FINAL

2016 VENTURA COUNTY AIR QUALITY MANAGEMENT PLAN

Adopted by the
Ventura County Air Pollution Control Board

February 14, 2017

VENTURA COUNTY
AIR POLLUTION CONTROL DISTRICT

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Acronyms

µg/m3	micrograms per cubic meter
AB	Assembly Bill
ACM	Asymmetric Convective Model
AERO	AEROsol
AERR	Air Emissions Reporting Requirements
AIM	Aerosol Inorganic Model
APCB	Air Pollution Control Board
APCD	Air Pollution Control District
APCO	Air Pollution Control Officer
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
ATADS	Federal Aviation Administration Air Traffic Activity Data System
ATCM	Air Toxic Control Measure
BACM	Best Available Control Measures
BACT	Best Available Control Technology
BAR	California Bureau of Automotive Repair
BARCT	Best Available Retrofit Control Technology
BMP	Best Management Practices
Btu	British thermal units
CAA	Clean Air Act
CAAA	federal Clean Air Act Amendments
CAIRS	California All Incident Reporting System
CALMET	CALifornia METeorological model
Caltrans	California Department of Transportation
CAMx	Comprehensive Air Quality Model with Extensions
CBD	Central Business District
CBP	County Business Patterns
CCAA	California Clean Air Act
CE	Control Efficiency
CEFS	California Emissions Forecasting System
CEIDARS	California Emission Inventory Development and Reporting System
CEPAM	California Emission Projection Analysis Model
CEQA	California Environmental Quality Act
CF	Control Factor
CFR	Code of Federal Regulations
CH&SC	California Health and Safety Code
CHC	Commercial Harbor Craft
CMAQ	Community Multiscale Air Quality Model (Model)
CMAQ	Congestion Mitigation Air Quality

CNG	Compressed Natural Gas
CO	Carbon Monoxide
CTG	Control Technique Guidelines
CURB	City Urban Restriction Boundary
District	Ventura County Air Pollution Control District
DMV	California Department of Motor Vehicles
DOF	California Department of Finance
DOGGR	California Department of Oil, Gas and Geothermal Resources
DPR	California Department of Pesticide Regulation
DTIM	Delivery Traffic Indication Message
EBI	Euler Backward Iterative
EC	Elemental Carbon
EDMS	Emissions and Dispersion Modeling System
EES	Emission Estimation System
EIA	U.S. Department of Energy, Energy Information Administration
EIC	Emissions Inventory Code
EITAC	Emissions Inventory Technical Advisory Committee
EMFAC	EMission FACtors on-road vehicles model
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPP	Early Progress Plan
ERC	Emission Reduction Credit
FAA	Federal Aviation Administration
FAF	Freight Analysis Framework
FAST Act	Fixing America's Surface Transportation Act
FDDA	Four Dimensional Data Assimilation
FERA	Fire and Environmental Research Applications
FHWA	Federal Highway Administration
FIP	Federal Implementation Plan
FLLG	Fixed Liquid Level Gauge
FR	Federal Register
FRIS	Farm and Ranch Irrigation Survey
FRM	Federal Reference Method
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GDF	Gasoline Dispensing Facility
GF	Growth Factor
GHG	Greenhouse Gas
GODAE	Global Ocean Data Assimilation Experiment
HDV	Heavy Duty Vehicle
HOV	High Occupancy Vehicle
hPa	hectopascal (100 pascals)

I&M	Inspection and Maintenance Program
IF	Implementation Factor
IRP	International Registration Plan
ITS	Intelligent Transportation Systems
LAER	Lowest Achievable Emission Rate
LAFCO	Local Agency Formation Commission
LCFS	Low Carbon Fuel Standard
LDV	Light Duty Vehicle
LEV	Low Emission Vehicle
LMI	Labor Management Information
LPG	Liquefied Propane Gas
m	meters
MM	million
MM5	fifth generation Penn State/NCAR Mesoscale Model
MODIS	MODerate resolution Imaging Spectroradiometer
MOZART	Model for OZone And Related chemical Tracers
mph	miles per hour
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NAM	North American Mesoscale
NARR	North American Regional Reanalysis
NBVC	Naval Base Ventura County
NCAR	National Center for Atmospheric Research
NCEP	National Center for Environmental Prediction
NEI	National Emissions Inventory
NFIRS	National Fire Incident Reporting System
ng/j	nanograms per joule
NH3	Ammonia
NH4	Ammonium Ion
NO2	Nitrogen Dioxide
NO3	Nitrate Ion
NOD	Notice of Decision
NOx	Nitrogen Oxides
NSR	New Source Review
O3	Ozone
OBDII	On-Board Diagnostics II
OC	Organic Carbon
OCS	Outer Continental Shelf
OGV	Ocean-Going Vessel
ORVR	Onboard Refueling Vapor Recovery
PBL	Planetary Boundary Layer
PeMS	(Caltrans) Performance Measurement System

PERP	Portable Equipment Registration Program
PES	Pacific Environmental Services
PM	Particulate Matter
PM10	Particulate Matter less than 10 micrometers in diameter (coarse particulate matter)
PM2.5	Particulate Matter less than 2.5 micrometers in diameter (fine particulate matter)
ppb	parts per billion
ppm	parts per million
PPM	Piecewise Parabolic Method
PSD	Prevention of Significant Deterioration
QA	Quality Assurance
QC	Quality Control
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
REMI	Regional Economic Models, Inc.
RFG	Reformulated Gasoline
RFP	Reasonable Further Progress
ROC	Reactive Organic Compounds
ROG	Reactive Organic Gases
RRF	Relative Response Factor
RRTM	Rapid Radiative Transfer Model
RTP	Regional Transportation Plan
SAPRC	Statewide Air Pollution Research Center
SASS	Speciation Air Sampler System
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCC	South Central Coast
SCG	SoCal Gas Company
SCRAM	Support Center for Regulatory Air Models
SCS	Sustainable Communities Strategy
SG	Scenario Generating
SIP	State Implementation Plan
SO2	Sulfur Dioxide
SO4	Sulfate Ion
SOAR	Save Open Space and Agricultural Resources
SST	Sea Surface Temperature
State Strategy	ARB's 2007 State Implementation Plan
TCM	Transportation Control Measure
TDM	Transportation Demand Management
TEOR	Thermally Enhanced Oil Recovery
TOC	Total Organic Compounds

TOG	Total Organic Gases
tpd	tons per day
TRU	Transport Refrigeration Unit
UCAR	University Corporation for Atmospheric Research
UCR	University of California, Riverside
USDA	United States Department of Agriculture
USFS	United States Forest Service
USGS	United States Geological Survey
VC	Ventura County
VCAPCD	Ventura County Air Pollution Control District
VCTC	Ventura County Transportation Commission
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WOE	Weight of Evidence
WRF	Weather Research and Forecast
WSM	WRF Single Moment
YSU	YonSei University
ZEV	Zero Emission Vehicle

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EXECUTIVE SUMMARY

Purpose

Pursuant to the federal Clean Air Act Amendments (CAAA) of 1990, the 2016 Ventura County Air Quality Management Plan (AQMP) presents Ventura County's: 1) strategy to attain the 2008 federal 8-hour ozone standard; 2) attainment demonstration for the federal 8-hour ozone standard; and, 3) reasonable further progress demonstration for the federal 8-hour ozone standard.

Background

The CAAA established clean air plan requirements for areas that exceed the National Ambient Air Quality Standards (NAAQS). These areas, called nonattainment areas, must develop and implement clean air plans to attain the NAAQS by specified dates. Clean air plans, also called Air Quality Management Plans, Nonattainment Plans, or State Implementation Plans (SIP), describe how an area, such as Ventura County, will attain the NAAQS.

Each state is responsible for implementing the CAAA within its jurisdiction. California state law designates the California Air Resources Board (ARB) as California's lead agency for all purposes set forth in the CAAA, including preparation of the California SIP. State law further specifies that the ARB must adopt clean air plans approved by local air districts, unless the ARB finds, after a public hearing, that a local clean air plan will not meet the requirements of the CAAA. ARB must submit SIPs and SIP revisions to the U.S. Environmental Protection Agency (EPA) for approval. The provisions and commitments in SIPs are federally enforceable.

On March 12, 2008, EPA strengthened its NAAQS for ground-level ozone, the principal component of photochemical smog, to improve public health protection. EPA revised the 8-hour "primary" ozone standard, designed to protect public health, to a level of 0.075 parts per million (ppm). The previous standard, set in 1997, was 0.08 ppm.

EPA also strengthened the secondary 8-hour ozone standard to 0.075 ppm making it identical to the revised primary standard. Secondary standards provide public welfare protection, including protection against decreased atmospheric visibility and damage to animals, crops, vegetation, and buildings. Current ozone air quality concentrations in many areas of the country – including some areas that meet the 1997 ozone standards – are still high enough to harm sensitive vegetation, including agricultural crops and ecosystems.

Attainment Strategy

Building on previous Ventura County AQMPs, the 2016 AQMP presents a combined local and state clean air strategy based on concurrent reactive organic gases (ROG) and nitrogen oxides (NOx) emission reductions to bring Ventura County into attainment of the 2008 federal 8-hour ozone standard. ROG and NOx emitted by both anthropogenic and natural sources react in the

atmosphere to produce photochemical smog. Ventura County was the first area in the nation to institute such a dual-emissions strategy for meeting ozone standards.

The 2016 AQMP control strategy consists of a local component implemented by the Ventura County Air Pollution Control District (APCD or District) and a combined state and federal component implemented by the ARB and EPA. The local strategy includes emission control measures carried forward from previous Ventura County clean air plans plus new and further study emission control measures. It also includes a transportation conformity budget that sets the maximum amount of on-road motor vehicle emissions produced while continuing to demonstrate progress towards attainment.

The new control measures are proposed new rules and revisions to existing Ventura County APCD rules that District staff has found practicable for Ventura County. The further study measures are proposals that may help Ventura County achieve the federal and state ozone standards but need additional air quality, feasibility, and environmental scrutiny before District staff can recommend them for adoption as District rules. They will become District rules and be implemented only if the District's governing board finds them to be practicable and appropriate for Ventura County. Both the new control measures and those further study measures recommended for adoption by District staff will also serve to meet the "every feasible measure" requirement of the California Clean Air Act.

Several of the local control measures from the 2007 AQMP are not in the 2016 AQMP. In each case, District staff determined that the measure is either obsolete or infeasible for Ventura County based on technological or economic considerations. However, no control measures from previous AQMPs would be deleted from the 2016 AQMP that would slow the county's progress towards attaining either the federal 8-hour ozone standard or the state ozone standards.

The 2016 AQMP includes a new transportation conformity budget for Ventura County. Transportation Conformity is a federal Clean Air Act (CAA) regulatory process that coordinates air quality planning and transportation planning to help ensure that highway and transit projects will not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS.

Once the 2016 AQMP's conformity budget is found adequate by EPA, it will replace the 2008 Early Progress Plan conformity budget and serve as the transportation conformity budget for future transportation conformity decisions in Ventura County. The 2016 AQMP transportation conformity budget for ROG and NOx is in Table 3-7.

Ventura County's strategy for attaining the federal 0.075 ppm ozone standard also relies on ARB's 2007 State Implementation Plan. The 2007 State Strategy, adopted by ARB on September 27, 2007, is a comprehensive and far-reaching set of emission reduction programs that focuses on reducing emissions from mobile sources, consumer products, and pesticides to

significantly improve air quality throughout California and meet federal clean air standards for ozone and fine particulate matter ($PM_{2.5}$). The 2007 State Strategy is available on ARB's website at http://www.arb.ca.gov/planning/sip/2007sip/2007sip.htm#state.

Ventura County's overall control strategy to attain the 2008 federal 8-hour ozone standard is presented in Chapter 3 and Appendices B, C, D, E, F, and G.

Attainment Demonstration

Photochemical modeling, which includes the photochemical modeling protocol, the photochemical modeling performance analysis, and the unmonitored area analysis, as well as supporting analyses completed as part of the supplemental Weight of Evidence (WOE) evaluation, indicates that Ventura County can expect to attain the 2008 federal 8-hour ozone standard by 2020, the attainment date for serious ozone nonattainment areas. The attainment demonstration for the 2016 AQMP is presented in Chapter 5, *Attainment Demonstration*, and Appendices H, I, J, and K.

Reasonable Further Progress Demonstration

In addition to showing attainment of the federal 8-hour ozone standard by 2020, the 2016 AQMP also must show steady progress towards attaining the 2008 federal 8-hour ozone standard by that date. Such steady progress towards attainment is called reasonable further progress (RFP). EPA defines RFP as "annual incremental reductions in air pollutant emissions as reflected in a State Implementation Plan that EPA deems sufficient to provide for the attainment of the applicable national ambient air quality standards by the statutory deadline."

The RFP demonstration shows that Ventura County will meet RFP requirements for the serious area milestone years 2018 and 2020 (all required RFP emission reductions must be in place by the beginning of the 2020 ozone season). The RFP demonstration for the 2016 AQMP is presented in Chapter 6, *Reasonable Further Progress*.

Air Quality Improvement

Ventura County continues to make great progress towards meeting federal clean air standards for ozone by a steady decades-long decrease in countywide ozone levels. In 1990, Ventura County had 18 days over the now revoked federal 1-hour (0.12 ppm) ozone standard. However, by 2003 there were only two days over that standard, and none in 2004 and 2005. Consequently, on May 27, 2009, the EPA formally found that Ventura County had attained the federal 1-hour ozone standard by its applicable attainment date of November 15, 2005. Likewise, all areas of the county have enjoyed similar reductions in 8-hour ozone levels.

There were 70 days countywide over the 1997 federal 8-hour (0.08 ppm) ozone standard in 1990 but only eight in 2009, four in 2010, and two in 2011. On September 14, 2012, the EPA found that Ventura County had attained the 1997 federal ozone standard by its applicable attainment

date of June 15, 2013. The EPA revoked the 1997 federal ozone standard effective April 6, 2015.

Ventura County's air quality continues to improve towards the more stringent 2008 federal 8-hour (0.075 ppm) ozone standard. In 1990, the county exceeded that standard 117 times but only seven times in 2014 and four times in 2015 and 2016. These improvements have occurred despite a 28 percent increase in county population from 1990 through 2016 and should continue as local, state, and federal clean air programs continue to reduce air emissions responsible for ozone formation.

More information regarding Ventura County's air quality improvement is presented in Chapter 1, beginning on page 11.

Important Partners

The District has not worked alone to improve Ventura County's air quality. We have benefited greatly from efforts of ARB, EPA, the South Coast Air Quality Management District, the Southern California Association of Governments, the County of Ventura and local cities, the Ventura County Transportation Commission, county businesses, and the public. We greatly appreciate their efforts on behalf of clean air in Ventura County and we look forward to these efforts continuing as we continue to work towards achieving the federal and state ozone standards.

1. PURPOSE AND BACKGROUND

Purpose

Pursuant to the federal Clean Air Act Amendments of 1990 (CAAA), the 2016 Ventura County Air Quality Management Plan (AQMP) presents Ventura County's: 1) strategy to attain the 2008 federal 8-hour ozone standard; 2) attainment demonstration for the federal 8-hour ozone standard; and, 3) reasonable further progress demonstration for the federal 8-hour ozone standards.

Background

Air pollution is hazardous to human health. It also diminishes the yield and quality of agricultural crops, reduces atmospheric visibility, degrades soils and materials, and damages native vegetation. Federal and state ambient air quality standards are set to protect public health and welfare, and minimize the effects of air pollution. These standards pertain to pollutants in ambient air, the air that people breathe outdoors. This plan focuses on one of those pollutants – ozone. Ventura County is designated an ozone nonattainment area for the state and federal ambient ozone standards.

Although the federal Clean Air Act (CAA) has significantly improved our nation's air quality, many areas still have serious air quality problems. Ozone, the main constituent of smog, is the most serious and widespread air pollution problem in the country. Ozone forms in the atmosphere by a series of chemical reactions and transformations involving reactive organic gases (ROG) and nitrogen oxides (NOx) in the presence of sunlight. These "ozone precursor" pollutants come from a wide variety of sources such as gasoline vapors, fuel combustion, chemical solvents, and household products such as hairsprays, deodorants, and cleaners.

Ozone is a pungent, pale blue, toxic gas, consisting of three atoms of oxygen, that can chemically burn and cause narrowing of airways, forcing the lungs and heart to work harder to provide oxygen to the body. A powerful oxidant, ozone is capable of destroying organic matter – including human lung and airway tissue.

Ozone damages cells in the lungs, making the passages inflamed and swollen. Ozone also causes shortness of breath, nasal congestion, coughing, eye irritation, sore throat, headache, chest discomfort, breathing pain, throat dryness, wheezing, fatigue, and nausea. It can damage alveoli, the individual air sacs in the lungs where oxygen and carbon dioxide exchange occurs. Ozone also has been associated with a decrease in resistance to infections.

People most affected by ozone include the young, elderly, and athletes. Ozone may pose the worst health threat to people who already suffer from respiratory diseases such as asthma, emphysema, and chronic bronchitis, and those with cardiovascular diseases. Ozone also damages agricultural crops, native vegetation, and various natural and manufactured materials.

California is divided into 15 air basins to regionally manage the state's air resources. An air basin generally has similar meteorological and geographic conditions throughout. Ventura County is in the South Central Coast (SCC) Air Basin, along with Santa Barbara and San Luis Obispo Counties. Each county in the air basin has its own air pollution control agency. The Ventura County Air Pollution Control District (VCAPCD or District) is the air pollution control agency for Ventura County and, along with the California Air Resources Board (ARB), is charged by state law to protect the people and the environment of Ventura County from the harmful effects of air pollution.

Geographic areas in California that exceed clean air standards are called nonattainment areas. Ventura County is a nonattainment area for the 2008 federal 8-hour ozone standard. The Ventura County 8-hour ozone nonattainment area includes all of mainland Ventura County (including ocean areas out to three miles from the mainland shore) but excludes Anacapa and San Nicolas Islands. A map of the Ventura County 8-hour ozone nonattainment area is available on the U.S. Environmental Protection Agency (EPA) website. Ventura County is also nonattainment for the California 1-hour and 8-hour ozone standards.

In Ventura County, ozone generally reaches peak levels by mid-afternoon and, along with ozone precursors, is often blown inland by the prevailing winds. Thus, inland areas such as Simi Valley, Thousand Oaks, Ojai, Fillmore, and Piru often have higher ozone levels and more days over the federal and state ozone standards than the county's coastal areas. The smoggiest days tend to occur from May through October (smog season) when high temperatures and stable atmospheric conditions produce conditions conducive to ozone formation and buildup.

Federal Clean Air Act and Air Quality Standards

On November 15, 1990, President George H.W. Bush signed the CAAA into law. The purpose of the CAAA is to provide clean, healthful air for all people of the country. The CAAA specifies dates by which areas of the country must meet the National Ambient Air Quality Standards (NAAQS).

The EPA sets NAAQS as the maximum concentrations in the atmosphere for specific air contaminants in order to protect public health and welfare. The EPA has adopted NAAQS for ozone, carbon monoxide (CO), lead, nitrogen dioxide (NO_2), fine particulate matter ($PM_{2.5}$), coarse particulate matter (PM_{10}), and sulfur dioxide (SO_2). Ventura County is designated nonattainment for the federal 2008 federal 8-hour ozone standard and attainment of all other federal air quality standards.

The CAAA delegates primary responsibility for achieving the NAAQS to the states. The State Implementation Plan (SIP) is the principal mechanism for complying with the CAAA and meeting clean air standards. SIPs are "roadmaps" to clean air. A SIP outlines the actions, programs, and commitments each state will take to carry out its CAAA responsibilities to provide clean air for its citizens.

SIPs are not single documents; rather they are compilations of new and previously submitted plans, programs (such as air quality monitoring and modeling, permitting, etc.), district rules, state regulations, and federal emission controls. Many California SIPs rely on the same core set of control strategies, including emission standards for motor vehicles, stationary internal combustion engines, fuel regulations, and limits on emissions from consumer products.

The provisions and commitments in SIPs are federally enforceable. Moreover, the CAAA require that EPA impose sanctions on areas that fail to submit a SIP, fail to submit an adequate SIP, or fail to implement a SIP unless the state corrects such failures. Sanctions include 2-to-1 emission offsets for new air pollution sources and a ban on most federal highway grants. An additional ban on air quality grants is discretionary. Ultimately, EPA may impose a federal clean air plan, called a federal implementation plan (FIP), if EPA finds that the state failed to submit or implement an adequate SIP.

The ARB is the lead state agency for the California SIP. Local and regional air agencies, as well as other local and state agencies, such as the Southern California Association of Governments (SCAG) and the Bureau of Automotive Repair, prepare SIP elements and submit them to ARB for review and approval. ARB then forwards the SIP revisions to EPA for approval and publication in the Federal Register (FR). The Code of Federal Regulations (CFR) Title 40, Chapter I, Part 52, Subpart F, Section 52.220, lists all the items and elements included in the California SIP.

Since its formation in 1968, the District has prepared many air quality documents to satisfy federal and state clean air requirements. The most important of these are the AQMPs. AQMPs are not one-time documents, but are periodically revised and updated in response to changes in governing law and air pollution control science and technology. The 2016 AQMP is the first Ventura County clean air plan for the 2008 federal 8-hour ozone standard.

1979 Federal 1-hour Ozone Standard

In 1979, EPA established a NAAQS for ozone at 0.12 parts per million (ppm) in any one-hour period. The CAAA classifies areas based on the severity of each area's respective ozone problem. These classifications are marginal, moderate, serious, severe, and extreme. Areas with more severe air quality problems have progressively greater requirements to meet under the CAAA. In addition, areas with higher nonattainment classifications also have later attainment dates. Marginal areas have the least amount of time to attain the standard; extreme areas have the most amount of time. The EPA designated Ventura County a severe nonattainment area for the 1-hour ozone standard with an attainment deadline of November 15, 2005.

Ventura County attained the federal 1-hour ozone standard in 2003 and subsequent air quality data shows that the county has remained in attainment since that time. Effective June 15, 2005, the EPA revoked the federal 1-hour ozone ambient air quality standard, including associated designations and classifications, in most areas of the country, including Ventura County.

However, a court decision related to the revocation of the 1-hour ozone standard found that areas that were subject to certain planning requirements based on their 1-hour ozone nonattainment designation were still obligated to meet those requirements even though the standard had been revoked (anti-backsliding provision).

On April 15, 2009, ARB requested that EPA find that Ventura County had attained the revoked 1-hour standard. On May 27, 2009, EPA made that finding (effective July 27, 2009). In conjunction with that finding, EPA also found that Ventura County was no longer required to implement contingency measures nor required to impose CAAA Section 185 penalty fees on certain large air emission sources. However, the attainment finding was not a redesignation of Ventura County from a nonattainment area to an attainment area. Redesignation would have been a far more complex EPA action involving an ozone maintenance plan.

The attainment finding only established that Ventura County had successfully fulfilled its statutory and regulatory obligations under the CAAA and corresponding federal regulations to attain the federal 1-hour ozone standard by its designated attainment deadline. Although an attainment finding under the CAA does not constitute a redesignation to attainment, under EPA's Clean Data Policy, an attainment finding allows suspension of certain SIP requirements, such as attainment and progress plans. Such a suspension applies as long as the area remains attainment or until the area completes the requirements for redesignation to attainment.

1997 Federal 8-hour Ozone Standard

Based on medical studies demonstrating that the 1-hour standard was inadequate for protecting public health, in 1997 the EPA adopted an 8-hour standard to replace the 1-hour standard. This change lowered the standard for ozone from 0.12 ppm, averaged over one hour, to 0.08 ppm, averaged over eight hours. That standard was more stringent than the 1-hour standard and better protected human health from the effects of smog.

The federal 1997 8-hour ozone rule set new planning requirements for nonattainment areas. These requirements address such topics as classification and attainment deadlines, 1-hour ozone standard to 8-hour ozone standard transition, anti-backsliding provisions, reasonably available control technology (RACT), reasonable further progress (RFP) plans for 2002 - 2008, post-2008 RFP plans, transportation control measures (TCM), including reasonably available control measures (RACM), attainment demonstrations, and transportation and general conformity.

As with the federal 1-hour ozone standard, 1997 8-hour ozone nonattainment areas have increasingly stringent requirements based on the severity of their respective 8-hour ozone attainment status. On April 30, 2004, the EPA determined that areas violated the federal 8-hour ozone standard based on their design values. These attainment status designations became effective June 15, 2004. Ventura County's 8-hour ozone design value was 0.095 ppm. Based on that value, EPA designated Ventura County a moderate nonattainment area for the federal 8-hour

ozone standard. Moderate areas were to attain the federal 8-hour ozone standard by June 15, 2010.

CAAA Section 181(b)(3) allows federal nonattainment areas to voluntarily reclassify (bump up) to higher nonattainment classifications (e.g., from moderate to serious). That provision gives areas additional time to attain if they are doing everything practicable to attain but are not able to do so by their statutory attainment dates. EPA is obligated to grant voluntary bump-ups, but bumped-up areas must still attain as expeditiously as practicable and meet all CAAA requirements for their new, higher classifications.

On February 14, 2007, at the behest of the District, ARB formally requested that EPA bump up Ventura County from its original moderate 8-hour ozone nonattainment classification to the higher serious 8-hour ozone nonattainment classification with an attainment deadline of June 15, 2013. EPA approved the request on May 20, 2008.

The voluntary bump up was necessary because the photochemical modeling conducted for the 2007 AQMP (prepared for the 1997 federal 8-hour ozone standard) indicated that Ventura County would not attain that standard until June 15, 2013, the attainment deadline for serious ozone nonattainment areas. A serious classification means that Ventura County had to meet the requirements for that classification in addition to the requirements for the lower marginal and moderate ozone nonattainment classifications.

On June 20, 2012, ARB requested that EPA find that Ventura County had attained the 1997 8-hour ozone standard. In addition, ARB also requested that EPA suspend the attainment plan and progress plan requirements as allowed by EPA's Clean Data Policy.

On September 14, 2012, EPA made that finding (effective November 13, 2012). Similar to the 1-hour attainment finding, the 8-hour attainment finding also suspended certain State Implementation Plan requirements for as long as Ventura County continues to meet the 1997-ozone standard or completes requirements for redesignation to attainment.

2008 Federal 8-hour Ozone Standard

On March 12, 2008, EPA strengthened the federal 8-hour ozone standard to better protect public health and welfare. EPA revised the 8-hour primary ozone standard, designed to protect public health, to 0.075 ppm from 0.08 ppm. EPA also strengthened the secondary 8-hour ozone standard to 0.075 ppm making it identical to the revised primary standard.

EPA estimates that the revised ozone standards will yield health benefits valued between $2 billion and $17 billion. Those benefits include preventing bronchitis, aggravated asthma, hospital and emergency room visits, nonfatal heart attacks and premature death, among others.

On May 21, 2012, EPA finalized its first of two ozone implementation rules for the 2008 ozone NAAQS. The rule established the air quality thresholds (marginal, moderate, serious, severe, and extreme) that define the classifications assigned to all nonattainment areas for the 2008 0.075 ppm ozone NAAQS that were promulgated on March 12, 2008. The rule also granted reclassification for six California ozone nonattainment areas that voluntarily reclassified themselves to higher nonattainment classifications under the 1997 ozone standard. Ventura County was one of those areas. Hence, its 2008 0.075 ppm 8-hour ozone nonattainment classification is serious, the same as under the 1997 0.08 ppm 8-hour ozone standard. Lastly, the rule revoked the 1997 ozone NAAQS for transportation conformity purposes one year after the effective date of designations for the 2008 0.075 ppm ozone NAAQS.

On March 6, 2015, EPA published its second implementation rule for the 2008 ozone standards that were promulgated on March 12, 2008. This rule addresses additional nonattainment area state implementation plan requirements for the 2008 ozone NAAQS, including requirements pertaining to attainment demonstrations, RFP, RACT, RACM, major new source review (NSR), emission inventories, and the timing of SIP submissions and of compliance with emission control measures in the SIP. Other issues addressed in the rule include revocation of the 1997 ozone standard for all purposes, including transportation conformity, and anti-backsliding requirements that apply for the 1997 ozone standard. Anti-backsliding requirements help ensure that air quality in non-attainment areas does not get worse when a federal air quality standard is revoked.

As a serious nonattainment area for the 2008 ozone standard, Ventura County must submit an air quality plan (attainment plan) by July 20, 2016 (four years from the effective date of designation on July 20, 2012) that shows how Ventura County will meet the 2008 ozone standard by the July 20, 2021. However, a December 23, 2014 D.C. Circuit Court decision vacated the portion of the Classifications Rule that established December 31 of the applicable year as the maximum attainment date for each ozone nonattainment classification. Pursuant to the ruling, moderate and above area attainment demonstrations must ensure emissions controls are implemented no later than the beginning of the ozone season prior to the attainment date (e.g., beginning of the 2020 ozone season for serious areas). This effectively shortens the maximum allowable attainment date for all classifications by one ozone season.

Another primary requirement that Ventura County has to meet for the 2008 ozone standard is an RFP plan showing 15 percent volatile organic compounds (VOC) and/or nitrogen oxides (NOx) reductions over the initial six-year period (2012-2018) and three percent per year thereafter to 2021 (attainment year). The RFP plan is also due July 20, 2016 and has been incorporated into the 2016 attainment plan. Ventura County has also set aside the required one-years' worth of emission reductions in the event that Ventura County is not able to achieve RFP or attainment.

Progress in Improving Ventura County Air Quality

Reduction in Ozone Levels

Since 1990, all areas of the county have enjoyed significant reductions in ozone levels. Figure 1-1 shows that, despite a population increase of 28 percent, there were 117 days countywide over the current federal 8-hour ozone standard of 0.75 ppm in 1990, but only four in 2015 and 2016. Over the same time period, the county's 8-hour ozone values (called "design values") used to determine compliance with the federal 8-hour ozone standard fell dramatically as well. More significantly, 8-hour ozone values at all of the county's air monitoring stations are approaching, or are now lower than the federal 8-hour ozone standard. The federal 8-hour standard is violated when the average of the three annual fourth highest 8-hour averages over three years is greater than or equal to 0.075 ppm (after truncation to three decimal places).

As shown in Figure 1-2, the countywide 8-hour ozone design value dropped from 0.130 ppm in 1990 to 0.077 ppm in 2016. Moreover, as shown in Figures 1-3 through 1-5, the design values at each of the county's monitoring stations are near (Simi and Ojai Valleys) or below (Piru, Thousand Oaks, Ventura, and El Rio) the federal 8-hour ozone standard.

