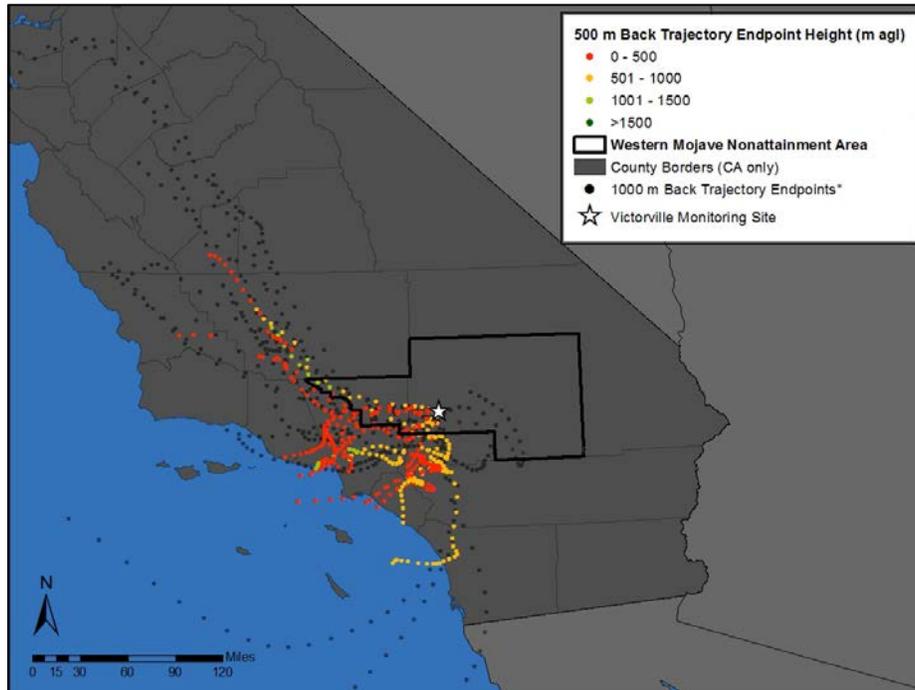
Cajon Pass, between the San Gabriel and San Bernardino Mountains, and through the Soledad Pass, between the Sierra Pelona and San Bernardino Mountains. The trajectories initiated from 1000 m agl have a footprint similar to those initiated from 500 m agl with more frequent extension from the San Joaquin Valley, suggesting that some of the air entering the high desert via the Soledad Pass may have previously passed through the San Joaquin Valley.

Figure 5: Back Trajectories for 2015 Exceedance Days at Phelan



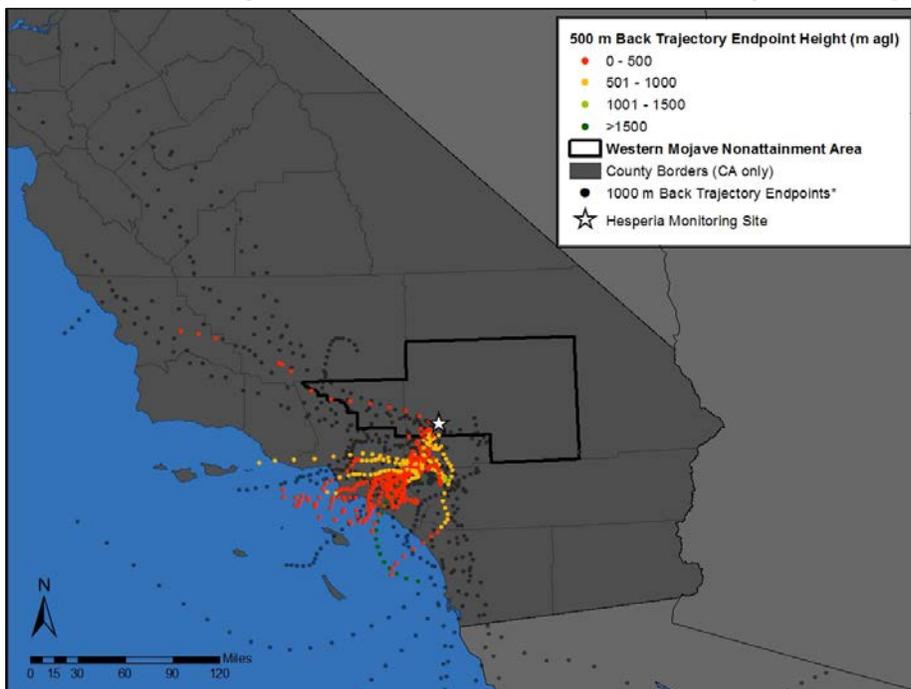
Trajectories initiated from Victorville (Figure 6) show that transport from the South Coast occurs primarily through the Cajon pass, and to a lesser extent, through the Soledad Pass. The footprint of the trajectories initiated from 1000 m agl indicates that the San Joaquin Valley may also be a source region for air intercepted at the site.

Figure 6: Back Trajectories for 2015 Exceedance Days at Victorville



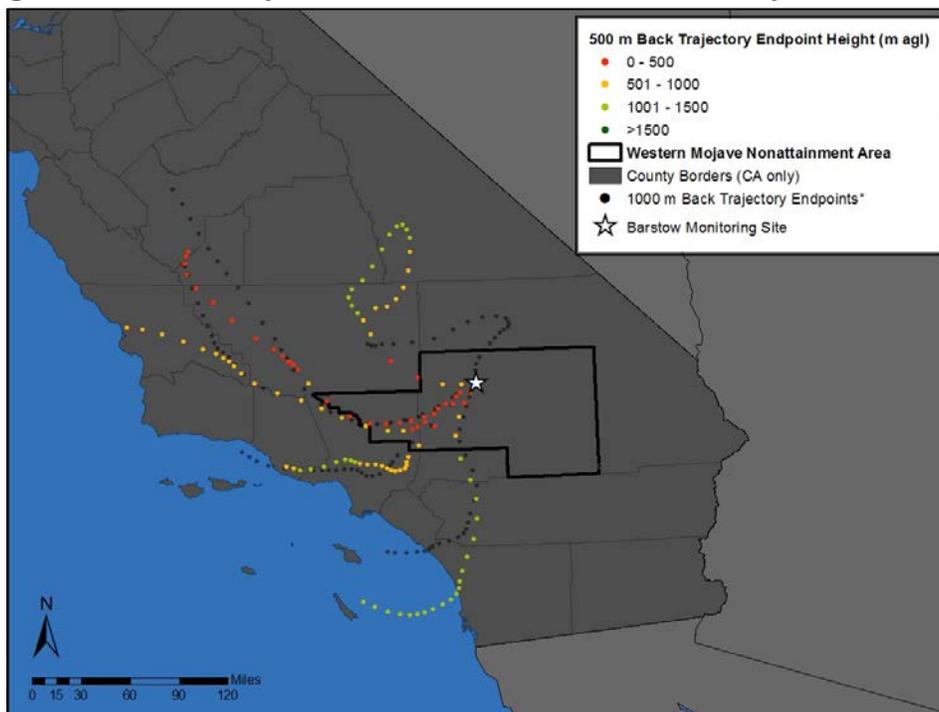
Back trajectories initiated from Hesperia (Figure 7) show that air masses intercepted at 500 m agl primarily exit the South Coast via the Cajon Pass. The trajectories initiated from 1000 m indicate that pollution from the San Joaquin Valley and western San Diego County may also contribute to air quality at Hesperia on exceedance days.

Figure 7: Back Trajectories for 2015 Exceedance Days at Hesperia



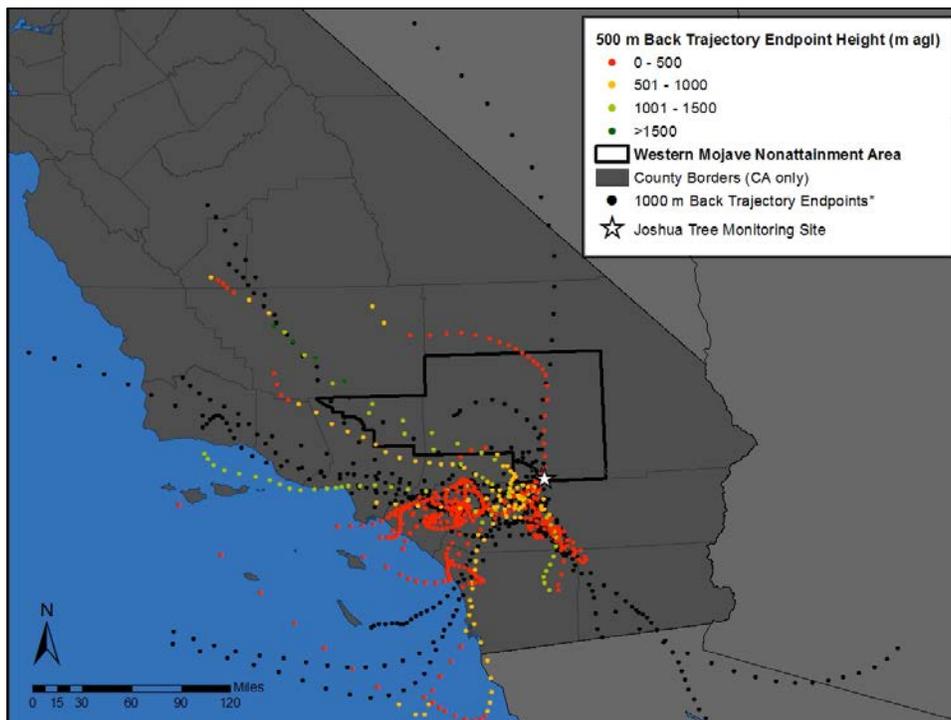
While the number of exceedance days at Barstow was limited in 2015, the back trajectories initiated from the site (Figure 8) illustrate the convergence of air in the high desert from numerous source areas. Transit via the Tehachapi Pass, Soledad Pass, and Cajon Pass is represented in this limited data set suggesting that emissions from the South Coast and San Joaquin Valley potentially contribute to exceedance days at Barstow. The footprint of the trajectories initiated from 1000 m agl is similar to those trajectories initiated from 500 m agl, indicating that air masses are well-mixed when they are intercepted at the site.

Figure 8: Back Trajectories for 2015 Exceedance Days at Barstow



Back trajectories initiated from 500 m agl at Joshua Tree (Figure 9) are indicative of routine transport from the South Coast, primarily by way of the San Geronio Pass. The footprint of the trajectories initiated from 1000 m agl are similar to those initiated from 500 m agl with occasional extension to the San Joaquin Valley to the north as well as San Diego and Imperial Counties to the south.

Figure 9: Back Trajectories for 2015 Exceedance Days at Joshua Tree

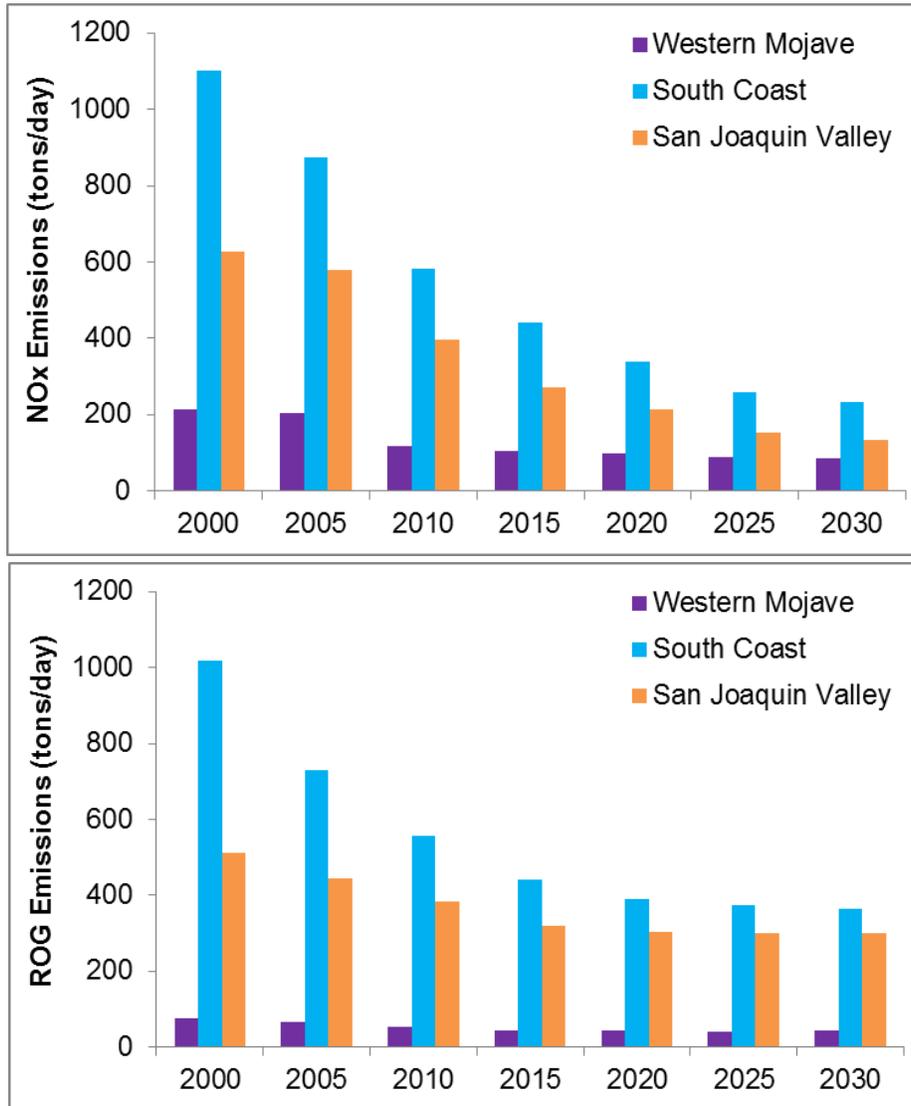


Distribution of Ozone Precursor Emissions

Emissions in Western Mojave are significantly lower than those in upwind areas. In 2015, NO_x emissions in the South Coast were more than four times greater than Western Mojave emissions, whereas emissions of reactive organic gases (ROG) in the South Coast were nearly ten times greater (Figure 10). Emissions in the San Joaquin Valley were also much larger than those in Western Mojave. The difference in emission between the three areas provides a clear indication that transport of emissions from the upwind source areas, and predominantly from the South Coast, is the key factor controlling ozone air quality in Western Mojave.

The connection between ozone, a secondary pollutant, and emissions of ozone precursor compounds is characterized by considerable temporal and spatial variability. In general, as air masses travel downwind from major emissions source areas, entrainment of fresh emissions, atmospheric reactions, depositional processes, and dilution increase the ROG/NO_x ratio. As a result, ozone formation in downwind suburban and rural areas is typically regarded as NO_x-limited (cf. Finlayson-Pitts and Pitts, 1993; Finlayson-Pitts and Pitts, 2000). Given Western Mojave's downwind location from the only two extreme ozone nonattainment areas in the country, it is expected that ozone formation would be limited by available NO_x emissions.

Figure 10: Comparison of NOx and ROG Emissions in Western Mojave and Surrounding Extreme Nonattainment Areas



As discussed earlier, regional transport significantly contributes to peak ozone concentrations in Western Mojave and ultimately, progress towards achieving ozone air quality goals in Western Mojave will be largely dependent upon emissions reductions in upwind areas. Photochemical modeling analyses conducted by the South Coast Air Quality Management District (South Coast AQMD) indicate that Western Mojave will not be able to attain the 0.075 ppm standard without emission reductions in the South Coast. Reductions in emissions within the San Joaquin Valley will also contribute to the regional efforts needed for Western Mojave to attain the federal standard. While emission reductions in areas upwind of Western Mojave are essential, understanding local emissions within Western Mojave and changes in the various sectors are also

important for determining if additional local rules and regulations would assist the region in meeting attainment goals.

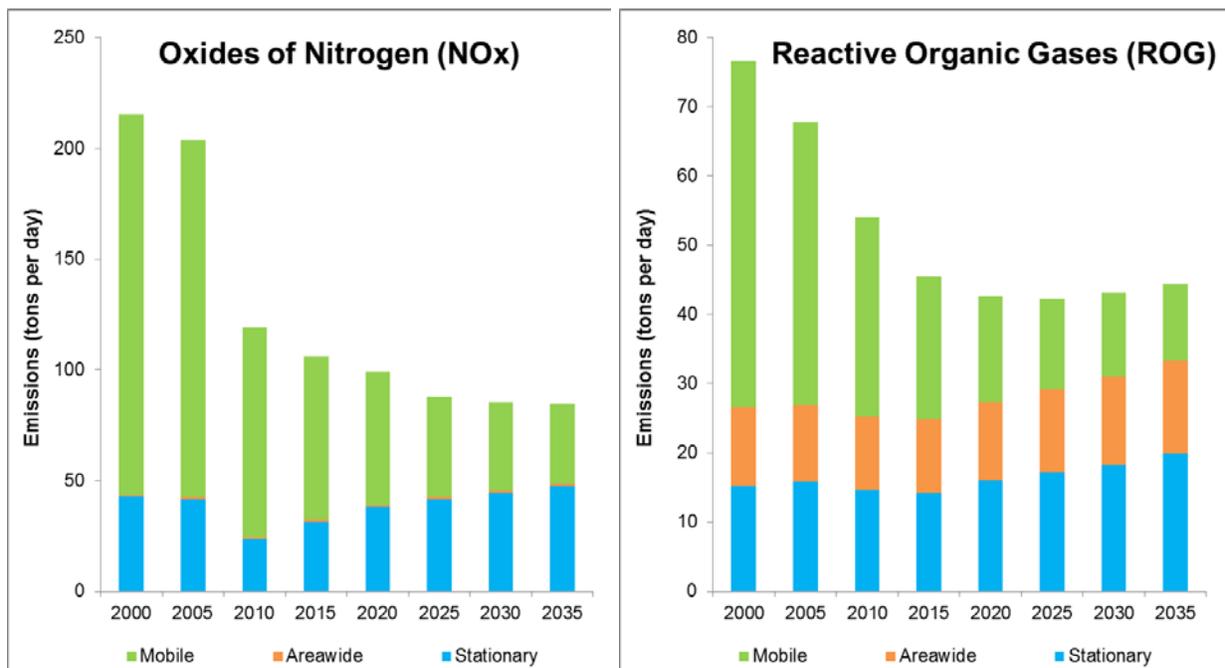
Anthropogenic Emission Trends

Data from the Air Resources Board (ARB) 2016 Ozone SIP Inventory for Summer (version 1.04 with approved external adjustments) were used to evaluate trends in anthropogenic emissions of ozone precursors, NO_x and ROG, in Western Mojave (Figure 11). Between 2000 and 2010, Western Mojave achieved substantial reductions in ozone precursor emissions:

- Total NO_x emissions declined by 45 percent; and
- Total ROG emissions declined by 29 percent.

Similar emissions reductions were also seen in the South Coast during the same period, with decreases of 47 percent for NO_x and 45 percent for ROG, and in the San Joaquin Valley, with decreases of 37 percent for NO_x and 25 percent for ROG.

Figure 11: Inventory of Western Mojave Ozone Precursor Emissions



Reductions between 2010 and 2015 were more modest with NO_x and ROG emissions declining by 16 percent and 11 percent, respectively. The Western Mojave emissions inventories are dominated by mobile sources, which accounted for 69 percent of NO_x emissions and 45 percent of ROG emissions in 2015. In contrast, stationary and areawide sources accounted for 30 percent and 1 percent of NO_x emissions,

respectively. Stationary and areawide sources accounted for 31 percent and 23 percent of ROG emissions, respectively.

Going forward from 2015, current emission control programs will further reduce emissions by 2026, namely:

- Total NO_x emissions will decline an additional 17 percent; and
- Total ROG emissions will decline an additional 7 percent.

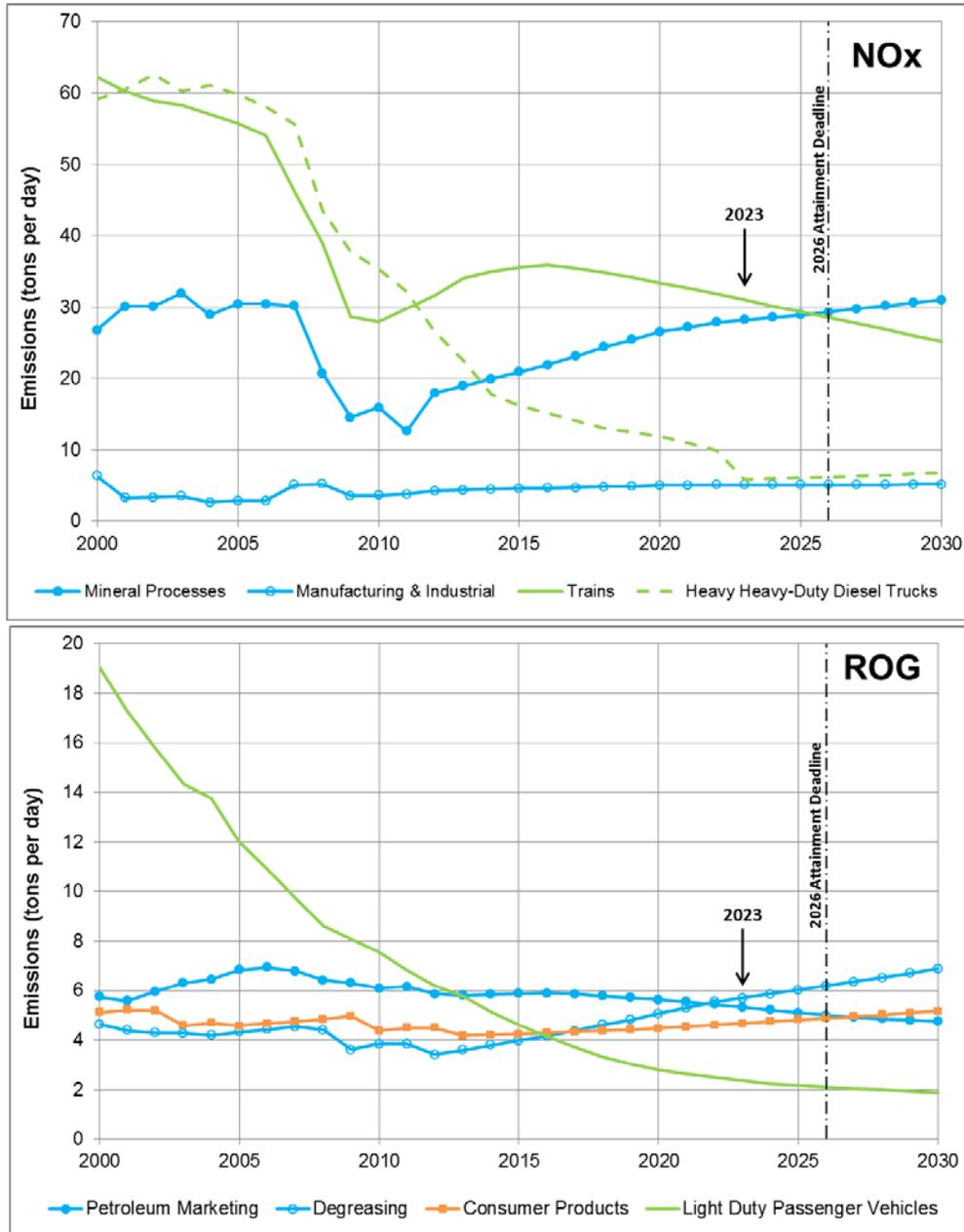
In comparison to 2015, mobile sources are expected to account for 52 percent of NO_x emissions and 31 percent of ROG emissions in 2026, which are both a lower percentage of the total emissions. Within the South Coast, future reductions of approximately 42 percent for NO_x and 16 percent for ROG through 2026, based on currently adopted control measures, will also lead to reductions in the emissions transported into Western Mojave. Similarly, emissions in the San Joaquin Valley are expected to decrease by approximately 44 percent for NO_x and 6 percent for ROG. Additional control measures that will be implemented in the future in Western Mojave, South Coast, and the San Joaquin Valley will further reduce emissions from the current modeled estimates.