Figure 1-1
Countywide Days Over Federal Ozone Standard vs. Population Growth

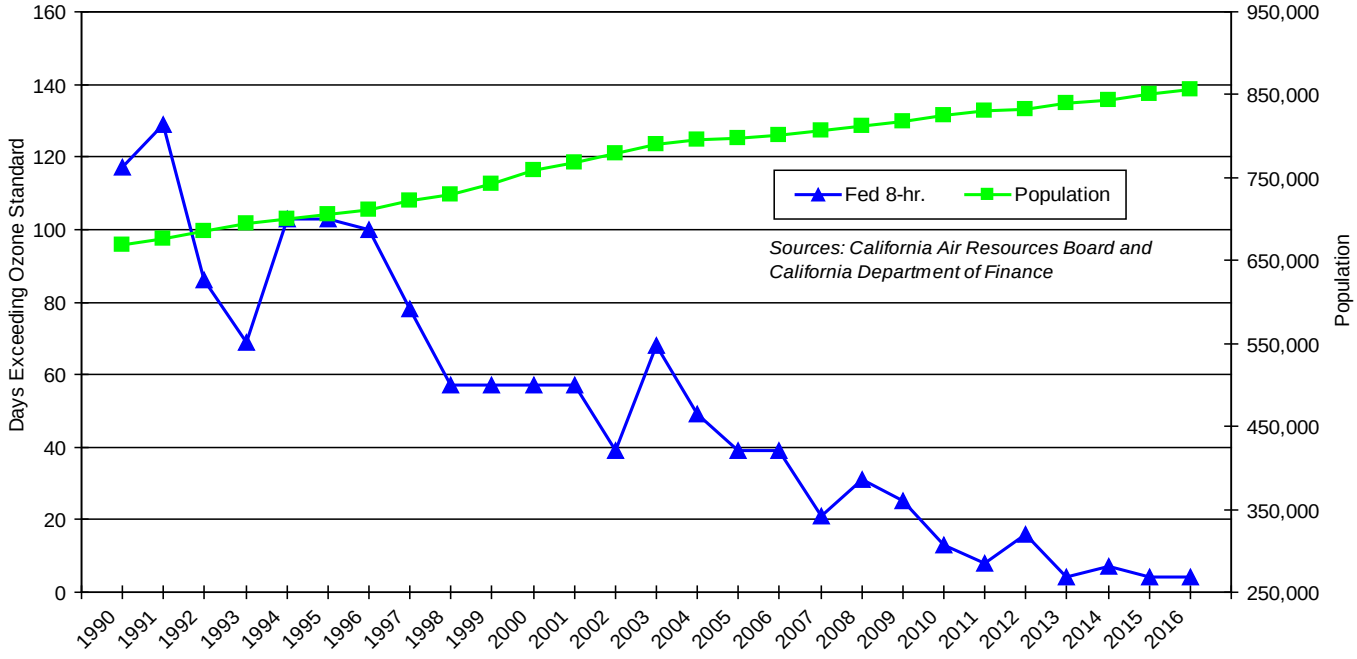


Figure 1-2
Countywide 8-Hour Ozone Design Values

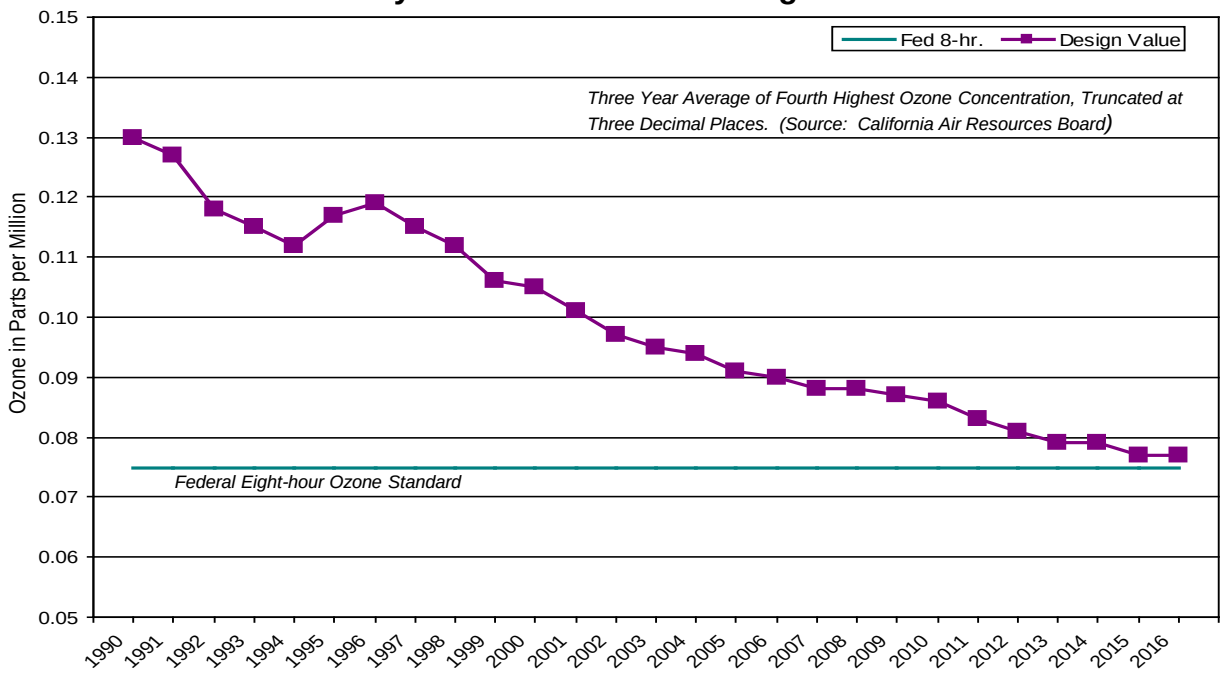


Figure 1-3
8-Hour Ozone Design Values for Simi Valley & Ojai Valley

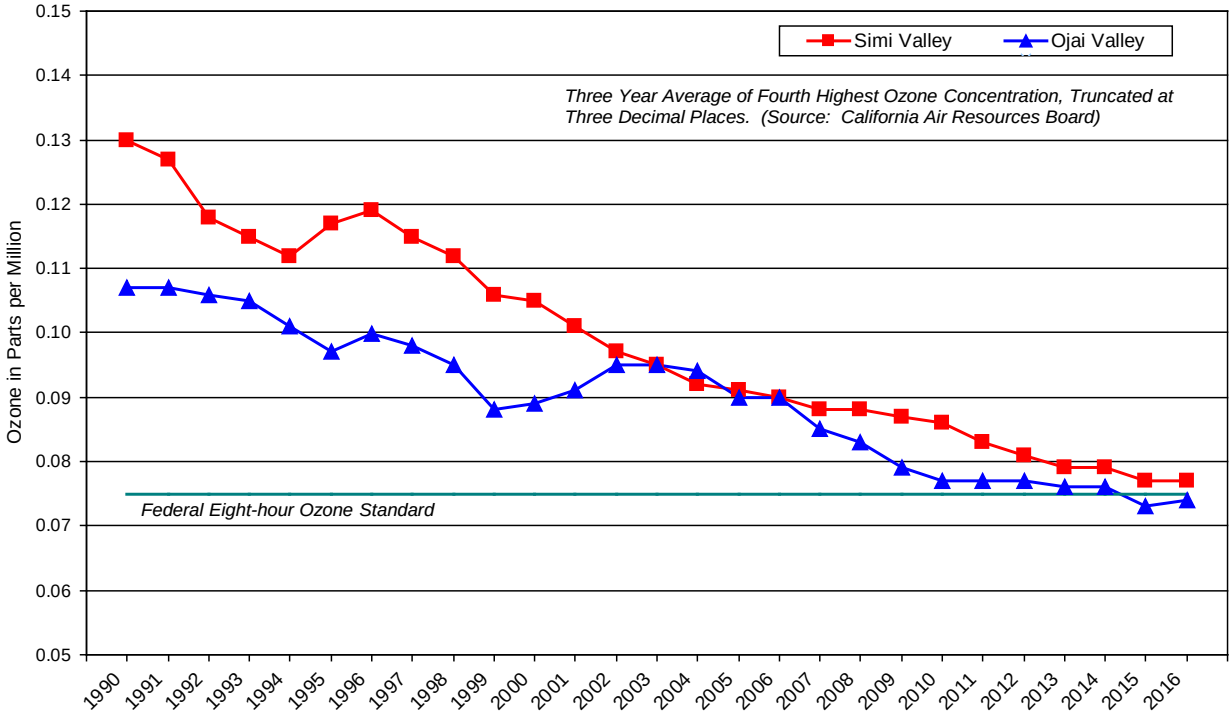


Figure 1-4
8-Hour Ozone Values for Piru & Thousand Oaks

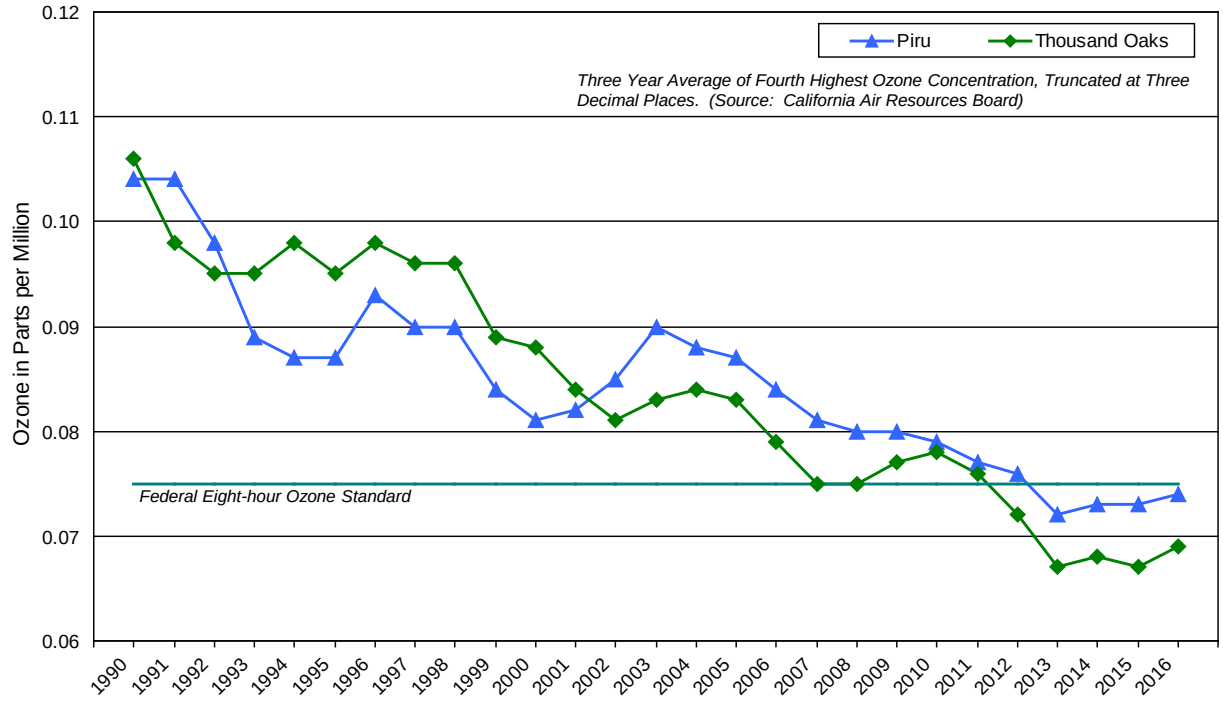
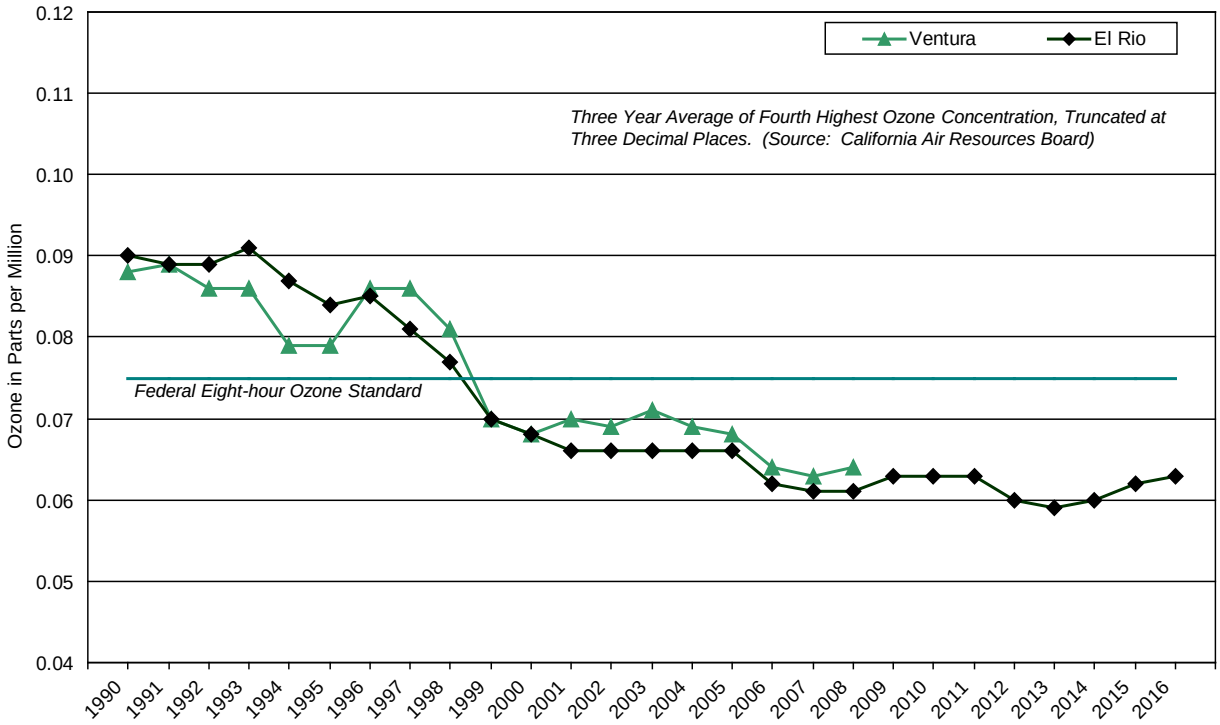


Figure 1-5
8-Hour Ozone Values for Ventura & El Rio



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2. 2012 BASELINE EMISSIONS INVENTORY

An emissions inventory is a large dataset that, as a whole, describes emission sources and quantifies pollutants released into the atmosphere from a large variety of sources. Ozone nonattainment areas, such as Ventura County, must develop and continually update their baseline emissions inventories to evaluate federal, state, and local control programs and report emission reduction progress.

A baseline year or base year is a specific year used to gauge and evaluate past and future emissions estimates. The 2012 emissions inventory is the current baseline year for forecasting future year emissions and from which the SIP inventories are derived. ARB chose 2012 as the base year inventory for the 8-hour Ozone SIP because it was the most recent year for which comprehensive emission estimates were available, as described in ARB's 8-Hour Ozone State Implementation Plan Emission Inventory Submittal to EPA in July 2014.

This chapter summarizes the 2012 baseline ROG and NOx 8-hour ozone SIP emissions inventory for Ventura County. Appendix A, *Ventura County Emissions Inventory Documentation*, provides further information and documentation of the emissions inventory for the 2016 AQMP.

ROG and NOx are the most important pollutants in the air chemistry of ozone formation because they chemically react in the presence of ultraviolet light from the sun to form ozone, the primary constituent of smog. ROG is the photochemically reactive fraction of Total Organic Compounds (TOC) involved in the creation of ozone.

ROG excludes methane and other compounds with inconsequential effects on ozone photochemical reactivity. For a list of negligibly reactive or low reactive compounds with respect to ambient ozone formation, refer to Exempt Organic Compounds in District Rule 2, *Definitions*. The definition of ROG is the same as the terms "reactive organic compounds" (ROC) used in District rules and operating permits and VOC used by EPA.

ROG and NOx emissions are reported in the emissions inventory in tons per day (TPD), calculated for the summer season (May - October) when the potential for ozone formation potential is greatest. Hence, May through October is considered ozone season in Ventura County. Ozone season summer day emissions also are referred to as "planning day emissions" and represent anthropogenic (man-made) emission sources only.

The planning day emissions inventory excludes non-anthropogenic "Natural Sources" emissions such as biogenics, geogenics, and wildfires. Although Natural Sources emissions are not subject to regulatory authority or control by the District or ARB, they are pertinent to ozone formation and are included in the Attainment Demonstration photochemical modeling emission inventory described in Appendix H, *Protocol for Photochemical Modeling of Ozone in Ventura County*.

Emissions data are compiled into major source categories. Ventura County emissions are also distinguished by onshore and offshore geographic areas. The onshore area includes all of Ventura County out to the 3-mile State Tidelands Boundary area. This area is also referred to in this document as the Ventura County portion of the SCC Air Basin. The SCC air basin includes Ventura, Santa Barbara, and San Luis Obispo Counties.

The offshore area beyond the State Tidelands out to 100 miles from shore is known as the Outer Continental Shelf (OCS) Air Basin. The OCS emissions are significant and are included in the photochemical modeling used to demonstrate attainment of the 8-hour ozone standard. These geographic areas distinguish the emissions in both this chapter and Chapter 4, *Emissions Inventory Forecasts*.

Emissions Inventory Reporting Requirements

This document complies with both state and federal emissions inventory reporting requirements for the 2012 base year actual emissions and future year emission inventory forecast methodology in Chapter 4. Guidance on how to develop emission inventories to meet 8-hour ozone SIP requirements is in EPA document, *Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations*. In addition, the California Health and Safety Code (CH&SC) Sections 40913(4)(5), 40914(c), 40918(a), 40924(b), and 40925(a) require emission inventory review, correction, and incorporation of the most current emission factors, growth and control data, and future year forecast estimates.

Clean Air Act Emissions Statement Requirements

Federal CAA section 182(a)(3)(B) Emissions Statements defines Emissions Statement requirements for ozone nonattainment areas classified as marginal and above. CAA 182(a)(3)(B) subsection (i) requires states to have an Emissions Statement program (i.e., a rule) requiring stationary sources to report and certify the accuracy of NOx and VOC emissions, beginning in 1993 and annually thereafter.

Subsection (ii) has waiver provisions for subsection (i) for stationary sources emitting less than 25 tons/year NOx or VOC if the State provides an inventory of emissions from such class or category of sources, based on the use of the emission factors established by the EPA or other methods acceptable to the EPA, under CAA 182(a) subparagraph (1) (the nonattainment plan actual emission inventory due for submittal to EPA in 1992) or subparagraph (3)(A) (the periodic triennial inventory ARB submits to EPA on behalf of all the nonattainment areas in California).

The Emissions Statement requirements for the 2008 8-hour ozone standard are described in the Ozone SIP Requirements Rule, FR Volume 80, March 6, 2015, Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule page 12291 (80 FR 12291, March 6, 2015). If a non-attainment area has a previously approved emission statement rule in force for the 1997 8-hour ozone standard or the 1-hour

ozone standard covering all portions of the nonattainment area for the 2008 8-hour ozone standard, the existing rule should be sufficient for the 2008 8-hour ozone standard. If the existing rule does not meet CAA 182(a)(3)(B) requirements, a revised or new rule would have to be submitted as part of the 2016 8-hour ozone SIP.

District Rule 24, *Source Recordkeeping, Reporting and Emission Statements*, Section C, *Emission Statements*, addresses CAA 182(a)(3)(B) Emissions Statement requirements. District Rule 24 was last revised in September 1992, submitted to EPA in November 1992 and adopted by EPA into the SIP on December 7, 2000 (65 FR 76567).

The first paragraph of Rule 24C deals with the reporting, certification, and reporting schedule requirements of CAA 182(a)(3)(B)(i). The owner or operator of any stationary source emitting NOx or ROG must provide the Air Pollution Control Officer (APCO) with a written statement showing actual NOx and ROG emissions from that source. Information in the emission statement shall be certified as accurate by a company or agency official. Emissions statements must be submitted annually thereafter.

The third paragraph of Rule 24C concerns the waiver requirements of CAA 182(a)(3)(B)(ii). The APCO may waive Rule 24 Section C requirements for any class or category of stationary sources which emit less than 25 tons/year of NOx and less than 25 tons/year of ROG if the District provides the ARB with an inventory of sources emitting more than 10 tons/year of either NOx or ROG based on the use of emission factors acceptable to the ARB.

The District updates emissions for stationary source facilities with 10 tons/year permitted NOx or ROG each year and reports the emissions to ARB's statewide emissions inventory. ARB in turn reports the process and emissions data to EPA in their triennial National Emissions Inventory (NEI) submittal. This satisfies the CAA 182(a)(3)(B)(ii) waiver provisions.

Since the Ventura County nonattainment area for the 2008 8-hour ozone standard is the same as for the revoked Ventura County 1-hour ozone standard non-attainment area, it is the District's determination that the existing provisions of Rule 24C adequately meet the Emissions Statement program requirements of CAA 182(a)(3)(B) for the purposes of the 2008 8-hour ozone standard, as shown in Table 2-1, and no revision of the rule is required.

Table 2-1
CAA 182(a)(3)(B) Requirements and Provisions of District Rule 24 C

CAA 182(a)(3)(B) Requirements	District Rule 24 C
CAA 182(a)(3)(B)(i)	
State must submit revision to SIP within 2 years of November 15, 1990 requiring the owner/operator of stationary sources to report NOx or VOC emissions.	Rule 24 submitted to EPA in November 1992 and adopted by EPA into the SIP on December 7, 2000.
Require the owner/operator of stationary sources of NOx or VOC to provide the State with statements showing the actual NOx and VOC emissions.	The owner or operator of any stationary source that emits or may emit nitrogen oxides or reactive organic compounds shall provide the APCO with a written statement showing actual emissions of nitrogen oxides and reactive organic compounds from such stationary source.
First emissions statement shall be submitted within 3 years after November 15, 1990. Subsequent statements shall be submitted at least every year thereafter.	The first emission statement shall cover the calendar year of 1992 and shall be submitted to the APCO no later than November 1, 1993. Emissions statements shall be submitted annually thereafter.
Statement shall contain a certification that the information contained in the statement is accurate to the best knowledge of the individual certifying the statement.	The emission statement shall be certified by a company or agency official of such source and shall state that the information contained in the emission statement is accurate to the best knowledge of the individual certifying the statement.
CAA 182(a)(3)(B)(ii)	
State may waive the application of clause (i) to any class or category of stationary sources emitting less than 25 tons per year of VOC or NOx. State provides an inventory of emissions from such class or category of sources in its submissions under CAA 182(a) subparagraph 1 or CAA 182(a) subparagraph (3)(A).	The APCO may waive the requirements of this Section for any class or category of stationary sources which emit less than 25 tons per year of nitrogen oxides and less than 25 tons per year of reactive organic compounds if the District provides the ARB with an inventory of sources emitting more than 10 tons per year of either nitrogen oxides or reactive organic compounds based on the use of emission factors acceptable to the ARB.

Emissions Inventory Major Categories

The 2012 base year emissions inventory is an aggregate of two general emission source types: 1) Stationary and Area-wide Sources, and 2) Mobile Sources, comprised of On-Road Motor Vehicles and Other Mobile (off-road) Sources. Stationary Sources are those that have a fixed geographic location, such as power plants, industrial engines, and oil storage tanks. Area-wide Sources are emission sources occurring over a wide geographic area such as consumer products and architectural coatings. Mobile Sources are mobile in nature, such as motor vehicles, boats, and aircraft.

ARB maintains the California Emission Inventory Development and Reporting System (CEIDARS), the comprehensive statewide emissions inventory database. The state's local air pollution control districts, including Ventura County, provide updates to CEIDARS every year using local data. Table 2-2 presents a summary of Ventura County's 2012 baseline summer planning day emissions for ROG and NOx for both the SCC and OCS air basins. Figure 2-1 displays the pollutant distribution in the major categories.

Table 2-2
2012 Baseline Summer Planning Day Emissions

	(tons/summer day)	
Both SCC and OCS Air Basins	**ROG**	**NOx**
Total Stationary and Areawide Sources	20.20	3.38
Total On-road Vehicle Sources	8.54	12.62
Total Other Mobile Sources	9.02	24.54
Total Emissions	**37.76**	**40.54**

Notes:
Source: California Emission Projection Analysis Model (CEPAM) v1.04 (June 2016).
Includes OCS Air Basin emissions.
Data rounding may affect totals.

Stationary Sources

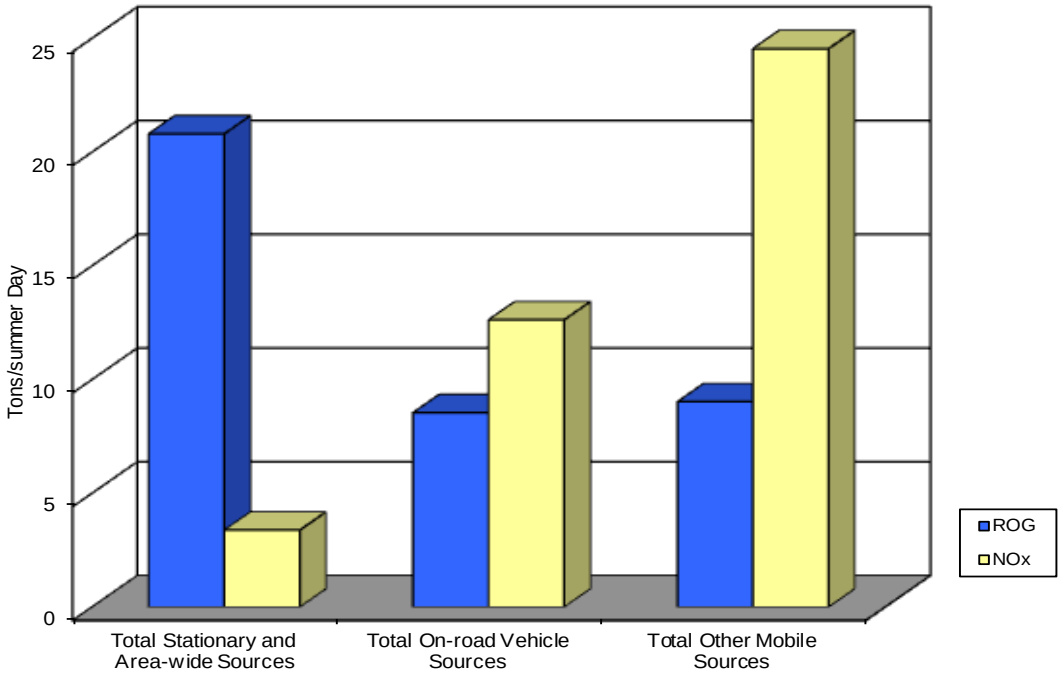
Stationary Sources are comprised of two major emission source types, point sources and area sources. Point sources are single, fixed sources of air pollution. Examples of point sources include electrical power generating plants, petroleum production facilities, and industrial engines. Initially, point sources are identified through the District's Permit to Operate evaluation or during the rule development process.

Permitted stationary sources are inspected by District staff annually and are subject to air pollution rules applicable to specific facility operations and equipment. In addition, the District surveys point source facilities annually to document changes to equipment and gather activity data used to calculate and update annual emissions.

Point sources that emit 25 tons or more per year of either ROG or NOx are considered major sources under CAAA Section 182(d). There were five ROG point sources emitting greater than 25 tons per year and three NOx point sources emitting greater than 25 tons per year in 2012. All of the major stationary sources are in the point source inventory along with 276 other permitted facilities for 2012.

Smaller permitted sources are accounted for in area source categories. Area source categories are groups of similar emission sources that do not individually emit large amounts of pollutants, but when aggregated on a countywide basis can contribute significant air emissions. Examples of permitted area sources include gasoline stations and dry cleaners. The District has approximately 1,400 permitted sources in its 2012 baseline emissions inventory, accounted for as either point or area sources.

Figure 2-1
2012 Baseline Summer Planning Day Emissions
Pollutant Distribution



Other area source categories also include sources not under district permit. Examples of unpermitted area sources include organic material composting, small combustion sources such as engines and boilers, and fugitive ROG losses from natural gas transmission.

Emissions from area sources are determined in a variety of ways. One accepted estimation method, generally referred to as the "bottom-up" method, surveys local emission sources, such as organic composting operations, to obtain specific countywide data. Another method is referred to as the "top-down" approach. National or statewide data such as metal parts coating and

architectural coating usage are gathered and apportioned down to the county level based on distribution factors representative of Ventura County.

Area source category emissions estimates are developed by both the District and the ARB. Area source methodologies are described in Appendix A and summaries of the area source methodologies are posted on the ARB's Index of Methodologies website.

Every year District staff evaluates the data and methods used in order to improve and update the emissions inventory. ARB and District staff coordinate the update process through the state's Emissions Inventory Technical Advisory Committee (EITAC). The refinement of the emissions categories is ongoing and necessary to better classify and quantify the emissions, and to evaluate feasibility of new control technologies and cost-effectiveness of controls when developing state or local rules.

Mobile Sources

There are two major source categories for mobile sources: On-Road Motor Vehicles and Other Mobile Sources. Mobile sources contribute the largest amount of criteria air pollutants into the air statewide. ARB calculates mobile source emissions with input from detailed mobile source emission models. Complete documentation for mobile source category emissions and models is available at ARB's website: http://arb.ca.gov/msei/msei.htm. Appendix A of the 2016 AQMP includes a general description of the mobile source emissions for Ventura County.

On-Road Motor Vehicles

ARB developed the EMission FACtors (EMFAC) model to assess state-wide and regional emissions from On-Road Motor Vehicles, including passenger cars, heavy-duty trucks, and buses operating on highways, freeways, and local roads in California, and to support ARB's regulatory and air quality planning efforts to meet the Federal Highway Administration's transportation planning requirements.

EPA approves EMFAC for use in SIPs and transportation conformity analyses. EMFAC uses regional transportation model outputs and motor vehicle-related data from the California Department of Transportation (Caltrans) and the California Department of Motor Vehicles (DMV) to calculate on-road vehicle emissions.

EMFAC2014 is the latest version of the model and represents ARB's current understanding of motor vehicle travel activities and their associated emission levels. The 2012 base year and future year On-Road Motor Vehicles emissions for Ventura County are calculated using EMFAC2014 and the current transportation and socioeconomic data in the SCAG 2016 Regional Transportation Plan (RTP). The Final 2016 RTP was adopted by SCAG's governing board on April 7, 2016. On-road motor vehicle emissions for Ventura County are based on ARB's EMFAC2014 (v1.0.7) model runs.

Other Mobile Sources

Other Mobile Sources encompass a wide variety of off-road equipment. The major categories include aircraft; locomotives; commercial and recreational marine vessels; agricultural, construction and lawn and garden equipment; off-road recreation vehicles, and a wide variety of equipment from hedge trimmers to cranes.

ARB estimates the majority of off-road emissions using a suite of emission estimation models and methods. The OFFROAD model is an integrated statewide mobile source emissions model that estimates population, activity, and emissions for specific categories of equipment and fuel types at the county level. OFFROAD is used to generate base year emissions and to project changes in future inventories of Other Mobile Sources emissions.

For some off-road equipment, the OFFROAD model is being replaced by category-specific methods and inventory models developed by ARB for specific regulatory projects, such as Off-Road Equipment (Construction, Industrial, Ground Support and Oil Drilling), Cargo Handling Equipment, Transport Refrigeration Units, Commercial Harbor Craft, Ocean-going Vessels and Locomotives.

Additional information on ARB's Off-Road Emissions Inventory Program and the OFFROAD model is available on ARB's website at: http://arb.ca.gov/msei/msei.htm and in Appendix A of the 2016 AQMP.

In addition to the Other Mobile Sources categories estimated by ARB, the District estimates emissions from civil and commercial aircraft and military aircraft and vessels.

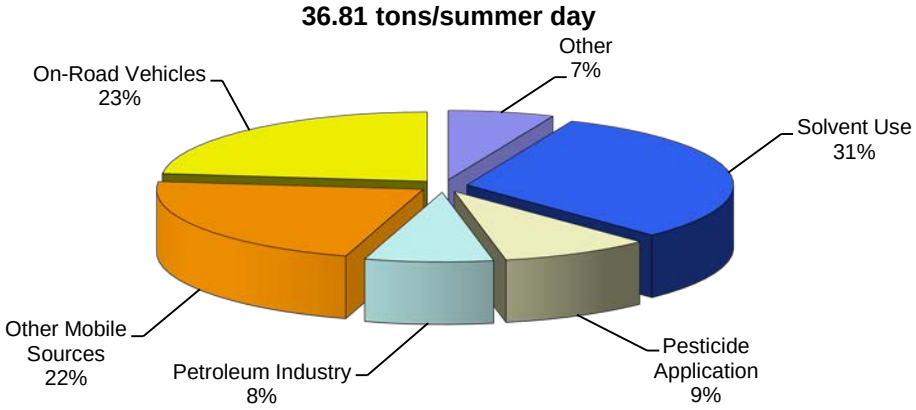
Table 2-3 presents 2012 baseline planning day emissions by major source category for the Ventura County portion of the SCC Air Basin. A more detailed summary of ROG and NOx emissions can be found in Appendix A, Tables A-7 and A-8. Figure 2-2 and Figure 2-3 exhibit those emissions in percentages of ROG and NOx by major source category.

Table 2-3
2012 Baseline Planning Day Emissions
by Major Source Category

Ventura County South Central Coast (SCC) Air Basin Major Source Category Name	(tons/summer day) ROG	NOx
Stationary Sources		
Fuel Combustion	0.22	1.89
Waste Disposal	0.87	0.10
Cleaning And Surface Coatings	4.01	0.00
Petroleum Production And Marketing	2.83	0.04
Industrial Processes	0.62	0.06
Total Stationary Sources	**8.55**	**2.08**
Area-wide Sources		
Solvent Evaporation	10.88	0.00
Miscellaneous Processes	0.69	0.95
Total Area-wide Sources	**11.57**	**0.95**
Mobile Sources		
On-Road Motor Vehicles	8.54	12.62
Other Mobile Sources	8.14	8.78
Total Mobile Sources	**16.68**	**21.41**
Total SCC Air Basin	**36.81**	**24.44**

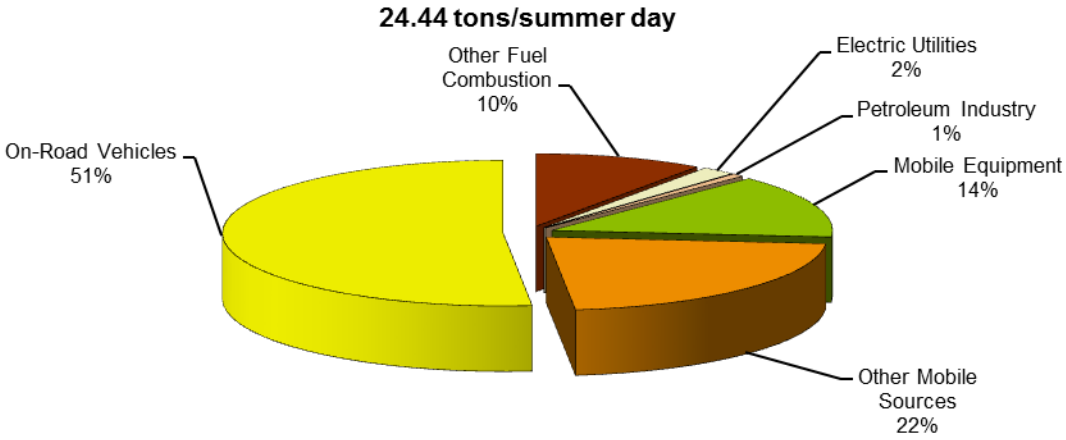
Notes:
Source: CEPAM v1.04 (June 2016).
No ARB Adjustments.
Excludes OCS and Natural Sources.
Data rounding may affect totals.

Figure 2-2
Ventura County 2012 Planning Day
ROG Emissions Inventory



Reference:
ARB CEPAM v1.04 (June 2016).
No ARB adjustments.
OCS excluded.

Figure 2-3
Ventura County 2012 Planning Day
NOx Emissions Inventory



Reference:
ARB CEPAM v1.04 (June 2016).
No ARB Adjustments.
OCS excluded.

Ventura County Marine Emissions Inventory

Marine emission sources include those in both the State Tidelines region of Ventura County and those in the OCS Air Basin. Examples of marine-related activities include ocean-going vessels, commercial harbor craft, and recreational boats. Also included are military aircraft operating out of Naval Base Ventura County (NBVC) and onshore cargo handling equipment at the Port of Hueneme.

Emission sources related to marine activities are a significant part of the overall base year emissions inventory for Ventura County. ARB undertook an extensive process to develop a new statewide emissions inventory for several important categories of marine emission sources used for the 8-hour Ozone SIP and ozone attainment modeling. ARB staff, in cooperation with local air districts, developed a consistent statewide emissions estimation methodology for Ocean-going Vessels, Commercial Harbor Craft, and Cargo Handling Equipment operating in California coastal waters, ports and inland waterways. The methodologies reflect updated vessel population and operational data, engine characteristics and emission factors.

Ventura County Marine Emissions

Coastal emission sources (within three miles of the shoreline) in the Ventura County portion of the SCC Air Basin in Table 2-3 are represented in Other Mobile Sources emission categories, including Ocean-going Vessels, Commercial Harbor Craft, Recreational Boats, Aircraft and Cargo Handling Equipment in the Off-Road Equipment category. Coastal marine emissions are shown in Table 2-4. Cumulatively these categories accounted for 2 tons/day each of ROG and NOx in 2012, over 6% of the total ROG and 10% of total NOx in the SCC Air Basin.

Table 2-4
2012 SCC Air Basin
Marine Planning Day Emissions

Ventura County Emission Category	(tons/summer day) ROG	NOx
Ocean-going Vessels	0.04	0.84
Commercial Harbor Craft	0.09	0.98
Recreational Boats	1.76	0.42
Aircraft	0.33	0.18
Cargo Handling Equipment	0.00	0.01
Total SCC Air Basin Marine Emissions	**2.21**	**2.44**

Notes:
CEPAM v1.04 (June 2016).
No ARB Adjustments.

Ocean-going Vessels include large commercial vessels calling on Port Hueneme (auto carriers, bulk cargo carriers, container vessels, passenger vessels, roll-on/roll off vehicle carriers, refrigerated cargo vessels, and tankers) and military vessel operations occurring at the U.S. Naval

facilities at the Port of Hueneme, as well as some non-military vessels utilizing Ventura County Naval facilities. Ocean-going Vessels generated 0.8 tons/day NOx in 2012, over 34% of total coastal NOx in 2012, with over two-thirds from commercial marine vessels. The majority of the commercial marine vessels are auto carriers and refrigerated produce vessels.

Commercial Harbor Craft include commercial and charter fishing vessels, excursion boats, tug and towboats, barges and dredges, crew and supply boats associated with the four offshore oil and gas production platforms, and military support and operations vessels, tugboats and other vessels utilizing U.S. Naval facilities at the Port of Hueneme. Commercial Harbor Craft contributed over 40% of coastal NOx in 2012, almost 1.0 tons/day. Commercial (non-military) vessels were responsible for almost 90% of NOx emissions in 2012. Over 75% of the commercial boats in Ventura County are commercial fishing boats.

Recreational Boats operate at the three ports, marinas and lakes in Ventura County, and include vessels with outboard, inboard and stern-drive engines, sailboat auxiliary engines, and personal watercraft. Recreational vessels accounted for 17% or 0.4 tons/day of the coastal NOx emissions in 2012 and 1.8 tons/day or nearly 80% of the coastal ROG emissions.

Aircraft emissions are associated with military aircraft operations at the U.S. Naval facility at Point Mugu, including transports, jet aircraft, helicopters, and missile launches. Military aircraft activities were responsible for about 15% of coastal ROG emissions and 7% of NOx in 2012.

Cargo Handling Equipment in the coastal waters include port operations/cargo handling equipment operating in association with large commercial vessels calling at the Port of Hueneme, such as yard tractors, forklifts, cranes, loaders, and other material handling equipment. Although Cargo Handling Equipment contributed one quarter of coastal NOx in 2002, this emission source became subject to ARB's Cargo Handling Equipment Regulation in 2007 and contributed less than 1% of total coastal NOx emissions in 2012.

Outer Continental Shelf Air Basin Marine Emissions (OCS)

Marine activities are even more significant emission sources in the OCS Air Basin (beyond three miles of the shoreline). As presented in Table 2-5, Figure 2-4, and Figure 2-5, emissions from Other Mobile Sources emission categories including Ocean-going Vessels, Commercial Harbor Craft, Ships and Commercial Boats, and Aircraft comprised the vast majority of emissions in the OCS Air Basin, almost 16 tons/day or almost 98% of total NOx in 2012, and over 92% of total ROG.

Ocean-going Vessels encompass large commercial vessels operating in the Santa Barbara Channel shipping lanes offshore of Ventura County, including vessels calling on Port Hueneme or the ports of Los Angeles/Long Beach and transiting vessels passing through southern California waters but without calling at either port, and military vessels operating offshore and in the approach corridors to the Port of Hueneme and San Nicolas Island. Over 13 tons/day of NOx

in 2012 came from Ocean-going Vessels, about 82% of total NOx in the OCS, as well as nearly 60% of total ROG. Virtually all emissions are from commercial vessels.

Commercial Harbor Craft and Commercial Boats include commercial fishing and charter vessels, excursion boats, tug and towboats, crew and supply boats affiliated with the offshore oil and gas production platforms, military support and operations vessels, and other vessels operating offshore and in the approach corridors to Port Hueneme and San Nicolas Island. Commercial Harbor Craft and Commercial Boats contributed nearly 28% of offshore ROG and about 16% of NOx in 2012. Commercial (non-military) vessels were responsible for 60% of NOx and 50% of ROG.

Aircraft emissions are associated with military aircraft operations at the U.S. Naval facility on San Nicolas Island, including transports, jet aircraft, and helicopters. Military aircraft activities were responsible for approximately 5% of offshore ROG emissions in 2012.

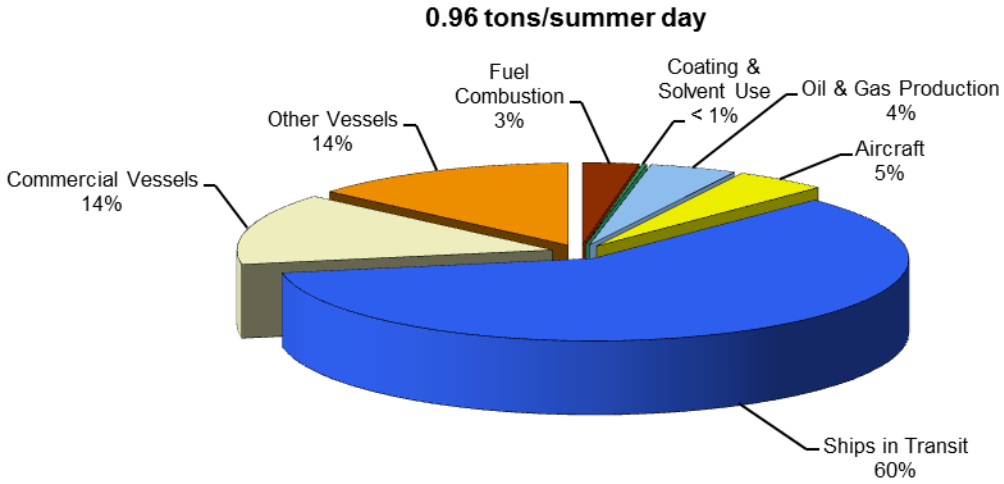
Stationary Sources were responsible for considerably less offshore emissions in 2012 than Mobile Sources, contributing 8% of total offshore ROG and 2% of NOx. Oil & Gas Production ROG emissions include fugitive hydrocarbon losses from oil and gas production components and production and processing equipment on the offshore oil and gas production platforms and accounted for over 4% of offshore ROG. Other offshore emission sources contributing less than 3% of total offshore ROG or NOx include Fuel Combustion sources such as electric generating types of equipment, and Coatings & Solvents ROG emissions from routine maintenance operations for the offshore oil and gas production platforms and the U.S. Naval facility on San Nicolas Island, all of which are permitted point sources.