As state mobile source controls continue to be implemented, the overall magnitude of precursor emissions are projected to decline modestly, as noted above, while the categorical distribution of emissions is projected to shift considerably. When the NO_x emissions inventory is considered in whole, the top four individual source subcategories are trains, heavy heavy-duty diesel trucks, mineral processes, and manufacturing & industrial processes. As shown in Figure 12, between 2000 and 2015, emissions from these top four source categories followed a generally decreasing trend. Emissions in 2015 from trains were 43 percent lower than in 2000, while emissions from heavy heavy-duty diesel trucks, mineral processes, and manufacturing & industrial processes were 73 percent, 22 percent, and 28 percent lower in 2015 than in 2000, respectively.

Beyond 2015, emissions from trains are expected to continue to gradually decrease. Additionally, emissions from heavy-heavy duty diesel trucks are expected to continue to decrease through 2023, when the ARB truck and bus rule will be fully implemented. However, following 2023, heavy heavy-duty diesel truck emissions will remain relatively stable, assuming no new emission controls are implemented by that time. Emissions from mineral processes are projected to increase and by 2021 will be greater than emissions in 2000. Manufacturing and industrial processes are also projected to increase at a modest rate.

The top four ROG source categories are petroleum marketing, light duty passenger vehicles, consumer products, and degreasing. Between 2000 and 2015, ROG

Figure 12: Emissions from Top 4 NOx and ROG Source Categories in Western Mojave



Consistent with Figure 11: Mobile sources are in green; stationary sources are in blue; and areawide sources are in orange.

emissions from light duty passenger vehicles decreased significantly. Similar to heavy heavy-duty diesel truck emissions, light duty passenger vehicle emissions are expected to continue to decrease steadily through 2026, when the ARB Advanced Clean Car program is fully implemented. Emissions from petroleum marketing increased between 2000 and 2006 then decreased through 2015. Modest reductions in petroleum marketing emissions are projected to continue in the years ahead. Emissions from

consumer products, which include hair spray, rubbing alcohol, and personal care products, among the top sub-categories, remained relatively stable between 2000 and 2015. Modest annual increases amounting to less than 0.1 tons per day (tpd) are projected between 2015 and 2030.

One effort that is expected to offset some of the projected emissions increases in the coming years is the MDAQMD continuing to adopt new rules that will reduce emissions from several source categories, including: electric utility operations, organic liquid handling and storage, boilers and process heaters, internal combustion engines, and portable cement kilns. The additional rules are expected to reduce ozone precursor emissions, namely NOx and ROG.

Ozone Air Quality Trends

Prior to 2000, only four of the six current regulatory monitoring sites in Western Mojave were in operation. The monitoring sites at Victorville and Lancaster were established in 2000 and 2001, respectively. The time scale considered in the analyses of ambient measurements, 2000 to 2015, was therefore selected to provide the most complete and representative sample of current air quality and progress toward air quality goals throughout Western Mojave.

Air quality in Western Mojave has improved in recent decades. Between 2000 and 2015, Western Mojave’s design value decreased by 18 percent, from 0.110 ppm to 0.090 ppm (Figure 13). The annual fourth highest daily maximum 8-hour ozone

Figure 13: 2000 – 2015 Western Mojave Ozone Summary Statistics

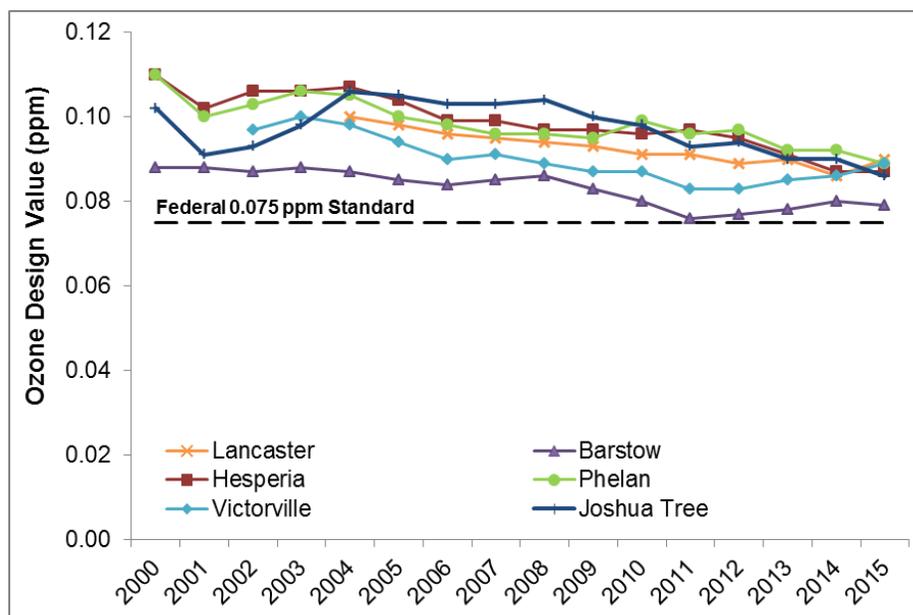


concentration decreased from a high of 0.119 ppm in 2003 to 0.102 ppm in 2015, a decrease of nearly 20 percent. Further, Western Mojave experienced 69 exceedance days in 2015, which is down 34 percent from a high of 105 days in 2003.

Ozone Design Values

In 2015, all regulatory sites in Western Mojave exceeded the 0.075 ppm standard (Figure 14). The design value, Barstow, was within five percent of the 0.075 ppm standard, while the other five regulatory sites exceeded the 0.075 ppm standard by more than ten percent.

Figure 14: Ozone Design Values at Western Mojave Monitoring Sites



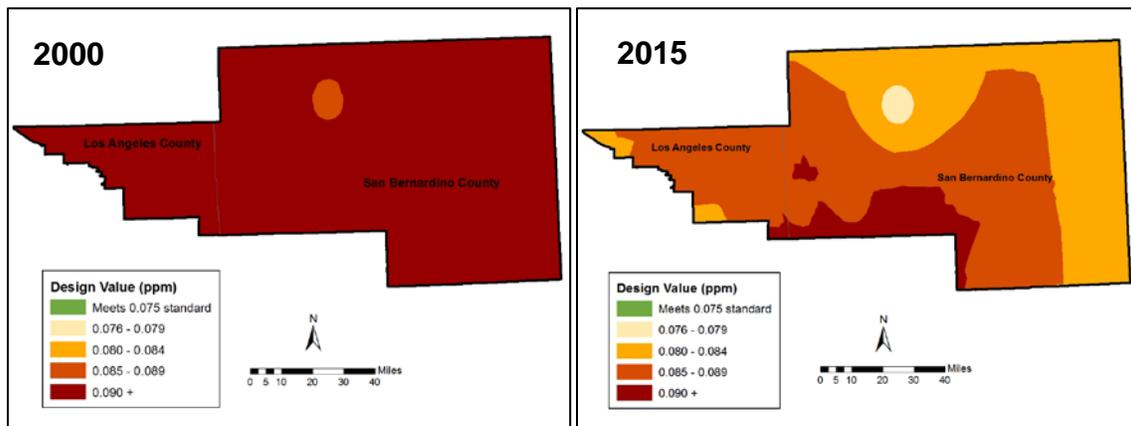
Between 2000 and 2015, design values decreased by an average of 0.001 ppm per year at all six of the regulatory monitoring sites. While an overall decreasing trend for this period was noticeable at each site, progress in the last five years was most pronounced at the high ozone sites, Hesperia and Joshua Tree; whereas, progress slowed at Victorville and Barstow, which have typically been the two sites with the lowest design values, as shown in Figure 14.

Population Exposure

Inverse distance weighting (IDW) was applied to spatially interpolate design values from monitoring sites throughout California and provide a visual representation of ozone air quality in Western Mojave. In 2000, all of Western Mojave exceeded the 0.075 ppm threshold by more than 0.010 ppm. Areas below 0.090 ppm were limited to the greater Barstow area.

As indicated by the map for 2015, which is shown in Figure 15, air quality has improved throughout the majority of Western Mojave. The northernmost and easternmost areas of Western Mojave had the largest improvements while areas in the southwest, adjacent to the San Gabriel and San Bernardino Mountains, remain above 0.090 ppm.

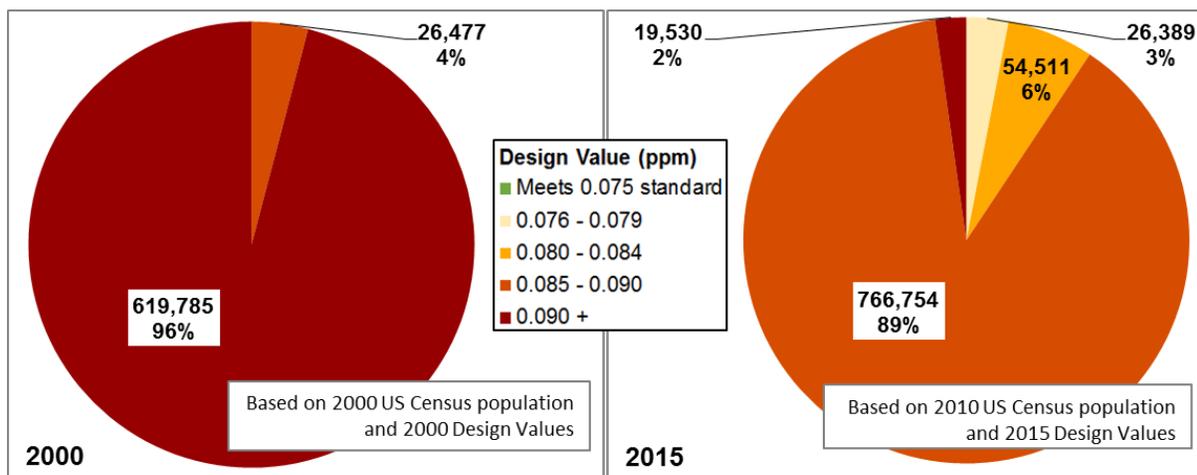
Figure 15: Contour Maps Representing the Spatial Distribution of Ozone Design Values in the Western Mojave Nonattainment Area in 2000 and 2015



Contour maps were developed using used inverse distance weighting (IDW) to spatially interpolate design values

To evaluate changes in population exposure, spatial analysis tools were used to overlay county level census data with the design value contour maps. As shown in Figure 16, between 2000 and 2015, the number of people residing in areas of Western Mojave that substantially exceeded the federal standard declined. In 2000, 96 percent of the population resided in areas with ozone air quality that was more than 20 percent above the 0.075 ppm standard.

Figure 16: Population Distribution by Ozone Design Value in 2000 and 2015



In 2015, the number of people residing in areas where ozone air quality was more than 20 percent above the 0.075 ppm standard was down to two percent of the population.

Further, in 2015, nine percent of the population, more than 80,000 people, lived in areas less than 0.010 ppm above the standard, which is a notable improvement from 2000 when zero percent of the population lived in areas at this threshold. While substantial progress is evident, all areas of Western Mojave remain above the 0.075 ppm standard and a continued, coordinated effort will be necessary meet ozone air quality goals.

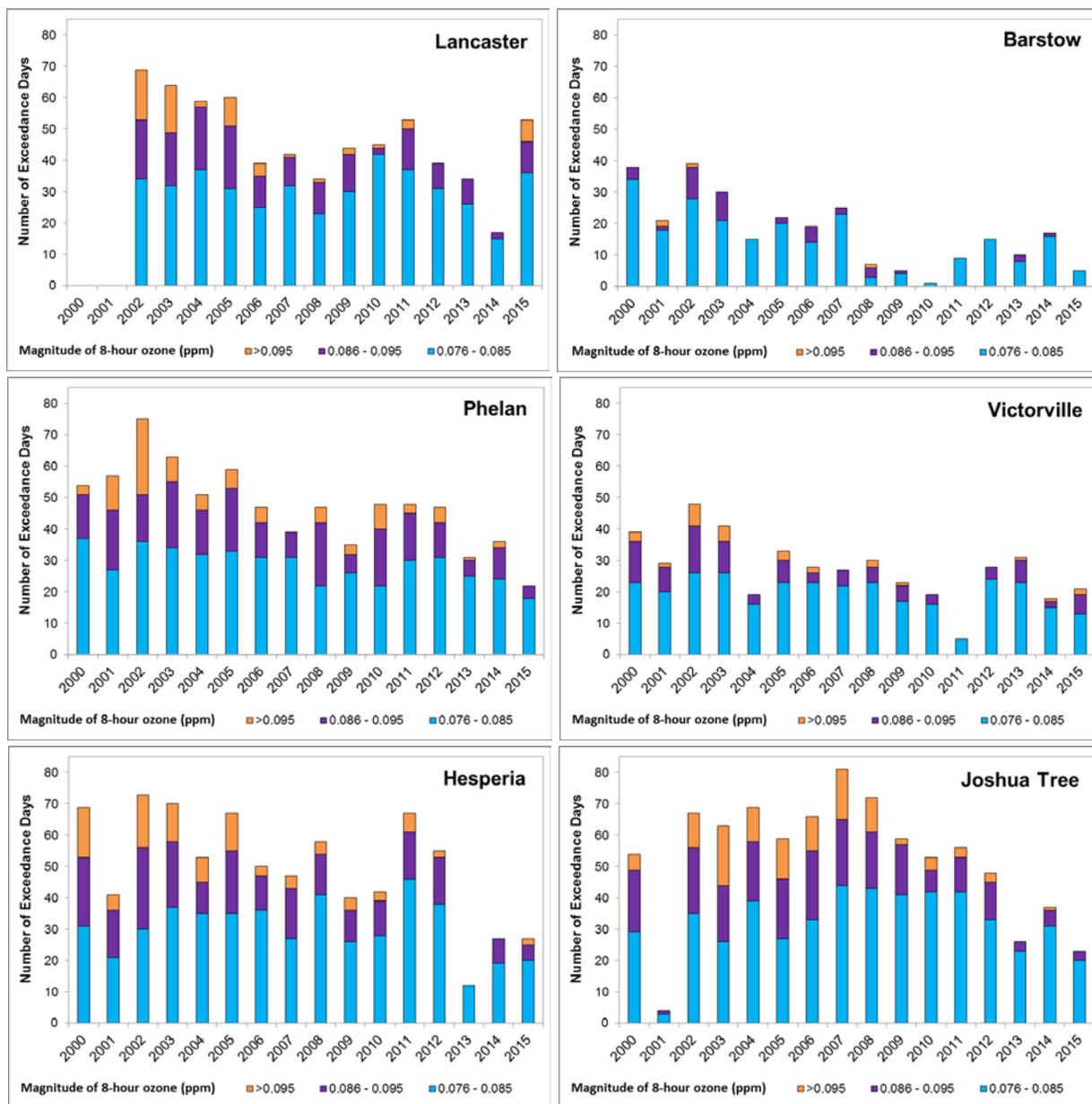
Exceedance Days

Since 2000, progress has been made in reducing both the frequency of and magnitude of ozone concentrations on exceedance days in Western Mojave (Figure 17). At Lancaster, the 2015 design value site for Western Mojave, the number of exceedance days declined by nearly 25 percent, from a high of 69 days in 2002 to 53 days in 2015. However, the number of exceedance days at Lancaster in 2015 was more than double the number of days in 2014. The increase at Lancaster was isolated to 2015 and preliminary data indicate that the increase at Lancaster did not persist in 2016. The decrease in the frequency of exceedance days at Phelan, which was the design value site for several years prior to 2016 and is the expected future design value site based on photochemical model analyses, has been persistent and fairly dramatic. The number of exceedance days at Phelan decreased from 75 days in 2002 to 22 days in 2015, a decrease of more than 71 percent.

The frequency of exceedance days varies considerably on an interannual and site-to-site basis. Despite this inherent variability, between 2000 and 2015, the frequency of exceedance days decreased by an average of two days per year at Lancaster, Barstow, Phelan, Hesperia, and Joshua Tree, while the frequency of exceedance days at Victorville decreased by an average of one day per year.

The magnitude of ozone concentrations on exceedance days also declined between 2000 and 2015. On exceedance days prior to 2004, the maximum 8-hour ozone concentrations ranged from 0.076 to 0.132 ppm, up to 76 percent above the 0.075 ppm standard. In contrast, maximum 8-hour ozone concentrations on exceedance days in 2015 ranged from 0.076 to 0.105 ppm. The decrease in the frequency and magnitude of ozone concentrations on exceedance days in Western Mojave is consistent with the progress reported for the South Coast and San Joaquin Valley, nonattainment areas that are the primary source areas for ozone measured at Western Mojave regulatory sites.

Figure 17: Frequency of and Maximum Concentrations on Ozone Exceedance Days in Western Mojave



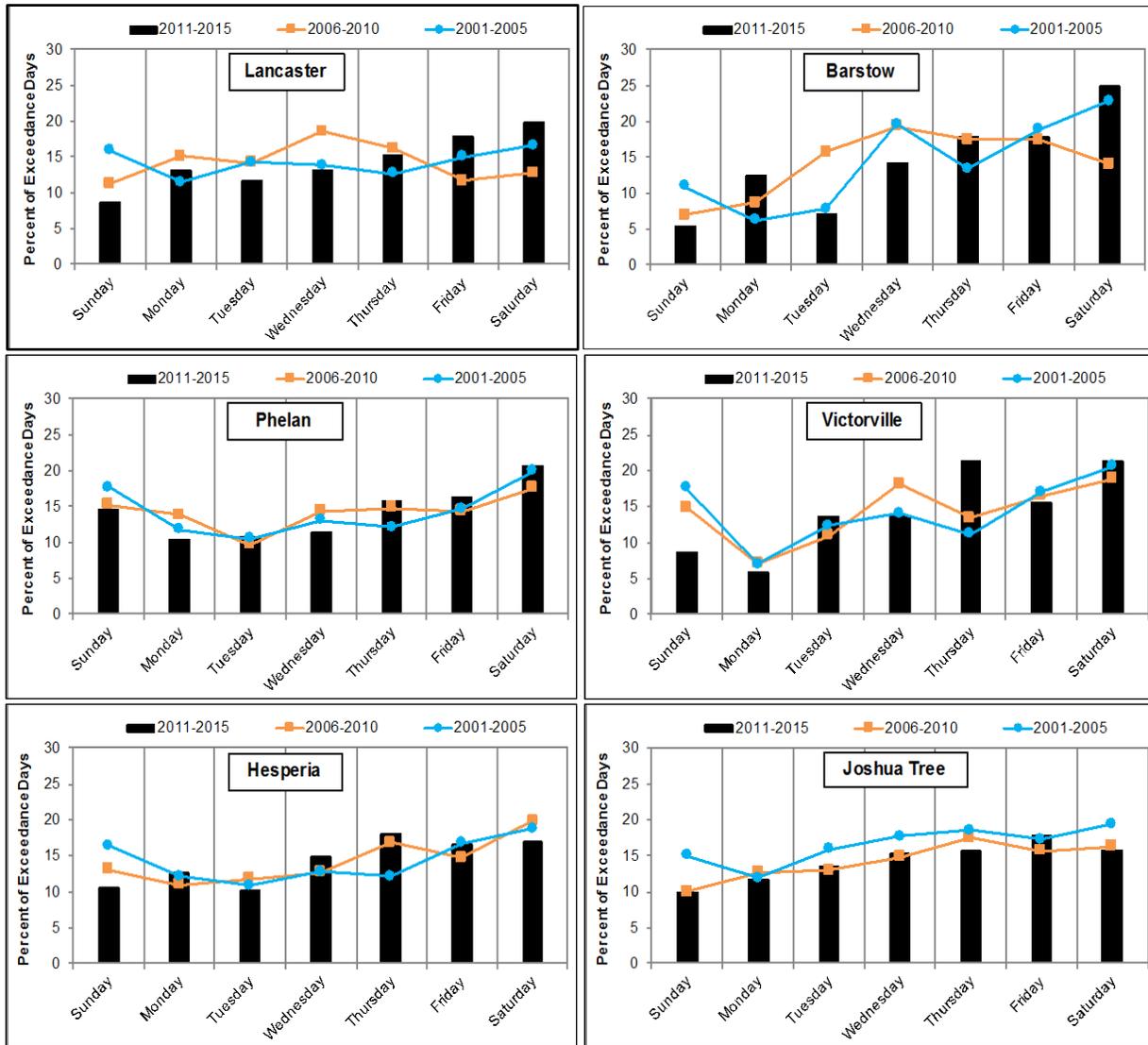
Weekday/Weekend Differences

The occurrence of higher ozone concentrations on weekends compared to weekdays has been widely acknowledged and the focus of many studies in the South Coast (cf. Baidar et al., 2015). Given the proximity of the South Coast and the established transport corridors between the South Coast and Western Mojave, analysis of potential weekday/weekend differences in Western Mojave was also conducted. To focus on

those periods of regulatory significance, the distribution of exceedance days by day of the week for 2011 to 2015 was considered in this analysis.