Table 2-5
2012 OCS Baseline Planning Day Emissions
by Emissions Summary Category

Ventura County Outer Continental Shelf (OCS) Air Basin EIC Summary Category Name	(tons/summer day) ROG	NOx
Stationary Sources		
Fuel Combustion		
Cogeneration	0.00	0.00
Oil And Gas Production (Combustion)	0.01	0.03
Service And Commercial	0.02	0.32
Total Fuel Combustion	**0.03**	**0.35**
Waste Disposal		
Incinerators	0.00	0.00
Total Waste Disposal	**0.00**	**0.00**
Cleaning And Surface Coatings		
Coatings And Related Process Solvents	0.00	0.00
Total Cleaning And Surface Coatings	**0.00**	**0.00**
Petroleum Production And Marketing		
Oil And Gas Production	0.04	0.00
Petroleum Marketing	0.00	0.00
Total Petroleum Production And Marketing	**0.04**	**0.00**
Total Stationary Sources	**0.07**	**0.35**
Mobile Sources		
Other Mobile Sources		
Aircraft	0.05	0.02
Ships And Commercial Boats	0.02	0.07
Ocean-going Vessels	0.57	13.21
Commercial Harbor Craft	0.25	2.46
Total Other Mobile Sources	**0.89**	**15.76**
Total Mobile Sources	**0.89**	**15.76**
Total OCS Air Basin	**0.96**	**16.11**

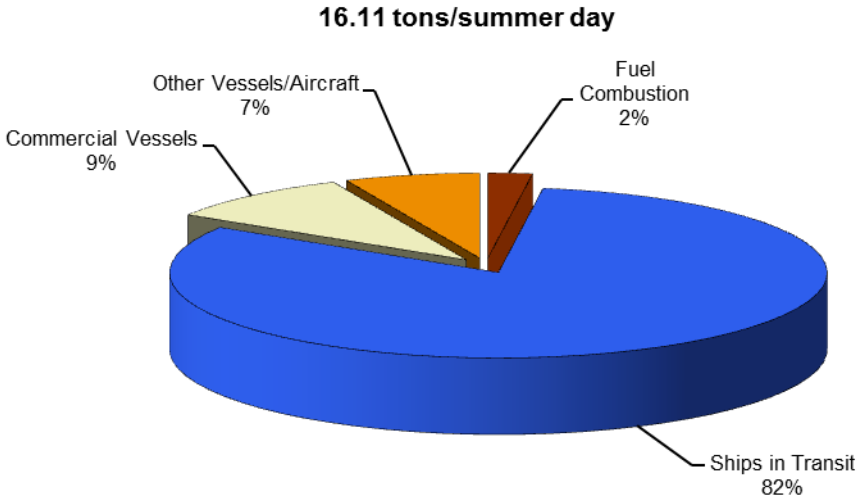
Notes:
EIC = Emissions Inventory Code
Source: CEPAM v1.04 (June 2016).
No ARB adjustments needed for OCS.
Excludes Natural Sources.
Data rounding may affect totals.

Figure 2-4
Ventura County 2012 Planning Day
ROG Emissions Inventory (OCS Air Basin)



Reference:
ARB CEPAM v1.04 (June 2016).
OCS is 3 – 100 miles offshore.

Figure 2-5
Ventura County 2012 Planning Day
NOx Emissions Inventory (OCS Air Basin)



Reference:
ARB CEPAM v1.04 (June 2016).
OCS is 3 – 100 miles offshore.

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3. CONTROL STRATEGY

This chapter presents the control strategy for the 2016 AQMP to achieve the 2008 federal 8-hour ozone standard. Since 1979, Ventura County's ozone strategy has been to use concurrent ROG and NOx emission reductions from stationary and mobile sources. Ventura County was the first area in the nation to institute a dual ROG/NOx strategy for meeting state and federal clean air standards for ozone.

The 2016 AQMP control strategy consists of a local component implemented by the District and a combined state and federal component implemented by the ARB and EPA. The District has primary responsibility for regulating stationary sources, including some area sources, within Ventura County. The ARB regulates on-road motor vehicles, some off-road mobile sources, and consumer products, and sets motor vehicle fuel specifications in California. The EPA regulates emissions from locomotives, aircraft, heavy-duty trucks used in interstate commerce, and some off-road engines exempt from state authority or best regulated at the national level. State and federal laws prohibit local air districts from regulating mobile sources.

The District's component of the 2016 AQMP control strategy consists of cost-effective stationary source control measures, TCMs, and the District's voluntary mobile source incentive programs. Most of these local control program elements were in previous Ventura County clean air plans. California air agencies, including this air district, have aggressively pursued measures to meet state and federal clean air standards and have developed many of the most innovative and effective clean air strategies in the world.

Ventura County, along with other California air agencies, long ago implemented clean air measures that other parts of the country are just now considering. By 2002, the District fully implemented most of the local control measures in earlier Ventura County AQMPs, and most stationary sources in the county are now subject to stringent clean air regulations. Consequently, new local emission reductions are becoming ever smaller and often not economically or technologically feasible for sources in Ventura County. The percentage of total countywide ROG and NOx emissions (OCS Air Basin excluded) under District authority to regulate has been shrinking for many years and is now about 50 percent.

ARB's component of the 2016 AQMP control strategy consists of its new State Strategy for California's 2016 SIP, a comprehensive clean air strategy designed to achieve federal air quality standards through a combination of technologically feasible, cost-effective, and far-reaching measures. It describes the scope of California's ozone and fine particulate matter ($PM_{2.5}$) nonattainment problems and presents ARB staff's recommendations on how California can comply with federal clean air standards.

As elsewhere in California, Ventura County's ongoing progress towards clean air depends largely on current and proposed mobile source strategies under state and federal jurisdiction. District

efforts will nonetheless remain crucial for Ventura County to attain and maintain state and federal clean air standards.

Stationary Source Control Measures

Stationary source control measures are comprised of equipment and techniques for reducing air pollutant emissions from stationary sources. Examples of stationary source control measures include vapor collection systems on gasoline and oil storage tanks, landfill gas recovery systems, low NOx burners on boilers, and replacing internal combustion engines with electric motors. Control measures provide the framework for District clean air rules that reduce ROG and NOx emissions. ARB's Ventura County APCD List of Current Rules website lists all District rules referenced in this and other chapters of the 2016 AQMP.

Previous AQMPs include descriptions of control measures which have been incorporated into District rules. Those control measures which have been fully implemented before the 2012 base year are considered part of the baseline emissions for the 2016 AQMP. The District will continue to implement these measures as part of the EPA-approved SIP.

Control Measures with Emission Reductions Beyond the Base Year

This section presents ROG and NOx control measures already adopted as VCAPCD rules but not fully implemented by the end of 2012, the base year for the 2016 AQMP. Table 3-1 presents these measures with expected emission reductions expressed in tons per day. The District will continue to implement these measures.

Table 3-1
Stationary Source Control Measures - Local Measures Only

Control Measure Number	Control Measure Name	District Rule	Year Adopted/ Amended	Year Fully Impl'd.	Summer Planning Day Emissions Reductions (tons per summer day) 2018	2020
ROG Control Measures						
R-335	Aerospace/Adhesives and Sealants/Marine Coating	74.13/ 74.20/ 74.24	2012	2013	0.0066	0.0069
R-336	Metalworking Fluids and Direct Contact Lubricants	74.31	2013	2015	0.1078	0.1113
R-433	Liquefied Petroleum Gas Transfer and Dispensing	74.33	2015	2020	0.2990	0.3059
Total ROG Control Measure Emissions Reductions					**0.4134**	**0.4241**
NOx Control Measures						
N-102-2012	Boilers, Steam Gen., Heaters <1MMBtu	74.11.1	2012	2023	0.0079	0.0105
N-105-2012	Boilers, Steam Generators, Heaters 1-2 MMBtu (2012)	74.15.1	2012	2022	0.0004	0.0005
N-105-2015	Boilers, Steam Generators and Process Heaters 2-5 MMBtu	74.15.1	2015	2025	0.0017	0.0028
N-110	Fan-type Central Furnaces	74.22	1993	2014	0.0386	0.0387
N-113	Natural Gas-Fired Water Heaters <75,000 Btu/hr	74.11	2010	2020	0.2368	0.2966
Total NOx Control Measure Emissions Reductions					**0.2854**	**0.3491**

Notes:
Data rounding may affect displayed values and totals.
This table does not list control measures fully implemented before 2012.

New Stationary Source Control Measures

This section presents new stationary source control measures recommended for inclusion in the 2016 AQMP as part of Ventura County's strategy to attain the federal and state ozone standards. The new measures are either a revision to an existing District rule or a new rule applicable to a previously unregulated source category. Some of these new control measures have been adopted in the years between the 2012 baseline and the 2017 adoption of this AQMP, while others are planned for adoption. These measures are summarized in Table 3-2, *New Stationary Source Control Measures*. The emission forecasts do not reflect emission reductions from these measures.

Table 3-2
New Stationary Source Control Measures

Control Measure Number	District Rule	Control Measure Name	Proposed Rule Adoption	Proposed Full Implementation
R303-2017	74.2	Architectural Coatings	2017	2018
R-607	74.32	Composting and Organic Material Conversion Operations	2017	2018
N-110-2016	74.22	Fan-Type Central Furnaces	2019	2038
N-114	74.34	NOx Reductions from Miscellaneous Sources	2016*	2020

Note: Emissions reductions from these new measures are not reflected in the emission forecasts.
* Rule 74.34 was adopted by the District Board of Directors on December 13, 2016.

R-303-2017, Architectural Coatings: This new control measure would reduce ROG emissions from architectural coatings through revisions to Rule 74.2, Architectural Coatings. SCAQMD has revised its Rule 1113, *Architectural Coatings*, applicable to similar source materials, three times since the District last revised Rule 74.2 in 2010. The revisions to SCAQMD Rule 1113 include lowering ROC content limits on several classes of coatings and imposing ROC content limits on coating colorants.

Rule 74.2 applies to any person who supplies, sells, offers for sale, or manufactures, blends, or repackages any architectural coating for use within the District, as well as any person who applies or solicits the application of any architectural coating within the District. The rule limits the ROG content of architectural coatings that may be sold and/or applied in the District based on the type of coating. Limits are expressed as "VOC Regulatory" thinned to the manufacturer's maximum recommendation, currently excluding colorant added to the tint bases.

Rule 74.2 was last revised on January 12, 2010 as a result of an "every feasible measure" analysis in accordance with the CCAA. The revisions integrated the ARB Suggested Control Measure for architectural coatings adopted on February 1, 2008. South Coast AQMD amended Rule 1113 on June 3, 2011. The amendments to Rule 1113 established limits on the ROG content of colorants used to tint coatings at the point of sale and certain new coating categories, and reduced the allowable ROG content for several existing coating categories.

Since Ventura County is adjacent to the South Coast AQMD, the District has often successfully adopted South Coast AQMD limits on industrial and consumer products. Manufacturers and distributors already handle compliant products, so expanding distribution to an area adjacent to South Coast AQMD jurisdiction is relatively simple and cost-effective.

The SCAQMD staff report for the June 2011 amendments to Rule 1113 shows the ROG limit reductions of 0.4 tons per day for the specified coating types at an average cost-effectiveness of

$7,172 per ton reduced. However, the cost-effectiveness for the individual coating types ranges from $0 per ton ROG reduced to $12,952 per ton ROG reduced.

The June 2011 amendments to Rule 1113 also imposed new limits on the ROG content of colorants used in architectural coatings at the point of sale. The staff report shows these limits generate an emissions reduction of 2.8 tons ROG per day at a cost-effectiveness of $7,990 per ton of ROG reduced. This includes an incremental cost increase of $1.80 per gallon of colorant. However, the staff report states colorant manufacturers expect low-VOC colorants to become less expensive than conventional colorants due to the reduction in the amount of glycols used and the reduced volatility in petroleum-based raw materials.

Architectural coating use in Ventura County is only a fraction of the consumption in the South Coast AQMD. This prospective rule revision would implement the limits on specified coating ROG content and ROG content of colorants used at point of sale similar to Rule 1113.

Preliminary calculations based on population ratio indicate possible ROG emission reductions of 0.02 tons per day from the reduced ROG limits in specified coating types. In addition, requiring low ROG colorants in Ventura County has the potential to reduce emissions by 0.14 tons ROG per day. However, the proposed revisions to Rule 74.2 would be adopted only if further analysis demonstrates them to be appropriate and cost-effective in Ventura County.

District Rule: 74.2
Rule Adoption Date: 2017
Rule Implementation Date: 2018
Required Board Action: Adoption of a rule revision
Cost-effectiveness: Between $0 and $13,000 per ton of ROG reduced
Estimated Control Efficiency: To be determined
Estimated Emission Reductions: 0.16 tons per day, ROG

R-607, Composting and Organic Material Conversion Operations: This control measure would implement new District Rule 74.32, *Composting and Organic Material Conversion Operations*, to incorporate requirements similar to South Coast Air Quality Management District (SCAQMD) Rules 1133.1, *Chipping and Grinding Activities*, and 1133.3, *Emission Reductions from Greenwaste Composting Operations*. The purpose of this control measure is to minimize VOC emissions through inadvertent decomposition during chipping and grinding activities (as Rule 1133.1) and during greenwaste composting operations (as Rule 1133.3).

Rule 1133.1 was revised July 8, 2011 to establish Best Management Practices (BMP) for chipping and grinding of greenwaste to produce materials other than compost material, and to better manage stockpile operations associated with chipping and grinding activities, consistent with greenwaste processing requirements established in the state regulation Title 14 of the

California Code of Regulations. Rule 1133.1 covers 70 facilities in the SCAQMD. Emission reductions were not quantified for the rule revisions.

Rule 1133.3 was adopted as a new rule on July 8, 2011 to establish operational Best Management Practices for greenwaste composting operations that produce compost material and applies to greenwaste composting operations involving greenwaste, wood waste, manure, or food waste. Rule 1133.3 affects 17 facilities in that region and is estimated to reduce 0.9 tons of VOCs per day from greenwaste composting operations. Cost-effectiveness was estimated to be $1,340 per ton of VOC reduced. Preliminary calculations based on population ratio indicate possible ROG emission reductions of 0.045 tons of ROG per day by implementing composting BMPs.

Greenwaste composting is an increasing source of VOC emissions in California. Ventura County has several greenwaste composting facilities to which this new rule could apply. However, the District does not currently require air permits for such facilities and none of the existing facilities are in the District's emission inventory system. If this new rule were adopted, District permit rules would have to be amended to require that composting facilities obtain District air permits and air emissions associated with the facilities would have to be determined and added to the District's emission inventory system. This new rule would be adopted only if subsequent analysis demonstrates it to be appropriate and cost-effective in Ventura County.

Proposed District Rule: 74.32
Proposed Rule Adoption Date: 2017
Proposed Rule Implementation Date: 2018
Required Board Action: Adoption of a new rule
Cost-effectiveness: $1,340 per ton of VOC reduced (overall)
Estimated Control Efficiency: 41%
Estimated Emission Reductions: 0.045 tons per day, ROG

N-110-2016, Fan-Type Central Furnaces: This control measure would reduce NOx emissions from fan-type central furnaces rated at less than 175,000 Btu per hour heat through revisions to District Rule 74.22, *Natural Gas Fan-Type Central Furnaces.* SCAQMD revised its Rule 1111, *NOx Emissions from Natural Gas-Fired, Fan-Type Central Furnaces,* applicable to similar source equipment, on November 6, 2009, reducing the NOx limit from 40 nanograms per joule (ng/j) to 14 ng/j.

This is a technology-forcing control measure as adopted by the SCAQMD. Due to uncertainties in technical feasibility, VCAPCD will not adopt the rule until all limits in revised SCAQMD Rule 1111 are achieved in practice. Implementation of the new SCAQMD limits began on April 1, 2015, and ends on October 1, 2018.

This control measure affects new or replacement units through a sales prohibition and certification requirements. Due to the lifespan of regulated equipment of 20-25 years, the low-emission units will not achieve saturation of the in-use sources until 2045 or later.

District Rule: 74.22
Rule Adoption Date: 2019
Rule Implementation Date: 2038
Required Board Action: Adoption of a rule revision
Cost-effectiveness: Between $8,600 and $19,000 per ton of NOx reduced
Estimated Control Efficiency: 65% (overall)
Estimated Emission Reductions: 0.25 tons per day (overall, full saturation), NOx

N-114, NOx Reductions from Miscellaneous Sources: This control measure is a new rule to minimize NOx emissions from a variety of sources not currently regulated. The emission standards are similar to SCAQMD Rule 1147, *NOx Reductions from Miscellaneous Sources.* The applicability threshold of 5 MMBtu/hour heat input is based on San Joaquin Valley Unified APCD Rule 4309, *Dryers, Dehydrators, and Ovens*. Restricting the applicability of the emission limits to larger sources increases the cost-effectiveness of the proposed rule.

Rule 1147 was originally adopted on December 5, 2008 and requires equipment or combustion modifications to meet NOx emission limits in the range of 30 ppm to 60 ppm (referenced to 3% oxygen) depending upon the process and process temperature. The emission limits in Rule 1147 can be achieved with low NOx burners.

There are 17 existing emission units in Ventura County subject to the new NOx standards. Half of the existing units already comply with the proposed NOx standards, and the remaining units will be retrofitted or adjusted to comply with the new NOx standard. The estimated potential emission reductions are about 40 tons NOx per year (annual average 0.11 tons per day).

A permitted facility having two or more emission units that would require the installation of NOx emission reducing equipment will have the option of submitting an alternative compliance plan to delay the compliance deadlines for additional unit retrofits. All units are required to comply by July 1, 2020.

It should be noted that even though this rule has been adopted, the emission reductions are not reflected in the projected inventory due to the timing of the adoption relative to the attainment modeling.

New District Rule: 74.34
New Rule Adoption Date: 2016
New Rule Implementation Date: 2020
Board Action: New rule adopted 12/13/2016

Cost-effectiveness: $3,000 to $4,000 per ton of NOx reduced (overall)
Estimated Control Efficiency: 40%
Estimated Emission Reductions: 0.11 tons per day (NOx)

Further Study Control Measures

Further study measures are emission control methods that are not proposed for adoption as District rules at this time, due to inconclusive information about their technical feasibility, economic feasibility, or appropriateness for Ventura County. District staff will evaluate these measures and will adopt them as District rules if they prove feasible and appropriate for Ventura County.

CH&SC Section 40914(b)(2) requires that the District's clean air plan for the California ambient ozone standards include expeditious implementation of "every feasible measure" to reduce ozone precursor emissions, ROG and NOx. Measures that help Ventura County attain the state ozone standard also help the county attain the federal 8-hour ozone standard.

District staff reviewed the District's rules for its periodic rule evaluation for the California Clean Air Act. This review determined that the existing rules listed in Table 3-3, Further Study Control Measures, have potential for enhancement, thereby realizing additional emission reductions for both the federal and state ozone standards. In addition, staff identified potential new rules to control emissions from vacuum truck operations and minimize the use of industrial flares. Consequently, the further study control measures listed in Table 3-3 will serve a dual purpose.

They will serve as potential measures for the District's federal 8-hour ozone plan and to meet the "every feasible measure" requirement for the state ozone standard. The emission reduction potential of these measures is unknown at this time but is likely significant in total. The District commits to evaluate the feasibility of each of the measures listed in Table 3-3 for Ventura County. For measures found feasible, District staff will provide emission reduction estimates prior to rule adoption.

Table 3-3
Further Study Control Measures

District Rule	Control Measure Name or Rule Title	Control Measure Description
70	Storage and Transfer of Gasoline	**R-431**: Consider semi-annual testing for high volume stations, operation and maintenance manuals and 98% control efficiency for Phase I (ROG)
70	Storage and Transfer of Gasoline	As suggested in Technical Support Document for the 2014 RACT SIP, consider reducing emission limit for gasoline transfer from bulk tank to delivery trucks similar to Bay Area AQMD Rule 8-33, *Gasoline Bulk Terminals and Gasoline Cargo Tanks* (ROG)

Table 3-3 (Cont.)
Further Study Control Measures

District Rule	Control Measure Name or Rule Title	Control Measure Description
71	Crude Oil and Reactive Organic Compound Liquids	Revise rule to set lower leak definition thresholds similar to SCAQMD Rule 463, *Storage of Organic Liquids* (ROG)
74.6	Surface Cleaning and Degreasing	**R-330**: Revise rule to lower ROG limits for solvents used on electronics, electrical components, medical devices, and application equipment; also re-examine potential to emit, Rocketdyne and ARB exemptions (ROG)
74.6.1	Batch Loaded Vapor Degreasers	**R-331**: Revise rule to limit vapor degreaser solvent to 25 grams ROG per gallon (ROG)
74.9	Stationary Internal Combustion Engines	Revise rule to set new NOx limits for stationary internal combustion engines consistent with San Joaquin Valley Unified APCD Rule 4702, *Internal Combustion Engines – Phase 2* (NOx)
74.13	Aerospace Assembly and Component Manufacturing Operations	Revise rule to reduce ROG emissions from coatings used on aerospace components by establishing ROG limits for certain new coating categories and reducing the allowable ROG content for several existing coating categories similar to SCAQMD Rule 1124, *Aerospace Assembly and Component Manufacturing Operations*, and San Joaquin Valley Unified APCD Rule 4605, *Aerospace Assembly and Component Manufacturing Operations* (ROG)
74.14	Polyester Resin Operations	Revise rule to include a small source exemption limit of 50 gallons per year, consistent with Santa Barbara County APCD Rule 349, *Polyester Resin Operations* (ROG)
74.15	Boilers, Steam Generators and Process Heaters	Revise rule to limit NOx from subject equipment similar to SCAQMD Rule 1146, *Emissions of Oxides of Nitrogen From Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters* (NOx)
74.19.1	Screen Printing Operations	Revise rule to limit screen printing cleaners to 100 grams per liter consistent with SCAQMD Rule 1171, *Solvent Cleaning Operations* (ROG)
74.20	Adhesives and Sealants	Revise rule to align ROG content limits with proposed revisions to SCAQMD Rule 1168, *Adhesive and Sealant Operations* (ROG)
74.21	Semiconductor Manufacturing	Revise rule to reduce allowable ROG content of solvents used in regulated operations so the limits are similar to SCAQMD Rule 1164, *Semiconductor Manufacturing* (ROG)
74.25	Restaurant Cooking Operations	Revise rule to limit NOx from commercial food preparation ovens similar to SCAQMD Rule 1153.1, *Emissions of Oxides of Nitrogen From Commercial Food Ovens* (NOx)

Table 3-3 (Cont.)
Further Study Control Measures

District Rule	Control Measure Name or Rule Title	Control Measure Description
74.26 & 74.27	Storage Tank Degassing Operations	Revise both rules to establish new limits and expand applicability to smaller tanks, pipelines and cleaning equipment consistent with SCAQMD Rule 1149, S*torage Tank and Pipeline Cleaning and Degassing* (ROG)
TBD [a]	Wastewater Treatment Plants	**R-605**: New rule to reduce ROG emissions from wastewater aeration by requiring steam stripping at the point of generation or capturing and controlling ROG emissions at wastewater treatment plants ROG)
TBD	Oil Well Degassing	**R-432**: New rule to limit ROG emissions when natural gas is vented from oil wells prior to maintenance or repair work (ROG)
TBD	Flare Minimization	Adopt a new rule to control gas flaring at oil and gas facilities similar to Bay Area AQMD Rule 12-12, *Flares at Petroleum Refineries* and/or SCAQMD Rule 1118, *Control of Emissions from Refinery Flares* (ROG)
TBD	Vacuum Truck Operations	Adopt a new rule to limit ROG emissions from vacuum truck operations similar to Bay Area AQMD Rule 8-53, *Vacuum Truck Operations* (ROG)

Note: To be determined.

Reasonably Available Control Technology

CAAA Sections 182(b)(2) and 182(f) (42 U.S.C. §7511a) require ozone nonattainment areas to implement Reasonably Available Control Technology (RACT) for sources that are subject to CTGs and for "major sources" of ROG and NOx, which are ozone precursors. RACT is the lowest emissions limitation that a particular source is capable of meeting by application of control technology that is reasonably available considering technological and economic feasibility (44 FR 53762; September 17, 1979).

RACT requirements are included in the CAAA to ensure that significant source categories at major sources of ozone precursor emissions are controlled to a "reasonable" extent, but not necessarily to the more stringent best available control technology (BACT), or lowest achievable emission rate (LAER) levels, expected for new or modified existing major stationary sources. CTGs are EPA documents that define RACT for existing sources of air pollution. Emission sources covered by CTGs are termed CTG sources.

2014 RACT SIP

According to the EPA's *Final Rule to Implement the 8-Hour Ozone NAAQS* (80 FR 12264; March 6, 2015), areas classified as moderate nonattainment or higher must submit a

demonstration that their current rules fulfill 8-hour ozone RACT for all CTG categories and all major, non-CTG sources as a revision to their SIPs. RACT SIP submittals are in addition to the 8-hour ozone attainment plans. The RACT SIPs were due to EPA by July 20, 2014.

The District approved its RACT SIP on June 10, 2014 and sent it to ARB for submittal to EPA. ARB submitted the District's RACT SIP to EPA on July 18, 2014 and EPA took final action to approve it on January 15, 2015 (80 FR 2016-2018). The RACT SIP found that all District rules subject to RACT review fulfill RACT requirements for the 8-hour ozone NAAQS.

The rules meet RACT, or more commonly, exceed RACT because they comply with more current and stringent control requirements of the California Clean Air Act. The 2014 RACT SIP also found that all CTG sources and major non-CTG sources within District boundaries meet or exceed RACT. These findings are not surprising since Ventura County has had a very aggressive clean air program for many years.

Updated CTGs

The CAAA requires the EPA to revise RACT, update existing CTG documents, or develop new documents on a frequent basis to provide states and local clean air agencies with the most current technical information and assist them in determining RACT. Table 3-4 lists the new or revised CTGs EPA issued since the 2007 AQMP was prepared. All of the new or revised CTGs apply to ROG emissions. EPA did not update any Alternative Control Techniques documents since the 2007 AQMP.

District staff evaluated the CTGs updated in 2007 and 2008 during the 2014 RACT SIP development process. During this evaluation District staff determined the only CTG updated in 2007 or 2008, which applies to sources in the District, is the CTG for Metal and Plastic Parts Coatings. All of the other CTGs listed in updated in 2007 or 2008 were included in the Negative Declaration (stating the District has no facilities subject to a CTG) approved by EPA with the 2014 RACT SIP.

The applicability of the CTG for Miscellaneous Metal and Plastic Parts Coatings was evaluated during the development of the 2009 RACT SIP. The 2009 RACT SIP, which received final approval from EPA on May 15, 2015, concluded District Rule 74.12, *Surface Coating of Metal Parts and Products*, meets or exceeds the RACT recommendations in the 2008 CTG for miscellaneous metal and plastic parts coatings. The review also concluded the District has no facilities that exceed the emissions thresholds that would make them subject to the CTG requirements for coating plastic parts.

EPA issued a new CTG for the Oil and Natural Gas Industry in October 2016. Since this CTG was finalized after the District completed its RACT SIP for the 2008 ozone NAAQS, it was not considered in the District's 2014 RACT SIP. In the oil and gas CTG, EPA set forth a two-year period, from the date of publication of the notice of availability of the CTG in the Federal

Register, for the required SIP revision. The notice of availability had not been published in the Federal Register as of December 22, 2016. Therefore, it is not necessary for the District to address this CTG in the 2016 AQMP.

Table 3-4
Updated Control Techniques Guidelines

EPA Report	*Description*
EPA 453/R-07-003 *2007/09*	*Control Techniques Guidelines for Paper, Film, and Foil Coatings*
EPA 453/R-07-004 *2007/09*	*Control Techniques Guidelines for Large Appliance Coatings*
EPA 453/R-07-005 *2007/09*	*Control Techniques Guidelines for Metal Furniture Coatings*
EPA 453/R-08-002 *2008/09*	*Protocol for Determining the Daily Volatile Organic Compound Emission Rate of Automobile and Light-Duty Truck Primer-Surfacer and Topcoat Operations*
EPA 453/R-08-003 *2008/09*	*Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings*
EPA 453/R-08-004 *2008/09*	*Control Techniques Guidelines for Fiberglass Boat Manufacturing Materials*
EPA 453/R-08-005 *2008/09*	*Control Techniques Guidelines for Miscellaneous Industrial Adhesives*
EPA 453/R-08-006 *2008/09*	*Control Techniques Guidelines for Automobile and Light-Duty Truck Assembly Coatings*
EPA-453/B-16-001 October 2016	*Control Techniques Guidelines for the Oil and Natural Gas Industry*

New Source Review

NSR is a permitting program required by the CAAA to help ensure that new or modified equipment and facilities (e.g., boilers, turbines, crude oil storage tanks, power plants, and factories) do not significantly degrade air quality or slow progress towards clean air. NSR permits are legally binding documents that specify what can be constructed, what emission limits must be met, and how emission sources must be operated. The primary components of NSR are BACT and emission offsets. The District's Engineering Division administers the District's NSR program. Further information regarding NSR is available on EPA's NSR website. Further information about the District's air permitting program is available on the District's Engineering Division website.

BACT is an emission limitation based on the maximum degree of reduction for each regulated air pollutant emitted from, or resulting from, any new or modified stationary source. It is generally determined on a case-by-case basis, taking into account energy, environmental and economic impacts, and other costs. Emission reduction credits (ERC) are banked emission

reductions available to offset emission growth from new, replacement, modified or relocated emissions units.

The District implements NSR through District Rule 26, *New Source Review*. Rule 26, which includes Rule 26 through 26.13, applies to new sources of air pollution and to modifications, replacements, and relocations of existing sources. The provisions of Rule 26 are applicable on a pollutant-by-pollutant and an emissions-unit-by-emissions-unit basis. Rule 26 requires that source owners and operators apply BACT to minimize air emissions from these sources. BACT is determined on a case-by-case basis by District staff during the permit approval process. Rule 26 also requires that certain emission increases be offset with emission decreases. However, it allows banking of certain emission decreases as ERCs for later use as offsets.

Control Measures Not Retained in the 2016 AQMP

Previous AQMPs contained stationary source control measures to help attain the federal and state 1-hour and 8-hour ozone standards. This section presents stationary source control measures identified in previous AQMPs but not retained in the 2016 AQMP. Table 3-5 lists these measures. In each case, the District has not adopted the measure as a District rule because the measure became obsolete or infeasible for Ventura County based on technological or economic considerations. Additionally, for the reasons given with each measure, no emission reductions would be lost by not retaining it in the 2016 AQMP. The following discussion includes a brief description of each measure and the reason for not retaining it in the 2016 AQMP.

N-112, Boilers, Steam Generators and Water Heaters and Process Heaters Less than 1 MMBtu's in Size: This control measure was originally included as a "further study" measure in the District's 1994 AQMP. It would have reduced NOx emissions from small combustion sources by requiring all new and existing units to meet a NOx emission limit of 20 ppm or by setting up an economic incentive program involving emission reduction credits. Initial data indicated a retrofit requirement was not cost effective.

The District adopted control measure N-102-2012 as an amendment to Rule 74.11.1, *Large Water Heaters and Small Boilers*, on September 11, 2012. During the rulemaking process it was determined retrofit of the regulated equipment was still not cost effective. The adopted rule revisions limit NOx from new regulated equipment to 20 ppm or less. Analysis indicates all emission reductions will be achieved by 2023 so no emission reductions will be lost by not retaining control measure N-112.

R-426, Vehicle Gasoline Dispensing - Phase I: This control measure was included as a "further study" control measure (number R-402) in the District's 1991 AQMP and renumbered R-426 in the District's 1994 AQMP. It would have reduced ROG emissions by requiring fail-safe Phase I vapor recovery systems at gasoline dispensing facilities so gasoline transfer would be automatically stopped if the vapor recovery system failed to perform correctly.

The control measure was dependent on the development of such systems for gasoline transfer. This technology has never been achieved in practice in California, so the control measure is not feasible. In addition, existing rules already require all Phase I systems to be operated in good working order without leaks. The District did not take credit for any emission reductions from this control measure so excluding control measure R-426 will not affect emissions reductions required to achieve attainment.

Table 3-5
Control Measures Not Retained in the 2016 AQMP

Control Measure Number	Control Measure Name	Reason
N-112	Boilers, Steam Generators, and Water and Process Heaters Less Than 1 MMBtu's in Size	Accomplished by implementation of control measure N-102-2012)
R-426	Vehicle Gasoline Dispensing - Phase I - Fail safe vapor recovery system	No such system achieved in practice in California; operating leaking system already illegal
R-429	Gas-Operated Control Devices	Targeted source equipment nearly eliminated from District inventory
R-600	Agricultural Pesticides	California Department of Pesticide Regulations determined to be sufficient to meet SIP goals
N-708/ R-707	Old Vehicle Buy-back Program	Fleet turnover has reduced control measure effectiveness
N/R-901	Best Available Retrofit Control Technology (BARCT)	BARCT is required for all permitted stationary sources by CH&SC 40919(a)(3), so a separate local control measure is unnecessary
N/R-905	Energy Efficiency	Accomplished by ARB and federal greenhouse gas regulations and incentive programs

R-429, Gas-Operated Control Devices: This control measure was included as a "further study" measure in the District's 1994 AQMP. It would have reduced ROG emissions by requiring retrofits of equipment actuated with ROG-containing gas. While devices using ROG-containing gas to power valves, actuators, and other equipment were common in 1994, they have been almost completely eliminated from oilfields in Ventura County in the last 15 years. This is due to the District's strict leak detection and repair regulations and aggressive enforcement efforts. Since the piping and valves used to transmit natural gas to these devices were prone to leaks, facility operators replaced them with non-ROG gas systems to reduce maintenance costs and exposure to enforcement action. Since this technology has been replaced by non-emitting systems, no emission reductions will be lost by not retaining control measure R-429.

R-600, Agricultural Pesticides: This control measure was included as a "further study" control measure (number R-19) in the District's 1987 AQMP and renumbered R-600 in the District's 1991 AQMP. It would have reduced ROG emissions by limiting the use of agricultural pesticides and/or pesticide carriers composed of reactive organic compounds. On July 1, 2013 the California Department of Pesticide Regulation (DPR) issued a Notice of Final Decision Concerning Reformulation Reevaluation of Certain Pesticide Products. This document states "In 2008, after regulations to reduce emissions from fumigants went into effect, pesticide fumigant emission regulations and control measures were considered to be adequate to meet and maintain SIP goals in most nonattainment areas (NAAs)." The only NAA requiring further reduction was the San Joaquin Valley. Therefore, this measure is now obsolete because DPR is controlling ROG emissions consistent with SIP goals. No potential emission reductions would be lost by not retaining control measure R-600.

N-708/R-707, Old Vehicle Buy-back Program: This control measure was included as a "further study" measure in the 1991 AQMP. In the 1994 AQMP it was included as a further study measure and as a contingency measure. N-708/R-707 targeted pre-1975 vehicles for early retirement due to higher emissions from these vehicles which were manufactured before exhaust emission control requirements. In the intervening years, the passenger vehicle fleet turnover has virtually eliminated these high-emission vehicles. As a result, this control measure is obsolete and no potential emission reductions would be lost by not retaining control measure N-708/R-707.

R-901/N-901, Best Available Retrofit Control Technology (BARCT): This control measure was included as a new control measure in the 1991 AQMP and retained in the 1994 AQMP. It was included as a local implementation of the California Clean Air Act (CCAA) BARCT requirement for Serious and above nonattainment areas pursuant to HS&C 40919(a)(3). Since BARCT is required by the CCAA the District must apply BARCT to existing sources when issuing permits to operate and adopting new or revised rules regulating sources of ozone precursors. Control measure R-901/N-901 is a local duplication of a state control measure, so no potential emission reductions would be lost by not retaining the local control measure.

N/R-905, Energy Efficiency: This control measure was included as a "further study" measure in the District's 1994 AQMP. It was added to facilitate exploration of options for the District to pursue programs that would contribute to increased energy efficiency. The original description of the control measure notes the District has no regulatory authority over energy markets. There are significant legal, institutional, and technological feasibility issues that would need to be resolved in order for the District to develop a regulatory program with a discernable impact on energy use and, as a result, ozone precursor emissions.

In the two decades since this control measure was proposed for further study, energy efficiency practices have penetrated industry and property development culture to a much greater extent. In addition, the recent development of ARB's greenhouse gas (GHG) Cap and Trade Program and

emission reduction targets has dramatically changed the regulatory environment of energy production and use. Federal, state, and utility company incentive programs have proliferated, leading to complex systems requiring significant knowledge and effort to navigate and obtain all available energy and emissions benefits for fuel-burning devices from home water heaters to combined heat and power electrical generating units.

A survey of other California air districts revealed no formal energy efficiency regulations. Several districts have policies in place to encourage the use of energy efficient equipment at regulated sources and energy efficient development practices for land use projects. However, none of these have quantified emission reductions in the district's AQMPs. Due to the changing regulatory and incentive environment, it is unlikely the District will be able to develop an energy efficiency program with creditable emission reductions. As a result, no emission reductions would be lost by not retaining control measure N/R-905.

Transportation Control Measures

Transportation Control Measures (TCMs) are strategies that reduce motor vehicle emissions by reducing vehicle trips, vehicle use, vehicle miles traveled (VMT), vehicle idling, and traffic congestion. The Clean Air Act (CAA) requires TCMs to meet milestones and help demonstrate attainment of the National Ambient Air Quality Standards (NAAQS). TCMs are based on the Southern California Association of Government's (SCAG) adopted Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and Federal Transportation Improvement Program (FTIP).

The following strategies include some of the most common TCMs that can reduce emissions from transportation sources. These strategies were also included in the 1994 and 2007 AQMPs.

Trip Elimination: This strategy reduces vehicle emissions by eliminating vehicle trips. The primary emissions eliminated are the cold-start emissions that occur when vehicle engines have been at rest for a period and then restarted. Cold-start emissions occur after engine startup but before the engines are warm enough for the emission control systems to work effectively. Cold-start emissions are a large percentage of total vehicle emissions and thus a major source of ozone precursors. Telecommuting, carpooling, combining trips, flexible work schedules, and land use policies that provide housing near jobs and shopping centers are measures that eliminate vehicle trips.

Vehicle Substitution: This strategy reduces emissions associated with motor vehicle use by using non-motorized transportation modes that do not produce air emissions. Walking, biking, and telecommuting measures are all examples of vehicle substitution. Adopting trip reduction ordinances to encourage installation of walking and biking facilities and discourage motor vehicle use in highly congested areas are measures to reduce air pollutants.

Vehicle Miles Traveled Reduction: This strategy reduces motor vehicle emissions because vehicles traveling fewer miles produce fewer emissions. This strategy does not reduce cold-start emissions. However, park-and-ride lots, carpooling, and land-use measures are all ways to reduce trip distances and, therefore, vehicle miles traveled and vehicle emissions.

Vehicle Occupancy: Increasing the number of passengers per vehicle can reduce all emissions associated with motor vehicle use. Transit, carpools, and vanpools are all measures to implement this strategy. Other measures include providing ride-match services to establish carpools and vanpools, restricting roads for high occupancy vehicles and passenger buses, establishing employer-based transportation management programs that encourage carpooling, vanpooling and transit use among employees.

Technological Improvements: This strategy reduces emissions through technological improvements to the operation of motor vehicles and the technologies used to improve the performance of transportation systems. Technological improvements such as clean-fuel/electric vehicles, vehicle emission controls, and global positioning system tracking devices used in vehicles that reduce trips and VMT multiply the emission reduction benefits. In addition, Intelligent Transportation Systems (ITS), signal synchronization and freeway management systems, and programs to control the extended idling of vehicles are technological measures to improve the performance of transportation systems and reduce emissions as well.

Transportation Control Measures Project Categories

This section presents the transportation control measures (TCMs) in the 2016 AQMP. The TCMs are grouped by project categories under the District's "umbrella" control measure R-700/N-700, Transportation Control Measures, retained from the 1994 and 2007 AQMPs. To be included in the AQMP, potential TCM projects must be in SCAG's Regional Transportation Plan (RTP) and Federal Transportation Improvement Program (FTIP).

Candidate projects are first screened by the District, Ventura County Transportation Commission (VCTC), and SCAG staff to determine if they are TCMs as defined by the project categories listed in Table 3-6 and SCAG's FTIP Guidelines. SCAG's Transportation Conformity Working Group, the local agency group responsible for interagency consultation confirms the projects as TCMs and the TCMs are subsequently programmed into the FTIP.

The interagency consultation process is part of the federal transportation conformity regulation that requires procedures for federal, state, and local air districts and transportation agencies to consult with each other on transportation plans, programs, and projects. Transportation conformity is a regulatory process to help ensure that transportation plans, programs, and projects are consistent with air quality goals of the AQMP. District Rule 221, *Transportation Conformity*, contains a memorandum of understanding that outlines the interagency consultation process. Further information regarding transportation conformity is presented later under the Conformity section.

Table 3-6
TCM Project Categories Included in R-700/N-700

Project Category
A. Ridesharing Measures Carpooling, Vanpooling, Park and Ride Lots, Ride Matching Services, Incentive Programs, Guaranteed Ride Home Programs, Station Cars, Onsite Services
B. Non-Motorized Measures Bicycle Paths/Facilities, Pedestrian Paths/Facilities, Telecommuting, Flexible Work Schedules, Bicycle and Pedestrian Programs, Satellite Work Centers
C. Traffic Flow Improvement Measures Signal Synchronization, Intersection Improvements, Incentive/Disincentive Programs, High Occupancy Vehicle Lanes, Intelligent Transportation Systems, Ramp Metering
D. Land Use Measures Transportation Demand Management (TDM) Ordinances, Smart Growth/Sustainable Community Projects, Mixed Use Development, Parking Management and Standards, Congestion Management Plan, TDM Strategies
E. Transit Measures Bus Fleet Expansion, Shuttles and Paratransit Vehicles Expansion, Transit Stations and Facilities, Express Busways, Passenger Rail Service, Rail Stations and Facilities, Real-Time Transit Information Systems, Transit Subsidies

The RTP/SCS and FTIP

The RTP (Regional Transportation Plan) is a long-range (2016-2040) transportation plan, covering a period of 25 years that provides a blueprint for future transportation improvements and investments based on specific transportation goals, objectives, policies, and strategies. The RTP, which is based on federal transportation law, identifies the strategies needed to meet mobility, financial, and air quality requirements in the SCAG region.

The SCS (Sustainable Communities Strategy) was introduced as part of the 2012 RTP. The SCS supports the State's required greenhouse gas (GHG) emission reduction targes for the region that is set by ARB. SCAG develops the transportation and land-use planning patterns and goals through the RTP and SCS and coordinates among various committees and local governments to allow the region to meet its GHG reduction targets. Once the SCS is adopted by SCAG, as part of the RTP/SCS approval process, ARB reviews the adopted SCS and determines whether its implementation will meet the regional GHG emission reduction targets.

The recently adopted 2016 RTP/SCS is the prevailing multi-modal plan outlining a better regional transportation system, integrated with the best possible growth pattern for the region out to year 2040. The plan provides the basic policy and program framework for long-term investment in the region's vast transportation system in a coordinated, cooperative, and continuous manner.

Transportation investments in the SCAG region that receive state or federal transportation funds must be consistent with the RTP/SCS and must be included in the SCAG FTIP when ready for funding. SCAG's 2016 RTP/SCS provides the basis for the transportation control strategy of the 2016 AQMP and includes the total regional emissions forecasts from transportation projects in Ventura County. SCAG is the Metropolitan Planning Organization responsible for updating the RTP/SCS every four years.

The FTIP is the short-term transportation program, with a six-year planning horizon, that identifies specific transportation projects that will implement the overall goals of the RTP/SCS. All transportation projects that receive approval and funding must be listed and programmed in the FTIP. TCMs are also listed and programmed in the SCAG FTIP.

TCM Commitments

The AQMP enforceable commitments for TCMs (called TCM Commitments) are the TCM projects contained in the first two years of the current six-year FTIP.

EPA's conformity regulation requires that all TCM commitments undergo a timely implementation analysis at each FTIP update. The timely implementation requirement assures that TCMs are implemented on schedule. The timely implementation report tracks each committed TCM and demonstrates their timely implementation and completion.

Appendix B, *Ventura County TCM Commitments*, presents the projects identified by SCAG and the District as the current TCM Commitments for Ventura County and thus, subject to the timely implementation requirement of Transportation Conformity (presented below).

TCM Rollover and Substitution

SCAG is responsible for updating the FTIP every two years. At each FTIP update, a new list of TCM commitments comprising of new TCMs (only TCMs in the first two years of the update), plus ongoing TCM commitments from the previous FTIP, are rolled-over to automatically update the State Implementation Plan (SIP) upon approval by ARB and EPA. This "rollover" list, consisting of new and ongoing TCM projects, becomes the committed TCMs for tracking timely implementation.

TCM commitments are monitored for compliance according the scheduled completion date established in the new FTIP. Once a TCM project is completed, it is reported in the next FTIP update as completed and removed from future FTIPs. FTIP updates can occur more frequently than the required biennial update in the form of amendments. However, the rollover process applies when the FTIP update requires a conformity analysis and finding; typically every two years.

A TCM substitution is required when a committed TCM project cannot be completed or will be significantly delayed. The VCTC and/or the project sponsor must notify SCAG of the problem

and propose a substitute TCM project or group of projects. The TCM substitution must follow the process set forth in the CAA Section 176(c) and the Federal Conformity Regulation. The substitute project(s) may not come from the current list of committed TCMs because a committed TCM cannot substitute another committed TCM.

Usually, SCAG, VCTC, and the project sponsor will identify a replacement TCM project(s) and formally present the changes to the interagency consultation group, the Transportation Conformity Working Group. If there are no air quality concerns identified during the replacement process, and the substitute TCM provides equivalent or greater emissions reductions, the new TCM is adopted without requiring a new conformity finding or formal SIP revision. Both the TCM rollover and substitution process are outlined in detail in SCAG's FTIP guidelines.

Conformity

Conformity is a federal regulatory process required in nonattainment areas by the CAA Section 176(c) to ensure that federal funding and approvals will not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. Section 176(c) prohibits federal agencies, departments, or instrumentalities from engaging in, supporting, providing financial assistance for, licensing, permitting or approving any action which does not conform to an approved state or federal clean air implementation plan. It is called conformity because federal agencies, such as the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and Federal Aviation Administration (FAA), must show that their actions "conform with" (i.e., do not undermine or hinder) approved SIPs.

A conformity determination is a formal demonstration that the subject federal action is consistent with the respective SIP. Federal agencies make such demonstrations by performing a conformity analysis of their proposed federal actions. The conformity analysis evaluates and documents project-related air pollutant emissions, local air quality impacts, and the potential need for emissions mitigation.

In 1993, EPA promulgated two sets of conformity regulations to implement Section 176(c): 1) transportation conformity and, 2) general conformity. Transportation conformity is applicable to highway and mass transit projects and to transportation plans, programs, and projects funded under the Federal Highway and Transit Act. General conformity is applicable to other non on-road federal actions and approvals such as, airport expansion projects or new water treatment facilities. The District currently has two conformity rules, Rule 221, *Transportation Conformity*; and, Rule 220, *General Conformity*.

Transportation Conformity

Transportation conformity is a CAA and FAST Act (Fixing America's Surface Transportation Act) regulatory process that coordinates air quality planning and transportation planning to help ensure that highway and transit projects will not cause new air quality violations, worsen existing

violations, or delay timely attainment of the NAAQS. Conformity applies to transportation plans, transportation improvement programs, and highway and transit projects funded or approved by the FHWA and FTA. Both the RTP/SCS and FTIP must demonstrate conformity with the clean air plans covering the SCAG region, including Ventura County.

Metropolitan planning organizations, such as SCAG, make initial conformity determinations in metropolitan areas, while state departments of transportation (i.e., Caltrans) usually do so in areas outside the metropolitan areas. The major requirements of transportation conformity are:

- Regional emission forecasts are compared to the SIP conformity budget, the latest planning assumptions and emissions models are used,
- TCMs are being implemented on a timely basis, and interagency consultations are being conducted on regional transportation issues.
- FHWA and FTA make final conformity determinations.
- The FHWA and EPA websites have additional information covering transportation conformity.

Motor Vehicle Emissions Budget

The 2016 AQMP includes a motor vehicle emissions budget (MVEB) for the Ventura County portion of the South Central Coast Air Basin (SCCAB). The MVEB has been developed in consultation with ARB, SCAG and EPA. The emissions budget presented in Table 3-7, *Motor Vehicle Emissions Budget*, used EMFAC2014 with SCAG's modeled VMT and speed distributions from the 2016 RTP/SCS adopted by SCAG in April 7, 2016. The Air Resources Board released EMFAC2014 that updated the emission rates and planning assumptions used in calculating motor vehicle emissions budgets. EMFAC2014 was approved by U.S. EPA on December 14, 2015.

The federal conformity rule allows a SIP to create a safety margin in an emissions budget (40 CFR 93.101, 93.118(e)(4)(vi)). A "safety margin" is the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for reasonable further progress, attainment, or maintenance.

This plan creates a safety margin of 0.5 tons/day of ROG (reactive organic gases) for only the year 2018. The baseline emissions and any safety margins are summed to obtain the total. The summed total is then rounded upward to the nearest ton to obtain the MVEB budget.

Table 3-7
Motor Vehicle Emissions Budget
(tons per day)

	2018		2020	
	ROG	NOx	ROG	NOx
Baseline Emissions	4.90	7.29	4.21	6.01
Safety Margin	0.50	---	---	---
Total	5.40	7.29	4.21	6.01
MVEB Totals	**6**	**8**	**5**	**7**

Note: Based on EMFAC2014 and SCAG's RTP/SCS April 2016.
Budget totals are rounded upward to the nearest ton.

Transportation Conformity Budget

Central to transportation conformity is the conformity budget. When the AQMP is submitted to EPA as part of the SIP, EPA will review the MVEB. An approval, disapproval, or adequacy finding of the MVEB will be determined by EPA. An approval or adequacy finding of the MVEB by EPA will establish the conformity budget that sets the maximum amount of on-road mobile source emissions that a nonattainment area can produce while continuing to demonstrate progress toward attainment of the required NAAQS.

All future RTPs and FTIPs in the SCAG region must conform to the conformity budget. In other words, the vehicle emissions forecasts of the RTP/SCS and FTIP must be equal to or less than the conformity budget approved or found adequate by EPA for SIP and conformity purposes. A conformity budget therefore acts as a "ceiling" for future total on-road mobile source emissions. Exceedances of a conformity budget indicate an inconsistency with the applicable AQMP/SIP. The continued federal funding for transportation projects in the Ventura County portion of the SCCAB depends on a positive conformity determination of the RTP/SCS and FTIP.

General Conformity

General conformity is a CAA regulatory process that applies to most federal actions other than transportation actions (see transportation conformity). Examples of federal actions subject to general conformity include issuance of Army Corps of Engineers permits, water and wastewater projects funded by EPA, and other federal projects impacting harbors, airports, and reservoirs. Certain federal projects are exempt from general conformity. Those include projects whose air pollutant emissions would be below specified de minimis emission levels (based on the area's nonattainment classifications) and certain projects presumed to conform, such routine maintenance activities, activities at Superfund sites, and activities conducted in response to national emergencies.

Activities in an attainment area are generally not subject to general conformity, unless the area was formally a nonattainment area and is now under a federal clean air maintenance plan. The federal agency that approves or funds a project or activity, that may be subject to the general

conformity, is responsible for the making a conformity determination. Environmental documents required under the National Policy Act (NEPA) and California Environmental Quality Act (CEQA) may provide a statement about a project's general conformity status. General conformity requirements are covered under the District's Rule 220, *General Conformity*. EPA's General Conformity website contains additional information about the federal regulation.

State Mobile Source Strategy

On May 16, 2016, the ARB released its 2016 State Mobile Source Strategy for California's 2016 State Implementation Plan to achieve the additional emission reductions needed for those areas of the state with the most challenging air quality problems – the SCAQMD, and San Joaquin Valley Unified APCD – to achieve the federal health-based standards for ozone and $PM_{2.5}$. The control measures in ARB's 2016 State Strategy target on-road light duty vehicles, on-road heavy-duty vehicles, off-road equipment, and off-road federal and international sources.

The State Mobile Source Strategy anticipates reducing smog-forming emissions by 80 percent and diesel particulate matter emissions 45 percent in the South Coast Air Basin from today's levels. Statewide, the strategy would also result in a 45 percent reduction of GHG emissions and a 50 percent reduction in the consumption of petroleum-based fuels. ARB and EPA will implement the State Strategy measures. The District will not implement any of the measures because they are not under District regulatory authority.

Nearly all the control measures in the 2016 Mobile Source Strategy will be implemented after 2020, the year by which Ventura County is required and expects to achieve the federal ozone standard. As such, Ventura County will see little benefit from the 2016 State Strategy prior to 2020 but will thereafter, bringing about even cleaner air to the county and furthering progress towards the more stringent 2015 federal ozone standard. The 2016 State Mobile Source Strategy, including the proposed statewide emission control measures, revisions, and appendices, is available on ARB's 2016 State Mobile Source Strategy website.

Although Ventura County will see little benefit from the 2016 State Strategy in the near term, it has realized and will continue to realize emission reductions from ARB's 2007 State Mobile Source Strategy. The 2016 AQMP incorporates the 2007 State Strategy measures by reference and reflects the emission reductions those measures will achieve in Ventura County. The 2007 State Strategy is available on ARB's 2007 State Strategy for California State Implementation Plan (SIP) for Federal PM2.5 and 8-Hour Ozone Standards website.

Appendix C, *Key Mobile Source Regulations and Programs Providing Emission Reductions*, presents an overview of key California mobile source regulations and programs. Appendix D, *Air Resources Board Control Measures 1985 – 2016*, presents all statewide emission control measures adopted by ARB from 1985 through 2016.

Reasonably Available Control Measures Analyses

Federal Clean Air Act Sections 172(c)(1) and (c)(2) require the District to demonstrate that it has adopted all control measures necessary to attain the 2008 federal 8-hour ozone standard as expeditiously as practicable and to meet Reasonable Further Progress (RFP) requirements. Reasonably Available Control Measures (RACM) applies to stationary source control measures, Transportation Control Measures, and mobile source control measures.

A potential control measure is considered "reasonably available" and must be implemented if it would advance attainment by at least one year, either alone or in combination with other reasonably available control measures. This means the combined emission reductions from RACM must be sufficient to reduce the emission inventory projected for 2019 (or earlier) to that currently projected for 2020, the attainment year, or lower. If such emission reductions can be demonstrated, the combined RACM measures must be implemented.

As shown in Table K-3, of Appendix K, *Ventura County Weight of Evidence Assessment*, the projected NOx and ROG emissions are 31 and 32 tons per day, respectively, in the attainment year 2020. The projected 2019 NOx and ROG emissions are 33 and 32 tons per day respectively. Therefore, in order to be considered RACM, the combined control measures must reduce NOx emissions by two tons per day.

Stationary Source RACM

District stationary source ROG and/or NOx prohibitory rules that were not fully addressed in the District's 2014 RACT SIP were evaluated for potential RACM emission reductions for the 2016 AQMP. Staff compared District rules to rules adopted by other air districts with higher or "worse" nonattainment classifications, namely the SCAQMD and the San Joaquin Valley Air Pollution Control District (SJVAPCD). Staff also reviewed rules from other air districts such as the Bay Area Air Quality Management District (BAAQMD).

District staff also identified a few rules from other air districts that apply to unregulated source categories in Ventura County. District staff conducted preliminary evaluations of the potential emission reductions, including the cost effectiveness and timing of the potential reductions.

A very conservative estimate of the total emission reductions achievable through potential RACM new and amended rules are as follows:

NOx: 0.008 tons per day
ROG: 0.25 tons per day

As noted above, in order to advance attainment by one year, emission reductions of at least two tons of NOx per day must be achieved. The potential RACM identified by the District are a tiny fraction of the required NOx reductions.

Since the ROG inventory remains stable for the two years prior to the District's modeled attainment, it is unclear how much ROG emissions reductions would be required to advance the attainment date. However, it is clear that reducing ROG emissions less than 1% of the county's anthropogenic emissions inventory is insufficient to advance the attainment date. Such a reduction is well within the margin of error for the emissions inventory and the annual variability of emissions due to other factors.

Appendix E, *Stationary Source Reasonably Available Control Measure Assessment*, provides the details of the stationary source RACM evaluations.

Transportation Control Measure RACM

The Clean Air Act requires a review of RACM for TCMs during AQMP development. Review of RACM provides an analysis of all potential TCMs that can be included as part of the control strategy in the AQMP. TCMs must be both technologically and economically feasible and must advance the projected attainment date of the air quality standard by at least one year to be considered RACM.

Appendix F, *Ventura County Transportation Control Measure Reasonably Available Control Measure Assessment*, lists the TCM RACM assessments conducted for the 2016 AQMP.

Mobile Source RACM

Appendix G, *Ventura County Mobile Source Reasonably Available Control Measures Assessment*, presents California's emission standards, fuel specifications, and incentive programs for heavy-duty vehicles that are technologically and economically feasible in California, including Ventura County.

RACM Conclusion

The combination of feasible RACM measures (stationary source, mobile source, and transportation control measures) not already implemented in Ventura county would provide only a tiny fraction of the 2.0 tons NOx per day reductions needed to advance the county's attainment date by at least one year. Therefore, none of the potential additional control measures are reasonably available, and therefore, none require adoption for the purposes of the 2016 AQMP.

Incentive Programs

The District participates in three clean air incentive programs to help Ventura County meet state and federal clean air standards: the *Carl Moyer Memorial Air Quality Standards Attainment Program*, the *Lower Emissions School Bus Program*, and the *Clean Air Fund*. Below are summaries of these programs. Further information regarding the District's clean air incentive programs is available on the District's Grants/Incentive Programs website.

Carl Moyer Memorial Air Quality Standards Attainment Program

The California State Legislature created the *Carl Moyer Program* in 1998, named after the late Dr. Carl Moyer to recognize his work in the air quality field and his efforts to develop this important program. The *Carl Moyer Program* provides grants to owners of heavy-duty diesel vehicles, vessels, locomotives, and/or stationary agricultural pumps to replace, repower, or retrofit heavy-duty diesel engines to reduce NOx, ROG, and particulate matter. The *Carl Moyer Program* complements California's regulatory clean air program by obtaining extra emission reductions to help meet state and federal clean air standards. *Carl Moyer Program* grants are available to both private companies and public agencies.

The *Carl Moyer Program* is a cooperative effort of the ARB and local air pollution agencies. Each year, the ARB awards grants to local air agencies that apply for funds for local *Carl Moyer Programs*. In turn, air districts, following guidelines adopted by ARB, provide grants to public and private entities for cleaner-than-required engines and equipment. ARB's *Carl Moyer Program* requires, in part, that funded projects in Ventura County operate for at least three years and 75 percent of their use be within the county. In addition, to qualify for funding, projects must meet cost-effectiveness requirements.

The District has operated its *Carl Moyer Program* since 1999. To date, over $37 million in *Carl Moyer Program* funding has been awarded to help replace 1,056 high-polluting diesel engines with new, much cleaner engines in Ventura County. The District's *Carl Moyer Program* has funded new, cleaner farm tractors, marine vessel engines, construction equipment engines, alternative fuel heavy-duty trucks, and agricultural irrigation pump engines. The total emission reductions from those engine replacements were 100 tons per year of ROG, 764 tons per year of NOx, and 43 tons per year of particulate matter.

Lower-Emission School Bus Program

The ARB adopted the *Lower-Emission School Bus Program* in December 2000. This program provides grants to school districts for new, lower emission school buses to reduce schoolchildren's exposure to both toxic particulate emissions and smog-forming NOx emissions. The program has two components: the *Lower-Emission School Bus Replacement Program*, and the *School Bus Retrofit Program*.

The *Lower-Emission School Bus Replacement Program* replaces older, in-use, high-polluting diesel school buses with new lower-emission buses. The *School Bus Retrofit Program* reduces diesel particulate matter emissions from diesel school buses by retrofitting the bus engines with particulate filters. The District has participated in both programs. These programs offer the District a unique opportunity to work with the school districts in the county to reduce children's exposure to diesel exhaust, which is a toxic air contaminant and a human carcinogen.

The *Lower-Emission School Bus Replacement Program* enabled local school districts to replace pre-1987 model year school buses with either new cleaner compressed natural gas (CNG) buses

or new lower-emission diesel buses. Eligible school districts contributed $25,000 (reduced to $10,000 in 2008) to replace in-use, 1977 through 1986 model year school buses. The program paid the remainder. Co-funding is not required of school districts for pre-1977 school bus replacements, school bus retrofits, or alternative-fueled school buses meeting 2010 emission standards. Moreover, school districts that purchase CNG buses can obtain an additional 10 percent of their grant for CNG refueling facilities. Replaced buses must be destroyed so that they can no longer operate in the county or elsewhere.

Recent amendments to the state guidelines now allow air districts to fund the replacement of 1987 or newer model year school buses having two-stroke diesel engines. Funding for these replacements may be available from AB 923 $2 DMV fees. Besides CNG and clean diesel-powered buses, propane-powered school buses and electric school buses are both potential replacements for existing eligible school buses. AB 923 funds may be also be used to replace CNG fuel tanks on existing eligible CNG-powered school buses. To date, 20 CNG school buses and nine lower-emission diesel school buses have replaced 29 pre-1987 school buses in Ventura County.

Clean Air Fund

The *Clean Air Fund* provides grants for air quality improvement projects in Ventura County. The 3M Company created the Clean Air Fund in 1991 with a $1.5 million donation. Three hundred thousand dollars of that amount was set aside as a permanent endowment, which is now more than $548,000 (as of January 19, 2017). The nonprofit Ventura County Community Foundation holds the funds in a trust. The Ventura County Air Pollution Control Board oversees the *Clean Air Fund* and authorizes project funding. The Clean Air Fund Advisory Committee (Committee) reviews all grant proposals and makes recommendations for funding to the Air Pollution Control Board. The Committee is comprised of representatives from transportation, environmental, business, and citizen interest groups.

Since its inception, the *Clean Air Fund* has allocated over $2 million for 52 clean air projects of various types. Examples of funded projects include clean air educational programs, solar pool heaters for local schools, cleaner boat engines, a lawn mower exchange program, electric bikes for law enforcement, a lower emission gasoline-powered leaf blower exchange program, a pesticide emissions reduction research program, a fast charge electric vehicle charging station, fuel-efficient tire voucher program, plug-in electric vehicle voucher program, and compressed natural gas transit buses and trash trucks.

Ventura County Smart Growth Policies and Programs

Ventura County has been a leader in controlling urban growth and sprawl for decades. As a result, Ventura County cities are distinct from each other geographically, with greenbelt buffers and agricultural land separating the urbanized areas of the county. Moreover, 90 percent of the county's population lives within the county's ten cities. Ventura County has successfully accommodated growth while remaining a leading agricultural area in California. Some of the

notable urban growth guidelines, policies, and programs in Ventura County are summarized below for informational purposes.

Guidelines for Orderly Development

The *Guidelines for Orderly Development* help facilitate orderly development of Ventura County by directing urban development to the cities rather than to the county's unincorporated areas. The *Guidelines for Orderly Development's* primary policy states: "Urban development should occur, whenever and wherever practical, within incorporated cities which exist to provide a full range of municipal services and are responsible for urban land use planning."

Ventura County's Local Agency Formation Commission (LAFCO) administers the *Guidelines for Orderly Development*. The County of Ventura, all ten cities in the county, and the LAFCO have adopted the Guidelines for Orderly Development as policy. The County of Ventura first adopted the *Guidelines for Orderly Development* in 1969 and revised them in 1996. The *Guidelines for Orderly Development*:

- Provide a framework for cooperative intergovernmental relations.
- Allow for urbanization in a manner that will accommodate the development goals of the individual communities while conserving the resources of the County.
- Promote efficient and effective delivery of community services for existing and future residents.
- Identify in a manner understandable to the public the planning and service responsibilities of local governments providing urban services.

Greenbelt Agreements

Greenbelt Agreements (Agreements) are policy statements adopted by resolution or ordinance between the County of Ventura and one or more of the county's ten cities. Greenbelts in Ventura County are areas where cities have agreed not to annex areas and the County of Ventura has pledged to permit only open space or agricultural uses. The Agreements protect open space and agricultural lands from urbanization by preventing premature conversion to agriculturally incompatible uses. The Agreements also help ensure that the cities do not sprawl into each other.

Although not a party to the Agreements, the Ventura County LAFCO will not approve a development that conflicts with any greenbelt agreement unless exceptional circumstances exist. City and County elected officials in Ventura County were pioneers in designing and adopting greenbelts.

There are seven greenbelt agreements in Ventura County:

- Ventura-Santa Paula Greenbelt
- Santa Paula-Fillmore Greenbelt
- Camarillo-Oxnard Greenbelt
- Santa Rosa Valley Greenbelt
- Tierra Rejada Greenbelt
- Ventura-Oxnard Greenbelt
- Fillmore-Piru Greenbelt

SOAR and CURB

The Save Open Space and Agricultural Resources (SOAR) and City Urban Restriction Boundary (CURB) resulted from voter-approved ballot initiatives in the unincorporated areas of Ventura County and eight of the county's ten cities. The SOAR initiatives require voter approval in the affected jurisdictions before specified General Plan land use designations, such as agriculture and open space, can be up-zoned to urban designations. The CURB initiatives define a boundary around the affected jurisdictions and require voter approval before urban development can occur outside the CURB lines.

The SOAR and CURB measures work together to direct urban growth to within existing city boundaries, thereby restricting urban sprawl, encouraging infill and higher density development, and protecting agricultural, open space, and natural lands in Ventura County. The city SOARs established CURBs around each city. With limited exceptions, development beyond a city's CURB cannot occur unless the city voters approve an extension of the CURB. The city CURBs complement the County SOAR by preventing annexations of adjacent unincorporated areas into the cities for development unless the voters approve such annexations. The following are the Ventura County jurisdictions covered by SOAR initiatives:

- County of Ventura
- City of Ventura
- City of Camarillo
- City of Thousand Oaks
- City of Simi Valley
- City of Oxnard
- City of Moorpark
- City of Santa Paula
- City of Fillmore

A map of the SOAR and CURB boundaries is available on the County of Ventura's Resource Management Agency's website at: http://www.vcrma.org/gis/.

Ventura County Air Quality Assessment Guidelines

The *Ventura County Air Quality Assessment Guidelines* (Guidelines) is a District document that provides District staff, lead agencies, consultants, and project applicants with uniform procedures for preparing the air quality sections of environmental documents pursuant to the California Environmental Quality Act (CEQA). CEQA applies to all discretionary activities, both public and private, approved by California public agencies, unless an exemption applies, and requires that any significant environmental effects of such projects be mitigated to the extent feasible. CEQA thereby provides a mechanism to help minimize air emissions associated with urban growth.

The Guidelines recommend specific criteria and threshold levels for determining whether a proposed project may have a significant adverse impact on air quality. The Guidelines also provide mitigation measures to lessen or eliminate air quality impacts of development projects found to be significant.

The District does not require that lead agencies use the Guidelines; however, most lead agencies in the county, including the ten cities and the County of Ventura, do so. Additionally, District staff routinely reviews and comments on the air quality sections of environmental documents prepared by county lead agencies.

4. EMISSIONS INVENTORY FORECASTS

This chapter summarizes the ROG and NOx planning emissions inventory for future years. Although the forecast contains other air pollutants, only ROG and NOx are pertinent to ozone formation and emission forecast reporting requirements. Appendix A, *Ventura County Emissions Inventory Documentation*, provides further information and documentation of the emissions forecasts for the 2016 AQMP.

The 2016 AQMP incorporates all anthropogenic emission categories using the latest emissions estimates and control implementation schedule. Emissions forecasts are calculated using the actual 2012 base year emissions inventory presented in Chapter 2, *2012 Baseline Emissions Inventory*, and control measure data in Chapter 3, *Control Strategy*.

Forecast Methodology

The 8-hour Ozone SIP base year emissions inventory and future year emissions forecast are a joint effort by the District and the ARB. The ARB's California Emission Projection Analysis Model (CEPAM) is a computer model that uses pollutant-specific algorithms to calculate future year emissions for all areas throughout the state. The District relies on this model to produce future-year and historical-year emissions in accordance with EPA's 8-hour Ozone SIP and the CCAA of 1988 emissions inventory reporting requirements.

Forecasted emissions are a product of two principal components: growth factors and control factors. The forecast methodology involves applying growth and control factors to 2012 base year emissions by pollutant-emitting process category. Growth and control factors are calculated by analyzing the 2012 actual emissions, future socioeconomic assumptions, and the future impact of district, state, and federal control strategies.

The CEPAM forecast model generated the summer planning day ROG and NOx emissions specific to Ventura County for 2018, 2020, 2025, 2030, and 2035 (CEPAM emission projection v1.04, June 2016). 2018 is a Rate-of-Progress milestone year and 2020 is Ventura County's 8-hour ozone standard attainment year.

Forecasted emissions after the 2020 attainment year are included in five-year increments out to 2035 for emission trend analysis and are not intended for the regulatory purposes of the 8-hour Ozone SIP and should be considered for informational purposes only.

The algorithm used in ARB's CEPAM emission forecasting model is:

$$FY_t = BY * GF_t * CF_t$$

Where:

FY_t = controlled planning day emissions for the forecast year (t)

BY = base year (2012) planning day emissions per process

GF_t = growth factor for forecast year (t)

CF_t = control factor for forecast year (t).

Growth factors (GF) account for changes in future year socioeconomic conditions relative to the 2012 base year using a variety of activity indicators. Activity indicators are collected from a number of sources to track the economic status or social trends of the surrounding area. Examples include economic output and employment by industry, population, housing, natural gas usage, agricultural-related activity, military aircraft and vessel activity, and activity for specialized types of facilities such as landfills and civilian airports.

District and ARB staff assign activity indicators to emissions categories that best characterize the source activity. The District updates the socioeconomic data used in the CEPAM model for every SIP planning cycle and as an ongoing process for rule development analyses. ARB's CEPAM calculates the growth factors, which reflect the change in future year ROG and NOx emissions relative to the base year before controls from rules and regulations are applied. The forecast activity indicators, growth factors and data sources used in the CEPAM v1.04 emissions projections are presented in Table 4-1.

Control factors (CF) represent the overall expected effectiveness of each control measure or rule to reduce emissions in a given future year. All emission categories in a base year are reviewed for potential assignment to control measures, and control factors are updated for every planning cycle. District staff calculates control measure effectiveness estimates based on the best data available, knowledge of local sources already under control, and future control technologies. Control factors may change in the future as better information becomes available during the rule development process.

A control factor is a composite of the following four multipliers:

1) technological control efficiency (CE) of the control technology, equipment or strategy requirements of the control measure;
2) compliance efficiency, or rule effectiveness (RE) of the control measure, reflecting the actual "real world" ability of a control measure to achieve expected emission reductions;
3) rule penetration (RP), or impact factor, representing the relative amount of emissions in a source category subject to a control measure, accounting for exemptions and other control measures; and,
4) implementation factor (IP), or relative amount of total control occurring in a given year, for control measures having phased implementation or control requirements occurring in tiers (i.e. increasing levels of control stringency over a period of years).

Control factors are applied to future year emissions projected from base year emissions using growth factors, resulting in the emissions remaining in a source category after control is applied, represented by the following equation: CF = 1-(CE*RE*RP*IP).