As shown in Figure 18, these analyses indicate that, while subtle weekday/weekend differences were evident at Phelan, Victorville, and Hesperia in the early 2000s, the differences are even less in Western Mojave in recent years. This shift is likely the

Figure 18: Distribution of Exceedance Days by Day of the Week



result of a diminished weekday/weekend differences in the South Coast (cf. Baidar et al., 2015), which have led to lower levels of ozone transported from upwind areas on weekend days. In addition, ozone formation in downwind of large urban areas is generally regarded as NO_x-limited (as discussed earlier in the Conceptual Model

section); therefore, weekday/weekend differences should not be expected in Western Mojave due to its downwind location and transport dominated nature.

Attainment Projections

Photochemical Modeling Results

Photochemical modeling reflecting the current emission control programs was completed by the South Coast AQMD in October 2016. The modeled design value was 0.083 ppm at Phelan for the year 2026. In addition, Joshua Tree, Hesperia and Victorville had design values above the level of the standard, with only Lancaster and Barstow meeting the standard. Thus, this modeling did not project attainment for the Western Mojave by 2026 when relying solely on currently adopted control measures. However, with the inclusion of future additional control measures targeting attainment needs of the upwind South Coast, the South Coast AQMD modeling projects that ozone design values at all sites in Western Mojave will meet the 0.075 ppm standard by the 2026 attainment date.

Upwind and Downwind Trends

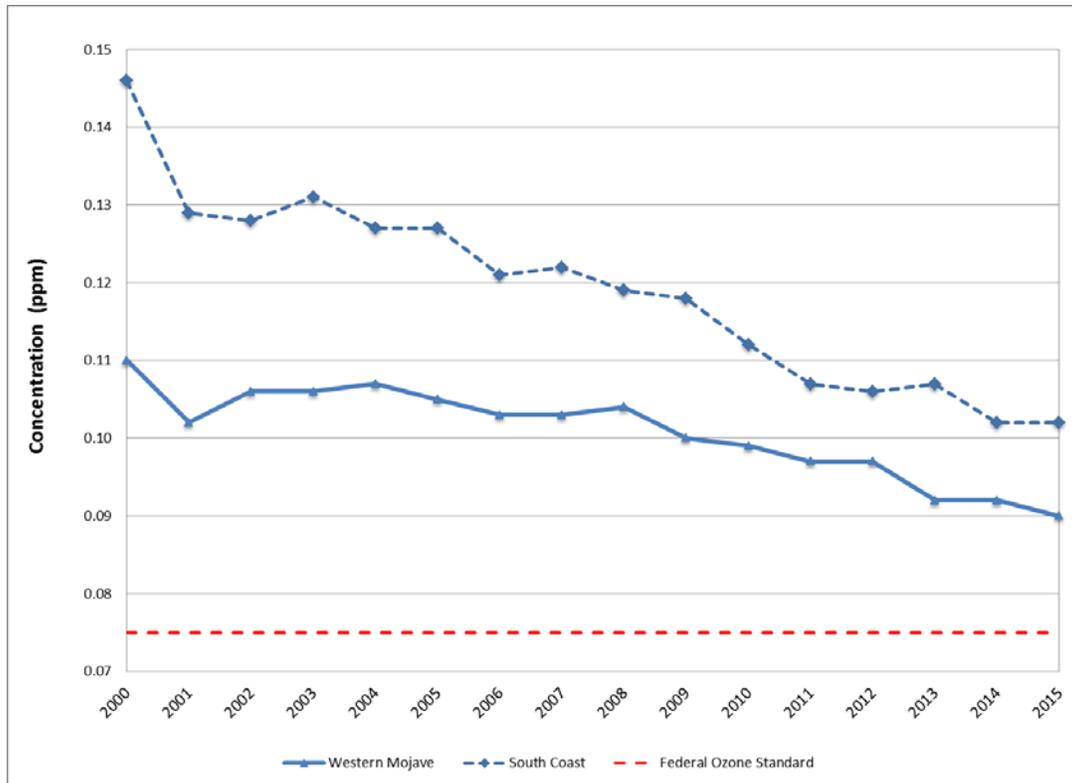
Maximum design values within each of the Western Mojave (downwind) and South Coast (upwind) nonattainment areas were compared to confirm that progress in the South Coast was translating to similar progress in Western Mojave. In Figure 19, the design value trends for the two regions, from 2000 through 2015, track very well with each other, especially considering the complex nature of the ozone challenges in both areas. The difference in the maximum design values between the South Coast and Western Mojave have been fairly consistent over the years, generally ranging from 0.02 ppm in the earlier years to 0.01 ppm in more recent years.

Between 2000 and 2015, the South Coast design value decreased by 30 percent while in Western Mojave, the design value decreased by 18 percent. During the most recent period of 2010-2015, both the South Coast and Western Mojave have continued to make steady progress, with design values decreasing by 9 percent in both areas.

The design values declines illustrate the significant progress made between 2000 and 2015 and the linkage between the upwind South Coast extreme nonattainment area and Western Mojave. Despite design values that are still above the 0.075 ppm federal standard at each of the monitoring sites in Western Mojave, ozone air quality has improved throughout the region in response to reductions in upwind ozone precursor emissions. Air quality data analyses presented in this WOE indicate that the monitoring sites are continuing to make progress toward attainment. Additionally, as ozone design

values continue to improve in South Coast, the magnitude of ozone transport and the impact on ozone concentrations in Western Mojave will be reduced.

Figure 19: Ozone Design Value Trends in Western Mojave and South Coast



Preliminary 2016 Ozone Data

With extended periods of high temperatures and minimal precipitation, conditions in 2016 were particularly favorable for ozone production throughout California. Preliminary data indicate that the 2016 design value site for Western Mojave will shift to Phelan and the design value will be 0.092 ppm, a two percent increase from the 0.090 ppm design value at Lancaster in 2015.

As shown in Table 4, the increase in design values was not isolated to Phelan. Rather, preliminary 2016 design values are higher than 2015 design values at three of the six regulatory monitoring sites in Western Mojave. Design values at Hesperia and Phelan increased by 0.003 ppm, whereas the design value at Barstow increased by 0.001 ppm. The preliminary 2016 design values at Lancaster and Joshua Tree were equal to the 2015 design values. The sole decrease between 2015 and the preliminary 2016 design value was at Victorville. The increase in 2016 design values highlights the role of interannual variability as well as the need for routine assessment of control strategies.

Table 4: Comparison of 2015 and Preliminary 2016 Design Values

Site Name	Design Value (ppb)			Exceedance Days		
	2015	2016*	2015 to 2016 Change	2015	2016*	2015 to 2016 Change
Lancaster	0.090	0.090	0.000	53	36	-17
Barstow	0.079	0.080	0.001	5	9	4
Hesperia	0.087	0.090	0.003	27	47	20
Phelan	0.089	0.092	0.003	22	27	5
Victorville	0.089	0.086	-0.003	21	18	-3
Joshua Tree	0.086	0.086	0.000	23	22	-1

*Preliminary: Based on 2016 Data Retrieved from AQMIS

Conclusions

Western Mojave is currently classified as a severe nonattainment area with a 2026 attainment date. This WOE evaluated ambient ozone data, precursor emission data, meteorology, and population exposure trends to complement the regional photochemical modeling analysis conducted to evaluate Western Mojave's progress towards attainment.

- The transport of emissions from the South Coast, and to a lesser extent the San Joaquin Valley, is the predominant cause of high ozone concentrations and exceedances in Western Mojave. The meteorology, terrain, distribution of emissions, and transport mechanisms are the key factors driving the ozone nonattainment challenge.
- Western Mojave emissions are a fraction of the emissions in the South Coast and San Joaquin Valley. Analyses indicate that transport from these areas routinely contributes to ozone air quality in Western Mojave and progress towards attainment in Western Mojave will depend on continued progress in upwind areas.
- Evaluation of wind trajectories and peer reviewed literature confirms that the high desert terrain and transport mechanisms are very complex and that transport can occur at both the surface and from top-down entrainment. Transport from South Coast to the Antelope Valley portion of the nonattainment area occurs through the Soledad pass; transport to the central portion of the Western Mojave occurs through the Cajon Pass; and transport to the far eastern portion of Western Mojave occurs through the Banning Pass. Transport impacts from the San Joaquin Valley occur via the Tehachapi Mountains to the northern portion of Western Mojave.

- Analysis of diurnal patterns of hourly ozone concentrations shows that Western Mojave monitoring sites have late afternoon peaks, indicative of downwind transport impacted sites. Wind roses show that prevailing winds originate in the South Coast, further strengthening the understanding of transport mechanisms.
- Although transport is the dominant cause of the air quality problem, the Western Mojave continues to make progress in reducing ozone precursor emissions. Between 2000 and 2010, total NO_x emissions in Western Mojave declined by 45 percent and total ROG emissions declined by 29 percent. Between 2010 and 2015, NO_x and ROG emissions decreased by 16 percent and 11 percent, respectively. Large emission reductions also occurred during the same 2000-2015 timeframe in the South Coast with decreases of 60 percent for NO_x and 56 percent for ROG.
- Ozone precursor emissions in Western Mojave are expected to continue to decline between 2015 and the 2026 attainment year, with NO_x decreasing by an additional 17 percent and ROG decreasing by an additional 7 percent. Similar reductions are also expected in the major upwind emission sources areas, based on currently adopted control measures, with NO_x and ROG decreasing by 44 percent and 16 percent, respectively, in the South Coast, and 42 percent and 6 percent, respectively, in the San Joaquin Valley. Further reductions in emissions from the current modeled estimates are expected in the future with the implementation of additional control measures in Western Mojave, South Coast, and the San Joaquin Valley.
- Considerable progress was achieved in reducing ozone. Since 2000, the design value decreased by 18 percent, which represents an average 0.001 ppm (1 ppb) decrease per year. The decrease in design values can be attributed to implementation of federal, state, and regional emission control programs, which have led to substantial declines in emissions of ozone precursors.
- Both the frequency of exceedance days and the magnitude of concentrations on exceedance days have improved. Since 2000, the number of exceedance days in the Western Mojave decreased by 33 percent (from 102 days to 69 days). The concentrations on exceedance days decreased from a high of 0.132 ppm to a high of 0.105 ppm, a decrease in peak concentrations of 20 percent.
- Exceedance days were examined to determine if there were currently any weekday/weekend differences. These analyses indicate that while there were subtle differences at several sites in the early 2000s, there is little evidence of such differences in recent years. This shift is likely a result of the diminished

weekday/weekend difference in the South Coast, which led to lower levels of ozone transported on weekend days.

- The regional modeling analyses conducted by the South Coast AQMD continue to demonstrate that Western Mojave cannot meet the standard without additional emission reductions from upwind neighbors, primarily the South Coast and, to a lesser extent, the San Joaquin Valley. However, with the inclusion of future additional control programs in all three regions, especially the South Coast, modeling analyses indicate that Western Mojave will meet the standard by 2026.

In summary, all of the meteorological, emissions, and ozone air quality analyses presented in this WOE, are in agreement with model projections and indicate that Western Mojave will be able to meet the federal standard of 0.075 ppm by the 2026 attainment date.

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APPENDIX C

MOBILE SOURCE REGULATIONS FOR VMT OFFSET DEMONSTRATION

**State of California Motor Vehicle Control Program (1990 - Present) Transportation Control Strategies
Adopted by the California Air Resources Board since 1990**

Measure	Hearing Date	Category
California Reformulated Gasoline (CaRFG), Phase I. T 13, CCR, 2251.5	9/27/1990	Fuels
California Reformulated Gasoline, Phase II. T 13, CCR, 2250, 2255.1, 2252, 2260 - 2272, 2295	11/21/1991	Fuels
Wintertime Gasoline Program. T 13, CCR, 2258, 2298, 2251.5, 2296	11/21/1991	Fuels
Wintertime Oxygenate Program. T 13, CCR, 2258, 2251.5, 2263(b), 2267, 2298, 2259, 2283, 2293.5	9/9/1993	Fuels
Diesel Fuel Certification Test Methods . T 13, CCR, 1956.8(b), 1960.1(k), 2281(c), 2282(b), (c) and (g)	10/24/1996	Fuels
Diesel Fuel Test Methods. T 13, CCR, 1956.8(b), 1960.1(k), 2281(c), 2282(b), (c) and (g)	10/24/1996	Fuels
Low Emission Vehicles Standards (LEV 2) and Compliance Assurance Program (CAP 2000). T 13, CCR,1961 & 1962 (both new); 1900, 1960.1, 1965, 1968.1, 1976, 1978, 2037, 2038, 2062, 2101, 2106, 2107, 2110, 2112, 2114, 2119, 2130, 2137-2140, 2143-2148	11/5/1998	On-road
Exhaust Standards for (On-Road) Motorcycles. T 13, CCR, 1900, 1958, 1965	12/10/1998	On-road
Light-and Medium Duty Low Emission Vehicle Alignment with Federal Standards. Exhaust Emission Standards for Heavy Duty Gas Engines. T 13, CCR, 1956.8 &1961	12/7/2000	On-road
Heavy Duty Diesel Engine Standards for 2007 and Later. T 13, CCR, 1956.8 and incorporated test procedures	10/25/2001	On-road
Low Emission Vehicle Regulations. T 13, CCR, 1960.1,1960.5, 1961, 1962 and incorporate test procedures and guidelines	11/15/2001	On-road
CaRFG Phase 3 Amendments. T 13, CCR, 2261, 2262, 2262.4, 2262.5, 2262.6, 2262.9, 2266.5, 2269, 2271, 2272, 2265, and 2296	7/25/2002	Fuels
Adoption of Minor Amendments to the Low-Emission Vehicle Regulations. T 13, CCR, 1961, 1965, 1978, and the incorporate test procedures	12/12/2002	On-road
Incorporation of Federal Exhaust Emission Standards for 2008 and Later Model-Year Heavy Duty Gasoline Engines and the Adoption of Minor Amendments to the Low-Emission Vehicle Regulations. T 13, CCR, 1956.8 and documents incorporated by reference	12/12/2002	On-road
CaRFG Phase 3 Amendments (specifications for De Minimis Levels of Oxygenates and MTBE Phase Out Issues). T 13, CCR, 2261, 2262.6, 2263, 2266.5, 2272, 2273, 2260, 2273.5	12/12/2002	Fuels
Specifications for Motor Vehicle Diesel Fuel. T 13 & T17, CCR, 1961, 2281, 2282, 2701, 2284, 2285, 93114, and incorporated test procedures	7/24/2003	Fuel
California Reformulated Gasoline, Phase 3. T 13, CCR, 2260, 2262, 2262.4, 2262.5, 2262.6, 2262.9, 2263, 2265 (and the incorporated "California Procedures"), and 2266.5	11/18/2004	Fuels
On-Board Diagnostic System Requirements for 2010 and Subsequent Model-Year Heavy-Duty Engines (HD OBD). T 13, CCR, 1971.1	7/21/2005	On-road
Requirements to Reduce Idling Emissions from New and In-Use Trucks, Beginning in 2008. T 13, CCR, 1956.8, 2404, 2424, 2425, and 2485 and the incorporated document	10/20/2005	On-road
Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yard. T 13, CCR, 2479	12/8/2005	On-road and Off-road
Evaporative and Exhaust Emission Test Procedures. T 13, CCR, 1961, 1976, 1978	6/22/2006	On-road

Measure	Hearing Date	Category
Phase 3 Reformulated Gasoline (Ethanol Permeation) T 13, CCR, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2270, 2271, and 2273	6/14/2007	Fuel
Port Truck Modernization T 13, CCR, 2027	12/6/2007	On-road
Cleaner In-Use Heavy-Duty Trucks (Truck and Bus Reg) T 13, CCR, 2025	12/11/2008	On-road
2010 Amendments to On-Board Diagnostic System Requirements for Heavy-Duty Engines (HD OBD). T 13, CCR, 1971.1 and 1971.5	5/28/2009	On-road
Truck and Bus Regulation 2010. T13, CCR, 2025	12/16/2010	On-road
Amendments to Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yard. T 13, CCR, 2479	9/22/2011	On-road
Advanced Clean Cars T 13, CCR, 1900, 1956, 1960, 1961, 1962, 1965, 1968, 1976, 1978, 2037, 2038, 2062, 2112, 2139, 2140, 2145, 2147, 2235, 2300, 2302, 2303, 2304, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, and 2318	1/26/2012	On-road
Zero Emission Vehicle Standards for 2009 through 2017 models. T 13, CCR, 1962.1, 1962.3	1/26/2012	On-road
Low Emission Vehicle III Greenhouse Gas and Zero Emission Vehicle Regulation Amendments for Federal Compliance Option T 13, CCR, 1900, 1956.8, 1960.1, 1961, 1961.2, 1961.3, 1962.1, 1962.2, 1976	11/15/2012	On-road
1997 Amendments to Onboard Diagnostics, Phase II, Technical Status. T 13, CCR, 1968.1, 2030, 2031	12/12/1996	On-road
2003 Amendments to On-Board Diagnostic II Review Amendments. T 13, CCR, 1968.1, 1968.2, 1968.5	4/25/2002	On-road
Heavy-Duty In-Use Compliance Regulation. T 13, CCR, 1956.1, 1956.8, and documents incorporated by reference	9/28/2006	On-road
2007 Amendments to On-Board Diagnostic II. T 13, CCR, 1968.2, 1968.5, 2035, 2037 and 2038	9/28/2006	On-road
2007 Amendments to Heavy-Duty In-Use Compliance Regulation. T 13, CCR, 1956.1, 1956.8, and documents incorporated by reference	12/6/2007	On-road
2010 Amendments to On-Board Diagnostic II. T 13, CCR, 1968.2, 1968.5, 2035, 2037 and 2038	5/28/2009	On-road
Plug-In Hybrid Electric Vehicle Test Procedure Amendments. T 13, CCR, 2032, 1900, 1962, 1962.1	5/28/2009	On-road
2011 Amendments to Heavy-Duty In-Use Compliance Regulation. T 13, CCR, 1956.1, 1956.8, and documents incorporated by reference	6/23/2011	On-road
2012 Amendments to On-Board Diagnostic II. T 13, CCR, 1968.2, 1968.5, 2035, 2037 and 2038	1/26/2012	On-road
Emergency Regulatory Amendments to the Tractor-Trailer Greenhouse Gas Regulation T 17, CCR, 95307	2/29/2012	On-Road
2013 Amendments to On-Board Diagnostics (OBD I and II) Regulations T 13, CCR, 1968.2, 1971.1	8/23/2012	On-road
2013 Amendments to Heavy Duty On Board Diagnostic Requirements	8/23/2013	On-road
Heavy-Duty Greenhouse Gas Phase 1: On-Road Heavy Duty Greenhouse Gas Emissions Rule, Tractor-Trailer Rule, Commercial Motor Vehicle Idling Rule, Optional Emission Standards, Heavy-Duty Hybrid-Electric Vehicle Certification Procedure T 13, CCR, 1900, 1956.	12/12/2013	On-road
Heavy-Duty Hybrid-Electric Vehicle Certification Procedure T 13, CCR, 1900, 1956.8, 2036, 2037, 2112, 2139, 2140, 2147, 2485, T 17, CCR, 95300, 95301, 95302, 95303, 95305, 95660, 95661, 95662, 95663, 95664	12/12/2013	On-road
2014 Amendments to Zero Emission Vehicle Regulation T 13, CCR, 1962.1, 1962.2	10/23/2014	On-road
	5/21/2015	

Measure	Hearing Date	Category
Amendments to Low Emission Vehicle III Criteria Pollutant Requirements for Light-and Medium-Duty Vehicles the Hybrid Electric Vehicle Test Procedures, and the Heavy-Duty Otto-Cycle and Heavy-Duty Diesel Test Procedures T 13, CCR, 1900, 1956.8, 1961.2, 1962.2, 1965, 1976, 1978	10/23/2014	On-road

Key Mobile Source Regulations and Programs Providing Emission Reductions

Given the severity of California's air quality challenges and the need for ongoing emission reductions, the Air Resources Board (ARB) has implemented the most stringent mobile source emissions control program in the nation. ARB's comprehensive program relies on four fundamental approaches:

- stringent emissions standards that minimize emissions from new vehicles and equipment;
- in-use programs that target the existing fleet and require the use of the cleanest vehicles and emissions control technologies;
- cleaner fuels that minimize emissions during combustion; and,
- incentive programs that remove older, dirtier vehicles and equipment and pay for early adoption of the cleanest available technologies.

This multi-faceted approach has spurred the development of increasingly cleaner technologies and fuels and achieved significant emission reductions across all mobile source sectors that go far beyond national programs or programs in other states. These efforts extend back to the first mobile source regulations adopted in the 1960s, and pre-date the federal Clean Air Act Amendments (Act) of 1970, which established the basic national framework for controlling air pollution. In recognition of the pioneering nature of ARB's efforts, the Act provides California unique authority to regulate mobile sources more stringently than the federal government by providing a waiver of preemption for its new vehicle emission standards under Section 209(b). This waiver provision preserves a pivotal role for California in the control of emissions from new motor vehicles, recognizing that California serves as a laboratory for setting motor vehicle emission standards. Since then, the ARB has consistently sought and obtained waivers and authorizations for its new motor vehicle regulations. ARB's history of progressively strengthening standards as technology advances, coupled with the waiver process requirements, ensures that California's regulations remain the most stringent in the nation. A list of regulatory actions ARB has taken since 1985 is provided at the end of this analysis to highlight the scope of ARB's actions to reduce mobile source emissions.

Recently, ARB adopted numerous regulations aimed at reducing exposure to diesel particulate matter and oxides of nitrogen, from freight transport sources like heavy duty diesel trucks, transportation sources like passenger cars and buses, and off-road sources like large construction equipment. Phased implementation of these regulations will produce increasing emission reduction benefits from now until 2020 and beyond, as the regulated fleets are retrofitted, and as older and dirtier portions of the fleets are replaced with newer and cleaner models at an accelerated pace.