Table 4-1
Future Year Growth Factor Summary

Ventura County 2012 Base Year Forecast Activity Indicator	2018 GF	2020 GF	2025 GF	2030 GF	2035 GF	Data Source
Agriculture, Forestry, Fishing & Hunting Economic Output	0.980	0.966	1.017	1.030	1.039	SCAG
Oil & Gas Extraction Economic Output	0.852	0.802	0.779	0.747	0.713	SCAG
Oil & Gas Extraction Economic Output - OCS	0.957	0.892	0.808	0.870	0.871	SCAG
Nonmetallic Mineral Mining & Quarrying Economic Output	0.849	0.797	0.774	0.742	0.709	SCAG
Construction Employment	1.302	1.398	1.463	1.528	1.594	SCAG
Food Manufacturing Economic Output	1.283	1.387	1.459	1.501	1.543	SCAG
Beverage & Tobacco Products Economic Output	1.236	1.321	1.378	1.429	1.480	SCAG
Paper Manufacturing Economic Output	1.324	1.447	1.555	1.627	1.702	SCAG
Printing & Related Support Activities Economic Output	1.288	1.394	1.476	1.531	1.587	SCAG
Petroleum & Coal Products Manufacturing Economic Output	1.418	1.586	1.758	1.866	1.979	SCAG
Chemical Manufacturing Economic Output	1.428	1.600	1.786	1.912	2.043	SCAG
Plastics & Rubber Products Manufacturing Economic Output	1.368	1.512	1.646	1.732	1.820	SCAG
Nonmetallic Mineral Products Economic Output	1.311	1.429	1.523	1.583	1.644	SCAG
Primary Metal Manufacturing Economic Output	1.318	1.438	1.554	1.650	1.749	SCAG
Fabricated Metal Products Economic Output	1.296	1.407	1.488	1.538	1.588	SCAG
Machinery Manufacturing Economic Output	1.429	1.602	1.797	1.938	2.086	SCAG
Computer & Electronic Products Economic Output	1.616	1.887	2.301	2.667	3.079	SCAG
Electrical Equipment & Components Economic Output	1.469	1.662	1.884	2.036	2.198	SCAG
Transportation Equipment Economic Output	1.355	1.493	1.625	1.717	1.813	SCAG
Furniture & Related Products Economic Output	1.356	1.494	1.620	1.702	1.785	SCAG
Miscellaneous Manufacturing Economic Output	1.492	1.697	1.947	2.131	2.327	SCAG
Merchant Wholesalers, Durable Goods Employment	1.109	1.142	1.193	1.239	1.288	SCAG
Water Transportation Economic Output	1.124	1.163	1.195	1.217	1.239	SCAG
Transit & Ground Passenger Transportation Economic Output	1.104	1.135	1.156	1.169	1.184	SCAG
Pipeline Transportation Economic Output	1.469	1.661	1.948	2.132	2.330	SCAG
Information Industries Economic Output	1.313	1.429	1.641	1.804	1.983	SCAG
Professional, Scientific & Technical Services Employment	1.187	1.250	1.330	1.409	1.488	SCAG
Administrative & Building Services, Waste Mgmt. Employment	1.187	1.250	1.330	1.409	1.488	SCAG
Arts, Entertainment & Recreation Economic Output	1.155	1.211	1.297	1.366	1.438	SCAG
Other Services, Except Public Administration Employment	1.176	1.229	1.281	1.327	1.377	SCAG
Public Administration Employment	0.989	0.985	1.000	1.012	1.025	SCAG
Federal Military Employment	0.860	0.854	0.848	0.848	0.843	ARB/Regional Economic Models, Inc. (REMI)

Table 4-1 (Cont.)
Future Year Growth Factor Summary

Ventura County 2012 Base Year Forecast Activity Indicator	2018 GF	2020 GF	2025 GF	2030 GF	2035 GF	Data Source
Wholesale Warehousing Employment	1.067	1.069	1.056	1.040	1.068	ARB/REMI
Total Employment	1.096	1.127	1.162	1.197	1.232	SCAG
Dwelling Units	1.044	1.059	1.084	1.110	1.135	SCAG
Population 5-24 (Educational Services)	1.000	1.004	1.021	1.035	1.045	SCAG
Population 0-4, 65-up (Hospitals)	1.148	1.192	1.316	1.415	1.487	SCAG
Population	1.046	1.061	1.084	1.107	1.131	SCAG
Consumer Product Use - Aerosol Coatings	1.000	1.000	1.000	1.000	1.000	CA Dept of Finance Population
Electric Generating Unit (Power Plant) Natural Gas Usage	0.710	0.734	0.740	0.747	0.753	CA Energy Commission Energy Generation Forecast
Natural Gas Combustion Commercial	0.961	0.946	0.926	0.945	0.962	Southern California Gas Co.
Natural Gas Combustion Industrial	0.937	0.909	0.848	0.823	0.798	Southern California Gas Co.
Natural Gas Combustion Residential	0.995	0.999	0.998	1.002	1.006	Southern California Gas Co.
Non-Methyl Bromide Structural Pesticide	1.082	1.113	1.200	1.302	1.302	ARB/Dept of Pesticide Regulation
Landfill Waste in Place	1.118	1.157	1.256	1.354	1.453	Ventura County Landfills
Civilian Airport Operations	1.002	1.010	1.031	1.052	1.075	FAA Terminal Area Forecast 2012-2040
Motor Vehicle Gasoline Consumption	0.948	0.899	0.768	0.680	0.648	ARB EMFAC2014 v1.07
Agricultural Harvest Acres	0.947	0.931	0.910	0.890	0.880	ARB Ag Commissioner Data
Livestock Waste	1.000	1.000	1.000	1.000	1.000	ARB State Ag Census/Ventura Co. Ag Commissioner
Livestock Waste - Range Cattle	1.000	1.000	1.000	1.000	1.000	United States Dept. of Agriculture Ag Census/Ventura Co. Ag Commissioner
Irrigation Pumps Natural Gas	0.957	0.934	0.889	0.845	0.804	ARB/Pechan
Food & Agriculture	1.118	1.156	1.236	1.324	1.424	ARB/Pechan
Agricultural Aircraft	0.816	0.760	0.642	0.542	0.476	ARB/CA Agricultural Aircraft Association (CAAA)
Military Aircraft - Mainland	2.501	2.604	3.115	3.784	4.605	US Navy/CBC/contractor
Military Vessels - Port Hueneme	1.532	1.635	1.979	2.407	2.930	US Navy/CBC/contractor
Military Aircraft - Outer Continental Shelf	3.004	3.025	3.151	3.321	3.507	US Navy/CBC/contractor
Military Vessels - Outer Continental Shelf 3-24 miles	1.279	1.301	1.365	1.435	1.507	US Navy/CBC/contractor
Military Vessels - Outer Continental Shelf 24-100 miles	1.813	1.834	1.923	2.098	2.098	US Navy/CBC/contractor
No Growth (Unity)	1.000	1.000	1.000	1.000	1.000	District

Each customized control factor is specific to an emission source category and reflects a future year's anticipated emission control relative to the level of control in the 2012 base year for adopted rules and regulations. Chapter 3 includes a summary table showing district control measure descriptions and expected future year emissions reductions.

Appendix A shows the assignment of growth surrogates to emission source categories in Table A-4 and lists adopted district rules reflected in the base year and forecast emissions in Table A-5.

The ARB Air Quality Planning and Science Division has the primary responsibility for developing on-road and off-road mobile source emissions in California. CEPAM integrates the emissions estimates from the EMFAC on-road motor vehicles model and the OFFROAD and other models for off-road other mobile sources into the future year emissions projections.

Growth assumptions for these mobile source categories are a product of collaboration among transportation agencies, local planning agencies, ARB, and SCAG. Appendix A contains a discussion of data and methods used by ARB to forecast future year mobile source emissions. This Plan uses the most current version of those emissions estimates modeled by the SCAG regional transportation model and the ARB EMFAC and other mobile source models.

Table 4-2 shows important motor vehicle growth indicators from the ARB EMFAC2014 v1.0.7 on-road vehicle model and the SCAG 2016 RTP. On-road motor vehicle planning day emissions for the base year and forecast years specific to Ventura County are included in Appendix A, Tables A-7 and A-8.

Table 4-2
Motor Vehicle Growth Trends

Ventura County Totals	Indicator	2012	2018	2020	2025	2030	2035
Population	Residents	835,400	873,828	886,359	905,574	924,788	944,837
All vehicle categories	Vehicles	614,710	595,694	600,855	615,154	645,217	655,564
Vehicle miles traveled (x 1000)	VMT/ 1000	19,759	20,828	21,009	21,031	21,287	21,118
All vehicle trips	Trip	3,825,700	3,706,063	3,739,468	3,826,918	4,004,748	4,065,320
Fuel Consumption (1000 gallons)	Gasoline	986.0	874.7	819.2	663.2	569.9	513.6
	Diesel	77.1	99.7	106.4	119.6	133.3	147.4

Notes:
EMFAC2014 v1.0.7.
Population: SCAG Final 2016 RTP/SCS (April 2016).

External Adjustments to CEPAM v1.04

For the 2016 AQMP, external adjustments developed by ARB were made to the ARB CEFS v1.06 emissions inventory projections. The adjustments incorporated data changes to the emissions inventory identified by ARB specific to Ventura County and documented in Appendix A of ARB's 2007 State Strategy for California's State Implementation Plan (SIP) for Federal PM2.5 and 8-Hour Ozone Standards.

The only external adjustment identified by ARB for the CEPAM v1.04 emissions inventory projections for the 2016 AQMP is an addition of 0.5 tons/day ROG to On-Road Motor Vehicles emissions in 2018. This adjustment provides a safety margin to the motor vehicle emissions budget for transportation conformity purposes, as described in Chapter 3.

Emission Reduction Credits

District New Source Review permitting Rules 26-26.13 require any facility that has the potential to emit five tons/year or more ROG or NOx from new, replacement, modified or relocated emissions sources to provide emission offsets for the emissions increase. ERCs represent emission reductions that already have occurred and can be used to offset emissions growth from a new or modified permitted facility. EPA policy, the federal CAA sections 172(c)(5) and 173 and the CFR (40 CFR 51.165(a)(3)(ii)(C)(1)) require ERCs from emission reductions occurring before a nonattainment plan base year to be treated as potential growth in forecast years in order for them to be used as offsets.

Unless pre-base year ERCs are included in future year growth factors, future year forecasted inventories must be adjusted to account for pre-base year inventory ERCs. Total available ERC balances as of January 2012 were 1.72 tons/day ROG and 0.82 tons/day NOx. These total ERC values are included as a separate line item adjustment to the forecasted emissions inventory to ensure credited ERC emission reductions are accounted for as potential future growth and not as permanent emission reductions. This is based on the conservative assumption that all pre-base year ERCs will be used to offset emission increases from permitted facilities, therefore the entire balance is included in forecast inventories as potential growth.

Emissions Forecast Summary

ROG and NOx summer planning day emissions in the SCC Air Basin (onshore Ventura County and within three miles of the coastline) for the 2012 base year and forecast years 2018, 2020, 2025, 2030 and 2035 are presented in the figures and tables below. Forecast emissions represent the effects of future socioeconomic changes and implementation of adopted local, state, and federal control measures but do not include emission reductions from proposed local control measures or ARB's Proposed 2016 State Strategy for the State Implementation Plan (May 2016).

Figure 4-1 and Figure 4-2 graphically present anticipated ROG and NOx emission trends from the 2012 base year through the interval of forecast years by major emission category. Table 4-3

and Table 4-4 numerically summarize those emissions by major emission category for years 2012 through 2035.

Figure 4-1 and Table 4-3 show that summer planning day ROG emissions should decrease by 5 tons/day or 13% by 2020 and 7 tons/day or 18% by 2035. Quantities and percentages of ROG emissions reductions are described below.

- Mobile Sources: 5.8 tons/day (35%) by 2020, 8.8 tons/day (53%) by 2035
  - On-Road Vehicles: 4.3 tons/day (51%) by 2020, 6.6 tons/day (77%) by 2035

    Although On-Road Vehicles represent the second largest emission category in the base year, responsible for 23% of ROG emissions, this category comprises 14% of the total by 2020 as the third largest category and 7% of the total by 2035 as the sixth largest. Over half of the emission reductions are in place by 2018.
  - Other Mobile Sources: 1.5 tons/day (19%) by 2020, 2.2 tons/day (27%) by 2035

    This category contributed about 22% of ROG in 2012, the third leading emission category in the base year. By 2020 Other Mobile Sources becomes the second largest emission source category. Other Mobile Sources comprises 22% of total ROG emissions in 2020 and 21% in 2035.
- Stationary Sources: 0.5 tons/day (3%) by 2020, 0.4 tons/day increase (+2%) by 2035
  - Solvent Use: 1.0 tons/day increase (+9%) by 2020, 2.1 tons/day increase (+18%) by 2035

    Solvent Use includes evaporative emissions from consumer products, architectural coatings, surface coatings, and cleaning solvent use. Solvent use accounted for 31% of total ROG emissions in 2012 as the largest emission category. Solvent Use is responsible for 41% of ROG emissions by 2020 and 48% by 2035, by far the largest ROG emission category.
  - Pesticide Application: 1.0 tons/day (30%) by 2020, 1.1 tons/day (34%) by 2035

    Pesticide Application is almost entirely attributable to agricultural pesticides (non-methyl bromide use), and contributed 9% of total ROG in 2012. Pesticide Application becomes about 8% of the total ROG emissions in 2020 and 2035.
  - Petroleum Industry and Other Sources. 0.6 tons/day (11%) by 2020, 0.6 tons/day (11%) by 2035

    The Petroleum Industry includes oil and gas production and related combustion activities, and petroleum product marketing such as gasoline dispensing. Other Sources such as stationary and residential fuel combustion, agricultural burning, industrial processes related to manufacturing, and waste disposal are relatively small emission categories individually. Together the Petroleum Industry and Other Sources accounted for about 15% of ROG in 2012, 15% in 2020 and 16% in 2035. Most of the future year net emission decreases occur in the Petroleum Industry.

Figure 4-1
ROG Major Emission Category Trends

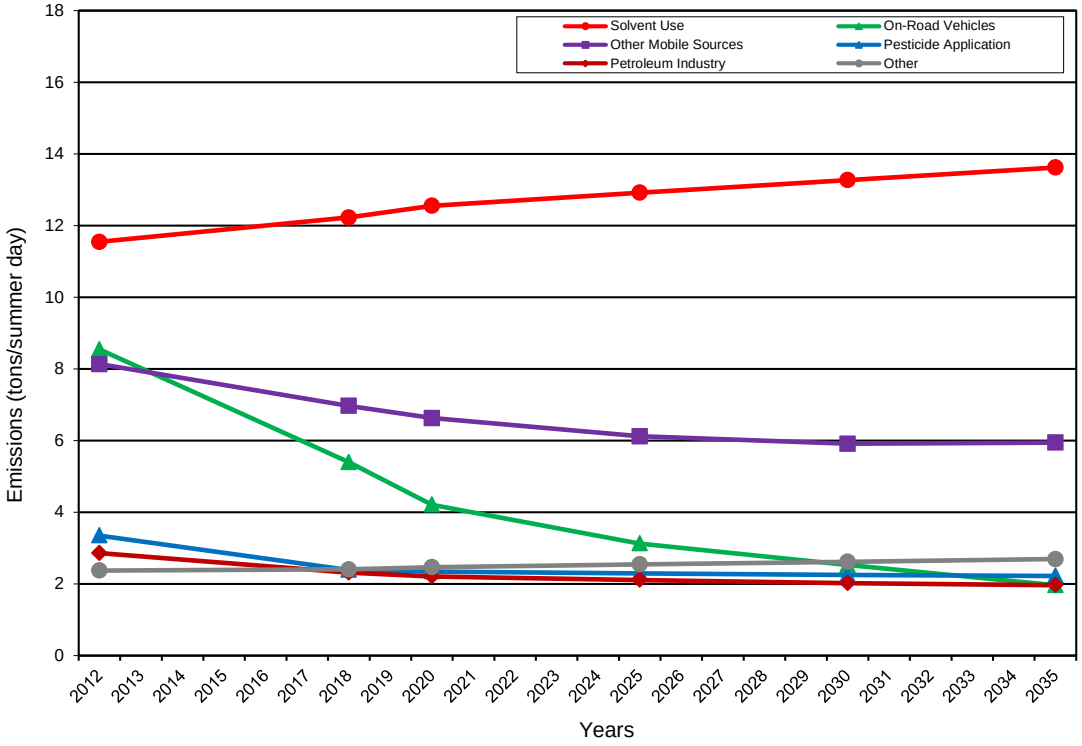


Table 4-3
Summer Planning Day ROG Emissions

Major Emission Category	ROG (tons/summer day)					
	2012	2018	2020	2025	2030	2035
Solvent Use	11.55	12.23	12.56	12.92	13.27	13.62
On-Road Vehicles	8.54	5.40	4.21	3.13	2.53	1.96
Other Mobile Sources	8.14	6.97	6.63	6.12	5.91	5.94
Pesticide Application	3.35	2.39	2.34	2.30	2.25	2.22
Petroleum Industry	2.86	2.31	2.21	2.11	2.02	1.97
Other	2.37	2.41	2.47	2.55	2.62	2.69
ERC Balance	0.00	1.72	1.72	1.72	1.72	1.72
ROG Total Emissions	**36.81**	**33.42**	**32.14**	**30.84**	**30.31**	**30.13**

Notes:
Based on ARB CEPAM v1.04 (June 2016).
Includes +0.5 tons/day adjustment to On-Road Vehicles 2018 ROG for transportation conformity safety margin.
Data rounding may affect displayed values and totals.
OCS not included

Figure 4-2 and Table 4-4 show that total summer planning day NOx emissions decrease by almost one third by 2020, declining nearly 8 tons/day, and by over half or 13 tons/day by 2035. The vast majority of emissions reductions are attributable to Mobile Sources. Amounts and percentages of emissions reductions are shown below.

- Mobile Sources: 8.1 tons/day (38%) by 2020, 13.3 tons/day (62%) by 2035
  - On-Road Vehicles: 6.6 tons/day (52%) by 2020, 10.3 tons/day (82%) by 2035

    On-Road Vehicles was the largest NOx emission category in 2012, responsible for 51% of NOx emissions, and in 2020 with 38%. By 2035, On-Road Vehicles contributes 22% of total NOx, and is the second largest emission category behind Other Mobile Sources. Over half of the total NOx emission reductions occur by 2018.
  - Other Mobile Sources: 0.8 tons/day (14%) by 2020, 1.3 tons/day (24%) by 2035

    Other Mobile Sources include aircraft, train locomotives, ships and commercial boats, recreational boats, off-road recreational vehicles and farm equipment. Other Mobile Sources accounted for approximately 22% of NOx in 2012 and 29% in 2020, but by 2035 represent 38% of total NOx emissions, becoming the largest emission category.
  - Mobile Equipment: 0.8 tons/day (22%) by 2020, 1.8 tons/day (52%) by 2035

    Mobile Equipment categories include industrial equipment such as forklifts, construction and mining equipment, commercial and residential lawn and garden equipment, airport ground support equipment and transport refrigeration units. Mobile Equipment represented 14% of NOx emissions in 2012, 17% by 2020 and 16% by 2035 when it becomes the fourth highest NOx emission category.
- Stationary Sources: 0.5 tons/day (18%) by 2020, 0.5 tons/day (16%) by 2035
  - Other Fuel Combustion: 0.5 tons/day (21%) by 2020, 0.5 tons/day (20%) by 2035

    Other Fuel Combustion includes stationary industrial and commercial sources (excluding electric utilities and oil and gas production), agricultural irrigation engines, landfill gas flaring, residential uses, and agricultural burning. Other Fuel Combustion sources contributed approximately 10% of NOx in 2012, 12% in 2020 and 18% by 2035, when it becomes the third highest NOx emission category.
  - Electric Utilities and the Petroleum Industry: 0.0 tons/day (8%) by 2020, 0.0 tons/day (3%) by 2035.

    Emissions from these sources are not expected to change significantly from the base year. They contributed less than 3% of NOx emissions in 2012, less than 4% by 2020 and less than 6% by 2035.

Summaries of forecast ROG and NOx emissions by Major Source Category and air basin follow in Table 4-5 and Table 4-6 for 2012, 2018, 2020, 2025, 2030 and 2035. The relative contributions by major emission category appear in Figure 4-3 and Figure 4-4 for ROG and NOx planning day emissions in 2020 and Figure 4-5 and Figure 4-6 for 2035.

Figure 4-2
NOx Major Emission Category Trends

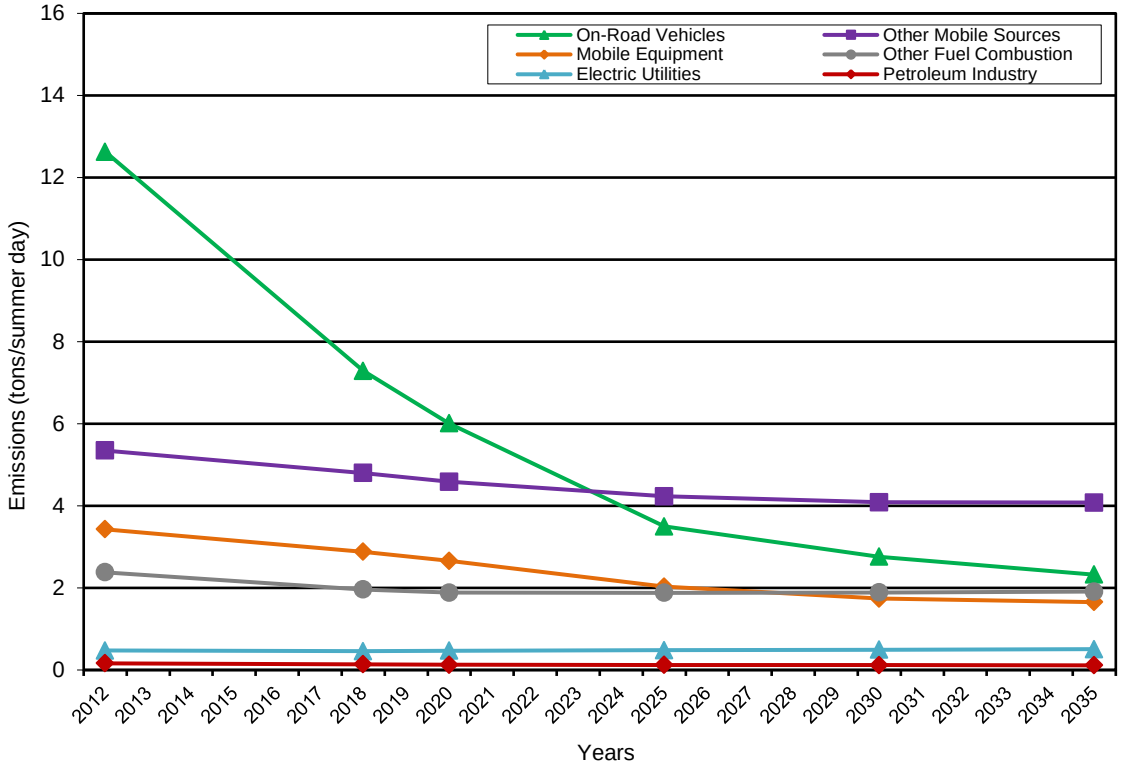


Table 4-4
Summer Planning Day NOx Emissions

Major Emission Category	NOx (tons/summer day)					
	2012	2018	2020	2025	2030	2035
On-Road Vehicles	12.62	7.29	6.01	3.50	2.76	2.33
Other Mobile Sources	5.35	4.80	4.59	4.23	4.09	4.08
Mobile Equipment	3.43	2.89	2.66	2.03	1.74	1.66
Other Fuel Combustion	2.38	1.96	1.89	1.89	1.89	1.91
Electric Utilities	0.48	0.46	0.47	0.49	0.50	0.51
Petroleum Industry	0.17	0.14	0.13	0.13	0.12	0.12
ERC Balance	0.00	0.82	0.82	0.82	0.82	0.82
NOx Total Emissions	**24.44**	**18.36**	**16.57**	**13.09**	**11.93**	**11.43**

Notes:
Based on ARB CEPAM v1.04 (June 2016).
Data rounding may affect displayed values and totals.
OCS not included.

Table 4-5
ROG Planning Emissions Forecast by Major Source Category

Ventura County	ROG (tons/summer day)					
Major Source Category Name	**2012**	**2018**	**2020**	**2025**	**2030**	**2035**
SCC AIR BASIN						
Stationary Sources						
Fuel Combustion	0.22	0.20	0.20	0.20	0.20	0.21
Waste Disposal	0.87	0.91	0.93	0.96	0.99	1.02
Cleaning And Surface Coatings	4.01	4.52	4.70	4.88	5.04	5.20
Petroleum Production And Marketing	2.83	2.29	2.19	2.08	2.00	1.95
Industrial Processes	0.62	0.61	0.65	0.69	0.72	0.76
Total Stationary Sources	**8.55**	**8.54**	**8.67**	**8.82**	**8.95**	**9.12**
Areawide Sources						
Solvent Evaporation	10.88	10.09	10.20	10.34	10.48	10.65
Miscellaneous Processes	0.69	0.70	0.71	0.72	0.72	0.73
Total Areawide Sources	**11.57**	**10.80**	**10.91**	**11.05**	**11.20**	**11.38**
Mobile Sources						
On-Road Motor Vehicles	8.54	5.40	4.21	3.13	2.53	1.96
Other Mobile Sources	8.14	6.97	6.63	6.12	5.91	5.94
Total Mobile Sources	**16.68**	**12.37**	**10.84**	**9.25**	**8.44**	**7.91**
TOTAL SCC AIR BASIN	**36.81**	**31.70**	**30.42**	**29.12**	**28.59**	**28.41**
ERC Balance	----	1.72	1.72	1.72	1.72	1.72
TOTAL SCC AIR BASIN	**36.81**	**33.42**	**32.14**	**30.84**	**30.31**	**30.13**
OCS AIR BASIN						
Stationary Sources						
Fuel Combustion	0.03	0.02	0.02	0.02	0.02	0.02
Waste Disposal	0.00	0.00	0.00	0.00	0.00	0.00
Cleaning And Surface Coatings	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Production And Marketing	0.04	0.04	0.04	0.03	0.04	0.04
Total Stationary Sources	**0.07**	**0.07**	**0.06**	**0.06**	**0.06**	**0.06**
Mobile Sources						
Other Mobile Sources	0.89	1.23	1.30	1.55	1.83	2.07
Total Mobile Sources	**0.89**	**1.23**	**1.30**	**1.55**	**1.83**	**2.07**
TOTAL OCS AIR BASIN	**0.96**	**1.30**	**1.37**	**1.61**	**1.89**	**2.14**
TOTAL VENTURA COUNTY	**37.76**	**34.72**	**33.50**	**32.44**	**32.21**	**32.27**

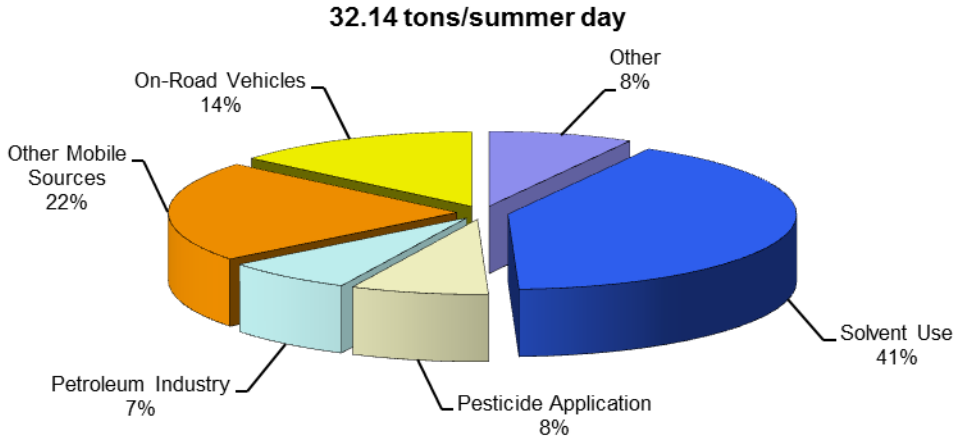
Notes:
Source: CEPAM v1.04 (June 2016).
Includes +0.5 tons/day adjustment to On-Road Vehicles 2018 ROG for transportation conformity safety margin.
Data rounding may affect totals.

Table 4-6
NOx Planning Emissions Forecast by Major Source Category

Ventura County	NOx (tons/summer day)					
Major Source Category Name	**2012**	**2018**	**2020**	**2025**	**2030**	**2035**
SCC AIR BASIN						
Stationary Sources						
Fuel Combustion	1.89	1.68	1.67	1.66	1.66	1.68
Waste Disposal	0.10	0.11	0.12	0.12	0.13	0.14
Cleaning And Surface Coatings	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Production And Marketing	0.04	0.03	0.03	0.03	0.03	0.03
Industrial Processes	0.06	0.06	0.06	0.06	0.07	0.07
Total Stationary Sources	**2.08**	**1.89**	**1.87**	**1.88**	**1.89**	**1.92**
Areawide Sources						
Solvent Evaporation	0.00	0.00	0.00	0.00	0.00	0.00
Miscellaneous Processes	0.95	0.68	0.62	0.62	0.62	0.62
Total Areawide Sources	**0.95**	**0.68**	**0.62**	**0.62**	**0.62**	**0.62**
Mobile Sources						
On-Road Motor Vehicles	12.62	7.29	6.01	3.50	2.76	2.33
Other Mobile Sources	8.78	7.69	7.25	6.27	5.83	5.74
Total Mobile Sources	**21.41**	**14.98**	**13.26**	**9.77**	**8.59**	**8.07**
TOTAL SCC AIR BASIN	**24.44**	**17.54**	**15.75**	**12.27**	**11.11**	**10.61**
ERC Balance	----	0.82	0.82	0.82	0.82	0.82
TOTAL SCC AIR BASIN	**24.44**	**18.36**	**16.57**	**13.09**	**11.93**	**11.43**
OCS AIR BASIN						
Stationary Sources						
Fuel Combustion	0.35	0.30	0.30	0.29	0.30	0.29
Waste Disposal	0.00	0.00	0.00	0.00	0.00	0.00
Cleaning And Surface Coatings	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Production And Marketing	0.00	0.00	0.00	0.00	0.00	0.00
Total Stationary Sources	**0.35**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**
Mobile Sources						
Other Mobile Sources	15.76	16.56	15.19	13.18	12.40	12.20
Total Mobile Sources	**15.76**	**16.56**	**15.19**	**13.18**	**12.40**	**12.20**
TOTAL OCS AIR BASIN	**16.11**	**16.86**	**15.49**	**13.48**	**12.70**	**12.50**
TOTAL VENTURA COUNTY	**40.55**	**35.23**	**32.06**	**26.57**	**24.62**	**23.93**

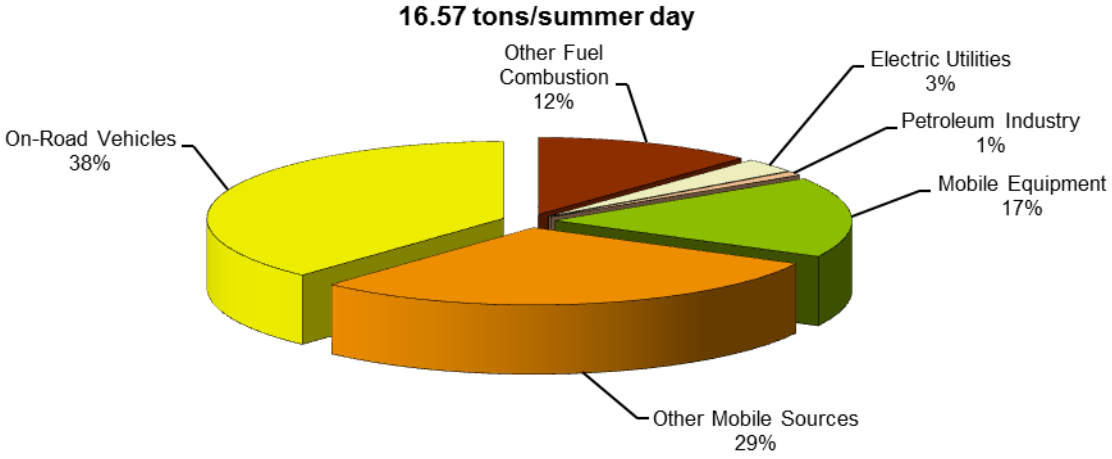
Notes:
Source: CEPAM v1.04 (June 2016).
Data rounding may affect totals.

Figure 4-3
Ventura County 2020 Planning Day
ROG Emissions Inventory



Reference:
ARB CEPAM v1.04 (June 2016)
Total emissions include ERCs
Excludes OCS and Natural Sources

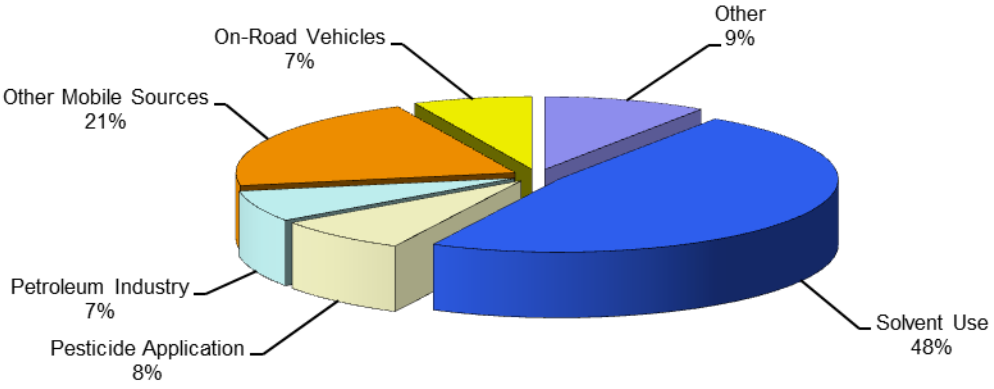
Figure 4-4
Ventura County 2020 Planning Day
NOx Emissions Inventory



Reference:
ARB CEPAM v1.04 (June 2016).
Total emissions include ERCs.
Excludes OCS and Natural Sources.

Figure 4-5
Ventura County 2035 Planning Day
ROG Emissions Inventory

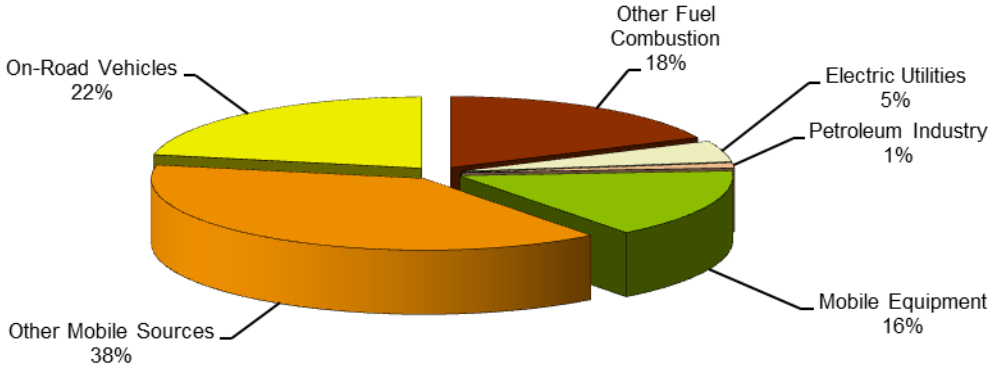
30.13 tons/summer day



Reference:
ARB CEPAM v1.04 (June 2016).
Total emissions include ERCs.
Excludes OCS and Natural Sources.

Figure 4-6
Ventura County 2035 Planning Day
NOx Emissions Inventory

11.43 tons/summer day



Reference:
ARB CEPAM v1.04 (June 2016).
Total emissions include ERCs.
Excludes OCS and Natural Sources.

Ventura County Marine-Related Emissions Forecast

As discussed in Chapter 2, *2012 Baseline Emissions Inventory*, coastal and offshore marine emissions sources are important segments of Ventura County's overall emissions inventory. A substantial effort has been made to improve and refine emissions estimates for these sources, described in detail in Chapter 2.

SCC Air Basin Marine-Related Emissions

Coastal marine emission sources are located in the State Tidelands within three miles of the Ventura County coastline in the SCC Air Basin, which also incorporates the onshore portion of Ventura County, including the Port of Hueneme and its approach corridors.

As shown in Table 4-7, coastal marine emission sources include Ocean-going Vessels, Commercial Harbor Craft, Recreational Boats, Aircraft, and Cargo Handling Equipment. Cumulatively these categories accounted for 2 tons/day each of ROG and NOx in 2012. Total ROG emissions increase by about 8% and NOx by over 21% by 2035. The most important ROG and NOx emission sources and their relative contributions to total coastal emissions in 2020 and 2035 are described below.

- Ocean-Going Vessels: 0.8 tons/day NOx by 2020 (35%), 1.1 tons/day by 2035 (36%)

  Ocean-Going Vessels include large commercial vessels calling on Port Hueneme (auto carriers, bulk cargo carriers, container vessels, passenger vessels, roll-on/roll off vehicle carriers, refrigerated cargo vessels and tankers) and military vessel operations occurring at the U.S. Navy facilities at the Port of Hueneme, as well as some non-military vessels utilizing Navy facilities. Ocean-Going Vessels comprised 34% of total coastal NOx in 2012, with over two-thirds from commercial vessels. There is little change in NOx emissions from 2012 to 2020 and an increase of 27% by 2035. Commercial and military vessels are about equal contributors in 2020, but by 2035 nearly 75% of NOx emissions are associated with operations at the military facilities.

- Commercial Harbor Craft: 0.7 tons/day NOx by 2020 (30%), 0.8 tons/day by 2035 (27%)

  Commercial Harbor Craft include commercial and charter fishing vessels, excursion boats, tug and towboats, barges and dredges, crew and supply boats associated with the four offshore oil and gas production platforms, and military support and operations vessels, tugboats and other vessels utilizing U.S. Navy facilities at the Port of Hueneme. Commercial Harbor Craft contributed over 40% of coastal NOx in 2012. Emissions are expected to decrease by over 26% by 2020 and 20% by 2035. Commercial (non-military) vessels were responsible for almost 90% of NOx emissions in 2012, nearly three quarters in 2020 and over half in 2035.

- Recreational Boats: 1.2 tons/day ROG by 2020 (56%), 0.7 tons/day by 2035 (29%) and 0.3 tons/day NOx by 2020 (15%), 0.3 tons/day by 2035 (10%)

  Recreational Boats operate at the three ports, marinas and lakes in Ventura County, and include vessels with outboard, inboard and stern-drive engines, sailboat auxiliary engines, and personal watercraft. Recreational vessels accounted for 80% of ROG emissions in 2012 and decrease by nearly 30% (0.5 tons/day) by 2020 and nearly 61% (1.1 tons/day) by 2035. About 17% of total coastal NOx came from recreational boats in 2012, decreasing by 17% by 2020 and 33% by 2035.

- Aircraft: 0.9 tons/day ROG by 2020 (39%), 1.5 tons/day by 2035 (64%) and 0.5 tons/day NOx by 2020 (19%), 0.8 tons/day by 2035 (28%)

  Aircraft emissions are associated with military aircraft operations at the U.S. Naval facility at Point Mugu, including transports, jet aircraft, helicopters, and missile launches. Military aircraft activities were responsible for about 15% of coastal ROG emissions and 7% of NOx in 2012. ROG and NOx emissions are expected to increase by over two and one-half times by 2020 and over four and one-half times by 2035.

- Cargo Handling Equipment: 0.0 tons/day NOx by 2020 (0.1%), 0.0 tons/day by 2035 (0.1%)

  Cargo Handling Equipment includes port operations/cargo handling equipment operating in association with large commercial vessels calling on Port Hueneme, such as yard tractors, forklifts, cranes, loaders, and other material handling equipment. Although Cargo Handling Equipment contributed one quarter of coastal NOx in 2002 in the 2007 AQMP, this emission source became subject to ARB's Cargo Handling Equipment Regulation in 2007 and contributed less than 1% of total coastal NOx emissions in 2012. Emissions continue to decline in 2020 and 2035.

Table 4-7
SCC Air Basin Marine Emissions Categories 2012 – 2035

Ventura County Emission Category	ROG Planning Day Emissions (tons/summer day) 2012	2018	2020	2025	2030	2035
Ocean-Going Vessels	0.04	0.04	0.04	0.05	0.05	0.06
Commercial Harbor Craft	0.09	0.09	0.09	0.10	0.10	0.11
Recreational Boats	1.76	1.35	1.24	0.99	0.80	0.69
Aircraft	0.33	0.82	0.86	1.03	1.25	1.52
Cargo Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Total SCC Air Basin Marine ROG	**2.21**	**2.30**	**2.22**	**2.16**	**2.21**	**2.39**

Ventura County Emission Category	NOx Planning Day Emissions (tons/summer day) 2012	2018	2020	2025	2030	2035
Ocean-going Vessels	0.84	0.86	0.84	0.90	0.99	1.07
Commercial Harbor Craft	0.98	0.73	0.72	0.72	0.75	0.78
Recreational Boats	0.42	0.36	0.35	0.32	0.30	0.28
Aircraft	0.18	0.44	0.46	0.55	0.67	0.82
Cargo Handling Equipment	0.01	0.00	0.00	0.00	0.00	0.00
Total SCC Air Basin Marine NOx	**2.44**	**2.40**	**2.37**	**2.50**	**2.71**	**2.96**

Notes:
CEPAM v1.04 (June 2016).
No ARB Adjustments.

OCS Air Basin Marine-Related Emissions

Offshore emissions marine sources shown in Table 4-8 and Figures 4-7 through 4-10 occur in the region beyond three miles of the coastline in the OCS Air Basin, San Nicolas Island and the offshore shipping lanes in the Santa Barbara Channel. OCS emissions sources accounted for 16 tons/day of NOx and nearly 1 tons/day ROG in 2012. Although total NOx emissions decline by about 4% by 2020 and over 22% to 12.5 tons/day by 2035, ROG emissions increase by over 42% by 2020 and by more than double by 2035. The most important ROG and NOx emission sources and their relative contributions to total offshore emissions in 2020 and 2035 are described below.

- Ocean-Going Vessels**:** 12.5 tons/day NOx by 2020 (81%), 9.6 tons/day by 2035 (77%) and 0.9 tons/day ROG by 2020 (63%), 1.6 tons/day by 2035 (75%)

  This category pertains to large commercial vessels traversing the Santa Barbara Channel shipping lanes offshore of Ventura County, including vessels calling on Port Hueneme or the ports of Los Angeles/Long Beach and transiting vessels passing through southern California waters but without calling at either port, and large military vessels operating offshore and in the approach corridors to Port Hueneme and San Nicolas Island. Ocean-going Vessels accounted for 82% of NOx and 60% of ROG emissions in the OCS Air Basin in 2012. Despite anticipated expansion in "goods movement" activity by ships

visiting ports in California, NOx should decrease 5% by 2020 and 27% by 2035 due largely to state and federal commercial vessel control measures. ROG emissions are expected to increase by 50% by 2020 and nearly triple by 2035. Virtually all emissions are from commercial vessels.

- Commercial Harbor Craft and Commercial Boats: 2.6 tons/day NOx by 2020 (17%), 2.5 tons/day by 2035 (20%) and 0.3 tons/day ROG by 2020 (22%), 0.3 tons/day by 2035 (15%)

  Commercial Harbor Craft and Commercial Boats include commercial and charter fishing vessels, excursion boats, tug and towboats, crew and supply boats affiliated with the offshore oil and gas production platforms, military support and operations vessels, tugboats and other vessels operating offshore and in the approach corridors to Port Hueneme and San Nicolas Island. Commercial Harbor Craft and Commercial Boats contributed nearly 28% of offshore ROG and about 16% of NOx in 2012. ROG emissions should increase by about 13% by 2020 and 18% by 2035, while NOx emissions will experience little change. Although 60% of NOx and 50% of ROG in 2012 were from commercial vessels, by 2035 they contribute less than 40% of emissions.

- Aircraft: 0.1 tons/day ROG by 2020 (10%), 0.2 tons/day by 2035 (8%)

  Aircraft emissions are associated with military aircraft operations at the U.S. Naval facility on San Nicolas Island, including transports, jet aircraft and helicopters. Aircraft activities were responsible for 5% of offshore ROG emissions in 2012 and are expected to triple by 2020 and increase another 16% by 2035.

- Stationary Sources: 0.3 tons/day NOx by 2020 (2%), 0.3 ton/day by 2035 (2%) and 0.1 tons/day ROG by 2020 (5%), 0.1 tons/day by 2035 (3%)

  Stationary Sources include Oil & Gas Production, Fuel Combustion and Coatings & Solvents emissions categories. Oil & Gas Production ROG emissions are fugitive hydrocarbon losses from oil and gas production components and production and processing equipment on the offshore oil and gas production platforms; natural gas flaring is responsible for ROG and NOx emissions. Fuel Combustion sources primarily are related to electric generating types of equipment. Coatings & Solvents ROG emissions are from routine maintenance surface coating and cleaning operations for the offshore oil and gas production platforms and the U.S. Naval facility on San Nicolas Island. Stationary Sources contributed 8% of ROG emissions and 2% of NOx in 2012. There should be negligible changes in emissions by 2020 and 2035.

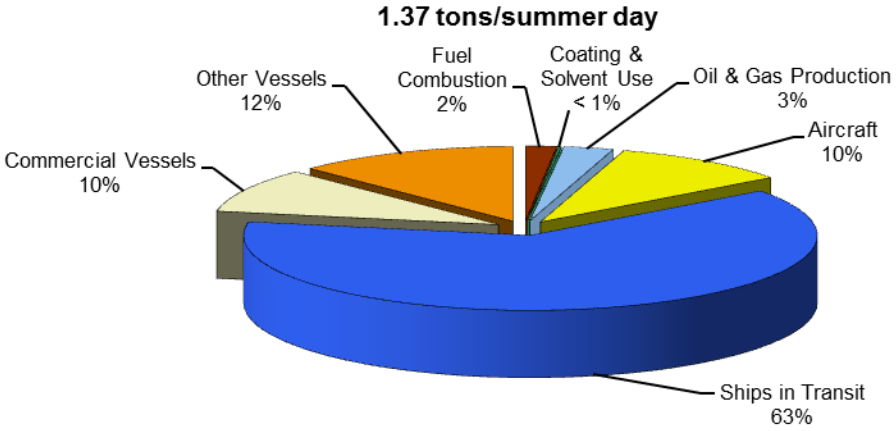
Table 4-8
OCS Air Basin Marine Emissions Categories 2012 – 2035

Ventura County Emission Category	ROG Planning Day Emissions (tons/summer day) 2012	2018	2020	2025	2030	2035
Ocean-Going Vessels	0.57	0.79	0.86	1.10	1.37	1.60
Commercial Harbor Craft	0.27	0.30	0.30	0.30	0.31	0.31
Aircraft	0.05	0.14	0.14	0.14	0.15	0.16
Oil & Gas Production	0.04	0.04	0.04	0.03	0.04	0.04
Fuel Combustion & Coating/Solvents	0.03	0.03	0.03	0.03	0.03	0.03
Total OCS Air Basin ROG	**0.96**	**1.30**	**1.37**	**1.61**	**1.89**	**2.14**

Ventura County Emission Category	NOx Planning Day Emissions (tons/summer day) 2012	2018	2020	2025	2030	2035
Ocean-Going Vessels	13.21	13.89	12.54	10.60	9.82	9.63
Commercial Harbor Craft	2.53	2.60	2.57	2.51	2.50	2.49
Aircraft	0.02	0.07	0.07	0.07	0.08	0.08
Fuel Combustion	0.35	0.30	0.30	0.30	0.30	0.30
Total OCS Air Basin NOx	**16.11**	**16.86**	**15.49**	**13.48**	**12.70**	**12.50**

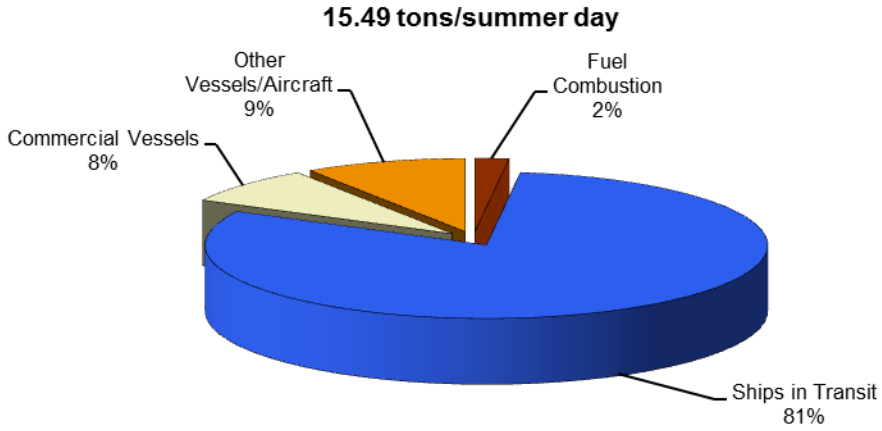
Notes:
CEPAM v1.04 (June 2016).
No ARB Adjustments.

Figure 4-7
Ventura County 2020 Planning Day
ROG Emissions Inventory (OCS Air Basin)



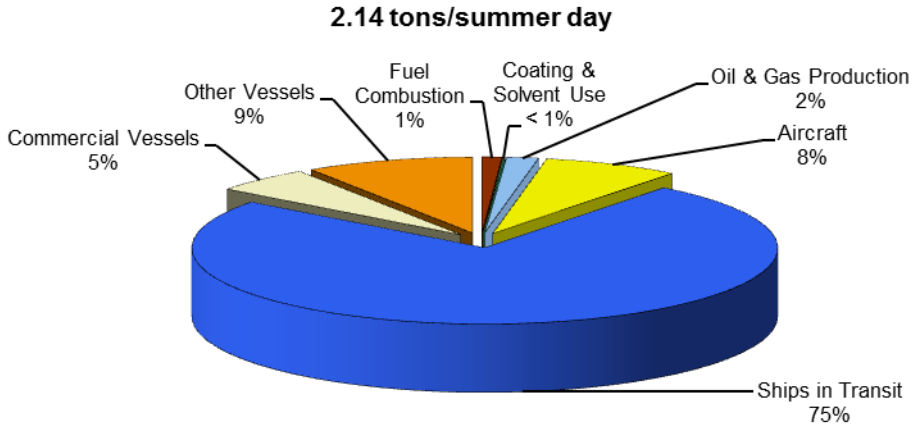
Reference:
ARB CEPAM v1.04 (June 2016).
OCS is 3 – 100 miles offshore.

Figure 4-8
Ventura County 2020 Planning Day
NOx Emissions Inventory (OCS Air Basin)



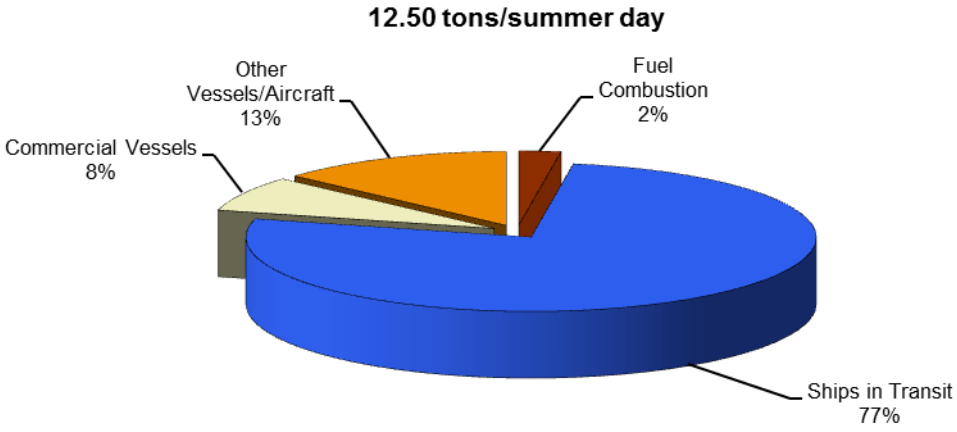
Reference:
ARB CEPAM v1.04 (June 2016).
OCS is 3 – 100 miles offshore.

Figure 4-9
Ventura County 2035 Planning Day
ROG Emissions Inventory (OCS Air Basin)



Reference:
ARB CEPAM v1.04 (June 2016).
OCS is 3 – 100 miles offshore.

Figure 4-10
Ventura County 2035 Planning Day
NOx Emissions Inventory (OCS Air Basin)



Reference:
ARB CEPAM v1.04 (June 2016).
OCS is 3 – 100 miles offshore.

Naval Base Ventura County Emission Forecasts

EPA's General Conformity Rule discussed in Chapter 3, *Control Strategy*, ensures federal actions or projects do not interfere with a nonattainment area's ability to attain and maintain national air quality standards by requiring emissions associated with the federal action or project to be accounted for in the attainment demonstration of the applicable State Implementation Plan.

The 2016 AQMP includes emissions associated with potential growth or change in activity at NBVC. The baseline and projected emissions are from aircraft and missile operations associated with NBVC Point Mugu and ship operations at Port Hueneme occurring within the Ventura County nonattainment area (the SCC air basin, including the mainland and three nautical miles offshore) and are included in the AQMP's base year inventory and emissions forecasts. Baseline and emissions projections were provided to the District by NBVC in October 2013. Increases in motor vehicle activity at NBVC are part of SCAG's regional transportation model and are not included in NBVC's baseline emissions or projections.

Table 4-9 summarizes the baseline 2012 emissions, estimated future year emissions from potential projects, and an additional 4% annual growth allowance for NBVC through year 2020 within the Ventura County nonattainment area. The 4% annual growth allowance is intended to account for uncertainties in potential projects resulting from future actions and unknown projects. This additional growth would result in a base-wide emissions budget for NBVC of 198.0 tons per year of ROG and 475.9 tons per year of NOx by the 2020 attainment year.

Table 4-9
Naval Base Ventura County Emissions Budget
(tons per year)

Pollutant	2012	2017	2018	2019	2020
ROG	128.4	178.6	184.8	191.3	198.0
NOx	274.1	434.2	447.6	461.5	475.9

Notes:
Source: Revised Final Naval Base Ventura County Mobile Source Emissions.
2012 Baseline Emissions and Future Emission Projection for 8-Hour Ozone Sip Planning (October 2013).

5. ATTAINMENT DEMONSTRATION

Introduction

This chapter presents the attainment demonstration to show that the proposed control strategy for the 2016 AQMP will provide sufficient emission reductions for Ventura County to attain the 2008 federal 8-hour ozone standard by no later than 2020, the county's mandated ozone attainment year under the federal CAAA. The attainment demonstration consists of two primary components: photochemical modeling and Weight of Evidence (WOE) assessment. This chapter also presents the rationale for 2020 as the attainment year rather than 2018 as indicated by the WOE.

The SCAQMD conducted the photochemical modeling for the 2016 AQMP. The SCAQMD also conducted the photochemical modeling for the South Coast, San Diego County, Imperial County, Coachella Valley, and Western Mojave Desert ozone nonattainment areas. The California Air Resources Board prepared the WOE for the 2016 AQMP and the rationale for 2020 as the county's attainment date for the federal 8-hour ozone standard.

Photochemical Modeling

Section 181(a)(1) of the federal CAAA requires that ozone nonattainment areas attain the federal 8-hour ozone standard as expeditiously as practicable but no later than by specific dates based on their ozone nonattainment area classifications – marginal, moderate, serious, severe, and extreme. Moreover, Section 182(c)(2)(A) of the federal CAAA requires that serious and above ozone nonattainment areas, including Ventura County, use a photochemical grid model to show attainment.

Photochemical grid models are computer programs that mathematically simulate each of the physical and chemical processes that govern air pollution in the lower atmosphere. Such processes include air pollutant release into the air, air pollutant transport and diffusion by the wind, air pollutant creation and destruction in the air through chemical reactions, and deposition of pollutants onto the ground. Further information regarding air quality models, including photochemical grid models of the type used for the 2016 AQMP, can be found on EPA's website at https://www3.epa.gov/ttn/scram/aqmindex.htm.

The region analyzed by a photochemical air pollution model is termed the modeling region or modeling domain and is a geographical area divided into a three-dimensional array of grid cells. The model calculates air pollutant concentrations in each grid cell for each hour of the modeling period and often displays the results graphically.

EPA modeling guidance, *Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze*, recommends that nonattainment areas supplement their photochemical modeling results with a WOE assessment to address the uncertainties inherent to photochemical modeling assessments. Further, EPA guidance indicates that as an area

approaches the target attainment date, ambient air quality and emissions data become an increasingly important element in demonstrating progress toward air quality goals.

The photochemical modeling for the 2016 AQMP contains three principal components.

The first, presented in Appendix H, is the *Protocol for Photochemical Modeling of Ozone for Ventura County*. The Protocol defines the scope of the regional modeling analyses including the attainment demonstration methodology and chemical transport platforms, gridded and speciated emission inventories, and geographical characteristics of the modeling domains. The Protocol also defines the methodology to assess model performance and the selection of the simulation periods.

The second, presented in Appendix I, is the *Ventura County Community Multiscale Air Quality Model Performance Analysis*. This analysis evaluated how well the photochemical model for the 2016 AQMP was able to predict 8-hour ozone concentrations at each monitoring site in the county compared to observed 8-hour ozone concentrations at those same monitoring sites.

The third, presented in Appendix J, is the *Ventura County Unmonitored Area Analysis*. This analysis estimated 8-hour ozone design values in areas of Ventura County that do not have ambient ozone monitors, such as the Los Padres National Forest region of the county. It is required by EPA modeling guidance to show that all grid cells in a modeling domain will attain the federal ozone standard.

Weight of Evidence Assessment

A Weight of Evidence (WOE) assessment is a set of analyses intended to verify modeled predictions of future air quality, especially at levels near the federal standards. These analyses can include air quality trends, emission trends, meteorological data, evaluation of other air quality indicators, and additional air quality modeling.

Because all analysis methods have strengths and weaknesses, examining an air quality problem using various analysis methods helps offset the limitations and uncertainty inherent in all air quality modeling methods. The scope of a WOE analysis is different for each nonattainment area. The level of detail appropriate for an area depends upon the complexity of the air quality problem in the area, how far into the future the attainment deadline is, and the amount of data and modeling available.

To complement regional photochemical modeling analyses included in the 2016 AQMP, the WOE assessment for Ventura County includes detailed analyses of county ambient ozone data, ozone precursor emission trends, population exposure trends, and a discussion of conditions that contribute to exceedances of the 0.075 ppm federal ozone standard in Ventura County. Further, the rate of progress toward air quality goals was evaluated by considering trends in the county's

ozone design values, precursor emission reductions, and the relationship between ozone air quality and past emission reductions.

The WOE assessment for Ventura County evaluated ambient air quality and emission trends to complement the regional photochemical modeling analyses conducted to evaluate Ventura County's progress toward meeting its 2020 ozone attainment date. Control measures implemented in the county through federal, state, and local programs have led to a substantial decline in emissions of ozone precursors and a substantial improvement in ozone air quality countywide.

Between 2000 and 2015, total NOx emissions in Ventura County declined by 42 percent whereas total ROG emissions declined by 45 percent. Moreover, between 2000 and 2015, the number of exceedance days in the County declined by 95 percent and the design value decreased by over 27 percent, from 0.105 ppm to 0.077 ppm (Simi Valley). In 2015, four out of five monitoring sites in the County met the standard.

Ventura County is classified as a serious nonattainment area with a 2020 ozone attainment date. Regression trends derived from ozone design values, as well as the association between NOx emissions and the fourth highest 8-hour ozone concentration, indicate that Ventura County is on track to attain the 0.075 ppm standard by 2020, which is consistent with design value projections derived from the regional photochemical modeling assessment conducted by the SCAQMD for Ventura County.

Appendix K, *Ventura County Weight of Evidence Assessment*, contains the WOE for the 2016 AQMP.

Attainment Demonstration Summary

Based on photochemical modeling design value projections presented in Table 5-1, as well as the supporting WOE assessment, Ventura County can expect to attain the federal 0.075 ppm 8-hour ozone standard by no later than July 20, 2020, the attainment date for serious ozone nonattainment areas.

Note that the El Rio monitoring site is not listed in Table 5-1 because there were not at least five days in the base year that had maximum daily 8-hour ozone concentration greater than or equal to 60 ppb and the draft EPA modeling guidance recommends that future design values are not calculated when this is the case.

Table 5-1
Regional Modeling Design Value Projections (ppm)

Site	2017	2018	2019	2020
Thousand Oaks	0.067	0.067	0.067	0.067
Piru	0.068	0.068	0.067	0.066
Ojai	0.072	0.072	0.071	0.070
Simi Valley	0.075	0.074	0.073	0.072

Note: Design values for the El Rio monitoring station were not include because there were not at least five days in the base year (2012) that had maximum daily 8-hour ozone concentrations greater than or equal to 60 ppm and the draft 2014 EPA modeling guidance recommends that future design values not be calculated when this is the case.

2020 Target Attainment Date

The photochemical modeling and accompanying WOE assessment project the earliest date that a nonattainment area could meet the standard. The photochemical modeling shows Ventura County will meet the federal 8-hour ozone standard in 2020. The WOE indicated that the area could meet the standard as early as 2018 if air quality trends continue.

However, the 2016 California ozone season saw a stall or decrease in improved air quality in many parts of California, including Ventura County. This highlights the unpredictability weather patterns have on air quality in the area. For example, in 2016, while emissions declined by two percent, the number of days that exceeded the 75 ppb standard at the Ventura County Simi Valley design site doubled from 2 to 4 days over the previous year. These annual variations in air quality make it difficult to pinpoint a specific year that an area will first achieve clean data and thus meet the standard. Therefore, Ventura County has identified 2020 as its attainment year, the attainment year for serious nonattainment areas, for this and the following reason.

EPA's *Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze,* dated April 2007, acknowledges the variability in year-to-year weather patterns, among other factors, when compared to photochemical modeling results by stating,

> "Past modeling analyses have shown that future design value uncertainties of 2-4 ppb for ozone, can result from use of alternate, yet equally appropriate, emissions inputs, chemical mechanisms, and meteorological inputs (Jones, 2005; Sistla, 2004)[1]."

The photochemical modeling and WOE analysis in this plan demonstrate a design value of 72 ppb in 2020. The three ppb difference between the 75 ppb standard and the 72 ppb modeled results for Ventura County is within the modeling uncertainty of 2-4 ppb referenced in the current

[1] Pg. 105, https://www3.epa.gov/scram001/guidance/guide/final-03-pm-rh-guidance.pdf

EPA modeling guidance. Since the modeling results are well within the uncertainties of the modeling, an attainment year earlier than 2020 is not justified.

Additionally, NOx and ROG emissions contribute significantly to ozone formation in Ventura County and likewise, reductions in NOx and ROG emissions will reduce ozone concentrations. In Ventura County, mobile sources contribute to over 90 percent of NOx emissions. Achieving NOx reductions leading up to the 2020 attainment year is reliant upon current ARB mobile source programs. While continuation of the existing mobile source program will achieve reductions between now and 2020, those reductions are represented in the model and there are no additional mobile source programs that will begin implementation in this period to further accelerate emission reductions in Ventura County.

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6. REASONABLE FURTHER PROGRESS

Introduction

Clean Air Act (CAA) sections 172(c)(2) and 182(b)(1) require attainment plans to provide for reasonable further progress (RFP). RFP is defined in CAA section 171(1) as annual incremental reductions for the purpose of ensuring attainment by the attainment year. This requirement to show steady progress in emission reductions between the baseline year and attainment date ensures that areas will not delay implementation of emission control programs until immediately before the attainment deadline.

There are two separate requirements for nonattainment areas depending upon their classification. The first is a one-time requirement for a 15 percent reduction in ROG-only emissions between the years of 1990 and 1996 for nonattainment areas classified as moderate or above (section 182(b)(1)). The second is an additional 3 percent per year reduction of ozone precursor emissions until attainment for ozone nonattainment areas classified as serious or higher (section 182(c)(2)(B)).

In addition to the RFP requirements, CAA section 172(c)(9) requires that plans provide for contingency measures in case the area fails to make RFP. U.S. EPA has interpreted this requirement to represent one year's worth of emission reduction progress, amounting to 3 percent reductions, from measures that are already in place or that would take effect without further rulemaking action.

Fifteen Percent ROG-only Rate of Progress Requirement

The March 2015 U.S. EPA implementation rule (Rule) for the 2008 federal 8-hour ozone standard interprets the CAA RFP requirements, establishing requirements for RFP that depend on the area's classification and whether the area has an approved 15 percent ROG-only reduction plan for a previous ozone standard that covers all of the 2008 8-hour ozone nonattainment area (80 FR 12264). In 1997, EPA approved a 15 percent rate of progress plan for Ventura County for the 1-hour ozone standard covering the entire Ventura County nonattainment area for the 2008 8-hour ozone standard (62 FR 1150). As a result, the 15 percent ROG-only requirement has been met for Ventura County.

Three Percent Per Year Rate of Progress Requirement

Per the EPA's RFP rule, Ventura County must demonstrate an 18 percent reduction in ozone precursor emissions for the first six years of the attainment planning period, and an average emission reduction of 3 percent per year after that until the attainment date (80 FR 12264). As detailed in CAA section 182(b)(1)(C), these emission reductions must be achieved through existing programs.

Reasonable Further Progress Demonstration

The Ventura County RFP demonstration is achieved by forecasted emission reductions from existing control regulations as shown in the planning inventory. Both ROG and NOx emission

reductions are needed to meet the RFP reduction targets. The NOx substitution is used on a percentage basis to cover any percentage shortfall in ROG reduction.

Table 6-1, *RFP Demonstration*, presents the RFP demonstrations showing Ventura County meeting RFP for the milestone years of 2018 and 2020, with a three percent contingency set-aside in 2018 and carried through to 2020 per the requirements of EPA's RFP rule.

Table 6-1
RFP Demonstration
(tons/summer day)

	2012	2018[1,2]	2020[1]
ROG (with existing measures)	36.8	33.4	32.1
Required percent change since previous milestone year (ROG or NOx)		18%	6%
Required percent change since 2012 (ROG) or NOx		18%	24%
Target ROG levels		30.2	28.4
Shortfall in ROG reductions needed to meet target		-3.2	-3.8
Percent Shortfall in ROG reductions needed to meet target		-8.8%	-10.2%
Percent ROG reductions since 2012 used for contingency in this milestone year		0.0%	0.0%
Percent ROG reductions shortfall previously provided by NOx substitution		0.0%	8.8%
Percent actual ROG reduction shortfall		**-8.8%**	**-1.4%**
RFP Met with ROG only?		**NO**	**NO**
NOx SUBSTITUTION NEEDED			
NOx (with existing measures)	**24.4**	**18.4**	**16.6**
Change in NOx since 2012		6.1	7.9
Percent reduction in NOx since 2012		24.9%	32.2%
Percent NOx reductions since 2012 already used for ROG substitution & contingency through last milestone year		0.0%	11.8%
Percent NOx reductions since 2012 available for ROG substitution & contingency in this milestone year		24.9%	20.4%
Percent NOx reductions since 2012 used for ROG substitution in this milestone year		8.8%	1.4%
Percent NOx reductions since 2012 used for contingency in this milestone year		3.0%	0.0%
Percent NOx reductions since 2012 surplus after meeting ROG substitution & contingency needs in this milestone year		13.1%	18.9%
Percent RFP shortfall (-) in reductions needed to meet target, if any		0.0%	0.0%
Percent total shortfall (-) for RFP and contingency, if any		**0.0%**	**0.0%**
RFP Met?		**YES**	**YES**
Contingency Met?		**YES**	**YES**

Notes:
[1] 2018 and 2020 projections include addition of ERC balance as of January 1, 2012, 1.72 tons/day ROG and 0.82 tons/day NOx
[2] Includes 0.5 tons/day ROG for transportation conformity budget safety margin
Source: CEPAM v1.04 (June 2016)

7. CONTINGENCY MEASURES

Introduction

Clean air plans for nonattainment areas must contain contingency reductions that take effect without further air agency action should the areas fail to achieve RFP goals or attainment by their attainment deadlines. CAAA Section 172(c)(9) requires that areas implement contingency measures if they fail to make RFP or fail to attain the air quality standards by the required attainment date. Section 182(c)(9) of the CAAA requires serious and above nonattainment areas to implement contingency measures if they fail to meet any applicable CAAA milestone for the federal 8-hour ozone standard.

Contingency measures must be specific federal, state, or local measures that will provide emission reductions surplus to those needed for attainment. The April 16, 1992 General Preamble to the CAAA of 1990 provided the following guidance regarding contingency measures: "States must show that their contingency measures can be implemented with minimal further action on their part and with no additional rulemaking actions such as public hearings or legislative review. In general, EPA will expect all actions needed to affect full implementation of the measures to occur within 60 days after EPA notifies the State of its failure (57 FR 13512). This could include Federal measures and local measures already scheduled for implementation."

The EPA has approved numerous SIPs that rely on one or more contingency measures that are in place and provide reductions surplus to RFP or attainment requirements. The key is that the statute requires extra reductions not relied on for RFP or attainment to provide a cushion while revising the plan to meet the missed milestone. However, nothing in the statute precludes an area from implementing such measures before needed by a milestone failure.

The CAAA does not require a specific number of contingency measures nor does it specify an exact magnitude of emission reductions that the contingency measures are to achieve. However, EPA's guidance specifies that contingency measures should represent 1-year's worth of progress, amounting to reductions of 3 percent of the baseline emissions inventory for the nonattainment area, which would be achieved while the state is revising its plans for the area.

EPA's guidance permits moderate and above ozone nonattainment areas that have completed the initial 15 percent VOC reduction required by CAA section 182(b)(1)(A)(i), can meet the contingency measures requirement based entirely on NOx controls if that is what the state's analyses have demonstrated would be most effective in bringing the area into attainment. Hence, there is no minimum VOC reduction as was required by prior EPA guidance.

RFP Contingency Measures

The CAAA specifies that each ozone nonattainment area must demonstrate ongoing emission reductions relative to the emission inventory base year (2012). Table 6-1, *RFP Demonstration*, shows that Ventura County meets CAA RFP requirements using a combination of ROG and NOx

emission reductions from state and local control measures. The emissions inventory indicates that the adopted state and local measures will provide emissions reductions well beyond those needed for Ventura County's RFP demonstration. As part of the RFP demonstration, Ventura County will rely on a portion of surplus NOx reductions (28.1% for 2018 and 29.4% for 2019) to provide for 3% contingency reductions in the 2018 and 2020 RFP milestone years.

Attainment Contingency Measures

Attainment contingency can be satisfied from additional reductions occurring between the attainment year and the following year – in Ventura County's case, the reductions between 2020 and 2021. Ventura County's attainment contingency obligation will be met by emission reductions from ARB's continued implementation of the mobile source program, including the turnover of the mobile source fleet in 2021. This ARB commitment will meet Ventura County's attainment contingency obligation.

8. 2015 FEDERAL 8-HOUR OZONE STANDARD

Sections 108 and 109 of the federal CAA govern the establishment, review, and revision, as appropriate, of the NAAQS to protect public health and welfare. Hence, on October 1, 2015, EPA strengthened the national ambient air quality standards for ozone. The new federal primary 8-hour ozone standard, set to protect public health with an adequate margin of safety as required by the federal CAA, is 0.070 ppm. For comparison purposes, the 2008 federal ozone standard that the new standard replaces is 0.075 ppm and the California 8-hour ozone standard is also 0.070 ppm.

This new, lower ozone standard provides increased protection for children, older adults, and people with asthma or other lung diseases, and other at-risk populations against an array of adverse health effects of near-ground ozone that include reduced lung function, increased respiratory symptoms and pulmonary inflammation; effects that contribute to emergency department visits or hospital admissions; and mortality. EPA also revised the federal secondary 8-hour ozone standard, set to protect public welfare, such as agricultural crops and ecosystems, to be identical to the primary standard. The former primary and secondary federal ozone standards, both at 0.075 ppm, were last set in 2008.

The revisions reflect scientific evidence from nearly 2,300 studies, including more than 1,000 new studies published since the last review of the standards in 2008, that that adverse public health effects occur at ozone levels below the former 0.075 ppm federal primary standard. Furthermore, other evidence now shows that natural vegetation and agricultural crops can be seriously damaged by repeated low-level ozone exposure.

Based on EPA estimates, excluding California, public health benefits of the updated standards are projected to be $2.9 to $5.9 billion annually in 2025, which significantly outweighs the estimated annual costs of $1.4 billion. Because of the severity of their ozone problem, several areas in California are not required to meet the existing standard until after 2025. EPA estimates that meeting the new federal ozone standard after 2025 in California will yield annual health benefits of $1.2 to 2.1 billion. These benefits outweigh the post-2025 cost in California, estimated at $0.8 billion.

EPA's timeline for implementing the new federal ozone standards calls for EPA to designate areas attainment or nonattainment for the new standards by October 1 2017. However, EPA may take up to another year if there is insufficient data to make a designation by that date. The designations will be based on 2014-2016 air quality data. Areas designated nonattainment would have until 2021 to submit plans to EPA outlining how they would meet the new standards by specific dates and until 2037 to meet the new standard, based on the severity of their respective ozone problems.

EPA intends to revoke the 2008 ozone standard effective one year after the initial designations for the 2015 standard. Until then, the 2008 federal 8-hour ozone standard and all associated

regulatory requirements remain in place. EPA's preliminary projections indicate that Ventura County will meet the new federal 0.070 ppm ozone standard by 2025.

EPA's Ozone Standards website contains more information regarding ozone and the new 8-hour ozone standards.

GLOSSARY

Activity Indicator: A measure of socioeconomic conditions relative to a base year, such as population, housing, and employment data, used to project future year emissions by the relationship of the related activity. Example: Natural gas use per household.

Aerosols: Very small particles of solid or liquid matter suspended in the air.

Air Basin: An area of the state designated by the California Air Resources Board pursuant to Subdivision (a) of Section 39606 of the CH&SC that has similar meteorological and geographic conditions.

Air Contaminant: Any discharge, release, or other propagation into the atmosphere and includes but is not limited to, smoke, charred paper, dust, soot, grime, carbon, fumes, gases, odors, particulate matter, acids or any combination thereof.

Air Monitoring: The periodic or continuous sampling and analysis of air pollutants in ambient air or from individual air pollutant sources.

Air Pollutants: Substances that are foreign to the atmosphere or are present in the natural atmosphere to the extent that they may result in adverse effects on humans, animals, vegetation, and/or materials.

Air Pollution Control Board (APCB): The governing body for an air pollution control district.

Air Pollution Control District (APCD): A county agency with authority to regulate sources of air pollution (other than emissions from mobile sources) such as refineries, manufacturing facilities, gasoline stations, dry cleaners, and power plants within a given county, and governed by a district APCB composed of elected city and county officials.

Air Pollution Control Officer (APCO): A person appointed by the APCB and given the authority to appoint district personnel for the purpose of observing and enforcing the provisions of Part 4, Division 26 of the CH&SC.

Air Quality Management District: A group or portions of counties, or an individual county specified in law with authority to regulate stationary, indirect, and area sources of air pollution with the region and governed by a regional air pollution control board comprised mostly of elected officials within the region.

Air Quality Management Plan (AQMP): A plan prepared by an APCD for a county or region designated nonattainment for one or more federal or state air pollutants, for the purpose of

bringing the area into compliance with the requirements of the federal and/or California ambient air quality standards. AQMPs are incorporated into the SIP.

Air Quality Standards: Those ambient air quality standards as promulgated by State or Federal pollution control agencies.

Ambient Air: Air occurring at a particular time and place outside of structures. Often used interchangeably with outdoor air.

Anthropogenic: Of, relating to, or influenced by the impact of humans on nature; man-made.

ARB: Air Resources Board, the state agency responsible for air pollution control in California.

Area-wide Sources: Also known as "area" sources; are those sources which are not large enough to be tracked individually, but when added together can represent a large quantity of pollution. Examples of such sources include water heaters, gas furnaces, fireplaces, gas stations, dry cleaners and woodstoves. Area sources of pollution are identified by Category of Emission Source codes.

Attainment: Achieving and maintaining one or more of the and/or California Ambient Air Quality Standards.

Atmosphere: The air that surrounds the earth but does not include the general volume of gases contained in any bona fide building.

Attainment Area: A geographic area that complies with one or more of the NAAQS or CAAQS.

Base Year: The year used in a predictive air pollution model that includes the known economic conditions, population, and air emissions. The base year, current or past, is used to predict the forecast year in a predictive model.

Best Available Control Technology (BACT): The most up-to-date methods, systems, techniques, and production processes available to achieve the greatest feasible emission reductions for given regulated air pollutants and processes. BACT is a requirement of NSR and Prevention of Significant Deterioration (PSD).

Best Available Control Measure (BACM): A term used to describe the "best" measures (according to EPA guidance) for controlling small or dispersed sources of particulate matter and other emissions from sources such as roadway dust, woodstoves, and open burning.

Best Available Retrofit Control Technology (BARCT): An emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each air pollutant source class or category (Section 40406 CH&SC).