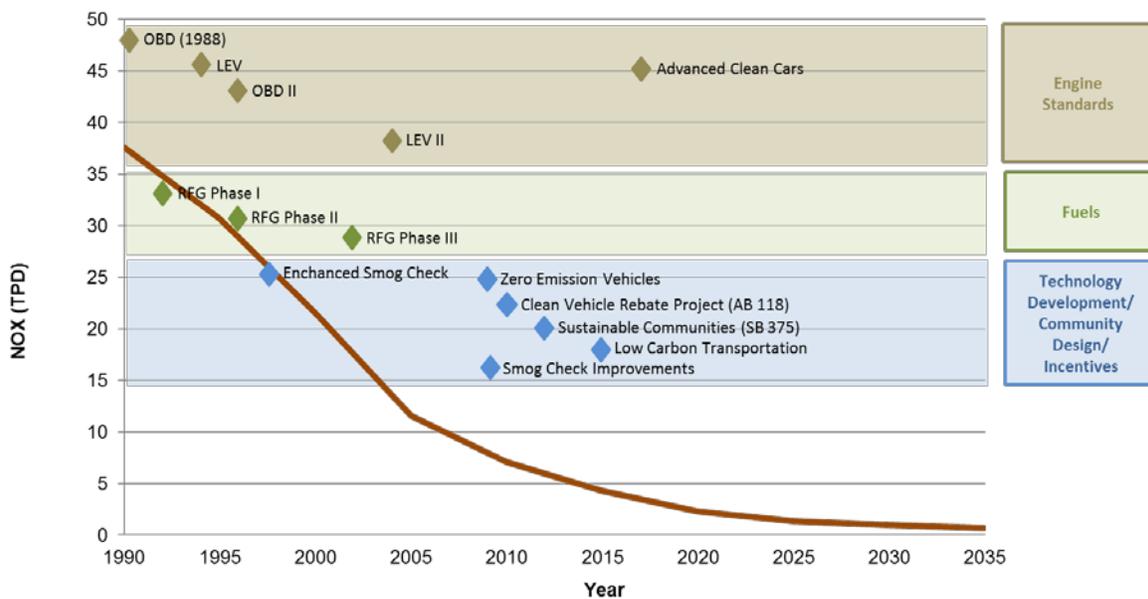
Further, ARB, Mojave Desert AQMD, and Antelope Valley AQMD staffs work closely on identifying and distributing incentive funds to accelerate cleanup of engines. Key

incentive programs include: the Carl Moyer Program; the Goods Movement Program; the Lower-Emission School Bus Program; and the Air Quality Improvement Program (AQIP). These incentive-based programs work in tandem with regulations to accelerate deployment of cleaner technology.

Light-Duty Vehicles

Figure 1 illustrates the trend in NOx emissions from light-duty vehicles and key programs contributing to those reductions. As a result of these efforts, light-duty vehicle emissions in the Western Mojave Desert have been reduced significantly since 1990 and will continue to go down through 2020 due to the benefits of ARB’s longstanding light-duty mobile source program. Key light-duty programs include Advanced Clean Cars, On-Board Diagnostics, Reformulated Gasoline, Incentive Programs, and the Enhanced Smog Check Program.

Figure 1: Key Programs to Reduce Light-Duty NOx Emissions



Since setting the nation’s first motor vehicle exhaust emission standards in 1966 that led to the first pollution controls, California has dramatically tightened emission standards for light-duty vehicles. Through ARB regulations, today’s new cars pollute 99 percent less than their predecessors did thirty years ago. In 1970, ARB required auto manufacturers to meet the first standards to control NOx emissions along with hydrocarbon emissions. The simultaneous control of emissions from motor vehicles and fuels led to the use of cleaner-burning reformulated gasoline (RFG) that has removed the emissions equivalent of 3.5 million vehicles from California’s roads. Since ARB first adopted it in 1990, the Low Emission Vehicle Program (LEV and LEV II) and

Zero-Emission Vehicle (ZEV) Program have resulted in the production and sales of hundreds of thousands of zero-emission vehicles (ZEVs) in California.

Advanced Clean Cars

ARB's groundbreaking Advanced Clean Cars (ACC) program is now providing the next generation of emission reductions in California, and ushering in a new zero emission passenger transportation system. The success of these programs is evident: California is the world's largest market for Zero Emission Vehicles (ZEVs), with over 21 models available today, and a wide variety are now available at lower price points, attracting new consumers. As of January 2015, Californians drive 40 percent of all ZEVs on the road in the United States, while the U.S. makes up about half of the world market. This movement towards commercialization of advanced clean cars has occurred due to ARB's ZEV regulation, part of ACC, which affects passenger cars and light-duty trucks.

ARB's ACC Program, approved in January 2012, is a pioneering approach of a 'package' of regulations that although separate in construction, are related in terms of the synergy developed to 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 package 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 approved by ARB in January 2012 also included amendments affecting the current ZEV regulation through the 2017 model year in order to enable manufacturers to successfully meet 2018 and subsequent model year requirements. These ZEV amendments are intended to achieve commercialization through simplifying the regulation and pushing technology to higher volume production in order to achieve cost reductions. The ACC Program benefits will increase over time as new cleaner cars enter the fleet displacing older and dirtier vehicles.

On Board Diagnostics

California's first OBD regulation required manufacturers to monitor some of the emission control components on vehicles starting with the 1988 model year. In 1989, ARB adopted OBD II, which required 1996 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles and engines to be equipped with second generation OBD systems. OBD systems are designed to identify when a vehicle's emission control systems or other emission-related computer-controlled components are malfunctioning, causing emissions to be elevated above the vehicle manufacturer's specifications. ARB subsequently strengthened OBD II requirements and added OBD II specific enforcement requirements for 2004 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles and engines.

Reformulated Gasoline

Since 1996, ARB has been regulating the formulation of gasoline resulting in California gasoline being the cleanest in the world. California's cleaner-burning gasoline regulation is one of the cornerstones of the State's efforts to reduce air pollution and cancer risk. Reformulated gasoline is fuel that meets specifications and requirements established by ARB. The specifications reduced motor vehicle toxics by about 40 percent and reactive organic gases by about 15 percent. The results from cleaning up fuel can have an immediate impact as soon as it is sold in the State. Vehicle manufacturers design low-emission emission vehicle to take full advantage of cleaner-burning gasoline properties.

Incentive Programs

There are a number of different incentive programs focusing on light-duty vehicles that produce extra emission reductions beyond traditional regulations. The incentive programs work in two ways, encouraging the retirement of dirty older cars and encouraging the purchase of a cleaner vehicle.

Voluntary accelerated vehicle retirement or "car scrap" programs provide monetary incentives to vehicle owners to retire older, more polluting vehicles. The purpose of these programs is to reduce fleet emissions by accelerating the turnover of the existing fleet and subsequent replacement with newer, cleaner vehicles. Both State and local vehicle retirement programs are available.

California's 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 either failed or passed their last Smog Check Test and that meet certain eligibility guidelines. This program is referred to as the Consumer Assistance Program.

The Enhanced Fleet Modernization Program (EFMP) was approved by the AB 118 legislation to augment the State's existing vehicle retirement program. Approximately \$30 million is available annually through 2015 to fund the EFMP via a \$1 increase in vehicle registration fees. ARB developed the program in consultation with BAR. The program is jointly administered by both BAR for vehicle retirement, and local air districts for vehicle replacement.

Other programs, in addition to vehicle retirement programs, help to clean up the light-duty fleet. The AQIP, established by AB 118, is an ARB voluntary incentive program to fund clean vehicle and equipment projects. The Clean Vehicle Rebate Project (CVRP) is one of the current projects under AQIP. CVRP, started in 2009, is designed to accelerate widespread commercialization of zero-emission vehicles and plug-in hybrid electric vehicles by providing consumer rebates up to \$2,500 to partially offset the higher cost of these advanced technologies. The CVRP is administered statewide by the California Center for Sustainable Energy. In Fiscal Years 2009-2012,

\$26.1 million, including \$2 million provided by the California Energy Commission, funded approximately 8,000 rebates. In June 2012, the ARB allocated up to \$15-21 million to the CVRP as outlined in the AQIP FY2012-2013 Funding Plan.

California Enhanced Smog Check Program

BAR is the state agency charged with administration and implementation of the Smog Check Program. The Smog Check Program is designed to reduce air pollution from California registered vehicles by requiring periodic inspections for emission-control system problems, and by requiring repairs for any problems found. In 1998, the Enhanced Smog Check program began in which Smog Check stations relied on the BAR-97 Emissions Inspection System (EIS) to test tailpipe emissions with either a Two-Speed Idle (TSI) or Acceleration Simulation Mode (ASM) test depending on where the vehicle was registered. For instance, vehicles registered in urbanized areas received an ASM test, while vehicles in rural areas or received a TSI test.

In 2009, the following requirements were added in to improve and enhance the Smog Check Program, making it more inclusive of motor vehicles and effective on smog reductions:

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

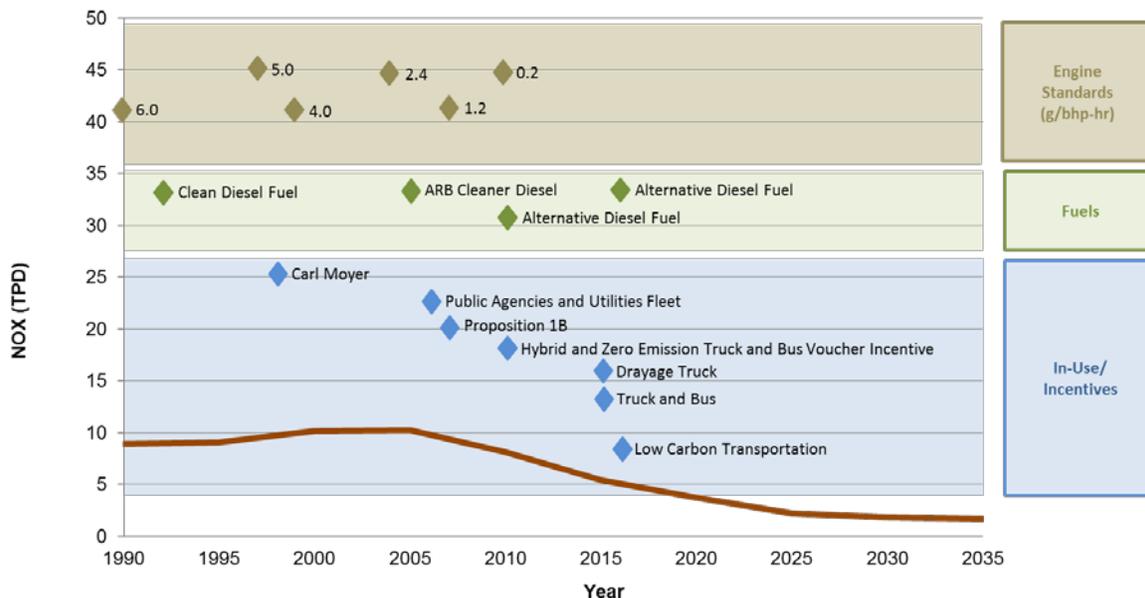
The next major change was due to AB 2289, adopted in October 2010, a new law restructuring California's Smog Check Program, streamlining and strengthening inspections, increasing penalties for misconduct, and reducing costs to motorists. This new law sponsored by ARB and BAR, promised faster and less expensive Smog Check inspections by taking advantage of OBD software installed on all vehicles since 2000. The new law also directs vehicles without this equipment to high-performing stations, helping to ensure that these cars comply with current emission standards. This program will reduce consumer costs by having stations take advantage of diagnostic software that monitors pollution-reduction components and tailpipe emissions. Beginning mid-2013, testing of passenger vehicles using OBD was required on all vehicles model years 2000 or newer.

Heavy-Duty Trucks

Figure 2 illustrates the trend in NO_x emissions from heavy-duty vehicles and key programs contributing to those reductions. As a result of these efforts, heavy-duty vehicle emissions in the Western Mojave Desert have also been reduced significantly since 1990 and will continue to go down through 2020 due to the benefits of ARB's longstanding heavy-duty mobile source program. Key programs include Heavy-Duty

Engine Standards, Clean Diesel Fuel, Truck and Bus Regulation and Incentive Programs.

Figure 2: Key Programs to Reduce Heavy-Duty Emissions



Heavy-Duty Engine Standards

Since 1990, heavy-duty engine NOx emission standards have become dramatically more stringent, dropping from 6 grams per brake horsepower-hour (g/bhp-hr) in 1990 down to the current 0.2 g/bhp-hr standard, which took effect in 2010. In addition to mandatory NOx standards, there have been several generations of optional lower NOx standards put in place over the past 15 years. Most recently in 2015, engine manufacturers can certify to three optional NOx emission standards of 0.1 g/bhp-hr, 0.05 g/bhp-hr, and 0.02 g/bhp-hr (i.e., 50 percent, 75 percent, and 90 percent lower than the current mandatory standard of 0.2 g/bhp-hr). The optional standards allow local air districts and ARB to preferentially provide incentive funding to buyers of cleaner trucks, to encourage the development of cleaner engines.

Clean Diesel Fuel

Since 1993, ARB has required that diesel fuel have a limit on the aromatic hydrocarbon content and sulfur content of the fuel. Diesel powered vehicles account for a disproportionate amount of the diesel particulate matter which is considered a toxic air contaminant. In 2006, ARB required a low-sulfur diesel fuel to be used not only by on-road diesel vehicles but also for off-road engines. The diesel fuel regulation allows

alternative diesel formulations as long as emission reductions are equivalent to the ARB formulation.

Cleaner In-Use Heavy-Duty Trucks (Truck and Bus Regulation)

The Truck and Bus Regulation was first adopted in December 2008. This rule represents a multi-year effort to turn over the legacy fleet of engines and replace them with the cleanest technology available. In December 2010, ARB revised specific provisions of the in-use heavy-duty truck rule, in recognition of the deep economic effects of the recession on businesses and the corresponding decline in emissions.

Starting in 2012, the Truck and Bus Regulation phases in requirements applicable to an increasingly larger percentage of the truck and bus fleet over time, so that by 2023 nearly all older vehicles would need to be upgraded to have exhaust emissions meeting 2010 model year engine emissions levels. The regulation applies to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds that are privately or federally owned, including on-road and off-road agricultural yard goats, and privately and publicly owned school buses. Moreover, the regulation applies to any person, business, school district, or federal government agency that owns, operates, leases or rents affected vehicles. The regulation also establishes requirements for any in-state or out-of-state motor carrier, California-based broker, or any California resident who directs or dispatches vehicles subject to the regulation. Finally, California sellers of a vehicle subject to the regulation would have to disclose the regulation's potential applicability to buyers of the vehicles. Approximately 170,000 businesses in nearly all industry sectors in California, and almost a million vehicles that operate on California roads each year are affected. Some common industry sectors that operate vehicles subject to the regulation include: for-hire transportation, construction, manufacturing, retail and wholesale trade, vehicle leasing and rental, bus lines, and agriculture.

ARB compliance assistance and outreach activities that are key support of the Truck and Bus Regulation include:

- The Truck Regulations Upload and Compliance Reporting System, an online reporting tool developed and maintained by ARB staff;
- The Truck and Bus regulation's fleet calculator, a tool designed to assist fleet owners in evaluating various compliance strategies;
- Targeted training sessions all over the State; and
- Out-of-state training sessions conducted by a contractor.

ARB staff also develops regulatory assistance tools, conducts and coordinates compliance assistance and outreach activities, administers incentive programs, and actively enforces the entire suite of regulations. Accordingly, ARB's approach to ensuring compliance is based on a comprehensive outreach and education effort.

Incentive Programs

There are a number of different incentive programs focusing on heavy-duty vehicles that produce extra emission reductions beyond traditional regulations. The incentive programs encourage the purchase of a cleaner truck

Several State and local incentive funding pools have been used historically -- and remain available -- to fund the accelerated turnover of on-road heavy-duty vehicles. Since 1998, the Carl Moyer Program (Moyer Program) has provided funding for replacement, new purchase, repower and retrofit of trucks. Beginning in 2008, the Goods Movement Emission Reduction Program funded by Proposition 1B has funded cleaner trucks for the region's transportation corridors; the final increment of funds will implement projects through 2018.

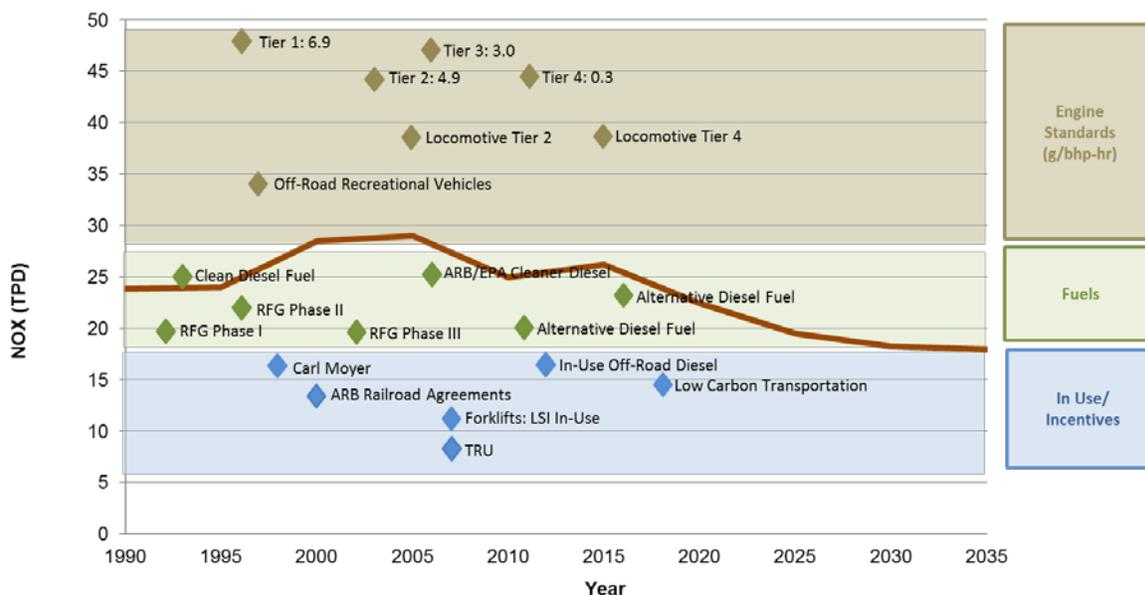
The Air Quality Improvement Program has funded the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) since 2010, and continued Mojave Desert and Antelope Valley participation is expected. ARB has also administered a Truck Loan Assistance Program since 2009.

Off-Road Sources

Off-road sources encompass equipment powered by an engine that does not operate on the road. Sources vary from ships to lawn and garden equipment and for example, include sources like locomotives, aircraft, tractors, harbor craft, off-road recreational vehicles, construction equipment, forklifts, and cargo handling equipment.

Figure 3 illustrates the trend in NO_x emissions from off-road equipment and key programs contributing to those reductions. As a result of these efforts, off-road emissions in the Western Mojave Desert have been reduced significantly since 1990 and will continue to go down through 2020 due to the benefits of ARB's and U.S. EPA longstanding programs. Key programs include Off-Road Engine Standards, Locomotive Engine Standards, Clean Diesel Fuel, Cleaner In-Use Off-Road Regulation and In-Use LSI Fleet Regulation.

Figure 3: Key Programs to Reduce Off-Road Emissions



Off-Road Engine Standards

The Clean Air Act preempts states, including California, from adopting requirements for new off-road engines less than 175 HP used in farm or construction equipment. California may adopt emission standards for in-use off-road engines pursuant to Section 209(e)(2), but must receive authorization from U.S. EPA before it may enforce the adopted standards.

The Board first approved regulations to control exhaust emissions from small off-road engines (SORE) such as lawn and garden equipment in December 1990 with amendments in 1998 and 2003. These regulations were implemented through three tiers of progressively more stringent exhaust emission standards that were phased in between 1995 and 2008.

Manufacturers of forklift engines are subject to new engine standards for both diesel and Large Spark Ignition (LSI) engines. Off-road diesel engines were first subject to engine standards and durability requirements in 1996 while the most recent Tier 4 Final emission standards were phased in starting in 2013. Tier 4 emission standards are based on the use of advanced after-treatment technologies such as diesel particulate filters and selective catalytic reduction. LSI engines have been subject to new engine standards that include both criteria pollutant and durability requirements since 2001 with the cleanest requirements phased-in starting in 2010.

Locomotive Engine Standards

The Clean Air Act and the U.S. EPA national locomotive regulations expressly preempt states and local governments from adopting or enforcing “any standard or other requirement relating to the control of emissions from new locomotives and new engines used in locomotives” (U.S. EPA interpreted new engines in locomotives to mean remanufactured engines, as well). U.S. EPA has approved two sets of national locomotive emission regulations (1998 and 2008). In 1998, U.S. EPA approved the initial set of national locomotive emission regulations. These regulations primarily emphasized NO_x reductions through Tier 0, 1, and 2 emission standards. Tier 2 NO_x emission standards reduced older uncontrolled locomotive NO_x emissions by up to 60 percent, from 13.2 to 5.5 g/bhphr.

In 2008, U.S. EPA approved a second set of national locomotive regulations. Older locomotives upon remanufacture are required to meet more stringent particulate matter (PM) emission standards which are about 50 percent cleaner than Tier 0-2 PM emission standards. U.S. EPA refers to the PM locomotive remanufacture emission standards as Tier 0+, Tier 1+, and Tier 2+. The new Tier 3 PM emission standard (0.1 g/bhphr), for model years 2012-2014, is the same as the Tier 2+ remanufacture PM emission standard. The 2008 regulations also included new Tier 4 (2015 and later model years) locomotive NO_x and PM emission standards. The U.S. EPA Tier 4 NO_x and PM emission standards further reduced emissions by approximately 95 percent from uncontrolled levels.