Bike Lanes: The California Streets and Highway Code Section 890.4 defines a "Bikeway" (herein referred to as a "bike lane") as a facility that is provided primarily for bicycle travel. A Class I bikeway (or bike path) provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow by motorists minimized. A Class II bikeway (or bike lane) provides a striped lane for one-way bike travel on a street or highway. A Class III bikeway (or bike route) provides for shared use with pedestrian or motor vehicle traffic.

Biogenic: Produced by living organisms. Biogenic air pollutant emissions are of great interest because of the predominance of agriculture and natural vegetation in Ventura County. However, the District has no authority to regulate biogenic emissions. Preliminary studies indicate that biogenic emissions may be at least two times the total hydrocarbon emissions already quantified in the emissions inventory for the AQMP.

Bureau of Automotive Repair (BAR): An agency of the California Department of Consumer Affairs and responsible for the implementation of the motor vehicle inspection and maintenance program (smog check).

California Air Resources Board (ARB): The State's lead air quality agency consisting of an eleven-member Governor-appointed board and supporting staff fully responsible for motor vehicle pollution control, and having oversight authority over California's air pollution management program.

California Clean Air Act (CCAA): A California law passed in 1988 that provides the basis for air quality planning and regulation independent of federal regulations, and which establishes new authority for attaining and maintaining California's air quality standards by the earliest practicable date. A major element of the Act is the requirement that local air districts in violation of the California clean air standards must prepare attainment plans that identify air quality problems, causes, trends, and actions to be taken for attainment.

California Department of Transportation (Caltrans): A California state agency that oversees the state's transportation infrastructure.

California Emissions Inventory Development and Reporting System (CEIDARS): The state's emissions inventory data base system.

California Emission Forecasting System (CEFS): ARB's model to forecast air pollutant emissions. A major feature of the model is its ability to track the effects of emission control

rules and growth activity for stationary and other mobile sources by linking these factors directly to the emission categories.

California Environmental Quality Act (CEQA): A California law that sets forth a process for public agencies to make informed decisions on discretionary projects such land use entitlements. The process aids decision makers to determine whether any environmental impacts are associated with a proposed project. It requires elimination or reduction of environmental impacts associated with a proposed project and the implementation of mitigation measures to reduce or remove those impacts.

California Health and Safety Code (CH&SC): The California Health and Safety Code is the collection of state laws that govern, among other things, the handling of air pollution, hazardous waste, corrective action and permitted facilities.

Carbon Monoxide (CO): A colorless, odorless gas resulting from the incomplete combustion of fossil fuels. Over 80 percent of the CO emitted in urban areas is contributed by motor vehicles. CO is a criteria pollutant, and interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects.

Cargo Handling Equipment: Cargo handling equipment is equipment used at ports to transfer goods or perform maintenance and repair activities, including but not limited to equipment such as yard trucks (hostlers), rubber-tired gantry cranes, top handlers, side handlers, forklifts, and loaders, etc.

Carl Moyer Program: The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is an incentive program offered jointly by the California Air Resources Board and California's local air districts that provides grants for cleaner-than-required engines and equipment to help improve air quality in California. The grants are administered by the local air districts.

City Urban Restriction Boundary (CURB): A regional boundary set in an attempt to control urbanization by designating the area inside the boundary for higher density urban development and the area outside for lower density rural development.

Clean Air Act Amendments (CAAA): Amendments passed in 1977 and 1990 to the federal Clean Air Act of 1970 and which form the basis for the current national air pollution control effort. Basic elements of the amended act include national ambient air quality standards for major air pollutants, air toxics standards, acid rain control measures, and enforcement provisions.

Commercial Harbor Craft: Commercial harbor craft (CHC) include ferries, excursion vessels, tugboats, towboats, crew and supply vessels, work boats, commercial and charter fishing boats, and barge and dredge vessels. In 2010, ARB staff estimated there are approximately 4,300

commercial harbor craft vessels with 8,700 diesel-fueled engines operating in California coastal waters.

Compressed Natural Gas (CNG): An alternative fuel that is cleaner burning and helps to meet ARB's mobile and stationary emission standards. CNG may be used in place of less clean fuels for powering motor vehicles.

Conformity: A formal demonstration of whether a federally-supported activity is consistent with the SIP – per section 176(c) of the federal CAA. Transportation conformity refers to plans, programs, and projects approved or funded by the Federal Highway Administration or the Federal Transit Administration. General conformity refers to projects approved or funded by other federal agencies.

Consumer Products: Products such as detergents, cleaning compounds, polishes, personal care products, and automotive specialty products that are part of our everyday lives and, through consumer use, may contribute to air pollution.

Contingency Measure: Requires back-up air pollution control measures to be implemented in the event of specific conditions, such as failure to meet interim milestone emission reduction targets or failure to attain an applicable air quality standard by the statutory attainment date. Both the state and federal clean air acts require that District clean air plans include contingency measures.

Control Efficiency (CE): A variable that estimates the technological efficiency of an air pollutant control strategy. Control efficiency is one of the variables used to develop a control factor.

Control Factor (CF): Data derived from adopted State and Federal regulations and local district rules that impose emission reductions or a technological change on a particular emission process. Control factors are closely linked to the type of emission process and type of industry. They also account for three types of variables which include control efficiency, rule effectiveness, and rule penetration.

Control Measure: A single measure in an air quality plan to maintain or reduce the emissions of criteria pollutants. Control measures are enforceable commitments in the air quality plan.

Control Strategy: A combination of control measures designed to reduce air contaminant emissions to attain and maintain ambient air quality standards.

Control Techniques Guidelines (CTG): Guidance documents issued by EPA designed to assist state and local pollution authorities to achieve and maintain air quality standards for certain air pollutant sources (e.g. organic emissions from solvent metal cleaning known as degreasing)

through RACT. CTGs contain information on the economic and technological feasibility of available emission control techniques.

Criteria Air Pollutant: An air pollutant for which acceptable levels of exposure can be determined and for which a federal or state ambient air quality standard has been set to protect public health and welfare. Examples include ozone, carbon monoxide, lead, nitrogen dioxide, sulfur dioxide, and fine particulates.

Department of Motor Vehicles (DMV): The California state agency responsible for registering motor vehicle drivers and motor vehicles and collecting state and local motor vehicle fees.

Department of Pesticide Regulation (DPR): The state agency responsible for regulating pesticide sales and use in California.

Design Value: The pollutant concentration used by air quality managers as the basis for determining attainment of an air quality standard, generally by using an air quality model. The design value may or may not be the same as the designation value.

District: A local air pollution control agency as defined by the CH&SC Section 40150. The Ventura County Air Pollution Control District is the local air pollution control agency for Ventura County, California.

EMFAC: The EMission FACtor computer model used by ARB to estimate on-road mobile vehicle emissions. This model is part of ARB's overall on-road mobile source Mobile Vehicle Emission Inventory model.

Early Progress Plan (EPP): An air quality planning document that shows progress towards attaining the federal ozone standards and establishes transportation conformity budgets.

Emissions Data: Measured or calculated concentrations or weights of air contaminants emitted into the ambient air. Data used to calculate emissions data are not emissions data.

Emission Factor: For stationary sources, the relationship between the amount of pollution produced and the amount of raw material processed or burned. For mobile sources, the relationship between the amount of pollution produced and the number of vehicle miles traveled. By using the emission factor of a pollutant and specific data regarding quantities of material used by a given source, it is possible to compute emissions for the source.

Emission Offsets: Actual enforceable emission reductions from existing sources sufficient to offset anticipated emission increases associated with new or modified stationary sources. A rule-making concept, whereby approval of a new stationary source of air pollution, or an increase of

emissions from an existing source of air pollution, is conditional on the equal or greater reduction of emissions from other existing stationary sources of air pollution. This concept is utilized in addition to reduction in emissions by employing BACT.

Emission Reduction Credit (ERC): Credits given for actual emission reductions that are real, enforceable, permanent, quantifiable, and surplus (beyond any required reductions). An actual credit is certified via a District-issued document that specifies the date of issuance, expiration date of credit, type of pollutant, and legal owner of emission reduction credits. In some cases, ERCs can be transferred to another owner or saved for future use.

Emission Standard: The maximum amount or rate of a pollutant permitted from a polluting source such as an automobile or smoke stack.

Emissions Inventory: An emissions inventory is a large dataset that, as a whole, describes emission sources and quantifies pollutants released into the atmosphere. Considerations that go into the inventory include type and location of emission sources, the processes involved, and the level of activity (day, month) and year of activity.

Emissions Inventory Category: A group of similar air pollutant sources. Examples include oil and gas production, dry cleaning, and pesticide application.

Emissions Inventory Code (EIC): State computer coding scheme (14 digits) used to categorize emissions in the CEIDARS database.

Equipment: Any operation, article, machine, equipment, or contrivance that may emit or reduce the emissions of any air contaminant or affected air pollutant.

Exceedance: Measured concentration of an air pollutant in ambient air is higher than the state and/or federal ambient air quality standard for that pollutant.

Federal Aviation Administration (FAA): An agency of the United States Department of Transportation with authority to regulate and oversee all aspects of civil aviation in the U.S.

Federal Clean Air Act (CAA): A federal law passed in 1970 and significantly amended in 1977 and 1990 that forms the basis for the national air pollution control efforts. Basic elements of the Act include national ambient air quality standards for major air pollutants, air toxics standards, acid rain control measures, and enforcement provisions.

Federal Highway Administration (FHWA): A division of the United States Department of Transportation that specializes in highway transportation. The agency's major activities are grouped into two programs, The Federal-aid Highway Program and the Federal Lands Highway Program.

Federal Implementation Plan (FIP): A plan prepared and enforced by the EPA that provides measures nonattainment areas must take to meet the requirements of the federal CAA. The EPA implements FIPs when states are unable or unwilling to adopt and implement adequate SIPs.

Federal Transit Administration (FTA): An agency within the United States Department of Transportation that provides financial and technical assistance to local public transit systems.

Forecast Year: The future year of interest in a predictive air pollution or emissions model. The predictivie model results produce future year emissions based on expectations of future land use, transportation changes, econmic conditions, population growth, and emission controls.

Greenhouse Gas (GHG): Gaseous components of the atmosphere that contribute to the greenhouse effect. Greenhouse gases include, in order of relative abundance: water vapor, carbon dioxide, methane, nitrous oxide, ozone and chlorofluorocarbons.

Growth Factor (GF): Data derived from county-specific economic activity profiles, population forecasts, and other socio-demographic activity.

Hydrocarbon: Any of a large number of compounds containing various combinations of hydrogen and carbon atoms. They may be emitted into the air as a result of fossil fuel combustion and fuel volatilization, and are a major contributor to smog.

Hydrofluorocarbons: A group of chemical compounds, consisting of alkanes, such as methane or ethane, with one or more halogens linked, such as chlorine or fluorine, making them a type of organic halide.

Implementation Factor (IF): A variable used to develop control factors, indicating the relative amount of total control from a control measure occurring in a given year to account for phased implementation or control requirements occurring in tiers.

Indirect Source: Any facility, building, structure, or installation, or combination thereof, which generates or attracts motor vehicle activity resulting in emissions of any pollutant (or precursor) for which there is a state or federal ambient air quality standard. Examples of indirect sources include employment sites, shopping centers, sports facilities, housing developments, airports, educational institutions, commercial and industrial developments, and parking lots and garages.

Inspection and Maintenance Program (I & M): A motor vehicle inspection program implemented by the California Bureau of Automotive Repair. It is designed to ensure the effectiveness of their emission control systems on a biennial basis. The program was enacted in 1979 and strengthened in 1990. The standard program is called Basic I & M. Enhanced I & M has more stringent testing requirements and is implemented in urbanized areas that are classified

as “serious” and above nonattainment for ozone or “high moderate” and above for carbon monoxide and which had a population of 200,000 or more in 1980. Also known as the Smog Check program.

Internal Combustion Engine: A heat engine in which the combustion generates the heat inside the engine proper instead of in a furnace. An example of an IC engine is an automobile engine.

Inversion: A layer of warm air in the atmosphere that lies over a layer of cooler air, trapping pollutants beneath it.

Lead: A gray-white metal that is soft, malleable, ductile, and resistant to corrosion. Sources of lead resulting in concentrations in the air include industrial sources and crustal weathering of soils followed by fugitive dust emissions. Health effects from exposure to lead include brain and kidney damage and learning disabilities. Lead is the only substance currently listed as both a criteria air pollutant and a toxic air contaminant.

Local Agency Formation Commission (LAFCO): A decision making government entity in California with the responsibility to decide boundary issues pertaining to city and county (non-incorporated) lands, including spheres of influence, and issues about the annexation of county lands into a city or special district.

Local Sources: Air pollution sources for which local governments (cities, counties, air agencies) have primary regulatory authority.

Maintenance Plan: A plan that details the actions needed to maintain air quality at or below federal standards. The federal CAA requires maintenance plans for areas that have been re-designated attainment areas.

Major Source Category: A general, broad category of similar emission sources. Examples are Fuel Combustion, Waste Disposal, Solvent Evaporation, are broad category classifications which are made up of many sub-categories.

“Major” Sources under CAAA: A source with a potential to emit more than a specific threshold of emissions annually, determined by the nonattainment designation of an air quality district.

Memorandum of Understanding (MOU): A formal agreement made among agencies for the purposes of jointly accomplishing a goal, program, etc. The governing boards of the involved agencies must ratify the agreement.

Metropolitan Planning Organization: The organization designated as being responsible, together with the State, for conducting the continuing, cooperative, and comprehensive planning process under 23 U.S.C. 134 and 49 U.S.C. 1607. It is the forum for cooperative transportation decision-making.

Mobile Sources: Sources of air pollution such as automobiles, motorcycles, trucks, off-road vehicles, boats, and airplanes.

Motor Vehicle: A self-propelled vehicle as defined in the California Vehicle Code, Division I, Section 415.

National Ambient Air Quality Standards (NAAQS): Standards set by the EPA for the maximum levels of certain air pollutants in outdoor air without unacceptable effects on human health or public welfare. There are NAAQS for ozone, particulates, carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide.

Naval Base Ventura County: A major U.S. military facility in Ventura County, California.

New Source Review (NSR): The mechanism to ensure that new and modified stationary sources of air pollution will not interfere with the attainment or maintenance of any ambient air quality standard, or prevent reasonable further progress towards the attainment or maintenance of any ambient air quality standard. A program used in a nonattainment area to permit or site new industrial facilities or modifications to existing industrial facilities that emit nonattainment criteria air pollutants. The two major requirements of NSR are Best Available Control Technology and Emission Offsets.

Nitrogen Dioxide (NO_2): A reddish-brown gas with a characteristic sharp, biting odor. Nitrogen dioxide is one of the most prominent air pollutants and a poison by inhalation.

Nonattainment Area: An area identified by the EPA and/or ARB as not meeting either federal or state clean air standards for a given criteria air pollutant.

Ocean-going Vessel: An ocean-going vessel (OGV) is a commercial ship greater than or equal to 400 feet in length or 10,000 gross tons; or propelled by a marine compression ignition engine with a displacement of greater than or equal to 30 liters per cylinder. The emissions inventory includes all OGV emissions occurring within 100 nautical miles of the California coastline.

OFFROAD Emissions Model: California Air Resources Board model that estimates population, activity, and emissions for specific categories of off-road (non-highway) equipment by fuel types at the county level.

Other Mobile Sources: A broad emissions category for mobile off-road equipment, including aircraft, locomotives, marine vessels, agricultural and construction equipment and more.

Organic Solvents: Liquids containing organic compounds which are used as dissolvers, viscosity reducers, or cleaning agents. These liquids are principally derived from petroleum and include petroleum distillates, chlorinated hydrocarbons, chlorofluorocarbons, ketones, and alcohols. Solutions, emulsions, and dispersions of water and soap, or water and detergent are not organic solvents. Soaps and detergents are water-based surfactants.

Outer Continental Shelf (OCS): All submerged lands lying seaward of state coastal waters (beyond 3 miles offshore) which are under U.S. jurisdiction as defined by the Outer Continental Shelf Lands Act of 1953.

Oxides of Nitrogen (NOx): A general term pertaining to compounds of nitric oxide (NO), nitrogen dioxide (NO_2), and other oxides of nitrogen. Nitrogen oxides are created during combustion processes and are major contributors to smog formation and acid deposition. NO_2 is a criteria pollutant and may result in numerous adverse human health effects.

Ozone: A reactive gas consisting of three oxygen atoms found in two layers of the atmosphere, the stratosphere and the troposphere. In the stratosphere (the atmospheric layer 7 to 10 miles or more above the earth's surface), ozone is a natural form of oxygen that provides a protective layer shielding the earth from ultraviolet radiation.

In the troposphere (the layer extending up 7 to 10 miles from the earth's surface), ozone is a chemical oxidant and major component of photochemical smog. It can seriously impair the respiratory system and is one of the most widespread of all the criteria pollutants for which the federal Clean Air Act required EPA to set standards. Ozone in the troposphere is produced through complex photochemical reactions of nitrogen oxides, which are among the primary pollutants emitted by combustion sources; hydrocarbons, released into the atmosphere through the combustion, handling and processing of petroleum products; and sunlight.

Ozone Precursors: Chemicals such as volatile organic compounds and nitrogen oxides, occurring either naturally or as a result of human activities, which contribute to the formation of ozone, a major component of smog.

Ozone Summer Season: May – October months, when ozone formation potential is the greatest.

Particulate Matter (PM): Any material, except pure water, that exists in the solid or liquid state in the atmosphere. The size of particulate matter can vary from coarse, wind-blown dust particles, to fine particle combustion products.

Particulate Matter - Fine ($PM_{2.5}$): A mixture of very small atmospheric particles with an aerodynamic diameter equal to or less than 2.5 microns. $PM_{2.5}$ consists of particles directly emitted into the air and particles formed in the air from the chemical transformation of gaseous pollutants. $PM_{2.5}$ particles result from activities such as industrial and residential combustion, and from vehicle exhaust. Particles 2.5 microns or smaller infiltrate the deepest portions of lungs, increasing the risks of long-term disease, including chronic respiratory disease, cancer, and increased and premature death.

Particulate Matter (PM_{10}): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and mists. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the air sacs deep in the lungs where they may be deposited to result in adverse health effects. PM_{10} also causes visibility reduction and is a criteria air pollutant.

parts per million (ppm): Standard measurement of concentration by which ozone or other atmospheric gases are measured.

Perfluorocarbons: Compounds derived from hydrocarbons by replacement of hydrogen atoms by fluorine atoms and made up of carbon and fluorine atoms only, such as octafluoropropane, perfluorohexane, and perfluorodecalin.

Photochemical Reaction: A term referring to chemical reactions brought about by the light energy of the sun. Photochemical reactions in the atmosphere create harmful air pollutants such as ozone.

Point Source: Stationary emission sources having a district permit to operate identified on an individual basis due to the quantity or nature of their emissions. Examples of point sources include electrical power generating plants or large surface coating operations.

Rate of Progress: Section 182(c)(2) of the federal CAA Amendments requires ozone nonattainment areas designated serious or above to demonstrate post-1996 volatile organic compound emission reductions of three percent per year, averaged over a three- year period. The U.S. Environmental Protection Agency refers to these reductions as the rate-of-progress requirement.

Reactive Fraction: The relative amount of TOG compounds which is photochemically reactive and participates in ozone formation, excluding methane and other compounds with inconsequential effects on ozone photochemical reactivity.

Reactive Organic Gas (ROG): A reactive chemical gas composed of hydrocarbon compounds that may contribute to the formation of smog by their involvement in atmospheric

chemical reactions. Also, sometimes referred to as non-methane organic compounds (NMOCs). VOC emissions are a subset of ROG emissions.

Reasonably Available Control Measures (RACM): A broadly defined term referring to technologies and measures to control air pollution.

Reasonably Available Control Technology (RACT): A set of air pollution control technologies defined in the CFR 57 FR 55620, as "the lowest emission limitation that a unit is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility".

Reasonable Further Progress (RFP): A requirement for a State Implementation Plan showing increments of progress (emission reductions) from the date of designation of nonattainment for federal ozone standards to the attainment dates - applicable for both Subpart 1 and Subpart 2 ozone nonattainment areas.

Recreational Boats: Recreational boats include pleasure boats with inboard or outboard engines, and personal watercraft, etc.

Regional Transportation Improvement Plan (RTIP): A staged, multiyear, intermodal program of transportation projects covering a metropolitan planning area, consistent with the metropolitan transportation plan, and developed pursuant to 23 CFR Part 450.

Regional Transportation Plan (RTP): The official intermodal metropolitan transportation plan developed through the metropolitan planning process for the metropolitan planning area, and developed pursuant to 23 CFR Part 450.

Reid Vapor Pressure (RVP): The absolute vapor pressure of volatile crude oil and volatile non-viscous petroleum liquids except liquefied petroleum gases as determined by American Society for Testing and Materials publication, "Test Method for Vapor Pressure of Petroleum Products."

Rule Effectiveness: An estimate of how well an air pollution rule or control strategy works in "real-world" application. Rule effectiveness is one of the variables used to develop a control factor.

Rule Penetration: An estimate of the degree an air pollution control strategy will penetrate a certain regulated sector taking into account such things as equipment exemptions.

Save Open-Space and Agricultural Resources (SOAR): A local nonprofit citizen organization in Ventura County dedicated to making Ventura County a better place to live by

limiting urban sprawl, protecting open space and agricultural lands, and promoting livable and sustainable communities in Ventura County.

South Central Coast (SCC) Air Basin: An air basin established by ARB that has similar meteorological and geographical conditions that consists of San Luis Obispo, Santa Barbara, and Ventura Counties.

South Coast Air Quality Management District (SCAQMD): South Coast Air Quality Management District. A regional air quality control district encompassing four counties in Southern California (Los Angeles, Orange, Riverside and San Bernardino).

Southern California Association of Governments (SCAG): The organization, known in federal law as the Council of Governments and Metropolitan Planning Organization, representing Los Angeles, Ventura, San Bernardino, Riverside, Orange, and Imperial Counties, and the cities within those six counties. As the designated Metropolitan Planning Organization for the designated areas, the Association of Governments is mandated by the federal government to research and formulate plans for transportation, growth management, hazardous waste management, and air quality. Additional mandates exist at the state level.

Smog: A combination of smoke, ozone, hydrocarbons, nitrogen oxides, and other chemically reactive compounds, which, under various conditions of weather and sunlight, may result in a murky brown haze that causes adverse health effects and human welfare effects. A primary source of smog is motor vehicles.

Smog Check Program: A motor vehicle inspection program implemented by the California Bureau of Automotive Repair. It is designed to ensure the effectiveness of automobile emission control systems on a biennial basis. The program was enacted in 1979 and strengthened in 1990. Also known as the Inspection and Maintenance Program (I & M).

State Implementation Plan (SIP): A document prepared by each state describing existing air quality conditions and measures that it will take to attain and maintain national ambient air quality standards. The provisions and commitments in SIPs are federally enforceable.

State Tidelands: The offshore region three miles from the shoreline.

Stationary Sources: Non-mobile sources such as power plants, refineries, and manufacturing facilities, and turbines that emit air pollutants.

Sulfur Dioxide (SO_2): A colorless, extremely irritating gas or liquid of sulfur and oxygen and whose chemical formula is SO_2. Sulfur dioxide mainly enters the atmosphere as a pollutant through burning high sulfur-content fuel oils and coal, and from chemical processes occurring at chemical plants and refineries. SO_2 is a criteria air pollutant.

Summer Planning Day Emissions: Emissions occurring during a typical summer day during the months of May – October. This term is interchangeable term with "ozone season" day emissions.

tons per day (tpd): A unit of measurement often used in air pollutant emission inventories.

Total Organic Compounds (TOC): Organic compounds of carbon including methane emitted to the atmosphere. TOCs exclude carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate.

Total Organic Gases: Total organic gases means "compounds of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate." TOG includes all organic gas compounds emitted to the atmosphere, including the low reactivity, or "exempt VOC", compounds (e.g., methane, ethane, various chlorinated fluorocarbons, acetone, perchloroethylene, volatile methyl siloxanes, etc.).

TOG also includes low volatility or "low vapor pressure" organic compounds (e.g., some petroleum distillate mixtures). TOG includes all organic compounds that can become airborne (through evaporation, sublimation, as aerosols, etc.), excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

Transportation Control Measure (TCM): Any control measure or strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. TCMs include encouraging the use of carpools and mass transit.

United States Environmental Protection Agency (EPA): The United States agency charged with setting policy and guidelines, and carrying out legal mandates for the protection of national interests in environmental resources.

Vehicle Miles Traveled (VMT): A measure of both the volume and extent of motor vehicle operation; the total number of vehicle miles traveled within a specified geographical area over a given period of time.

Ventura County Transportation Commission (VCTC): Agency responsible for planning and funding transportation and transit improvements in Ventura County. VCTC develops and implements transportation policies, projects, and funding priorities for a wide variety of transportation projects.

Visibility: The distance that atmospheric conditions allow a person to see at a given time and location. Visibility reduction from air pollution is often due to the presence of sulfur and nitrogen oxides, as well as particulate matter, including aerosols.

Volatile Organic Compounds (VOC): Hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and/or may themselves be toxic. VOCs often have an odor, and examples include gasoline, alcohol, and paint solvents.

Weight of Evidence (WOE): A supplementary set of analyses intended to verify modeled predictions of future air quality, especially at levels near the federal standards. These analyses can include air quality trends, emission trends, meteorological data, evaluation of other air quality indicators, and additional air quality modeling.

APPENDIX A

VENTURA COUNTY

EMISSIONS INVENTORY DOCUMENTATION

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Introduction

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 presents a summary of the data sources, along with revisions and improvements made to the emissions inventory included in the 2016 Ventura County 8-hour Ozone Air Quality Management Plan (AQMP).

The California Air Resources Board (ARB) and Ventura County Air Pollution Control District (District) 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 emissions 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. Staff also reviewed the growth profiles for stationary and areawide source categories, and updated them as necessary to ensure that the emissions projections are based on data that reflect historical trends, current conditions, and recent economic and demographic forecasts.

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 (EPA) regulations require that the emissions inventory contain emissions data for the two precursors to ozone formation: oxides of nitrogen (NOx) and volatile organic compounds (VOC), also referred to reactive organic gases (ROG) in this document.

Agency Responsibilities

ARB and District staff worked jointly to develop the emissions inventory for the Ventura County 8-hour ozone nonattainment area. The District worked closely with operators of major stationary facilities in their jurisdiction to develop the point source emissions estimates. ARB staff developed the emissions inventory for mobile sources, both on-road and off-road. The District and ARB shared responsibility for developing estimates for the nonpoint (areawide) sources such as architectural coatings 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), the California Energy Commission (CEC), and the Southern California Association of Governments (SCAG) to assemble activity information necessary to develop the mobile and areawide source emissions 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. 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, 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, 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 emissions forecasts by applying growth and control profiles to the base year inventory.

Growth profiles for stationary and areawide sources are derived from socioeconomic factors (growth surrogates) such as economic activity, fuel usage, population, housing units, etc., that best reflect the expected growth or decline rates 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, including the District for its rules.

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) emissions estimates. Annual emissions 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 emissions inventory used in the Plan is based on the summer season (May through October).

Geographical Scope

The inventories presented in this Plan consist of emissions for the county of Ventura, including offshore emissions from ocean-going vessels out to 100 nautical miles.

Quality Assurance and Quality Control

ARB has established a quality assurance and quality control (QA/QC) process involving ARB and District 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 emissions inventory development. Base year emissions are assembled and maintained in the California Emission Inventory Development and Reporting System (CEIDARS).

ARB inventory staff works with District staff, who are responsible for developing and reporting point source emissions estimates, to verify these data are accurate. The locations of point sources, including stacks, are checked to ensure they are valid. Areawide source emissions estimates are developed by ARB as well as District staff. The methodologies for estimating these categories are reviewed by ARB and district staff before their inclusion in the emissions inventory. Additionally, CEIDARS is designed with automatic system checks to prevent errors such as double counting of emissions sources. The system also makes various reports available to assist staff in their efforts to identify and reconcile anomalous emissions.

Future year emissions are estimated using the California Emission Projection Analysis Model (CEPAM). Growth and control factors are reviewed for each category and year along with the resulting emissions 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 Ventura County 8-hour ozone SIP emissions inventory is presented in the sections below.

Stationary Sources

Stationary Sources are comprised of two emission source types, point sources and area sources. Point sources are individual, fixed sources of air pollution from facilities with District operating permits. Area sources are groups of similar emission sources that do not individually emit large amounts of pollutants, but when aggregated on a county-wide basis can contribute significant air emissions. Area sources represent emissions from small permitted facilities and sources not under district permit, such as composting, small engines and boilers and fugitive ROG losses from oil and gas production.

Stationary Point Sources

The emissions inventory reflects actual emissions from industrial point sources reported to the District by the facility operators for calendar year 2012, in accordance with the requirements set forth in 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, and engineering calculations.

The stationary point source categories are listed in Table A-1.

In addition to the stationary point source emission categories in Table A-1, the District also reports emissions from crew and supply boats affiliated with the offshore oil and gas production platforms in Off-Road Mobile Sources 'Ships and Commercial Boats' emission categories.

Table A-1
Stationary Point Source Categories

Source Category	Subcategory
Fuel Combustion	Electric Utilities
	Cogeneration
	Oil and Gas Production (Combustion)
	Petroleum Refining (Combustion)
	Manufacturing and Industrial
	Food and Agricultural Processing
	Service and Commercial
	Other (Fuel Combustion)
Waste Disposal	Sewage Treatment
	Landfills
	Incinerators
	Other (Waste Disposal)
Cleaning and Surface Coatings	Laundering
	Degreasing
	Coatings and Related Process Solvents
	Printing
	Adhesives and Sealants
	Other (Cleaning and Surface Coatings)

Table A-1 (Cont.)
Stationary Point Source Categories

Source Category	Subcategory
Petroleum Production and Marketing	Oil and Gas Production
	Petroleum Marketing
Industrial Processes	Chemical
	Food and Agriculture
	Mineral Processes
	Metal Processes
	Wood and Paper
	Electronics
	Other (Industrial Processes)

Stationary Area Sources

Stationary area sources 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. The District provides regular updates for many of these categories – over 60 of them were updated in 2010 or 2012, accounting for 91 percent of the NOx and 81 percent of the ROG emissions for this subset. The stationary area source categories are listed in Table A-2.

Table A-2
Stationary Area Source Categories

Source Category	Subcategory
Fuel Combustion	Oil and Gas Production (Combustion)
	Manufacturing and Industrial
	Food and Agricultural Processing
	Service and Commercial
	Other (Fuel Combustion)
Waste Disposal	Other (Waste Disposal)
Cleaning and Surface Coatings	Laundering
	Degreasing
	Coatings and Related Process Solvents
	Printing
	Adhesives and Sealants
	Other (Cleaning and Surface Coatings)
Petroleum Production and Marketing	Oil and Gas Production
	Petroleum Marketing
Industrial Processes	Chemical
	Food and Agriculture
	Other (Industrial Processes)

A summary of the recently updated and other important stationary area source methodologies is presented below.

Fuel Combustion

Natural Gas Combustion

Industrial and commercial natural gas combustion emissions estimates were revised by the District for 2012. Emissions were estimated based on the natural gas consumed by various industrial and commercial sectors (space heating, water heating, and other unspecified). Industrial and commercial natural gas usage reported by the gas utilities to the California Energy Commission (CEC) for 2012 was distributed to the sectors using allocation factors from Southern California Gas Company. Emission factors were from EPA AP-42 Section 1.4 "Natural Gas Combustion" (July 1998). The growth profile is based on the natural gas usage demand forecasts developed by Southern California Gas Company for South Coast Air Quality Management District and takes into account energy savings benefits from statewide energy efficiency programs and standards.

Liquid Fuel Combustion

Industrial and commercial liquid fuel combustion emissions were updated by the District for 2010. State-wide distillate oil, residual oil and liquefied petroleum gas fuel consumption from the U.S. Dept. of Energy Energy Information Administration (EIA) from 2009 was projected to 2010 using the 2010/2009 statewide ratio of either industrial or commercial employment from California Employment Development Department Labor Management Information (LMI) data, then allocated to the county level on the basis of the county/state ratio. Point source fuel use was then subtracted out. Distillate and residual fuel oil categories are subject to ARB's state-wide Diesel Fuel regulations and sulfur content is assumed to be 0.0015%. Emission factors are from EPA AP-42 Section 1.3 "Fuel Oil Combustion" and Section 1.5 "Liquefied Petroleum Gas Combustion". The growth profile is based on total employment projections from SCAG.

Stationary Agricultural Natural Gas Engines

The District updated emissions for 2010 based on fuel use and emission factor data from Emission Reduction Credits (ERC) applications submitted to the District for unpermitted agricultural well pump natural gas engines. Emissions were adjusted by the ratio of known engine fuel use and countywide natural gas fuel use data from the California Energy Commission (CEC) for - 'Ag & Water Pump' NAICS 221311 (Water Supply) - to account for unknown engines. The growth profile for natural gas irrigation pumps was developed by ARB/Pechan.

Estimates for the following Fuel Combustion categories were developed by ARB.

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: http://www.arb.ca.gov/ei/areasrc/FULLPDF/FULL1-2.pdf.

Agricultural Irrigation Pumps Diesel Engines

Emissions from agricultural irrigation pumps are estimated from a model developed by ARB staff. Air districts with significant irrigated agricultural acreage provided estimates of the population and emissions from stationary and mobile diesel-fueled agricultural irrigation pumps. These data were reconciled with equipment population estimates from the 2003 U.S. Department of Agriculture Farm and Ranch Irrigation Survey (FRIS). The inventory also reflects the number of pumps that have been replaced to date under the Carl Moyer Program. Emissions are forecasted using irrigated cropland acreage trends. Additional information on this methodology is available at: http://www.arb.ca.gov/regact/agen06/attach2.pdf.

Waste Disposal

Composting

The District developed a new methodology for 2012 to estimate ROG and NH_3 emissions from organic material composting operations in support of a proposed District rule to regulate ROG emissions from these sources. Annual 2012 composting, co-composting and chip-and-grind throughput was obtained from a November 2013 survey of composting facilities in Ventura County and from CalRecycle. ROG and NH3 emission factors are from the ARB Composting Regulatory Workgroup, Proposed ARB Emissions Inventory Methodology for Composting Facilities (September 2014) Table III-1 and III-2. The growth profile is based on population projections from SCAG.

Cleaning and Surface Coatings

Laundering

The District updated emissions from dry cleaning establishments using petroleum solvent or perchloroethylene for 2010. Emissions are based on solvent use and type of dry cleaning equipment used at dry cleaning facilities under District permit. Emissions from petroleum solvent were calculated using the solvent density. Perchloroethylene emission factors were derived from the California Air Resources Board Technical Support Document to the state-wide Dry Cleaning Air Toxic Control Measure (ATCM). Because of its toxic effects, the trend has been to reduce the use of perchloroethylene by using petroleum solvent or by converting to other alternative dry cleaning methods. The growth profile is based on total employment projections from SCAG.

Degreasing

This category includes emissions from the use of solvents in degreasing operations (cold cleaning, vapor degreasing and handwipe cleaning) in the manufacturing and maintenance industries. ARB estimated 1993 emissions for this source category based on a 1996 study by E.H. Pechan and Associates, Inc. (Pechan) entitled, Solvent Cleaning/Degreasing Source Category Emission Inventory. To estimate degreasing emissions, Pechan collected activity data by surveying solvent users in two major groups: manufacturing and maintenance.

Emissions were estimated for 32 equipment and solvent pairs using employment in the nine industry groups and three emission variables: an activity factor (AF), which is the net solvent loss per employee accounting for recycled solvent; an emission factor (EF), which is the solvent density; and a user fraction (UF), which is the fraction of employees using a particular equipment/solvent. For the manufacturer's survey, the emission factor for pure solvents is the density of the particular solvent. The emission factor for solvent blends is the density of the solvent multiplied by the total organic gas (TOG) content of the solvent. Exhaust controls were taken into account if used. For the maintenance survey, the emission factors are the density of the solvent with no exhaust controls.

The District revised the Pechan Report methodology for 2010, using 2010 employment data from the U.S Department of Labor Bureau of Labor Statistics database, the three Pechan Report variables, an additional variable to account for spray gun cleaning equipment not subject to District Rule 74.6 "Surface Cleaning and Degreasing" and revised control factors to account for exempt emissions. The growth profile is based on total employment projections from SCAG.

Coatings and Process Solvents

The District updated 2010 ROG emissions in four Coatings & Process Solvent categories: Metal Parts and Products, Wood Furniture Coatings, Thinning and Cleaning Solvent, and Industrial Coatings (unspecified). 2010 national coating and solvent product data from the U.S. Census Bureau publication Current Industrial Reports, Paint & Allied Products: 2010 (July 2011) were allocated to the county level based on the county/national employment ratio using 2010 U.S. Department of Labor Bureau of Labor Statistics employment data. Thinning and clean-up solvent usage was adjusted for solvent usage already accounted for in Architectural Coatings area source categories. The resulting process rates were adjusted by subtracting 2010 point source process rate data. Area source category ROG emissions were determined using the composite emission factors from the corresponding point source emission categories reconciling with each area source category. The composite point source emission factors represent control from applicable district rules. Growth profiles are SCAG industry-specific economic output or total employment projections.

Petroleum Production and Marketing

Oil and Gas Production

The District updated 2010 ROG emissions for three Oil and Gas Production categories: Tertiary Oil Wells, Gas Stripping and Oil Production Fugitive Losses Well Heads.