Clean Diesel Fuel

Since 1993, ARB has required that diesel fuel have a limit on the aromatic hydrocarbon content and sulfur content of the fuel. Diesel powered vehicles account for a disproportionate amount of the diesel particulate matter which is considered a toxic air contaminant. In 2006, ARB required a low-sulfur diesel fuel to be used not only by on-road diesel vehicles but also for off-road engines. The diesel fuel regulation allows alternative diesel formulations as long as emission reductions are equivalent to the ARB formulation.

Cleaner In-Use Off-Road Equipment (Off-Road Regulation)

The Off-Road Regulation which was first approved in 2007 and subsequently amended in 2010 in light of the impacts of the economic recession. These off-road vehicles are used in construction, manufacturing, the rental industry, road maintenance, and airport ground support and landscaping. In December 2011, the Off-Road Regulation was modified to include on-road trucks with two diesel engines.

The Off-Road Regulation will significantly reduce emissions of diesel PM and NO_x from the over 150,000 in-use off-road diesel vehicles that operate in California. The

regulation affects dozens of vehicle types used in thousands of fleets by requiring owners to modernize their fleets by replacing older engines or vehicles with newer, cleaner models, retiring older vehicles or using them less often, or by applying retrofit exhaust controls.

The Off-Road Regulation imposes idling limits on off-road diesel vehicles, requires a written idling policy, and requires a disclosure when selling vehicles. The regulation also requires that all vehicles be reported to ARB and labeled, restricts the addition of older vehicles into fleets, and requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing verified exhaust retrofits. The requirements and compliance dates of the Off-Road Regulation vary by fleet size.

Fleets will be subject to increasingly stringent restrictions on adding older vehicles. The regulation also sets performance requirements. While the regulation has many specific provisions, in general by each compliance deadline, a fleet must demonstrate that it has either met the fleet average target for that year, or has completed the Best Available Control Technology requirements. The performance requirements of the Off-Road Regulation are phased in from January 1, 2014 through January 1, 2019.

Compliance assistance and outreach activities in support of the Off-Road Regulation include:

- The Diesel Off-road On-line Reporting System, an online reporting tool developed and maintained by ARB staff.
- The Diesel Hotline (866-6DIESEL), which provides the regulated public with questions about the regulations and access to ARB staff. Staff is able to respond to questions in English, Spanish and Punjabi.
- The Off-road Listserv, providing equipment owners and dealerships with timely announcement of regulatory changes, regulatory assistance documents, and reminders for deadlines.

LSI In-Use Fleet Regulation

Forklift fleets can be subject to either the LSI fleet regulation, if fueled by gasoline or propane, or the off-road diesel fleet regulation. Both regulations require fleets to retire, repower, or replace higher-emitting equipment in order to maintain fleet average standards. The LSI fleet regulation was originally adopted in 2007 with requirements beginning in 2009. While the LSI fleet regulation applies to forklifts, tow tractors, sweeper/scrubbers, and airport ground support equipment, it maintains a separate fleet average requirement specifically for forklifts. The LSI fleet regulation requires fleets with four or more LSI forklifts to meet fleet average emission standards.

APPENDIX D

SUPPLEMENTAL DOCUMENTS FROM MOJAVE DESERT AQMD

- D-1) Mojave Desert AQMD Ozone Plan Submittal Letter**
- D-2) Emission Statement Certification**
- D-3) RACM Assessment**



Mojave Desert Air Quality Management District

14306 Park Avenue, Victorville, CA 92392-2310

760.245.1661 • fax 760.245.2699

Visit our web site: <http://www.mdaqmd.ca.gov>

Brad Poiriez, Executive Director

April 3, 2017

Richard Corey, Executive Officer
State of California EPA
California Air Resources Board
PO Box 2815
Sacramento, CA 95812

**Project Title: Adoption of MDAQMD Federal 75 ppb Ozone Attainment Plan
(Western Mojave Desert Nonattainment Area)**

Dear Mr. Corey:

The Mojave Desert Air Quality Management District (MDAQMD) requests that the California Air Resources Board submit *MDAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)*, to the United States Environmental Protection Agency (USEPA) for inclusion in the State Implementation Plan (SIP).

The Governing Board of the Mojave Desert Air Quality Management District (MDAQMD) adopted the *MDAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Plan)* on February 27, 2017. The *MDAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)* was adopted to satisfy Federal Clean Air Act (FCAA) requirements that the MDAQMD develop a plan to attain the 0.075 part per million (ppm) 8-hour ozone National Ambient Air Quality Standard (NAAQS). This plan will update the 2008 *MDAQMD Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area)*. Portions of previously adopted and approved plans will remain in effect until the region has been designated attainment for the relevant prior standard.

Enclosed are various documents associated with this action. The enclosures are:

- *MDAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)*
- Certified Set Date and Adoption Minute Items
- Certified Resolution 17-05
- Final Staff Report
- Proof of Publication – San Bernardino County (Daily Press) and Riverside County (The Press-Enterprise) (Final Staff Report Appendix “B”)
- Notice of Exemption (posted) – Riverside and San Bernardino Counties (Final Staff Report Appendix “D”)

In addition to the official adoption items, the District is also providing Addendum A, an Emission Statement Certification; and Addendum B, a demonstration that control of Reasonably Available Control Technology (RACT) sources will not advance the attainment date of this plan.

Please feel free to contact me if you need any further information.

Sincerely,



Alan J. De Salvo
Deputy Director. Mojave Desert Operations

AJD/tw

Addendum A & B

Cc: Monica Lewis
Sylvia Vanderspek

Addendum A

Emission Statement Certification

Federal Clean Air Act (FCAA) §182(a)(3)(B) requires ozone nonattainment areas to mandate submittal of emission statement data from certain sources of VOC or NO_x. The FCAA stipulates the following emission statement requirements be met:

FCAA Requirements	District Response
<i>"Within two years after November 15, 1990, the state (or District) is required to submit a revision to the State Implementation Plan requiring stationary sources of NO_x or VOC to provide the agency with a statement, in such form as the Administrator may prescribe (or accept an equivalent alternative developed by the state), for classes or categories of sources, showing the actual emissions of NO_x or VOC from that source." (FCAA §182(a)(3)(B)(i))</i>	Rule 107 adopted September 14, 1992; Rule 107 promulgated into SIP on May 26, 2004 (69 FR 29880).
<i>"Submittal of the first statement was required to be submitted within three (3) years after November 15, 1990. Submittal of subsequent statements is required at least every year thereafter." (FCAA §182(a)(3)(B)(i))</i>	The District reports emission data electronically to the USEPA through the ARB on an annual basis. Data has been submitted annually since 1993.
<i>"Statements shall contain a certification that the information contained in the statement is accurate to the best knowledge of the individual certifying the statement." (FCAA §182(a)(3)(B)(i))</i>	Each statement contains a certification that the information contained in the statement is accurate to the best knowledge of the completer.
<i>"The state (or District) may elect to waive the application of clause (i) to any class or category of stationary sources which emit less than 25 tons per year of VOC or NO_x if the state provides an inventory of emissions from such class or category of source, based on the use of the emission factors established by the Administrator or other methods acceptable to the Administrator." (FCAA §182(a)(3)(B)(ii))</i>	N/A

The 2008 eight-hour ozone standard implementation rule acknowledges that if an area has a previously approved emission statement rule in force for the former 1997 eight-hour or 1979 one-hour ozone NAAQS, the existing rule is likely sufficient for meeting the emission statement requirement for the 2008 eight-hour ozone NAAQS. The District adopted Rule 107 – *Certification and Emission Statements* on September 14, 1992 to cover the entire MDAQMD. The nonattainment area for the MDAQMD has not been significantly modified since that time. Additionally, the implementation rule recommends that air districts review the existing rule to ensure adequacy in the form of a written statement to the USEPA.

The District reviewed Rule 107 for adequacy, pursuant to the FCAA requirements and subsequent USEPA guidance and associated memoranda. The rationale is specified in the table above. Consequently, the District determines that existing Rule 107 meets all FCAA requirements set forth in the implementation rule. The District certifies that Rule 107, as promulgated into the SIP on May 26, 2004 (69 FR 29880), remains adequate for the purposes of implementing the 2008 eight-hour ozone NAAQS.

RACM Assessment, Mojave Desert AQMD Submittal Letter

Addendum B

Transportation Control Measures Reasonably Available Control Measure Assessment

The Federal Clean Air Act (FCAA) Section 172(c)(1) requires ozone nonattainment areas to complete a review of control measures in the State Implementation Plan. These control measures must be shown to be Reasonably Available Control Measures (RACM). CARB is responsible for measures to reduce emissions from mobile source programs needed to attain the National Ambient Air Quality Standards (NAAQS), including Transportation Control Measures (TCM). For TCMs to be RACM, TCMs must be both technologically and economically feasible and must advance the projected attainment date of the National Ambient Air Quality Standard (NAAQS) by one year. Given the severity of California's air quality challenges, CARB has implemented the most stringent mobile source emissions control program in the nation. CARB's comprehensive strategy to reduce emissions from mobile sources includes stringent emissions standards for new vehicles, in-use programs to reduce emissions from existing vehicle and equipment fleets, cleaner fuels that minimize emissions, and incentive programs to accelerate the penetration of the cleanest vehicles beyond that achieved by regulations alone. Taken together, California's mobile program meets RACM requirements in the context of ozone nonattainment.

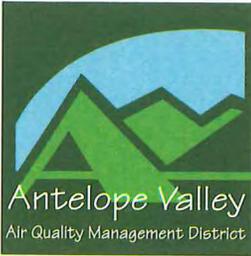
The MDAQMD adopted the *8-Hour Reasonably Available Control Technology – State Implementation Plan Analysis (RACT SIP Analysis)* on February 23, 2015. The District has examined existing control measures and has determined that controls from Reasonably Available Control Technology and mobile source emission control programs (RACM Analysis) will not advance the attainment year of the plan. The MDAQMD is downwind of the Los Angeles basin, and to a lesser extent, is downwind of the San Joaquin Valley. Prevailing winds transport ozone and ozone precursors from both regions into and through the Mojave Desert Air Basin (MDAB) during the summer ozone season. These transport couplings have been officially recognized by CARB¹. Local MDAQMD emissions contribute to exceedances of both the national and state ambient air quality standards for ozone, but photochemical ozone modeling conducted by the South Coast Air Quality Management District (SCAQMD) and CARB indicates that the MDAB would be in attainment of both standards without the influence of this transported air pollution from upwind regions.

¹ Ozone Transport: 2001 Review," April 2001, CARB identifies the South Coast Air Basin as having an overwhelming and significant impact on the MDAB (which includes the Mojave Desert) and the San Joaquin Valley as having an overwhelming impact on the MDAB.

APPENDIX E

SUPPLEMENTAL DOCUMENTS FROM ANTELOPE VALLEY AQMD

- E-1) Antelope Valley AQMD Ozone Plan Submittal Letter**
- E-2) Emission Statement Certification**
- E-3) RACM Assessment**



Antelope Valley Air Quality Management District
43301 Division St., Suite 206
Lancaster, CA 93535-4649

661.723.8070

April 18, 2017

Richard Corey, Executive Officer
State of California EPA
California Air Resources Board
PO Box 2815
Sacramento, CA 95812

Project Title: Adoption of *AVAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)*

Dear Mr. Corey:

The Antelope Valley Air Quality Management District (AVAQMD) requests that the California Air Resources Board submit *AVAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)*, to the United States Environmental Protection Agency (USEPA) for inclusion in the State Implementation Plan (SIP).

The Governing Board of the Antelope Valley Air Quality Management District (AVAQMD) adopted the *AVAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Plan)* on March 21, 2017. The *AVAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)* was adopted to satisfy Federal Clean Air Act (FCAA) requirements that the AVAQMD develop a plan to attain the 0.075 part per million (ppm) 8-hour ozone National Ambient Air Quality Standard (NAAQS). This plan will update the 2008 *AVAQMD Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area)*. Portions of previously adopted and approved plans will remain in effect until the region has been designated attainment for the relevant prior standard.

Enclosed are various documents associated with this action. The enclosures are:

- *AVAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)*
- Certified Adoption Minute Item
- Certified Resolution 17-05
- Final Staff Report
- Proof of Publication – Los Angeles County (Final Staff Report Appendix “B”)
- Notice of Exemption – Los Angeles County (Final Staff Report Appendix “D”)

In addition to the official adoption items, the District is also providing Addendum A, an Emission Statement Certification; and Addendum B, a demonstration that control of Reasonably Available Control Technology (RACT) sources will not advance the attainment date of this plan.

Please feel free to contact me if you need any further information.

Sincerely,



Alan J. De Salvio
Deputy Director, Mojave Desert Operations

AJD/tw

Addendum A & B

Cc: Monica Lewis
Sylvia Vanderspek

Addendum A

Emission Statement Certification

Federal Clean Air Act (FCAA) §182(a)(3)(B) requires ozone nonattainment areas to mandate submittal of emission statement data from certain sources of VOC or NO_x. The FCAA stipulates the following emission statement requirements be met:

FCAA Requirements	District Response
<i>"Within two years after November 15, 1990, the state (or District) is required to submit a revision to the State Implementation Plan requiring stationary sources of NO_x or VOC to provide the agency with a statement, in such form as the Administrator may prescribe (or accept an equivalent alternative developed by the state), for classes or categories of sources, showing the actual emissions of NO_x or VOC from that source." (FCAA §182(a)(3)(B)(i))</i>	Rule 107 adopted May 15, 2012; Rule 107 promulgated into SIP on April 11, 2013 (78 FR 21545).
<i>"Submittal of the first statement was required to be submitted within three (3) years after November 15, 1990. Submittal of subsequent statements is required at least every year thereafter." (FCAA §182(a)(3)(B)(i))</i>	The District reports emission data electronically to the USEPA through the ARB on an annual basis. Data has been submitted annually.
<i>"Statements shall contain a certification that the information contained in the statement is accurate to the best knowledge of the individual certifying the statement." (FCAA §182(a)(3)(B)(i))</i>	Each statement contains a certification that the information contained in the statement is accurate to the best knowledge of the completer.
<i>"The state (or District) may elect to waive the application of clause (i) to any class or category of stationary sources which emit less than 25 tons per year of VOC or NO_x if the state provides an inventory of emissions from such class or category of source, based on the use of the emission factors established by the Administrator or other methods acceptable to the Administrator." (FCAA §182(a)(3)(B)(ii))</i>	N/A

The 2008 eight-hour ozone standard implementation rule acknowledges that if an area has a previously approved emission statement rule in force for the former 1997 eight-hour or 1979 one-hour ozone NAAQS, the existing rule is likely sufficient for meeting the emission statement requirement for the 2008 eight-hour ozone NAAQS. The District adopted Rule 107 – Certification and Emission Statements on May 15, 2012 to cover the entire AVAQMD. Additionally, the implementation rule recommends that air districts review the existing rule to ensure adequacy in the form of a written statement to the USEPA.

The District reviewed Rule 107 for adequacy, pursuant to the FCAA requirements and subsequent USEPA guidance and associated memoranda. The rationale is specified in the table above. Consequently, the District determines that existing Rule 107 meets all FCAA requirements set forth in the implementation rule. The District certifies that Rule 107, as promulgated into the SIP on April 11, 2013 (78 FR 21545), remains adequate for the purposes of implementing the 2008 eight-hour ozone NAAQS.

Addendum B

Transportation Control Measures
Reasonably Available Control Measure Assessment

The Federal Clean Air Act (FCAA) Section 172(c)(1) requires ozone nonattainment areas to complete a review of control measures in the State Implementation Plan. These control measures must be shown to be Reasonably Available Control Measures (RACM). CARB is responsible for measures to reduce emissions from mobile source programs needed to attain the National Ambient Air Quality Standards (NAAQS), including Transportation Control Measures (TCM). For TCMs to be RACM, TCMs must be both technologically and economically feasible and must advance the projected attainment date of the National Ambient Air Quality Standard (NAAQS) by one year. Given the severity of California's air quality challenges, CARB has implemented the most stringent mobile source emissions control program in the nation. CARB's comprehensive strategy to reduce emissions from mobile sources includes stringent emissions standards for new vehicles, in-use programs to reduce emissions from existing vehicle and equipment fleets, cleaner fuels that minimize emissions, and incentive programs to accelerate the penetration of the cleanest vehicles beyond that achieved by regulations alone. Taken together, California's mobile program meets RACM requirements in the context of ozone nonattainment.

The AVAQMD adopted the *8-Hour Reasonably Available Control Technology – State Implementation Plan Analysis (RACT SIP Analysis)* on July 21, 2015. The District has examined existing control measures and has determined that controls from Reasonably Available Control Technology and mobile source emission control programs (RACM Analysis) will not advance the attainment year of the plan. The AVAQMD is downwind of the Los Angeles basin, and to a lesser extent, is downwind of the San Joaquin Valley. Prevailing winds transport ozone and ozone precursors from both regions into and through the Mojave Desert Air Basin (MDAB) during the summer ozone season. These transport couplings have been officially recognized by CARB¹. Local AVAQMD emissions contribute to exceedances of both the national and state ambient air quality standards for ozone, but photochemical ozone modeling conducted by the South Coast Air Quality Management District (SCAQMD) and CARB indicates that the MDAB would be in attainment of both standards without the influence of this transported air pollution from upwind regions.

¹ Ozone Transport: 2001 Review," April 2001, CARB identifies the South Coast Air Basin as having an overwhelming and significant impact on the MDAB (which includes the Mojave Desert) and the San Joaquin Valley as having an overwhelming impact on the MDAB.

APPENDIX F

CALIFORNIA MOBILE SOURCE CONTROL MEASURES, 1985-2016

Air Resources Board Control Measures, 1985 - 2016

Board Action	Hearing Date
<p>Amendments to the Portable Fuel Container Regulation Amendments to the Portable Fuel Container (PFC) regulation, which include requiring certification fuel to contain 10 percent ethanol, harmonizing aspects of the Board's PFC certification and test procedures with those of the U.S. EPA, revising the ARB's certification process, and streamlining, clarifying, and increasing the robustness of ARB's certification and test procedures.</p>	2/18/16
<p>Technical Status and Proposed Revisions to On-Board Diagnostic System Requirements and Associated Enforcement Provisions for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II) Amendments to the OBD II regulations that update requirements to account for LEV III applications and monitoring requirements for gasoline and diesel vehicles, and clarify and improve the regulation; also, updates to the associated OBD II enforcement regulation to align it with the proposed amendments to the OBD II regulations and a minor amendment to the definition of "emissions-related part" in title 13, CCR section 1900.</p>	9/25/15
<p>2015 Low Carbon Fuel Standard (LCFS) Amendments (2 of 2) Re-adoption of the Low Carbon Fuel Standard, which includes updates and revisions to the regulation now in effect. The proposed regulation was first presented to the Board at its February 2015 public hearing, at which the Board directed staff to make modifications to the proposal.</p>	9/24/15
<p>Proposed Regulation on the Commercialization of Alternative Diesel Fuels (2 of 2) Regulation governing the introduction of alternative diesel fuels into the California commercial market, including special provisions for biodiesel.</p>	9/24/15
<p>CA Cap on GHG Emissions and Market-Based Compliance Mechanisms (2 of 2) Amendments to the Cap and Trade Regulation to include a new Rice Cultivation Compliance Offset Protocol and an update to the United States Forest Compliance Offset Protocol that would include project eligibility in parts of Alaska.</p>	6/25/15
<p>Intermediate Volume Manufacturer Amendments to the Zero Emission Vehicle Regulation (2 of 2) Amendments regarding intermediate volume manufacturer compliance obligations under the Zero Emission Vehicle regulation.</p>	5/21/15
<p>2015 Amendments to Certification Procedures for Vapor Recovery Systems at Gasoline Dispensing Facilities—Aboveground Storage Tanks and Enhanced Conventional Nozzles Amendments would establish new performance standards and specifications for nozzles used at fleet facilities that exclusively refuel vehicles equipped with onboard vapor recovery systems, would provide regulatory relief for owners of certain existing aboveground storage tanks, and would ensure that mass-produced vapor recovery equipment matches the specifications of equipment evaluated during the ARB certification process.</p>	4/23/15
<p>Proposed Regulation for the Commercialization of Alternative Diesel Fuels (1 of 2) Regulation governing the introduction of alternative diesel fuels into the California commercial market, including special provisions for biodiesel. This is the first of two hearings on the item, and the Board will not take action to approve the proposed regulation.</p>	2/19/15
<p>Evaporative Emission Control Requirements for Spark-Ignition Marine Watercraft Regulation for controlling evaporative emissions from spark-ignition marine watercraft. The proposed regulation will harmonize, to the extent feasible, with similar federal requirements, while adding specific provisions needed to support California's air quality needs.</p>	2/19/15
<p>2015 Low Carbon Fuel Standard (LCFS) Amendments (1 of 2) Regulation for a Low Carbon Fuel Standard that includes re- adoption of the existing Low Carbon Fuel Standard with updates and revisions. This is the first of two hearings on the item, and the Board will not take action to approve the proposed regulation.</p>	2/19/15
<p>CA Cap on GHG Emissions and Market-Based Compliance Mechanisms to Add the Rice Cultivation Projects and Updated U.S. Forest Projects Protocols (1 of 2) Updates to the Cap and Trade Regulation to include a new Rice Cultivation Compliance Offset Protocol and an update to the United States Forest Compliance Offset Protocol that would include project eligibility in parts of Alaska.</p>	12/18/14
<p>2014 Amendments to ZEV Regulation Additional compliance flexibility to ZEV manufacturers working to bring advanced technologies to market.</p>	10/23/14
<p>LEV III Criteria Pollutant Requirements for Light- and Medium-Duty Vehicles the Hybrid Electric Vehicle Test Procedures, and the HD Otto-Cycle and HD Diesel Test Procedures Applies to the 2017 and subsequent model years.</p>	10/23/14
<p>Amendments to Mandatory Reporting Regulation for Greenhouse Gases Further align reporting methods with USEPA methods and factors, and modify reporting requirements to fully support implementation of California's Cap and Trade program.</p>	9/19/14

Air Resources Board Control Measures, 1985 - 2016

Board Action	Hearing Date
Amendments to the California Cap on Greenhouse Gas Emissions and Market Based Compliance Mechanisms Technical revisions to Mandatory Reporting of Greenhouse Gas Emissions Regulation to further align reporting methods with U.S.EPA update methods and factors, and modify reporting requirements to fully support implementation of California's Cap and Trade program.	9/18/14
Amendments to the AB 32 Cost of Implementation Fee Regulation Amendments to the regulation to make it consistent with the revised mandatory reporting regulation, to add potential reporting requirements, and to incorporate requirements within the mandatory reporting regulation to streamline reporting.	9/18/14
Low Carbon Fuel Standard 2014 Update As a result of a California Court of Appeal decision, ARB will revisit the LCFS rulemaking process to meet certain procedural requirements of the APA and CEQA. Following incorporation of any modifications to the regulation, the Board will consider the proposed regulation for adoption at a second hearing held in the spring of 2015.	7/24/14
Revisions to the Carl Moyer Memorial Air Quality Standards Attainment Program Guidelines for On-Road Heavy-Duty Trucks Revisions to 1) reduce surplus emission reduction period, 2) reduce minimum CA usage requirement, 3) prioritize on-road funding to small fleets, 4) include light HD vehicles 14000-19500 lbs, and 5) clarify program specifications.	7/24/14
Amendments to Enhanced Fleet Modernization (Car Scrap) Program Amendments consistent with SB 459 which requires ARB to increase benefits for low-income California residents, promote cleaner replacement vehicles, and enhance emissions reductions.	6/26/14
Proposed Approval of Amendments to CA Cap on GHG Emissions and Market-Based Compliance Mechanisms Second hearing of two, continued from October 2013.	4/24/14
Truck and Bus Rule Update Amendments to the Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen, and Other Criteria Pollutants From In-Use On-Road Diesel-Fueled Vehicles: increasing low-use vehicle thresholds, allowing owners to newly opt-in to existing flexibility provisions, adjusting "NOx exempt" vehicle provisions, and granting additional time for fleets in certain areas to meet PM filter requirements.	4/24/14
Heavy-Duty GHG Phase I: On-Road Heavy-Duty GHG Emissions Rule, Tractor-Trailer Rule, Commercial Motor Vehicle Idling Rule, Optional Reduced Emission Standards, Heavy-Duty Hybrid-Electric Vehicles Certification Procedure New GHG standards for MD and HD engines and vehicles identical to those adopted by the USEPA in 2011 for MYs 2014-18.	12/12/13
Agricultural equipment SIP credit rule Incentive-funded projects must be implemented using Carl Moyer Program Guidelines; must be surplus, quantifiable, enforceable, and permanent, and result in emission reductions that are eligible for SIP credit.	10/25/13
Mandatory Report of Greenhouse Gas Emissions Approved a regulation that establishes detailed specifications for emissions calculations, reporting, and verification of GHG emission estimates from significant sources.	10/25/13
CA Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Technical revisions to the Mandatory Reporting of Greenhouse Gas Emissions Regulation to further align reporting methods with U.S.EPA, update factors, and modify definitions to maintain consistency with the Cap and Trade program.	10/25/13
Zero emission vehicle test procedures Existing certification test procedures for plug-in hybrid vehicles need to be updated to reflect technology developments. The ZEV regulation will require minor modifications to address clarity and implementation issues.	10/24/13
Consumer Products: Antiperspirants, Deodorants, Test Method 310, Aerosol Coatings, Proposed Repeal of Hairspray Credit) Amendments to require various consumer products to reformulate to reduce VOC or reactivity content to meet specified limits, and to clarify various regulatory provisions, improve enforcement, and add analytical procedures.	9/26/13
Alternative fuel certification procedures Amendments to current alternative fuel conversion certification procedures for motor vehicles and engines that will allow small volume conversion manufacturers to reduce the upfront demonstration requirements and allow systems to be sold sooner with lower certification costs than with the current process, beginning with MY 2018.	9/26/13
Vapor Recovery for Gasoline Dispensing Facilities Amendments to certification and test procedures for vapor recovery equipment used on cargo tanks and at gasoline dispensing facilities.	7/25/13
Off-highway recreational vehicle evaporative emission control Staff proposes to set evaporative emission standards to control hydrocarbon emissions from Off-Highway Recreational Vehicles. The running loss, hot soak, and diurnal performance standards can be met by using proven automobile type control technology.	7/25/13

Air Resources Board Control Measures, 1985 - 2016

Board Action	Hearing Date
Gasoline and diesel fuel test standards Adopted amendments to add test standards for the measurement of prohibited oxygenates at trace levels specified in existing regulations.	1/25/13
LEV III and ZEV Programs for Federal Compliance Option Adopted amendments to deem compliance with national GHG new vehicle standards in 2017-2025 as compliance with California GHG standards for the same model years.	11/15/12 12/6/12 EO
Consumer products (automotive windshield washing fluid) Adopted amendments to add portions of 14 California counties to the list of areas with freezing temperatures where 25% VOC content windshield washing fluid could be sold.	10/18/2012 EO 03/15/13
GHG mandatory reporting, Fee Regulation, and Cap and Trade 2012 Adopted amendments to eliminate emission verification for facilities emitting less than 25,000 MTCO ₂ e and make minor changes in definitions and requirements.	9/20/12 11/2/12 EO
Amendments to Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines Approved amendments to the verification procedure used to evaluate diesel retrofits through emissions, durability, and field testing. Amendments will lower costs associated with required in-use compliance testing, streamline the in-use compliance process, and will extend time allowed to complete verifications.	8/23/2012 EO 07/02/13
Amendments to On-Board Diagnostics (OBD I and II) Regulations Approved amendments to the light- and medium-duty vehicle and heavy-duty engine OBD regulations.	8/23/2012 EO 06/26/13
Cap and Trade: Amendments to CA Cap on GHG Emissions and Market-Based Compliance Mechanisms, and Amendments Allowing Use of Compliance Instruments Issued by Linked Jurisdictions Amends Cap-and-Trade and compliance mechanisms to add security to the market system and to aid staff in implementation. Amendments include first auction rules, offset registry, market monitoring provisions, and information gathering necessary for the financial services operator.	6/28/12 7/31/12 EO
Vapor recovery defect list Adopted amendments to add defects and verification procedures for equipment approved since 2004, and make minor changes to provide clarity	6/11/12 EO
Tractor-Trailer GHG Regulation: Emergency Amendment Adopted emergency amendment to correct a drafting error and delay the registration date for participation in the phased compliance option	2/29/2012 2/29/12 EO
Advanced Clean Cars (ACC) Regulation: Low-Emission Vehicles and GHG Adopted more stringent criteria emission standards for MY 2015-2025 light and medium duty vehicles (LEV III), amended GHG emission standards for model year 2017-2025 light and medium duty vehicles (LEV GHG), amended ZEV Regulation to ensure the successful market penetration of ZEVs in commercial volumes, amended hydrogen fueling infrastructure mandate of the Clean Fuels Outlet regulation, and amended cert fuel for light duty vehicles from an MTBE-containing fuel to an E10 certification fuel.	1/26/12
Zero Emission Vehicle (ZEV) Adopted amendments to increase compliance flexibility, add two new vehicle categories for use in creating credits, increase credits for 300 mile FCVs, increase requirements for ZEVs and TZEVs, eliminate credit for PZEVs and AT PZEVs, expand applicability to smaller manufacturers, base ZEV credits on range, and make other minor changes in credit requirements	1/26/12
Amendments to Low Carbon Fuel Standard Regulation The amendments address several aspects of the regulation, including: reporting requirements, credit trading, regulated parties, opt-in and opt-out provisions, definitions, and other clarifying language.	12/16/11 10/10/12 EO
Amendments to Small Off-Road Engine and Tier 4 Off-Road Compression-Ignition Engine Regulations And Test Procedures; also "Recreational Marine" Spark-Ignition Marine Engine Amendments (Recreational Boats) adopted. Aligns California test procedures with U.S. EPA test procedures and requires off-road CI engine manufacturers to conduct in-use testing of their entire product lines to confirm compliance with previously established Not-To-Exceed emission thresholds.	12/16/2011 10/25/12 EO
Regulations and Certification Procedures for Engine Packages used in Light-Duty Specially Constructed Vehicles (Kit Cars) Ensures that certified engine packages, when placed into any Kit Car, would meet new vehicle emission standards, and be able to meet Smog Check requirements.	11/17/11 9/21/12 EO

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Board Action	Hearing Date
Amendments to the California Reformulated Gasoline Regulations Corrects drafting errors in the predictive model, deletes outdated regulatory provisions, updates the notification requirements, and changes the restrictions on blending CARBOB with other liquids.	10/21/11 8/24/12 EO
Amendments to the In-Use Diesel Transport Refrigeration Units (TRU) ATCM Mechanisms to improve compliance rates and enforceability.	10/21/11 8/31/12 EO
Amendments to the AB 32 Cost of Implementation Fee Regulation Clarifies requirements and regulatory language, revises definitions.	10/20/11 8/21/12 EO
Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation, Including Compliance Offset Protocols Greenhouse Gas Emissions Cap-and-Trade Program, including compliance offset protocols and multiple pathways for compliance.	10/21/11 8/21/12 EO
Amendments to the Regulation for Cargo Handling Equipment (CHE) at Ports and Intermodal Rail Yards (Port Yard Trucks Regulation) Provides additional compliance flexibility, and maintains anticipated emissions reductions. As applicable to yard trucks and two-engine sweepers.	9/22/11 8/2/12 EO
Amendments to the Enhanced Vapor Recovery Regulation for Gasoline Dispensing Facilities New requirement for low permeation hoses at gasoline dispensing facilities.	9/22/11 7/26/12 EO
Amendments to Cleaner Main Ship Engines and Fuel for Ocean-Going Vessels Adjusts the offshore regulatory boundary. Aligns very low sulfur fuel implementation deadlines with new federal requirements.	6/23/11 9/13/12 EO
Particulate Matter Emissions Measurement Allowance For Heavy-Duty Diesel In-Use Compliance Regulation Emission measurement allowances provide for variability associated with the field testing required in the regulation.	6/23/11
Low Carbon Fuel Standard Carbon Intensity Lookup Table Amendments Adds new pathways for vegetation-based fuels	2/24/11
Amendments to Cleaner In-Use Heavy-Duty On-Road Diesel Trucks and LSI Fleets Regulations Amends five regulations to provide relief to fleets adversely affected by the economy, and take into account the fact that emissions are lower than previously predicted.	12/16/10 9/19/11 EO
Tractor-Trailer GHG Regulation Amendment Enacts administrative changes to increase compliance flexibility and reduce costs	12/16/10
Amendments to Cleaner In-Use Off-Road Diesel-Fueled Fleets Regulation Amendments provide relief to fleets adversely affected by the economy, and take into account the fact that emissions are lower than previously predicted.	12/16/10 10/28/11 EO
In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks at Ports and Rail Yard Facilities Amendments add flexibility to fleets' compliance schedules, mitigate the use of noncompliant trucks outside port and rail properties, and provide transition to the Truck and Bus regulation.	12/16/10 9/19/11 EO
Amendments to the Regulation for Mandatory Reporting of Greenhouse Gas Emissions Changes requirements to align with federal greenhouse gas reporting requirements adopted by US EPA.	12/16/10 10/28/11 EO
Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation Establishes framework and requirements for Greenhouse Gas Emissions Cap-and-Trade Program, including compliance offset protocols.	12/16/10 10/26/11 EO
Amendments to the Consumer Products Regulation Amendments set new or lower VOC limits for some categories, prohibit certain toxic air contaminants, high GWP compounds, and surfactants toxic to aquatic species. Also changes Method 310, used to determine aromatic content of certain products.	11/18/10 9/29/11 EO
Amendment of the ATCM for Diesel Transportation Refrigeration Units (TRU) Amendments expand the compliance options and clarify the operational life of various types of TRUs.	11/18/10 2/2/11 EO
Amendments to the ATCM for Stationary Compression Ignition Engines Approved amendments to closely align the emission limits for new emergency standby engines in the ATCM with the emission standards required by the federal Standards of Performance.	10/21/10 3/25/11 EO
Diesel Vehicle Periodic Smoke Inspection Program Adopted amendments to exempt medium duty diesel vehicles from smoke inspection requirements if complying with Smog Check requirements.	10/21/10 8/23/11 EO
Renewable Electricity Standard Regulation Approved a regulation that will require electricity providers to obtain at least 33% of their retail electricity sales from renewable energy resources by 2020.	9/23/10
Energy Efficiency at Industrial Facilities Adopted standards for the reporting of GHG emissions and the feasibility of emissions controls by the largest GHG-emitting stationary sources.	7/22/10 5/9/11 EO
Amendments to Commercial Harbor Craft Regulation Approved amendments to require the use of cleaner engines in diesel-fueled crew and supply, barge, and dredge vessels.	6/24/10 4/11/11 EO

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Board Action	Hearing Date
Accelerated Introduction of Cleaner Line-Haul Locomotives Agreement with railroads sets prescribed reductions in diesel risk and target years through 2020 at four major railyards.	6/24/10
Amendments to New Passenger Motor Vehicle Greenhouse Gas Emission Standards Approved amendments deeming compliance with EPA's GHG standards as compliance with California's standards in 2012 through 2016 model years.	2/25/2010 03/29/10
Sulfur Hexafluoride (SF6) Regulation Regulation to reduce emissions of sulfur hexafluoride (SF6), a high-GWP GHG, from high-voltage gas-insulated electrical switchgear.	2/25/10 12/15/10 EO
Amendments to the Statewide Portable Equipment Registration Regulation and Portable Engine ATCM Approved amendments that extend the deadline for removal of certain uncertified portable engines for one year.	1/28/10 8/27/10 EO 12/8/10 EO
Diesel Engine Retrofit Control Verification, Warranty, and Compliance Regulation Amendments Approved amendments to require per-installation compatibility assessment, performance data collection, and reporting of additional information, and enhance enforceability.	1/28/10 12/6/10 EO
Stationary Equipment High-GWP Refrigerant Regulation Approved a regulation to reduce emissions of high-GWP refrigerants from stationary non-residential equipment.	12/1/09 9/14/10 EO
Amendments to Limit Ozone Emissions from Indoor Air Cleaning Devices Adopted amendments to delay the labeling compliance deadlines by one to two years and to make minor changes in testing protocols.	12/9/09
Emission Warranty Information Reporting Regulation Amendments Repealed the 2007 regulation and readopted the 1988 regulation with amendments to implement adverse court decision.	11/19/09 9/27/10 EO
Amendments to Maximum Incremental Reactivity Tables Added many new compounds and modified reactivity values for many existing compounds in the tables to reflect new research data.	11/3/09 7/23/10 EO
AB 32 Cost of Implementation Fee Regulation AB 32 authorizes ARB to adopt by regulation a schedule of fees to be paid by sources of greenhouse gas emissions regulated pursuant to AB 32. ARB staff will propose a fee regulation to support the administrative costs of AB 32 implementation.	9/24/2009 05/06/10 EO
Passenger Motor Vehicle Greenhouse Gas Limits Amendments Approved amendments granting credits to manufacturers for compliant vehicles sold in other states that have adopted California regulations.	9/24/09 2/22/10 EO
Consumer Products Amendments Approved amendments that set new VOC limits for multi-purpose solvent and paint thinner products and lower the existing VOC limit for double phase aerosol air fresheners.	9/24/09 8/6/10 EO
Amendments to In-Use Off-Road Diesel-Fueled Fleets Regulation Approved amendments to implement legislatively directed changes and provide additional incentives for early action.	7/23/09 12/2/09 EO 6/3/10 EO
Methane Emissions from Municipal Solid Waste Landfills Approved a regulation to require smaller and other uncontrolled landfills to install gas collection and control systems, and also requires existing and newly installed systems to operate optimally.	6/25/09 5/5/10 EO
Cool Car Standards Approved a regulation requiring the use of solar management window glass in vehicles up to 10,000 lb GVWR.	6/25/09
Enhanced Fleet Modernization (Car Scrap) Approved guidelines for a program to scrap up to 15,000 light duty vehicles statewide.	6/25/09 7/30/10 EO
Amendments to Heavy-Duty On-Board Diagnostics Regulations Approved amendments to the light and medium-duty vehicle and heavy duty engine OBD regulations.	5/28/2009 4/6/10 EO
Smog Check Improvements BAR adopted amendments to implement changes in state law and SIP commitments adopted by ARB between 1996 and 2007.	5/7/09 by BAR 6/9/09 EO
AB 118 Air Quality Improvement Program Guidelines The Air Quality Improvement Program provides for up to \$50 million per year for seven years beginning in 2009-10 for vehicle and equipment projects that reduce criteria pollutants, air quality research, and advanced technology workforce training. The AQIP Guidelines describe minimum administrative, reporting, and oversight requirements for the program, and provide general criteria for how the program shall be implemented.	04/23/09 08/28/09 EO
Pesticide Element Reduce volatile organic compound (VOC) emissions from the application of agricultural field fumigants in the South Coast, Southeast Desert, Ventura County, San Joaquin Valley, and Sacramento Metro federal ozone nonattainment areas.	4/20/09 10/12/09 EO (2) 8/2/11 EO
Low Carbon Fuel Standard Approved new standards to lower the carbon content of fuels.	4/20/09 11/25/09 EO

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Board Action	Hearing Date
Pesticide Element for San Joaquin Valley DPR Director approved pesticide ROG emission limit of 18.1 tpd and committed to implement restrictions on non-fumigant pesticide use by 2014 in the San Joaquin Valley.	4/7/09 DPR
Tire Pressure Inflation Regulation Approved a regulation requiring automotive service providers to perform tire pressure checks as part of every service.	3/26/09 2/4/10 EO
Sulfur Hexafluoride from Non-Utility and Non-Semiconductor Applications Approved a regulation to phase out use of Sulfur Hexafluoride over the next several years.	2/26/09 11/12/09 EO
Semiconductor Operations Approved a regulation to set standards to reduce fluorinated gas emissions from the semiconductor and related devices industry.	2/26/09 10/23/09 EO
Plug-In Hybrid Electric Vehicles Test Procedure Amendments Amends test procedures to address plug-in-hybrid electric vehicles.	1/23/09 12/2/09 EO
In-Use Off-Road Diesel-Fueled Fleets Amendments Makes administrative changes to recognize delays in the supply of retrofit control devices.	1/22/09
Small Containers of Automotive Refrigerant Approved a regulation to reduce leakage from small containers, adopt a container deposit and return program, and require additional container labeling and consumer education requirements.	1/22/09 1/5/10 EO
Aftermarket Critical Emission Parts on Highway Motorcycles Allows for the sale of certified critical emission parts by aftermarket manufacturers.	1/22/09 6/19/09 EO
Heavy-Duty Tractor-Trailer Greenhouse Gas (GHG) Reduction Approved a regulation to reduce greenhouse gas emissions by improving long haul tractor and trailer efficiency through use of aerodynamic fairings and low rolling resistance tires.	12/11/08 10/23/09 EO
Cleaner In-Use Heavy-Duty Diesel Trucks (Truck and Bus Regulation) Approved a regulation to reduce diesel particulate matter and oxides of nitrogen through fleet modernization and exhaust retrofits. Makes enforceability changes to public fleet, off-road equipment, and portable equipment regulations.	12/11/08 10/19/09 EO 10/23/09 EO
Large Spark-Ignition Engine Amendments Approved amendments to reduce evaporative, permeation, and exhaust emissions from large spark-ignition (LSI) engines equal to or below 1 liter in displacement.	11/1/08 3/12/09 EO
Small Off-Road Engine (SORE) Amendments Approved amendments to address the excessive accumulation of emission credits.	11/21/08 2/24/10 EO
Proposed AB 118 Air Quality Guidelines for the Air Quality Improvement Program and the Alternative and Renewable Fuel and Vehicle and Technology Program. The California Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007 (AB 118) requires ARB to develop guidelines for both the Alternative and Renewable Fuel and Vehicle Technology Program and the Air Quality Improvement Program to ensure that both programs do not adversely impact air quality.	09/25/08 EO 05/20/09
Portable Outboard Marine Tanks and Components (part of Additional Evaporative Emission Standards) Approved a regulation that establishes permeation and emission standards for new portable outboard marine tanks and components.	9/25/08 7/20/09 EO
Cleaner Fuel in Ocean Going Vessels Approved a regulation that requires use of low sulfur fuel in ocean-going ship main engines, and auxiliary engines and boilers.	7/24/08 4/16/09 EO
Spark-Ignition Marine Engine and Boat Amendments Provides optional compliance path for > 500 hp sterndrive/inboard marine engines.	7/24/08 6/5/09 EO
Consumer Products Amendments Approved amendments that add volatile organic compound (VOC) limits for seven additional categories and lower limits for twelve previously regulated categories.	6/26/08 5/5/09 EO
Zero emission vehicles Updated California's ZEV requirements to provide greater flexibility with respect to fuels, technologies, and simplifying compliance pathways. Amendments give manufacturers increased flexibility to comply with ZEV requirements by giving credit to plug-in hybrid electric vehicles and establishing additional ZEV categories in recognition of new developments in fuel cell vehicles and battery electric vehicles.	3/27/08 12/17/08 EO
Amendments to the Verification Procedure, Warranty, and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines Adds verification requirements for control technologies that only reduce NOx emissions, new reduction classifications for NOx reducing technologies, new testing requirements, and conditional extensions for verified technologies.	1/24/08 12/4/08 EO

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Board Action	Hearing Date
Mandatory Report of Greenhouse Gas Emissions Approved a regulation that establishes detailed specifications for emissions calculations, reporting, and verification of GHG emission estimates from significant sources.	12/6/07 10/12/08 EO
Gaseous Pollutant Measurement Allowances for In-Use Heavy-Duty Diesel Compliance Measurement accuracy margins are to be determined through an ongoing comprehensive testing program performed by an independent contractor. Amendments include these measurement accuracy margins into the regulation.	12/6/07 10/14/08 EO
Ocean-Going Vessels While at Berth (aka Ship Hoteling) - Auxiliary Engine Cold Ironing and Clean Technology Approved a regulation that reduces emissions from auxiliary engines on ocean-going ships while at-berth.	12/6/07 10/16/08 EO
In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks at Ports and Rail Yard Facilities Approved a regulation that establishes emission standards for in-use, heavy-duty diesel-fueled vehicles that transport cargo to and from California's ports and intermodal rail facilities.	12/6/07 10/12/08 EO
Commercial Harbor Craft Approved a regulation that establishes in-use and new engine emission limits for both auxiliary and propulsion diesel engines on ferries, excursion vessels, tugboats, and towboats.	11/15/07 9/2/08 EO
Suggested Control Measure for Architectural Coatings Amendments Approved amendments to reduce the recommended VOC content of 19 categories of architectural coatings.	10/26/07
Aftermarket Catalytic Converter Requirements Approved amendments that establish more stringent emission performance and durability requirements for used and new aftermarket catalytic converters offered for sale in California.	10/25/07 2/21/08 NOD
Limiting Ozone Emissions from Indoor Air Cleaning Devices Approved ozone emission limit of 0.050 ppm for portable indoor air cleaning devices in response to requirements of AB 2276 (2006).	9/27/07 8/7/08 EO
Pesticide Commitment for Ventura County in 1994 SIP Approved substitution of excess ROG emission reductions from state motor vehicle program for 1994 SIP reduction commitment from pesticide application in Ventura County.	9/27/07 11/30/07 EO
In-Use Off-Road Diesel Equipment Approved a regulation that requires off-road diesel fleet owners to modernize their fleets and install exhaust retrofits.	7/26/07 4/4/08 EO
Emission Control and Environmental Performance Label Regulations Approved amendments to add a Global Index Label and modify the format of the Smog Index Label on new cars.	6/21/07 5/2/08 EO
Vapor Recovery from Aboveground Storage Tanks Approved a regulation to establish new performance standards and specifications for the vapor recovery systems and components used with aboveground storage tanks.	6/21/07 5/2/08 EO
CaRFG Phase 3 amendments Approved amendments to mitigate the increases in evaporative emissions from on-road motor vehicles resulting from the addition of ethanol to gasoline.	6/14/07 4/25/08 EO 8/7/08 EO
Formaldehyde from Composite Wood Products Approved an ATCM to limit formaldehyde emissions from hardwood plywood, particleboard, and medium density fiberboard to the maximum amount feasible.	4/26/07 3/5/08 EO
Portable equipment registration program (PERP) and airborne toxic control measure for diesel-fueled portable engines Approved amendments to allow permitting of Tier 0 portable equipment engines used in emergency or low use duty and to extend permitting of certain Tier 1 and 2 "resident" engines to 1/1/10.	3/22/07 7/31/07 EO
Perchloroethylene Control Measure Amendments Approved amendments to the Perchloroethylene ATCM to prohibit new Perc dry cleaning machines beginning 2008 and phase out all Perc machines by 2023.	1/25/07 11/7/07 EO
Amendments to Emission Warranty Information Reporting & Recall Regulations Approved amendments that tighten the provisions for recalling vehicles for emissions-related failures, helping ensure that corrective action is taken to vehicles with defective emission control devices or systems.	12/7/06 3/22/07 10/17/07 EO
Voluntary accelerated vehicle retirement regulations Approved amendments that authorize the use of remote sensing to identify light-duty high emitters and that establish protocols for quantifying emissions reductions from high emitters proposed for retirement.	12/7/06
Emergency regulation for portable equipment registration program (PERP), airborne toxic control measures for portable and stationary diesel-fueled engines	12/7/06
Amendments to the Hexavalent Chromium ATCM Approved amendments that require use of best available control technology on all chrome plating and anodizing facilities.	12/7/06
Consumer Products Regulation Amendments Approved amendments that set lower emission limits in 15 product categories.	11/17/06 9/25/07 EO

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Board Action	Hearing Date
Requirements for Stationary Diesel In-Use Agricultural Engines Approved amendments to the stationary diesel engine ATCM which set emissions standards for in-use diesel agricultural engines.	11/16/06 7/3/07 NOD
Ships - Onboard Incineration Approved amendments to cruise ship incineration ATCM to include all oceangoing ships of 300 gross registered tons or more.	11/16/06 9/11/07 EO
Zero Emission Bus Approved amendments postponing the 15 percent purchase requirement three years for transit agencies in the diesel path and one to two years for transit agencies in the alternative fuel path, in order to keep pace with developments in zero emission bus technology, and adding an Advanced Demonstration requirement to offset emission losses.	10/19/06 8/27/07 EO
Distributed generation certification Approved amendments improving the emissions durability and testing requirements, adding waste gas emission standards, and eliminating a redundant PM standard in the current 2007 emission standards.	10/19/06 5/17/07 NOD
Heavy-Duty Diesel In-Use Compliance Regulation Approved amendments to the heavy-duty diesel engine regulations and test procedures to create a new in-use compliance program conducted by engine manufacturers. The amendments would help ensure compliance with applicable certification standards throughout an engine's useful life.	9/28/06 7/19/07 NOD
Revisions to OBD II and the Emission Warranty Regulations Approved amendments to the OBD II regulation to provide for improved emission control monitoring including air-fuel cylinder imbalance monitoring, oxygen sensor monitoring, catalyst monitoring, permanent fault codes for gasoline vehicles and new thresholds for diesel vehicles.	9/28/06 8/9/07 EO
Off-Highway Recreational Vehicle Amendments Approved amendments to the Off-Highway Recreational Vehicle Regulations including harmonizing evaporative emission standards with federal regulations, expanding the definition of ATVs, modifying labeling requirements, and adjusting riding seasons.	7/20/06 6/1/07 EO
Portable Equipment Registration Program (PERP) Amendments Approved amendments to the Statewide Portable Equipment Registration program that include installation of hour meters on equipment, and revisions to recordkeeping, reporting, and fees.	6/22/06 11/13/06 NOD
Heavy Duty Vehicle Service Information Approved amendments to the Service Information Rule to require manufacturers to make available diagnostic equipment and information for sale to the aftermarket.	6/22/06 5/3/07 EO
LEV II technical amendments Approved amendments to evaporative emission test procedures, four-wheel drive dynamometer provisions, and vehicle label requirements.	6/22/06 9/27/06 NOD
Dry Cleaning ATCM Amendments Approved amendments to the Dry Cleaning ATCM to limit siting of new dry cleaners, phase out use of Perc at co-residential facilities, phase out higher emitting Perc sources at other facilities, and require enhanced ventilation at existing and new Perc facilities.	5/25/06
Forklifts and other Large Spark Ignition (LSI) Equipment Adopted a regulation to reduce emissions from forklifts and other off-road spark-ignition equipment by establishing more stringent standards for new equipment, and requiring retrofits or engine replacement on existing equipment. Adopts EPA's standards for 2007; adopts more stringent standards for 2010.	5/25/06 3/2/07 EO
Enhanced Vapor Recovery Amendments Approved amendments to the vapor recovery system regulation and adopted revised test procedures.	5/25/06
Diesel Retrofit Technology Verification Procedure Approved amendments to the Diesel Emission In-use Control Strategy Verification Procedure to substitute a 30% increase limit in NOx concentration for an 80% reduction requirement from PM retrofit devices.	3/23/06 12/21/06 NOD
Heavy duty vehicle smoke inspection program amendments Approved amendments to impose a fine on trucks not displaying a current compliance certification sticker.	1/26/06 12/4/06 EO
Ocean-going Ship Auxiliary Engine Fuel Approved a regulation to require ships to use cleaner marine gas oil or diesel to power auxiliary engines within 24 nautical miles of the California coast.	12/8/05 10/20/06 EO
Diesel Cargo Handling Equipment Approved a regulation to require new and in-use cargo handling equipment at ports and intermodal rail yards to reduce emissions by utilizing best available control technology.	12/8/05 6/2/06 EO
Public and Utility Diesel Truck Fleets Approved a regulation to reduce diesel particulate matter emissions from heavy duty diesel trucks in government and private utility fleets.	12/8/05 10/4/06 EO

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Board Action	Hearing Date
Cruise ships – Onboard Incineration Adopted an Air Toxic Control Measure to prohibit cruise ships from conducting onboard incineration within three nautical miles of the California coast.	11/17/05 2/1/06 NOD
Inboard Marine Engine Rule Amendments Approved amendments to the 2001 regulation to include additional compliance options for manufacturers.	11/17/05 9/26/06 EO
Heavy-Duty Diesel Truck Idling Technology Approved a regulation to limit sleeper truck idling to 5 minutes. Allows alternate technologies to provide cab heating/cooling and power.	10/20/05 9/1/06 EO
Automotive Coating Suggested Control Measure Approved an SCM for automotive coatings for adoption by air districts. The measure will reduce the VOC content of 11 categories of surface protective coatings.	10/20/05
2007-09 Model-year heavy duty urban bus engines and the fleet rule for transit agencies Adopted amendments to align urban bus emission limits with on-road heavy duty truck emission limits and allow for the purchase of non-complying buses under the condition that bus turnover increase to offset NOx increases.	10/20/05 10/27/05 7/28/06 EO
Portable fuel containers (part 2 of 2) Approved amendments to revise spout and automatic shutoff design.	9/15/05 7/28/06 EO
Portable Fuel Containers (part 1 of 2) Approved amendments to include kerosene containers in the definition of portable fuel containers.	9/15/05 11/9/05 NOD
2007-09 Model-year heavy duty urban bus engines and the fleet rule for transit agencies Adopted amendments to require all transit agencies in SCAQMD to purchase only alternate fuel versions of new buses.	9/15/05 Superceded by 10/20/05
Reid vapor pressure limit emergency rule Approved amendments to relax Reid vapor pressure limit to accelerate fuel production for Hurricane Katrina victims.	9/8/05 Operative for September and October 2005 only
Heavy-Duty Truck OBD Approved a regulation to require on-board diagnostic (OBD) systems for new gas and diesel trucks, similar to the systems on passenger cars.	7/21/05 12/28/05 EO
Definition of Large Confined Animal Facility Adopted a regulation to define the size of a large CAF for the purposes of air quality permitting and reduction of ROG emissions to the extent feasible.	6/23/05 4/13/06 EO
ATCM for stationary compression ignition engines Approved emergency amendments (3/17/05) and permanent amendments (5/26/05) to relax the diesel PM emission limits on new stationary diesel engines to current off-road engine standards to respond to the lack of availability of engines meeting the original ATCM standard.	3/17/05 5/26/05 7/29/05 EO
Transit Fleet Rule Approved amendments to add emission limits for non-urban bus transit agency vehicles, require lower bus and truck fleet-average NOx and PM emission limits, and clarify emission limits for CO, NMHC, and formaldehyde.	2/24/05 10/19/05 NOD
Thermal Spraying ATCM Approved a regulation to reduce emissions of hexavalent chromium and nickel from thermal spraying operations.	12/9/04 7/20/05 EO
Tier 4 Standards for Small Off-Road Diesel Engines (SORE) Approved new emission standards for off-road diesel engines to be phased in between 2008 and 2015.	12/9/04 10/21/05 EO
Emergency Regulatory Amendment Delaying the January 1, 2005 Implementation Date for the Diesel Fuel Lubricity Standard Adopted an emergency regulation delaying the lubricity standard compliance deadline by five months to respond to fuel pipeline contamination problems.	11/24/04 12/10/04 EO
Enhanced vapor recovery compliance extension Approved amendments to the EVR regulation to extend the compliance date for onboard refueling vapor recovery compatibility to the date of EVR compliance.	11/18/04 2/11/05 EO
CaRFG Phase 3 amendments Approved amendments correcting errors and streamlining requirements for compliance and enforcement of CaRFG Phase 3 regulations adopted in 1999.	11/18/04
Clean diesel fuel for harborcraft and intrastate locomotives Approved a regulation that required harborcraft and locomotives operating solely within California to use clean diesel fuel.	11/18/04 3/16/05 EO
Nonvehicular Source, Consumer Product, and Architectural Coating Fee Regulation Amendment Approved amendments to fee regulations to collect supplemental fees when authorized by the Legislature.	11/18/04
Greenhouse gas limits for motor vehicles Approved a regulation that sets the first ever greenhouse gas emission standards on light and medium duty vehicles starting with the 2009 model year.	9/24/04 8/4/05 EO
Gasoline vapor recovery system equipment defects list Approved the addition of defects to the VRED list for use by compliance inspectors.	8/24/04 6/22/05 EO

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Board Action	Hearing Date
Unihose gasoline vapor recovery systems Approved an emergency regulation and an amendment to delay the compliance date for unihose installation to the date of dispenser replacement.	7/22/04 11/24/04 EO
General Idling Limits for Diesel Trucks Approved a regulation that limits idling of heavy-duty diesel trucks operating in California to five minutes, with exceptions for sleeper cabs.	7/22/04
Consumer Products Approved a regulation to reduce ROG emissions from 15 consumer products categories, prohibit the use of 3 toxic compounds in consumer products, ban the use of PDCB in certain products, allow for the use of Alternative Control Plans, and revise Test Method 310.	6/24/04 5/6/05 EO
Urban bus engines/fleet rule for transit agencies Approved amendments to allow for the purchase of hybrid diesel buses and revise the zero emission bus demonstration and purchase timelines.	6/24/04
Engine Manufacturer Diagnostics Approved a regulation that would require model year 2007 and later heavy duty truck engines to be equipped with engine diagnostic systems to detect malfunctions of the emission control system.	5/20/04
Chip Reflash Approved a voluntary program and a backstop regulation to reduce heavy duty truck NOx emissions through the installation of new software in the engine's electronic control module.	3/25/04 3/21/05 EO
Portable equipment registration program (PERP) Approved amendments to allow uncertified engines to be registered until December 31, 2005, to increase fees, and to modify administrative requirements.	2/26/04 1/7/05 EO 6/21/05 EO
Portable Diesel Engine ATCM Adopted a regulation to reduce diesel PM emissions from portable engines through a series of emission standards that increase in stringency through 2020.	2/26/04 1/4/05 EO
California motor vehicle service information rule Adopted amendments to allow for the purchase of heavy duty engine emission-related service information and diagnostic tools by independent service facilities and aftermarket parts manufacturers.	1/22/04 5/20/04
Transportation Refrigeration Unit ATCM Adopted a regulation to reduce diesel PM emissions from transport refrigeration units by establishing emission standards and facility reporting requirements to streamline inspections.	12/11/03 2/26/04 11/10/04 EO
Diesel engine verification procedures Approved amendments that reduced warranty coverage to the engine only, delayed the NOx reduction compliance date to 2007, added requirements for proof-of-concept testing for new technology, and harmonized durability requirements with those of U.S. EPA.	12/11/03 2/26/04 10/17/04
Chip Reflash Approved a voluntary program and a backstop regulation to reduce heavy duty truck NOx emissions through the installation of new software in the engine's electronic control module.	12/11/03 3/27/04 3/21/05 EO
Revised tables of maximum incremental reactivity values Approved the addition of 102 more chemicals with associated maximum incremental reactivity values to existing regulation allowing these chemicals to be used in aerosol coating formulations.	12/3/03
Stationary Diesel Engines ATCM Adopted a regulation to reduce diesel PM emissions from stationary diesel engines through the use of clean fuel, lower emission standards, operational practices.	11/20/03 12/11/03 2/26/2004 9/27/04 EO
Solid waste collection vehicles Adopted a regulation to reduce toxic diesel particulate emissions from solid waste collection vehicles by over 80 percent by 2010. This measure is part of ARB's plan to reduce the risk from a wide range of diesel engines throughout California.	9/25/03 5/17/04 EO
Small off-road engines (SORE) Adopted more stringent emission standards for the engines used in lawn and garden and industrial equipment, such as string trimmers, leaf blowers, walk-behind lawn mowers, generators, and lawn tractors.	9/25/03 7/26/04 EO
Off-highway recreational vehicles Changes to riding season restrictions.	7/24/03
Clean diesel fuel Adopted a regulation to reduce sulfur levels and set a minimum lubricity standard in diesel fuel used in vehicles and off-road equipment in California, beginning in 2006.	7/24/03 5/28/04 EO

Air Resources Board Control Measures, 1985 - 2016

Board Action	Hearing Date
Ozone Transport Mitigation Amendments Adopted amendments to require upwind districts to (1) have the same no-net-increase permitting thresholds as downwind districts, and (2) Adopt "all feasible measures."	5/22/03 10/2/03 NOD
Zero emission vehicles Updated California's ZEV requirements to support the fuel cell car development and expand sales of advanced technology partial ZEVs (like gasoline-electric hybrids) in the near-term, while retaining a role for battery electric vehicles.	3/27/03 12/19/03 EO
Heavy duty gasoline truck standards Aligned its existing rules with new, lower federal emission standards for gasoline-powered heavy-duty vehicles starting in 2008.	12/12/02 9/23/03 EO
Low emission vehicles II Minor administrative changes.	12/12/02 9/24/03 EO
Gasoline vapor recovery systems test procedures Approved amendments to add advanced vapor recovery technology certification and testing standards.	12/12/02 7/1/03 EO 10/21/03 EO
CaRFG Phase 3 amendments Approved amendments to allow for small residual levels of MTBE in gasoline while MTBE is being phased out and replaced by ethanol.	12/12/02 3/20/03 EO
School bus Idling Adopted a measure requiring school bus drivers to turn off the bus or vehicle engine upon arriving at a school and restart it no more than 30 seconds before departure in order to limit children's exposure to toxic diesel particulate exhaust.	12/12/02 5/15/03 EO
California Interim Certification Procedures for 2004 and Subsequent Model Year Hybrid-Electric Vehicles in the Urban Transit Bus and Heavy-Duty Vehicle Classes Regulation Amendment Adopted amendments to allow diesel-path transit agencies to purchase alternate fuel buses with higher NOx limits, establish certification procedures for hybrid buses, and require lower fleet-average PM emission limits.	10/24/02 9/2/03 EO
CaRFG Phase 3 amendments Approved amendments delaying removal of MTBE from gasoline by one year to 12/31/03.	7/25/02 11/8/02 EO
Diesel retrofit verification procedures, warranty, and in-use compliance requirements Adopted regulations to specify test procedures, warranty, and in-use compliance of diesel engine PM retrofit control devices.	5/16/02 3/28/03 EO
On-board diagnostics for cars Adopted changes to the On-Board Diagnostic Systems (OBD II) regulation to improve the effectiveness of OBD II systems in detecting motor vehicle emission-related problems.	4/25/02 3/7/03 EO
Voluntary accelerated light duty vehicle retirement regulations Establishes standards for a voluntary accelerated retirement program.	2/21/02 11/18/02 EO
Residential burning Adopted a measure to reduce emissions of toxic air contaminants from outdoor residential waste burning by eliminating the use of burn barrels and the outdoor burning of residential waste materials other than natural vegetation.	2/21/02 12/18/02 EO
California motor vehicle service information rule Adopted regulations to require light- and medium-duty vehicle manufacturers to offer for sale emission-related service information and diagnostic tools to independent service facilities and aftermarket parts manufacturers.	12/13/01 7/31/02 EO
Vapor recovery regulation amendments Adopted amendments to expand the list of specified defects requiring equipment to be removed from service.	11/15/01 9/27/02 EO
Distributed generation guidelines and regulations Adopted regulations requiring the permitting by ARB of distributed generation sources that are exempt from air district permitting and approved guidelines for use by air districts in permitting non-exempt units.	11/15/01 7/23/02 EO
Low emission vehicle regulations (LEV II) Approved amendments to apply PM emission limits to all new gasoline vehicles, extend gasoline PZEV emission limits to all fuel types, and streamline the manufacturer certification process.	11/15/01 8/6/02 EO
Gasoline vapor recovery systems test methods and compliance procedures Adopted amendments to add test methods for new technology components, streamline test methods for liquid removal equipment, and***.	10/25/01 7/9/02 EO
Heavy-duty diesel trucks Adopted amendments to emissions standards to harmonize with EPA regulations for 2007 and subsequent model year new heavy-duty diesel engines.	10/25/01
Automotive coatings Adopted Air Toxic Control Measure which prohibits the sale and use in California of automotive coatings that contain hexavalent chromium or cadmium.	9/20/01 9/2/02 EO

Air Resources Board Control Measures, 1985 - 2016

Board Action	Hearing Date
Inboard and sterndrive marine engines Lower emission standards for 2003 and subsequent model year inboard and sterndrive gasoline-powered engines in recreational marine vessels.	7/26/01 6/6/02 EO
Asbestos from construction, grading, quarrying, and surface mining Adopted an Airborne Toxic Control Measure for construction, grading, quarrying, and surface mining operations requiring dust mitigation for construction and grading operations, road construction and maintenance activities, and quarries and surface mines to minimize emissions of asbestos-laden dust.	7/26/01 6/7/02 EO
Zero emission vehicle infrastructure and standardization of electric vehicle charging equipment Adopted amendments to the ZEV regulation to alter the method of quantifying production volumes at joint-owned facilities and to add specifications for standardized charging equipment.	6/28/01 5/10/02 EO
Pollutant transport designation Adopted amendments to add two transport couples to the list of air basins in which upwind areas are required to adopt permitting thresholds no less stringent than those adopted in downwind areas.	4/26/01
Zero emission vehicle regulation amendments Adopted amendments to reduce the numbers of ZEVs required in future years, add a PZEV category and grant partial ZEV credit, modify the ZEV range credit, allow hybrid-electric vehicles partial ZEV credit, grant ZEV credit to advanced technology vehicles, and grant partial ZEV credit for several other minor new programs.	1/25/01 12/7/01 EO 4/12/02 EO
Heavy duty diesel engines supplemental test procedures Approved amendments to extend "Not-To-Exceed" and EURO III supplemental test procedure requirements through 2007 when federal requirements will include these tests.	12/7/00
Light and medium duty low emission vehicle alignment with federal standards Approved amendments that require light and medium duty vehicles sold in California to meet the more restrictive of state or federal emission standards.	12/7/00 12/27/00 EO
Exhaust emission standards for heavy duty gas engines Adopted amendments that establish 2005 emission limits for heavy duty gas engines that are equivalent to federal limits.	12/7/00 12/27/00 EO
CaRFG Phase 3 amendments Approved amendments to regulate the replacement of MTBE in gasoline with ethanol.	11/16/00 4/25/01 EO
CaRFG Phase 3 test methods Approved amendments to gasoline test procedures to quantify the olefin content and gasoline distillation temperatures.	11/16/00 7/11/01 EO 8/28/01 EO
Antiperspirant and deodorant regulations Adopted amendments to relax a 0% VOC limit to 40% VOC limit for aerosol antiperspirants.	10/26/00
Diesel risk reduction plan Adopted plan to reduce toxic particulate from diesel engines through retrofits on existing engines, tighter standards for new engines, and cleaner diesel fuel.	9/28/00
Conditional rice straw burning regulations Adopted regulations to limit rice straw burning to fields with demonstrated disease rates reducing production by more than 5 percent.	9/28/00
Asbestos from unpaved roads Tightened an existing Air Toxic Control Measure to prohibit the use of rock containing more than 0.25% asbestos on unsurfaced roads.	7/20/00
Aerosol Coatings Approved amendments to replace mass-based VOC limits with reactivity-based limits, add a table of Maximum Incremental Reactivity values, add limits for polyolefin adhesion promoters, prohibit use of certain toxic solvents, and make other minor changes.	6/22/00 5/1/01 EO
Consumer products aerosol adhesives Adopted amendments to delete a 25% VOC limit by 2002, add new VOC limits for six categories of adhesives, prohibit the use of toxic solvents, and add new labeling and reporting requirements.	5/25/00 3/14/01 EO
Automotive care products Approved an Air Toxic Control Measure to eliminate use of perchloroethylene, methylene chloride, and trichloroethylene in automotive products such as brake cleaners and degreasers.	4/27/00 2/28/01 EO
Enhanced vapor recovery emergency regulation Adopted a four-year term for equipment certifications.	5/22/01 EO

Air Resources Board Control Measures, 1985 - 2016

Board Action	Hearing Date
Enhanced vapor recovery Adopted amendments to require the addition of components to reduce spills and leakage, adapt to onboard vapor recovery systems, and continuously monitor system operation and report equipment leaks immediately.	3/23/00 7/25/01 EO
Agricultural burning smoke management Adopted amendments to add marginal burn day designations, require day-specific burn authorizations by districts, and smoke management plans for larger prescribed burn projects.	3/23/00 1/22/01 EO
Urban transit buses Adopted a public transit bus fleet rule and emissions standards for new urban buses that mandates a lower fleet-average NOx emission limit, PM retrofits, lower sulfur fuel use, and purchase of specified percentages of zero emission buses in future years.	1/27/00 2/24/00 11/22/00 EO 5/29/01 EO
Small Off-Road (diesel) Equipment (SORE) Adopted amendments to conform with new federal requirements for lower and engine power-specific emission limits, and for the averaging, banking, and trading of emissions among SORE manufacturers.	1/28/00
CaRFG Phase 3 MTBE phase out Adopted regulations to enable refiners to produce gasoline without MTBE while preserving the emissions benefits of Phase 2 cleaner burning gasoline.	12/9/99 6/16/00 EO
Consumer products – mid-term measures II Adopted a regulation which adds emission limits for 2 new categories and tightens emission limits for 15 categories of consumer products.	10/28/99
Portable fuel cans Adopted a regulation requiring that new portable fuel containers, used to refuel lawn and garden equipment, motorcycles, and watercraft, be spill-proof beginning in 2001.	9/23/99 7/6/00 EO
Clean fuels at service stations Adopted amendments rescinding requirements applicable to SCAB in 1994-1995, modifying the formula for triggering requirements, and allowing the Executive Officer to make adjustments to the numbers of service stations required to provide clean fuels.	7/22/99
Gasoline vapor recovery Adopted amendments to certification and test methods.	6/24/99
Reformulated gasoline oxygenate Adopted amendments rescinding the requirement for wintertime oxygenate in gasoline sold in the Lake Tahoe Air Basin and requiring the statewide labeling of pumps dispensing gasoline containing MTBE.	6/24/99
Marine pleasurecraft Adopted regulations to control emissions from spark-ignition marine engines, specifically, outboard marine engines and personal watercraft.	12/11/98 2/17/00 EO 6/14/00 EO
Voluntary accelerated light duty vehicle retirement Adopted regulation setting standards for voluntary accelerated retirement program.	12/10/98 10/22/99 EO
Off-highway recreational vehicles and engines Approved amendments to allow non-complying vehicles to operate in certain seasons and in certain ORV-designated areas.	12/10/98 10/22/99 EO
On-road motorcycles Amended on-road motorcycle regulations, to lower the tailpipe emission standards for ROG and NOx.	12/10/98
Portable equipment registration program (PERP) Approved amendments to exclude non-dredging equipment operating in OCS areas and equipment emitting hazardous pollutants, include NSPS Part OOO rock crushers, require SCR emission limits and onshore emission offsets from dredging equipment operating in OCS areas, set catalyst emission limits for gasoline engines, and relieve certain retrofitted engines from periodic source testing.	12/10/98
Liquid petroleum gas motor fuel specifications Approved amendment rescinding 5% propene limit and extending 10% limit indefinitely.	12/11/98
Reformulated gasoline Approved amendments to rescind the RVP exemption for fuel with 10% ethanol and allow for oxygen contents up to 3.7% if the Predictive Model weighted emissions to not exceed original standards.	12/11/98
Consumer products Adopted amendments to add new VOC test methods, to modify Method 310 to quantify low vapor pressure VOC (LVP-VOC) constituents, and to exempt LVP-VOC from VOC content limits	11/19/98
Consumer products Approved amendments to extend the 1999 VOC compliance deadline for several aerosol coatings, antiperspirants and deodorants, and other consumer products categories to 2002, to exempt methyl acetate from the VOC definition, and make other minor changes.	11/19/98

Air Resources Board Control Measures, 1985 - 2016

Board Action	Hearing Date
Low-emission vehicle program (LEV II) Adopted regulations adding exhaust emission standards for most sport utility vehicles, pick-up trucks and mini-vans, lowering tailpipe standards for cars, further reducing evaporative emission standards, and providing additional means for generating zero-emission vehicle credits.	11/5/98 9/17/99 EO
Off-road engine aftermarket parts Approved implementation of a new program to test and certify aftermarket parts in gasoline and diesel, light-duty through heavy duty, engines used in off-road vehicles and equipment.	11/19/98 10/1/99 EO 7/18/00 EO
Off-road spark ignition engines Adopted new emission standards for small and large spark ignition engines for off-road equipment, a new engine certification program, an in-use compliance testing program, and a three-year phase-in for large LSI.	10/22/98
Gasoline deposit control additives Adopted amendments to decertify pre-RFG additives, tighten the inlet valve deposit limits, add a combustion chamber deposit limit, and modify the test procedures to align with the characteristics of reformulated gasoline formulations.	9/24/98 4/5/99 EO
Stationary source test methods Adopted amendments to stationary source test methods to align better with federal methods.	8/27/98 7/2/99 EO
Locomotive MOA for South Coast Memorandum of agreement (MOA) signed by ARB, U.S. EPA and major railroads to concentrate cleaner locomotives in the South Coast by 2010 and fulfill 1994 ozone SIP commitment.	7/2/98
Gasoline vapor recovery Adopted amendments to certification and test methods to add methods for onboard refueling vapor recovery, airport refuelers, and underground tank interconnections, and make minor changes to existing methods.	5/21/98 8/27/98
Reformulated gasoline Approved amendments to rescind the wintertime oxygenate requirement, allow for sulfur content averaging, and make other minor technical amendments.	8/27/98
Ethylene oxide sterilizers Adopted amendments to the ATCM to streamline source testing requirements, add EtO limits in water effluent from control devices, and make other minor changes.	5/21/98
Chrome platers Adopted amendments to ATCM to harmonize with requirements of federal NESHAP standards for chrome plating and chromic acid anodizing facilities.	5/21/98
On-road heavy-duty vehicles Approved amendments to align on-road heavy duty vehicle engine emission standards with EPA's 2004 standards and align certification, testing, maintenance, and durability requirements with those of U.S. EPA.	4/23/98 2/26/99 EO
Small off-road engines (SORE) Approved amendments to grant a one-year delay in implementation, relaxation of emissions standards for non-handheld engines, emissions durability requirements, averaging/banking/trading, harmonization with the federal diesel engine regulation, and modifications to the production line testing requirements.	3/26/98
Heavy duty vehicle smoke inspection program Adopted amendments to require annual smoke testing, set opacity limits, and exempt new vehicles from testing for the first four years.	12/11/97 3/2/98 EO
Consumer products (hairspray credit program) Adopted standards for the granting of tradable emission reduction credits achieved by sales of hairspray products having VOC contents less than required limits.	11/13/97
Light-duty vehicle off-cycle emissions Adopted standards to control excess emissions from aggressive driving and air conditioner use in light duty vehicles and added two light duty vehicle test methods for certification of new vehicles under these standards.	7/24/97 3/19/98 EO
Consumer products Adopted amendments to add VOC limits to 18 categories of consumer products used in residential and industrial cleaning, automobile maintenance, and commercial poisons.	7/24/97
Enhanced evaporative emissions standards Adopted amendments extending the compliance date for ultra-small volume vehicle manufacturers by one year.	5/22/97
Emission reduction credit program Adopted standards for District establishment of ERC programs including certification, banking, use limitation, and reporting requirements.	5/22/97

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Board Action	Hearing Date
Lead as a toxic air contaminant Adopted an amendment to designate inorganic lead as a toxic air contaminant.	4/24/97
Consumer products (hair spray) Adopted amendments to (1) delay a January 1, 1998, compliance deadline to June 1, 1999, (2) require progress plans from manufacturers, and (3) authorize the Executive Officer to require VOC mitigation when granting variances from the June 1, 1999 deadline.	3/27/97
Portable engine registration program (PERP) Adopted standards for (1) the permitting of portable engines by ARB and (2) District recognition and enforcement of permits.	3/27/97
Liquefied petroleum gas Adopted amendments to extend the compliance deadline from January 1, 1997, to January 1, 1999, for the 5% propene limit in liquefied petroleum gas used in motor vehicles.	3/27/97
Onboard diagnostics, phase II Adopted amendments to extend the phase-in of enhanced catalyst monitoring, modify misfire detection requirements, add PVC system and thermostat monitoring requirements, and require manufacturers to sell diagnostic tools and service information to repair shops.	12/12/96
Consumer products Adopted amendments to delay 25% VOC compliance date for aerosol adhesives, clarify portions of the regulation, exempt perchloroethylene from VOC definition, extend the sell-through time to three years, and add perchloroethylene reporting requirements.	11/21/96
Consumer products (test method) Adopted an amendment to add Method 310 for the testing of VOC content in consumer products.	11/21/96
Pollutant transport designation Adopted amendments to modify transport couples from the Broader Sacramento area and add couples to the newly formed Mojave Desert and Salton Sea Air Basins.	11/21/96
Diesel fuel certification test methods Approved amendments specifying the test methods used for quantifying the constituents of diesel fuel.	10/24/96 6/4/97 EO
Wintertime requirements for utility engines & off-highway vehicles Optional hydrocarbon and NOx standards for snow throwers and ice augers, raising CO standard for specialty vehicles under 25hp.	9/26/96
Large off-road diesel Statement of Principles National agreement between ARB, U.S. EPA, and engine manufacturers to reduce emissions from heavy-duty off-road diesel equipment four years earlier than expected in the 1994 SIP for ozone.	9/13/96
Regulatory improvement initiative Rescinded two regulations relating to fuel testing in response to Executive Order W-127-95.	5/30/96
Zero emission vehicles Adopted amendments to eliminate zero emission vehicle quotas between 1998 and 2002, and approved MOUs with seven automobile manufacturers to accelerate release of lower emission "49 state" vehicles.	3/28/96 7/24/96 EO
CaRFG variance requirements Approved amendments to add a per gallon fee on non-compliant gasoline covered by a variance and to made administrative changes in variance processing and extension.	1/25/96 2/5/96 EO 4/2/96 EO
Utility and lawn and garden equipment engines Adopted an amendment to relax the CO standard from 300 to 350 ppm for Class I and II utility engines.	1/25/96
National security exemption of military tactical vehicles Such vehicles would not be required to adhere to exhaust emission standards.	12/14/95
CaRFG regulation amendments Approved amendments to allow for downstream addition of oxygenates and expansion of compliance options for gasoline formulation.	12/14/95
Required additives in gasoline (deposit control additives) Terms, definitions, reporting requirements, and test procedures for compliance are to be clarified.	11/16/95
CaRFG test method amendments Approved amendments to designate new test methods for benzene, aromatic hydrocarbon, olefin, and sulfur content of gasoline.	10/26/95
Motor vehicle inspection and maintenance program Handled by BAR.	10/19/95 by BAR
Antiperspirants and deodorants, consumer products, and aerosol coating products Ethanol exemption for all products, modifications to aerosol special requirements, modifications for regulatory language consistency, modifications to VOC definition.	9/28/95

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Board Action	Hearing Date
Low emission vehicle (LEV III) standards Reactivity adjustment factors, introduction of medium-duty ULEVs, window labels, and certification requirements and test procedures for LEVs.	9/28/95
Medium- and heavy-duty gasoline trucks Expedited introduction of ultra-low emission medium-duty vehicles and lower NOx emission standards for heavy-duty gasoline trucks to fulfill a 1994 ozone SIP commitment.	9/1/95
Retrofit emission standards: all vehicle classes to be included in the alternate durability test plan, kit manufacturers to be allowed two years to validate deterioration factors under the test plan, update retrofit procedures allowing manufacturers to disable specific OBDs if justified by law.	7/27/95
Gasoline vapor recovery systems Adopts revised certification and test procedures.	6/29/95
Onboard refueling vapor recovery standards 1998 and subsequent MY engine cars, LD trucks, and MD trucks less than 8500 GVWR.	6/29/1995 4/24/96 EO
Heavy duty vehicle exhaust emission standards for NOx Amendments to standards and test procedures for 1985 and subsequent MY HD engines, amendments to emission control labels, amendments to Useful Life definition and HD engines and in-use vehicle recalls.	6/29/95
Aerosol coatings regulation Adopted regulation to meet California Clean Air Act requirements and a 1994 ozone SIP commitment.	3/23/95
Periodic smoke inspection program Delays start of PSIP from 1995 to 1996.	12/8/94
Onboard diagnostics phase II Amendments to clarify regulation language, ensure maximum effectiveness, and address manufacturer concerns regarding implementation.	12/8/94
Alternative control plan (ACP) for consumer products A voluntary, market-based VOC emissions cap upon a grouping of consumer products, flexible by manufacturer that will minimize overall costs of emission reduction methods and programs.	9/22/94
Diesel fuel certification: new specifications for diesel engine certification fuel, amended oxygen specification for CNG certification fuel, and amended commercial motor vehicle liquefied petroleum gas regulations.	9/22/94
Utility and lawn and garden equipment (UGLE) engines Modification to emission test procedures, ECLs, defects warranty, quality-audit testing, and new engine compliance testing.	7/28/94
Evaporative emissions standards and test procedures Adopted evaporative emissions standards for medium-duty vehicles.	2/10/94
Off-road recreational vehicles Adopted emission control regulations for off-road motorcycles, all-terrain vehicles, go-karts, golf carts, and specialty vehicles.	1/1/94
Perchloroethylene from dry cleaners Adopted measure to control perchloroethylene emissions from dry cleaning operations.	10/1/93
Wintertime oxygenate program Amendments to the control time period for San Luis Obispo County, exemption for small retailers bordering Nevada, flexibility in gasoline delivery time, calibration of ethanol blending equipment, gasoline oxygen content test method.	9/9/93
Onboard diagnostic phase II	7/9/93
Urban transit buses Amended regulation to tighten state NOx and particulate matter (PM) standards for urban transit buses beyond federal standards beginning in 1996.	6/10/93
1-year implementation delay in emission standards for utility engines	4/8/93
Non-ferrous metal melting Adopted Air Toxic Control Measure for emissions of cadmium, arsenic, and nickel from non-ferrous metal melting operations.	1/1/93
Certifications requirements for low emission passenger cars, light-duty trucks & medium duty vehicles	1/14/93
Airborne toxic control measure for emissions of toxic metals from non-ferrous metal melting	12/10/92
Periodic self-inspection program Implemented state law establishing a periodic smoke self-inspection program for fleets operating heavy-duty diesel-powered vehicles.	12/10/92
Notice of general public interest for consumer products	11/30/92
Substitute fuel or clean fuel incorporated test procedures	11/12/92

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Board Action	Hearing Date
New vehicle testing using CaRFG Phase 2 gasoline Approved amendments to require the use of CaRFG Phase 2 gasoline in the certification of exhaust emissions in new vehicle testing.	8/13/92
Standards and test procedures for alternative fuel retrofit systems	5/14/92
Alternative motor vehicle fuel certification fuel specification	3/12/92
Heavy-duty off-road diesel engines Adopted the first exhaust emission standards and test procedures for heavy-duty off-road diesel engines beginning in 1996.	1/9/92
Consumer Products - Tier II Adopted Tier II of regulations to reduce emissions from consumer products.	1/9/92
Wintertime oxygen content of gasoline Adopted regulation requiring the addition of oxygenates to gasoline during winter to satisfy federal Clean Air Act mandates for CO nonattainment areas.	12/1/91
CaRFG Phase 2 Adopted CaRFG phase 2 specifications including lowering vapor pressure, reducing the sulfur, olefin, aromatic, and benzene content, and requiring the year-round addition of oxygenates to achieve reductions in ROG, NOx, CO, oxides of sulfur (SOx) and toxics.	11/1/91
Low emissions vehicles amendments revising reactivity adjust factor (RAF) provisions and adopting a RAF for M85 transitional low emission vehicles	11/14/91
Onboard diagnostic, phase II	11/12/91
Onboard diagnostics for light-duty trucks and light & medium-duty motor vehicles	9/12/91
Utility and lawn & garden equipment Adopted first off-road mobile source controls under the California Clean Air Act regulating utility, lawn and garden equipment.	12/1/90
Control for abrasive blasting	11/8/90
Roadside smoke inspections of heavy-duty vehicles Adopted regulations implementing state law requiring a roadside smoke inspection program for heavy-duty vehicles.	11/8/90
Consumer Products Tier I Adopted Tier I of standards to reduce emissions from consumer products.	10/11/90
CaRFG Phase I Adopted CaRFG Phase I reformulated gasoline regulations to phase-out leaded gasoline, reduce vapor pressure, and require deposit control additives.	9/1/90
Low-emission vehicle (LEV) and clean fuels Adopted the landmark LEV/clean fuel regulations which called for the gradual introduction of cleaner cars in California. The regulations also provided a mechanism to ensure the availability of alternative fuels when a certain number of alternative fuel vehicles are sold.	9/1/90
Evaporative emissions from vehicles Modified test procedure to include high temperatures (up to 105 F) and ensure that evaporative emission control systems function properly on hot days.	8/9/90
Dioxins from medical waste incinerators Adopted Airborne Toxic Control Measure to reduce dioxin emissions from medical waste incinerators.	7/1/90
CA Clean Air Act guidance for permitting Approved California Clean Air Act permitting program guidance for new and modified stationary sources in nonattainment areas.	7/1/90
Consumer products BAAQMD	6/14/90
Medium duty vehicle emission standards Adopted three new categories of low emission MDVs, required minimum percentages of production, and established production credit and trading.	6/14/90
Medium-duty vehicles Amended test procedures for medium-duty vehicles to require whole-vehicle testing instead of engine testing. This modification allowed enforcement of medium-duty vehicle standards through testing and recall.	6/14/90
Ethylene oxide sterilizers Adopted Airborne Toxic Control Measure to reduce ethylene oxide emissions from sterilizers and aerators.	5/10/90
Asbestos in serpentine rock Adopted Airborne Toxic Control Measure for asbestos-containing serpentine rock in surfacing applications.	4/1/90
Certification procedure for aftermarket parts	2/8/90
Antiperspirants and deodorants Adopted first consumer products regulation, setting standards for antiperspirants and deodorants.	11/1/89

Air Resources Board Control Measures, 1985 - 2016

Board Action	Hearing Date
Residential woodstoves Approved suggested control measure for the control of emissions from residential wood combustion.	11/1/89
On-Board Diagnostic Systems II Adopted regulations to implement the second phase of on-board diagnostic requirements which alert drivers of cars, light-trucks and medium-duty vehicles when the emission control system is not functioning properly.	9/1/89
Cars and light-duty trucks Adopted regulations to reduce ROG and CO emissions from cars and light trucks by 35 percent.	6/1/89
Architectural coatings Approved a suggested control measure to reduce ROG emissions from architectural coatings.	5/1/89
Chrome from cooling towers Adopted Airborne Toxic Control Measure to reduce hexavalent chromium emissions from cooling towers.	3/1/89
Reformulated Diesel Fuel Adopted regulations requiring the use of clean diesel fuel with lower sulfur and aromatic hydrocarbons beginning in 1993.	11/1/88
Vehicle Recall Adopted regulations implementing a recall program which requires auto manufacturers to recall and fix vehicles with inadequate emission control systems (Vehicles are identified through in-use testing conducted by the ARB).	9/1/88
Suggested control measure for oil sumps Approved a suggested control measure to reduce emissions from sumps used in oil production operations.	8/1/88
Chrome platers Adopted Airborne Toxic Control Measure to reduce emissions of hexavalent chromium emissions from chrome plating and chromic acid anodizing facilities.	2/1/88
Suggested control measure for boilers Approved suggested control measure to reduce NOx emissions from industrial, institutional, and commercial boilers, steam generators and process heaters.	9/1/87
Benzene from service stations Adopted Airborne Toxic Control Measure to reduce benzene emissions from retail gasoline service stations (Also known as Phase II vapor recovery).	7/1/87
Agricultural burning guidelines Amended existing guidelines to add provisions addressing wildland vegetation management.	11/1/86
Heavy-duty vehicle certification Amended certification of heavy-duty diesel and gasoline-powered engines and vehicles to align with federal standards.	4/1/86
Cars and light-duty trucks Adopted regulations reducing NOx emissions from passenger cars and light-duty trucks by 40 percent.	4/1/86
Sulfur in diesel fuel Removed exemption for small volume diesel fuel refiners.	6/1/85
On-Board Diagnostics I Adopted regulations requiring the use of on-board diagnostic systems on gasoline-powered vehicles to alert the driver when the emission control system is not functioning properly.	4/1/85
Suggested control measure for wood coatings Approved a suggested control measure to reduce emissions from wood furniture and cabinet coating operations.	3/1/85
Suggested control measure for resin manufacturing Approved a suggested control measure to reduce ROG emissions from resin manufacturing.	1/1/85