ROG emissions in the Tertiary Oil Wells category are from thermally enhanced oil recovery (TEOR) steam drive and cyclic steam well casing vents. Emissions are calculated using the number of TEOR wells from the California Department of Conservation Division of Oil, Gas, and Geothermal Resources (DOGGR), 2009 Annual Report of the State Oil & Gas Supervisor, Injection 2009 Table (November 2011) and ROG emission factors developed by Radian Corporation in Assessment of VOC Emissions from Well Vents Associated with Thermally Enhanced Oil Recovery Report No. EPA 909/9-81-003 (September 1981). The controlled ROG emission factor assumes 90% control from vapor recovery systems.

Gas Stripping ROG emissions are from gas plant valves and fittings. Emissions are calculated using the annual million cubic feet of gas processed obtained from the DOGGR 2010 Annual Report of the State Oil & Gas Supervisor, Oil and Gas Production by County Table (January 2012) and fugitive gas emission factors developed in a study conducted by KVB entitled Emission Characteristics of Crude Oil Production Operations in California - Final Report No. KVB72 5810-1309 (January 1983). The controlled emission factor assumes 80%

control from District Rule 74.10 "Components at Crude Oil and Natural Gas Production and Processing Facilities."

Oil Production Fugitive Losses Well Heads ROG emissions are from oil production well head maintenance. Well head maintenance refers to opening a producing well to replace or repair rod pumps, sucker rods or tubing, or to perform other well servicing operations, allowing the pressurized gas to escape or vent to the atmosphere. The 2010 methodology was revised to incorporate assumptions in ARB's, 2007 Oil & Gas Industry Survey Results Draft Report released in August 2011. Emissions per maintenance event are estimated by determining the volume of well gas released during maintenance operations, which depends on well depth, casing diameter, tubing diameter, well gas pressure and gas temperature. Total annual emissions are determined from emissions per maintenance event, the number of operating wells obtained from the DOGGR 2010 Annual Report of the State Oil & Gas Supervisor, January 2012 and well maintenance operations per year from the 2007 ARB Oil & Gas Industry Survey.

The growth profile for the three categories is based on the SCAG industry-specific economic output for oil & gas extraction.

ARB staff updated the statewide emissions inventory for oil and natural gas production, which included the revision of emissions estimates and the addition of emission categories that previously were not estimated. For Ventura County, these categories included fugitive emissions from mud degassing (the practice of extracting entrained gas from drilling mud once it is outside the wellbore and venting the gas to the atmosphere), and pneumatic devices powered by high pressure produced gas for Ventura County. Emissions were calculated with a software tool developed by EPA that generates county-level emissions for upstream oil and gas activity.

This tool uses 2011 as the base year, with activity data taken from DOGGR and an industry database, and default emission factors provided in an associated report. Staff incorporated data from ARB's 2007 Oil and Gas Industry Survey (e.g., typical component counts) and feedback from individual air districts (e.g., minimum controls required to operate in a certain district, with associated control factors) to improve these parameters and further adjust the tool's output. Emissions estimates for 2012 and other years were forecasted using the historical trend in statewide oil production from DOGGR, which assumes a 2.2 percent annual decline.

Gasoline Dispensing Facilities/Bulk Plants

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: http://www.arb.ca.gov/vapor/gdf-emisfactor/gdf-emisfactor.htm.

The District estimated 2012 ROG emissions from gasoline bulk loading facilities not captured in the point source inventory, including aviation gasoline bulk plants located at airports. Emissions are associated with tank breathing and working loss. Working loss emissions are a composite of several processes associated with loading/unloading gasoline into or from the storage tanks. All facilities have Phase I controls only. Throughput and emission factors were obtained from the District permits for the facilities. The growth profile for GDFs and Bulk Plants is based on projections of gasoline consumption from ARB's EMFAC model.

LPG Transfer and Dispensing Losses

The District developed a new emission estimation methodology for fugitive ROG emissions from transfer and dispensing of liquefied petroleum gas (LPG) for 2012, based on the South Coast Air Quality Management District emission estimation methodology described in Final Staff Report for Proposed Rule 1177 'Liquefied Petroleum Gas Transfer and Dispensing' Appendix B 'Emission Inventory Calculations' (June 2012). LPG fugitive ROG emissions result from (1) venting of LPG through fixed liquid level gauges (FLLG) used as overfill safety devices on pressurized receiving containers, tanks and cylinders and (2) volatilization of entrapped LPG when transfer lines are disconnected.

FLLG venting emissions depend on the number of filling events, container filling time and whether gravity or pump assisted pressure filling is used to fill the receiving containers. Disconnect emissions depend on the number of disconnect events and the entrapment volume for a connector type. The number of container filling and disconnect events depends on annual LPG usage and average tank fill volume. LPG usage was estimated for seven different end-use sectors: residential, commercial, sales to retail, internal combustion engines, industrial, agricultural and chemical. Statewide LPG sales by market/end-use sector for 2009 from the American Petroleum Institute were allocated to Ventura County using allocation surrogates specific to each market sector. Each end-use sector has particular container configurations, fill times, fill volumes and product transfer methods which are used to derive FLLG and connector emission factors in pounds ROG/thousand gallons LPG. The growth profile for this category is based on industry-specific employment projections developed by ARB/REMI.

Industrial Processes

Industrial Lubricants

The District developed a new emission estimation methodology for estimating ROG emissions from industrial lubricants for 2012, based on South Coast Air Quality Management District's emission estimation methodology described in Final Staff Report for Proposed Amended Rule 1144 'Metalworking Fluids and Direct-Contact Lubricants' (May 2010). ROG emissions result from metalworking fluids and direct-contact lubricants such as vanishing oils, lubricants and rust

inhibitors used during metalworking and/or metal forming operations in four industrial sectors: petroleum and coal products manufacturing, fabricated metal product manufacturing, machinery manufacturing and transportation equipment manufacturing. The Rule 1144 Staff Report contains an estimate of the baseline metalworking fluids emissions inventory based on a 2006 survey of local manufacturers, distributors and end-users of metalworking fluids and direct-contact lubricants.

Baseline emissions were calculated for individual metalworking fluid types using volume of fluid used (thousand gallons) and sales-weighted average ROC content. The quantity of metalworking fluids and direct contact lubricants in 2006 is assumed to be related to employment in the four industrial sectors. South Coast Air Quality Management District metalworking fluid use was projected to 2011 using the ratio of 2011 to 2006 U.S. Census Bureau County Business Patterns (CBP) employment in the four industrial sectors. Then the ratio of 2011 employment in the four sectors between Ventura County and South Coast Air Quality Management District was used to estimate 2011 industrial lubricant use for Ventura County, which was then projected to 2012 using growth in the four industrial sectors from 2011 to 2012. ROG emissions for 2012 were determined using volume of industrial lubricant usage and the average emission factor for all four industrial sectors from the South Coast Air Quality Management District Staff Report. The growth profile is based on total employment projections from SCAG.

Areawide Sources

Areawide sources are categories such as consumer products, fireplaces, and agricultural burning for which emissions occur over a wide geographic area, shown in Table A-3. Areawide source emissions are comprised entirely of area source categories. Emissions for these categories are estimated by both ARB and the local air districts using various models and methodologies.

Table A-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

A summary of the areawide methodologies is presented below.

Solvent Evaporation

Consumer Products

The consumer products category reflects the three most recent surveys conducted by ARB staff for the years 2003, 2006, and 2008. Together these surveys collected updated product 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 growth trend for most consumer product subcategories is based on the latest California Department of Finance (DOF) population growth projections, 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: http://www.arb.ca.gov/consprod/survey/survey.htm.

Architectural Coatings

The architectural coatings category reflects emissions estimates based on the comprehensive survey for the 2004 calendar year. The emissions estimates include benefits of the 2003 and 2007 ARB Suggested Control Measures for Architectural Coatings. These emissions are grown based on the growth in housing units. Additional information about ARB's architectural coatings program is available at: http://www.arb.ca.gov/coatings/arch/arch.htm.

Pesticides

The Department of Pesticide Regulation (DPR) develops month-specific emissions 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 2012 calendar year. Emissions forecasts for years 2013 and beyond are based on the average of the most recent five years.

Asphalt Paving/Roofing

Asphalt paving and roofing emissions were grown from a 1995 estimate developed by the District. ROG emissions are estimated based on tons of asphalt applied in the county and a default emission factor for each type of asphalt operation from an ARB area source methodology document Methods for Assessing Area Source Emissions in California (December 1982). The growth profile for both categories is based on construction employment forecasts from SCAG.

Miscellaneous Processes

Residential Wood Combustion

ARB's residential wood combustion methodology uses fuel consumption data from various surveys, including newer sales data for manufactured logs, and emission factors from EPA's National Emission Inventory. Additional information on this methodology is available at: http://www.arb.ca.gov/ei/areasrc/arbmiscprocresfuelcom.htm.

Residential Natural Gas Combustion

The inventory for residential natural gas combustion emissions reflects estimates provided by the District for 2012. Emissions are estimated based on the natural gas consumed by various residential uses (space heating, water heating, cooking, other). Natural gas usage reported by the gas utilities in 2012 to the California Energy Commission (CEC) was distributed to the end-use sectors using allocation factors from Southern California Gas Company. Emission factors were from EPA AP-42 Section 1.4 "Natural Gas Combustion" (July 1998). The growth profile is based on the housing units forecast from SCAG.

Farming Operations

The livestock emissions estimates reflect animal population data from the U.S. Department of Agriculture's (USDA) 2002 Census of Agriculture and the Ventura County Agriculture Commissioner. The emissions reflect a no-growth assumption based on an analysis of livestock population trends that found no significant growth.

Fires

Emissions from structural and automobile fires were updated for 2010 by the District. Structural fire emissions estimates are based on the number of structural fires, rates of structural and content material loss per fire, average combustible content, and an emission factor per ton of material burned. Automobile fire emissions are based the number of vehicle fires per year and a composite emission factor from EPA's AP-42 Section 2.5 "Open Burning", Table 2.5-1 and Section 2.6 "Automobile Body Incineration", Table 2.6-1 (October 1992). For the 2010 update, the number of structure and automobile fires was obtained from the California Office of the State Fire Marshall, California All Incident Reporting System/National Fire Incident Reporting System (CAIRS/NFIRS) database, December 2011. The growth profile assumes there will be no growth in fire emissions.

Managed Burning and Disposal

The managed burning and disposal category is based on emissions data reported by the District for 2012. Emissions are calculated using crop-specific tons burned, fuel loadings and emission factors. Total 2012 tonnage burned for each agricultural debris and weed abatement crop type was obtained from the County of Ventura, Fire Protection District, Bureau of Planning and Fire Prevention, Activated Burn Permit Program. Total 2012 burn data for each range improvement and forest management crop type were obtained from the County of Ventura, Fire Department Wildland Fire and Aviation Division, and the U.S. Forest Service (USFS) for prescribed burning in the Los Padres National Forest.

ARB's managed burn emission factor table was used for all agricultural burn and prescribed burn crop categories, except for forest management crop categories "chaparral (piles)" and "pine", for which the USFS Fire and Environmental Research Applications (FERA) Team Piled Fuels Biomass and Emissions Calculator and ARB's Emission Estimation System (EES) emission factors were used. The growth profile for agricultural burning and weed abatement is based on

ARB's projection of agricultural harvest acres. A no-growth assumption was used for forest management and range improvement emissions based on analyses of District reported data that don't show a discernible trend.

Commercial Cooking

Commercial cooking emissions estimates were grown from 2002 estimates provided by the District. The original estimates were developed from the number of restaurants and types of cooking equipment data obtained from the County of Ventura, Resource Management Agency. Process rates were derived using the 1999 Pacific Environmental Services (PES) study, A Detailed Survey of Restaurant Operations in the South Coast Air Basin, Final Report. Emissions were calculated using emission factors from the 1997 South Coast Air Quality Management District Staff Report for the Proposed Rule 1138 'Control of Emissions From Restaurant Operations', and EPA Methods for Developing a National Emission Inventory for Commercial Cooking Processes (2003). The growth profile is based on the SCAG total employment forecast.

Stationary and Areawide Source Emissions Forecasting

Emission forecasts for 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 in Table A-4 below. Future year growth factors by growth surrogate activity indicator are shown in Chapter 4, Table 4-1, *Emissions Inventory Forecasts*.

Table A-4
Growth Surrogates for Stationary and Areawide Sources

Source Category	Subcategory	Growth Surrogate
Fuel Combustion		
Electric Utilities	Natural Gas Boilers/ I.C. Turbines	VCAPCD power plant natural gas use
	Others	SCAG total employment
Cogeneration	I.C. Engines	SCAG industry-specific economic output/population projection
	I.C. Turbines	SCAG total employment
Oil and Gas Production (Combustion)	All	SCAG industry-specific economic output
Petroleum Refining (Combustion)	All	SCAG industry-specific economic output

Table A-4 (Cont.)
Growth Surrogates for Stationary and Areawide Sources

Source Category	Subcategory	Growth Surrogate
Manufacturing and Industrial	Boilers	SCAG industry-specific economic output
	I.C. Engines, Turbines	SCAG industry-specific economic output / employment / population projection
	Others	SCAG industry-specific economic output / total employment, SoCAL Gas Company (SCG) 2014 report
Food and Agricultural Processing	Boilers, Engines	SCAG industry-specific economic output
	Ag Irrigation Pumps - Diesel	ARB emission model output
	Ag Irrigation Pumps - Natural Gas	ARB/Pechan irrigation pumps, natural gas
	Others	ARB harvested acreage
Service and Commercial	Boilers - natural gas	SCAG industry-specific economic output or employment / total employment/ population projection, ARB/REMI federal military employment, VCAPCD power plant natural gas use
	Boilers – landfill, biogas	SCAG population projection, VCAPCD landfills 2% annual growth projection
	I.C. Engines, Turbines	SCAG industry-specific economic output or employment / total employment / population projection, ARB/REMI federal military employment, VCAPCD power plant natural gas use, VCAPCD landfills 2% annual growth projection
	Others	SCAG industry-specific economic output / total employment, SCG 2014 report
Other (Fuel Combustion)	I.C. Reciprocating Engines - Diesel	ARB emission model output

Table A-4 (Cont.)
Growth Surrogates for Stationary and Areawide Sources

Source Category	Subcategory	Growth Surrogate
Waste Disposal		
Sewage Treatment	Sewage Treatment Plants	SCAG industry-specific economic output
	Flares	SCAG population projection
Landfills	All	VCAPCD landfills 2% annual growth projection
Incinerators	Incineration	SCAG total employment
	Flares	SCAG industry-specific economic output
Other (Waste Disposal)	All	SCAG population projection
Cleaning and Surface Coatings		
Laundering	All	SCAG total employment
Degreasing	Cold Cleaning	SCAG industry-specific economic output / total employment, ARB/REMI federal military employment
	Vapor Degreasing	SCAG industry-specific economic output / total employment
	Hand-wiping	SCAG total employment
Coatings and Related Process Solvents	All	SCAG industry-specific economic output or employment / total employment / population projection, ARB/REMI federal military employment
Printing	All	SCAG industry-specific economic output / employment
Adhesives and Sealants	Area Sources	SCAG total employment
	Point Sources	SCAG industry-specific economic output, ARB/REMI federal military employment
Other (Cleaning and Surface Coatings)	All	SCAG total employment / population projection
Petroleum Production and Marketing		
Oil and Gas Production	All	SCAG industry-specific economic output

Table A-4 (Cont.)
Growth Surrogates for Stationary and Areawide Sources

Source Category	Subcategory	Growth Surrogate
Petroleum Marketing	Area Source Fuel Dispensing, Vehicle Refueling, Bulk Plants, Cargo Tanks - Gasoline	ARB EMFAC model gasoline projection
	Point Source Fuel Dispensing, Vehicle Refueling, Bulk Plants, Tank Cars and Trucks	ARB EMFAC model gasoline projection, SCAG industry-specific economic output, ARB/REMI federal military employment, VCAPCD power plant natural gas use, VCAPCD landfills 2% annual growth projection, VCAPCD civilian airport FAA terminal area forecast
	Point Source Storage Tanks – Crude Oil, Gasoline	ARB EMFAC model gasoline projection, SCAG industry-specific economic output, ARB/REMI federal military employment, VCAPCD power plant natural gas use, VCAPCD landfills 2% annual growth projection
	Natural Gas Transmission	SCAG industry-specific economic output / population projection
	LPG Transfer and Dispensing	ARB/REMI industry-specific employment
Industrial Processes		
Chemical	All	SCAG industry-specific economic output
Food and Agriculture	All	SCAG industry-specific economic output, ARB/Pechan Food & Agriculture industry projections
Mineral Processes	All	SCAG industry-specific economic output
Metal Processes	All	SCAG industry-specific economic output
Wood and Paper	All	SCAG industry-specific economic output
Electronics	All	SCAG industry-specific economic output / employment

Table A-4 (Cont.)
Growth Surrogates for Stationary and Areawide Sources

Source Category	Subcategory	Growth Surrogate
Other (Industrial Processes)	All	SCAG industry-specific employment / total employment / population projection
Solvent Evaporation		
Consumer Products	Consumer Products	SCAG population projection
	Aerosol Coatings	No growth
Architectural Coatings and Related Process Solvents	All	SCAG households projection
Pesticides/Fertilizers	Agricultural Pesticides/Fertilizer	ARB harvested acreage
	Structural Pesticides	ARB housing expenditure
Asphalt Paving / Roofing	All	SCAG industry-specific employment
Miscellaneous Processes		
Residential Fuel Combustion	Natural Gas	SCG 2014 report
	Other Fuels	SCAG households projection
Farming Operations	Livestock	No growth
Fires	All	VCPACD no growth assumption
Managed Burning and Disposal	Agricultural Burning & Weed Abatement	ARB harvest acreage
	Others	ARB no growth assumption
Cooking	All	SCAG total employment

Control Profiles

The emissions inventory reflects emissions reductions from stationary and areawide sources subject to District rules. The local rules reflected in the inventory are listed in Table A-5 below. Most of the rules were fully implemented by the 2012 base year.

Table A-5
District Rules Included in the SIP Inventory

Rule No.	Rule Title	Source Categories Impacted
74.11	Natural Gas-Fired Water Heaters	Fuel combustion – Water heaters
74.11.1	Large Water Heaters and Small Boilers	Fuel combustion – Boilers, process heaters, and steam generators
74.12	Surface Coating of Metal Parts and Products	Coatings and related process solvents; degreasing
74.13	Aerospace Assembly and Component Manufacturing Operations	Coatings and related process solvents; degreasing
74.14	Polyester Resin Material Operations	Fiberglass manufacturing
74.15.1	Boilers, Steam Generators and Process Heaters (1 to 5 MMBTUs)	Fuel combustion - Boilers, process heaters, and steam generators
74.18	Motor Vehicle and Mobile Equipment Coating Operations	Coatings and related process solvents
74.19	Graphic Arts	Printing operations
74.2	Architectural Coatings	Architectural coatings
74.20	Adhesives and Sealants	Adhesives and sealants
74.22	Natural Gas-Fired, Fan-Type Central Furnaces	Fuel combustion - Space heating
74.24	Marine Coating Operations	Coatings and related process solvents
74.25	Restaurant Cooking Operations	Cooking
74.29	Soil Decontamination Operations	Industrial processes - other
74.30	Wood Products Coatings	Coatings and related process solvents; degreasing
74.31	Metalworking Fluids and Direct-Contact Lubricants	Other processes - Multi-purpose lubricants
74.33	Liquefied Petroleum Gas Transfer or Dispensing	Petroleum marketing
74.6	Surface Cleaning and Degreasing	Degreasing
74.6.1	Batch Loaded Vapor Degreasers	Degreasing

Mobile Sources

There are two major source categories for mobile sources: On-Road Motor Vehicles and Off-Road Other Mobile Sources.

On-Road Motor Vehicles Mobile Sources

Emissions from on-road mobile sources, which include passenger vehicles, buses and trucks, were estimated using 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 Regional Transportation Plan.

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 California Department of Motor Vehicles 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: http://www.arb.ca.gov/msei/categories.htm#emfac2014.

Off-Road Other Mobile Sources

Emissions from off-road sources were estimated using either a newer 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, ocean-going vessels and others. The sections below summarize the updates made to specific off-road categories.

Oil and Gas Wells: Workover Rigs, Drill Rigs and Support Equipment Allocation

The allocation of drill and work-over rigs and support equipment (such as pumps) for oil and gas wells was updated to reflect the physical location of wells instead of the registration location. The physical location and count of wells was updated using DDOGGR Well Finder data from September, 2013. DOGGR data are available at: http://www.conservation.ca.gov/dog/Pages/Wellfinder.aspx.

Ocean-Going Vessels (OGV)

Staff updated the OGV activity growth rates and NOx emissions calculations in September 2013. These updates reflect more recently available long-term economic forecasts and historical data from 2006 to 2012. ARB staff updated the long-term growth factors for container ships, auto

ships, tankers, and cruise ships. Additional information is available at: http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

Commercial Harbor Craft (CHC)

In 2007, ARB staff developed an updated statewide CHC emissions inventory to support the Regulations to Reduce Emissions from Diesel Engines on Commercial Harbor Craft Operated Within California Waters and 24 Nautical Miles of the California Baseline (Harbor Craft Regulation), adopted by the Air Resources Board November 15, 2007. The Harbor Craft Regulation was amended in 2010 to include additional categories of vessels. Commercial harbor craft include nine vessel types powered by diesel engines, including ferry and excursion vessels, tow boats, tug boats, pilot vessels, work boats, crew and supply vessels, commercial fishing vessels, charter fishing vessels, and other types of vessels.

Vessel population data were collected from various sources, including the U.S. Coast Guard, the California Department of Fish and Game, the ARB Harbor Craft Survey, and the Port of Los Angeles. Vessel and engine profiles, including vessel and engine type, age, size, annual hours of operation and annual fuel use were developed based on ARB's survey. Future year emissions were forecasted based on estimated vessel/engine activity growth and estimated future engine age profiles. Emissions factors accounted for fuel sulfur content and increasing emission rates with engine age and use. Additional information is available at: http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

Cargo Handling Equipment

Cargo Handling Equipment includes port operations/cargo handling equipment operating in association with large commercial vessels such as yard tractors, forklifts, cranes, loaders and other material handling equipment operating at ports and intermodal rail yards. 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. Additional information is available at: http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

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: http://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: http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

Locomotives

In 2014, ARB developed a revised inventory for line-haul locomotive activity in California. The new model is based primarily on activity data reported to ARB by the major rail lines for calendar year 2011. To estimate emissions, ARB used duty cycle, fuel consumption and activity data reported by the rail lines. Activity is forecasted for individual train types and is consistent with ARB's ocean-going vessel and truck growth rates. Fuel efficiency improvements are projected to follow Federal Railroad Association projections and turnover assumptions are consistent with EPA projections. Additional information is available at: http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

Transport Refrigeration Units (TRU)

Transport Refrigeration Units (TRU) are diesel -powered engines used to refrigerate perishable goods in insulated truck and trailer vans, rail cars and domestic shipping containers. The TRU 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: http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

Fuel Storage and Handling

Fuel storage and handling pertains to portable fuel containers used to store and dispense fuel into on-road and off-road mobile sources. Emissions for fuel storage and handling were estimated using the OFFROAD2007 model. Additional information is available at: http://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 2008 survey of thousands of farmers, custom operators and first processors. The survey data, along with information from the 2007 U.S. Department of Agriculture (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 and UC Davis, in cooperation with the San Joaquin Valley agricultural community. Additional information is available at: http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

In addition to the off-road mobile source emission categories estimated by ARB, the District estimates emissions for the following categories.

Civil and Commercial Aircraft

The District used the Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS) model version 5.1.2 and airport-specific aircraft operations and time-in-mode operating profiles based on local airport operational characteristics and the local mixing height to estimate 2008 criteria emissions and fuel consumption by aircraft operating mode for civil and commercial aircraft at civilian airport facilities operating in Ventura County. Civil and commercial aircraft include single and twin engine piston aircraft, turbine engine and jet powered aircraft and helicopters.

Sources of aircraft activity data include the FAA Air Traffic Activity Data System (ATADS) database and a Caltrans noise study in 1997 for the three largest airports and an EPA methodology for estimating aircraft operations at small facilities that do not report operations data to the FAA for one small private civilian airport and 14 heliports (Environmental Protection Agency, Calculating Aviation Gasoline Lead Emissions in the 2008 NEI, (March 2009)). 2008 emissions were projected to 2012 using the ratio of 2012 to 2008 ATADS operations for the two largest airports responsible for over 76% of county-wide aircraft operations and no growth for the other smaller facilities. The District's growth profile is based on the FAA Terminal Area Forecast 2012-2040 for the two largest airports and no growth for the other facilities.

Military Aircraft and Vessels

Emissions are associated with military aircraft operations at the U.S. Navy facility Naval Base Ventura County (NBVC) at Point Mugu on the Ventura County mainland and the facility on San Nicolas Island in the Outer Continental Shelf (OCS) air basin, and with military vessel operations occurring at the U.S. Navy facilities at the Port of Hueneme in Ventura County and large military vessels operating offshore and in the approach corridors to Port Hueneme and San Nicolas Island in the OCS air basin.

NBVC provided 2012 baseline emissions estimates for military aircraft and vessel activities in both the Ventura County attainment area (mainland and three nautical miles offshore) and the OCS air basin 3-100 nautical miles offshore (Revised Final Naval Base Ventura County Mobile Source Emissions 2012 Baseline Emissions and Future Emission Projection for 8-Hour Ozone Sip Planning (October 2013)). Aircraft include transports, piston and jet aircraft, helicopters, and missile launches. Emissions are from landings and takeoffs, touch and go aircraft operations and ground maintenance operations. Military vessels include large military ships, support and operations vessels, tugboats and some non-military vessels utilizing Navy facilities at Port

Hueneme. Emissions occur from main propulsion and auxiliary engines during in-port at-berth and maneuvering operations and underway operations.

NBVC provided future year emissions estimates for military aircraft and vessels from planned projects and an additional 4% annual growth allowance through year 2020 within the Ventura County nonattainment area. The 4% annual growth allowance is intended to account for uncertainties in potential projects resulting from future actions and unknown projects. Beyond 2021 through 2035, emissions in the nonattainment area were assumed to grow at a rate of 4% per year, compounded annually and emissions in the OCS were assumed to grow at a rate of 1% per year, compounded annually.

Mobile Source Forecasting

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

Table A-6
Growth Surrogates for Mobile Sources

Category	Growth Methodology
On-Road Sources	
All	Match total VMT projections provided by Municipal 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	
Commercial Harbor Craft	Growth rates provided by District, except for tugs and fishing vessels. Fishing fleet growth rates were adjusted to reflect a decline in fish landings. Assumed no growth for tugboats.
Construction and Mining	California construction employment data from U.S. Bureau of Labor Statistics
Farm Equipment	2011 study of forecasted growth by URS Corp, with San Joaquin Valley Advisory Committee funding.
Industrial Equipment	California construction employment data from Bureau of Labor Statistics
Oil Drilling	California oil and gas extraction gross domestic product from the U.S. Bureau of Economic analysis, oil company diesel fuel use published by the U.S. Energy Information Administration, California rotary rig counts from Baker Hughes, and California oil and gas extraction employment from the U.S. Bureau of Labor Statistics
Ocean-Going Vessels	Projected commodity tonnage in the Freight Analysis Framework (FAF) Model developed by the Federal Highway Administration
Trains (line haul)	International/premium train growth tied to OGV forecast; Domestic train growth tied truck growth
Transport Refrigeration Units	Projection of historical Truck/Trailer TRU sales from ACT Research, adjusted for recession
District-estimated Categories	
Civil and Commercial Aircraft	FAA Terminal Area Forecast 2012-2040 for the two largest airports and no growth for the other facilities
Military Aircraft and Vessels	Naval Base Ventura County future year emissions estimates from planned projects and additional 1-4% annual growth allowance

Base Year and Forecast Emissions Summaries

Tables A-7 and A-8 contain summaries of 2012 base year and forecast year ROG and NOx planning day emissions by summary category and air basin.

Table A-7
ROG Planning Emissions Forecast by Summary Category and Air Basin

Ventura County	ROG (tons/summer day)					
EIC Summary Category Name	2012	2018	2020	2025	2030	2035
SCC AIR BASIN						
STATIONARY SOURCES						
Fuel Combustion						
Electric Utilities	0.10	0.08	0.09	0.09	0.09	0.09
Cogeneration	0.00	0.00	0.00	0.00	0.00	0.00
Oil And Gas Production (Combustion)	0.03	0.02	0.02	0.02	0.02	0.02
Petroleum Refining (Combustion)	0.00	0.00	0.00	0.00	0.00	0.00
Manufacturing And Industrial	0.02	0.02	0.03	0.03	0.03	0.03
Food And Agricultural Processing	0.03	0.02	0.02	0.02	0.02	0.02
Service And Commercial	0.03	0.03	0.03	0.04	0.04	0.04
Other (Fuel Combustion)	0.01	0.01	0.01	0.01	0.01	0.01
Total Fuel Combustion	**0.22**	**0.20**	**0.20**	**0.20**	**0.20**	**0.21**
Waste Disposal						
Sewage Treatment	0.01	0.01	0.01	0.01	0.01	0.01
Landfills	0.11	0.13	0.13	0.14	0.16	0.17
Incinerators	0.00	0.00	0.00	0.00	0.00	0.00
Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00
Other (Waste Disposal)	0.74	0.78	0.79	0.80	0.82	0.84
Total Waste Disposal	**0.87**	**0.91**	**0.93**	**0.96**	**0.99**	**1.02**
Cleaning And Surface Coatings						
Laundering	0.04	0.05	0.05	0.05	0.05	0.05
Degreasing	1.87	2.05	2.11	2.18	2.25	2.31
Coatings And Related Process Solvents	0.85	1.01	1.06	1.11	1.15	1.19
Printing	0.27	0.35	0.38	0.40	0.42	0.43
Adhesives And Sealants	0.40	0.44	0.45	0.47	0.48	0.50
Other (Cleaning And Surface Coatings)	0.58	0.63	0.65	0.67	0.69	0.71
Total Cleaning And Surface Coatings	**4.01**	**4.52**	**4.70**	**4.88**	**5.04**	**5.20**
Petroleum Production And Marketing						
Oil And Gas Production	1.45	1.23	1.16	1.13	1.08	1.03
Petroleum Refining	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Marketing	1.38	1.06	1.03	0.96	0.92	0.92
Other (Petroleum Production And Marketing)	0.00	0.00	0.00	0.00	0.00	0.00
Total Petroleum Production And Marketing	**2.83**	**2.29**	**2.19**	**2.08**	**2.00**	**1.95**
Industrial Processes						
Chemical	0.07	0.09	0.10	0.11	0.12	0.12
Food And Agriculture	0.01	0.02	0.02	0.02	0.02	0.02
Mineral Processes	0.02	0.02	0.02	0.02	0.02	0.02
Metal Processes	0.01	0.00	0.00	0.00	0.00	0.00
Wood And Paper	0.10	0.13	0.15	0.16	0.16	0.17
Electronics	0.02	0.04	0.04	0.05	0.06	0.07
Other (Industrial Processes)	0.39	0.32	0.32	0.33	0.34	0.35
Total Industrial Processes	**0.62**	**0.61**	**0.65**	**0.69**	**0.72**	**0.76**
TOTAL STATIONARY SOURCES	**8.55**	**8.54**	**8.67**	**8.82**	**8.95**	**9.12**

Table A-7 (Cont.)
ROG Planning Emissions Forecast by Summary Category and Air Basin

Ventura County	ROG (tons/summer day)					
EIC Summary Category Name	2012	2018	2020	2025	2030	2035
AREAWIDE SOURCES						
Solvent Evaporation						
Consumer Products	4.64	4.53	4.59	4.68	4.77	4.87
Architectural Coatings And Related Process Solvents	2.31	2.41	2.45	2.51	2.57	2.62
Pesticides/Fertilizers	3.35	2.39	2.34	2.30	2.25	2.22
Asphalt Paving / Roofing	0.58	0.76	0.82	0.86	0.89	0.93
Total Solvent Evaporation	**10.88**	**10.09**	**10.20**	**10.34**	**10.48**	**10.65**
Miscellaneous Processes						
Residential Fuel Combustion	0.39	0.40	0.41	0.41	0.42	0.43
Farming Operations	0.12	0.12	0.12	0.12	0.12	0.12
Construction And Demolition	0.00	0.00	0.00	0.00	0.00	0.00
Paved Road Dust	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	0.00
Fires	0.01	0.01	0.01	0.01	0.01	0.01
Managed Burning And Disposal	0.14	0.13	0.13	0.13	0.12	0.12
Cooking	0.04	0.05	0.05	0.05	0.05	0.05
Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00
Total Miscellaneous Processes	**0.69**	**0.70**	**0.71**	**0.72**	**0.72**	**0.73**
TOTAL AREAWIDE SOURCES	**11.57**	**10.80**	**10.91**	**11.05**	**11.20**	**11.38**
MOBILE SOURCES						
On-Road Motor Vehicles						
Light Duty Passenger (LDA)	3.54	1.74	1.47	1.09	0.90	0.71
Light Duty Trucks - 1 (LDT1)	0.99	0.50	0.42	0.29	0.20	0.11
Light Duty Trucks - 2 (LDT2)	1.36	0.77	0.64	0.48	0.38	0.28
Medium Duty Trucks (MDV)	1.23	0.89	0.76	0.51	0.39	0.29
Light Heavy Duty Gas Trucks - 1 (LHDV1)	0.29	0.23	0.21	0.16	0.13	0.06
Light Heavy Duty Gas Trucks - 2 (LHDV2)	0.03	0.03	0.02	0.01	0.01	0.01
Medium Heavy Duty Gas Trucks (MHDV)	0.07	0.03	0.03	0.02	0.02	0.02
Heavy Heavy Duty Gas Trucks (HHDV)	0.01	0.00	0.00	0.00	0.00	0.00
Light Heavy Duty Diesel Trucks - 1 (LHDV1)	0.03	0.03	0.03	0.02	0.01	0.01
Light Heavy Duty Diesel Trucks - 2 (LHDV2)	0.01	0.01	0.01	0.00	0.00	0.00
Medium Heavy Duty Diesel Trucks (MHDV)	0.08	0.04	0.03	0.01	0.01	0.01
Heavy Heavy Duty Diesel Trucks (HHDV)	0.16	0.04	0.04	0.03	0.03	0.03
Motorcycles (MCY)	0.67	0.56	0.53	0.48	0.44	0.42
Heavy Duty Diesel Urban Buses (UB)	0.01	0.01	0.01	0.00	0.00	0.00
Heavy Duty Gas Urban Buses (UB)	0.00	0.00	0.00	0.00	0.00	0.00
School Buses - Gas (SBG)	0.01	0.00	0.00	0.00	0.00	0.00
School Buses - Diesel (SBD)	0.00	0.00	0.00	0.00	0.00	0.00
Other Buses - Gas (OBG)	0.01	0.01	0.01	0.01	0.01	0.01
Other Buses - Motor Coach - Diesel (OBC)	0.00	0.00	0.00	0.00	0.00	0.00
All Other Buses - Diesel (OBD)	0.00	0.00	0.00	0.00	0.00	0.00
Motor Homes (MH)	0.02	0.01	0.01	0.00	0.00	0.00
Other (On-Road Motor Vehicles)	0.00	0.50	0.00	0.00	0.00	0.00
Total On-Road Motor Vehicles	**8.54**	**5.40**	**4.21**	**3.13**	**2.53**	**1.96**

Table A-7 (Cont.)
ROG Planning Emissions Forecast by Summary Category and Air Basin

Ventura County	ROG (tons/summer day)					
EIC Summary Category Name	2012	2018	2020	2025	2030	2035
Other Mobile Sources						
Aircraft	0.38	0.87	0.91	1.08	1.30	1.57
Trains	0.01	0.01	0.01	0.01	0.01	0.01
Ocean Going Vessels	0.04	0.04	0.04	0.05	0.05	0.06
Commercial Harbor Craft	0.09	0.09	0.09	0.10	0.10	0.11
Recreational Boats	3.06	2.26	2.04	1.55	1.19	0.99
Off-Road Recreational Vehicles	0.39	0.38	0.37	0.35	0.34	0.34
Off-Road Equipment	3.07	2.50	2.42	2.36	2.37	2.45
Farm Equipment	0.52	0.39	0.35	0.29	0.23	0.20
Fuel Storage And Handling	0.58	0.43	0.40	0.35	0.32	0.22
Total Other Mobile Sources	**8.14**	**6.97**	**6.63**	**6.12**	**5.91**	**5.94**
TOTAL MOBILE SOURCES	**16.68**	**12.37**	**10.84**	**9.25**	**8.44**	**7.91**
TOTAL SCC AIR BASIN	**36.81**	**31.70**	**30.42**	**29.12**	**28.59**	**28.41**
ERC Balance	**----**	**1.72**	**1.72**	**1.72**	**1.72**	**1.72**
TOTAL SCC AIR BASIN	**36.81**	**33.42**	**32.14**	**30.84**	**30.31**	**30.13**
OCS AIR BASIN						
STATIONARY SOURCES						
Fuel Combustion						
Cogeneration	0.00	0.00	0.00	0.00	0.00	0.00
Oil And Gas Production (Combustion)	0.01	0.01	0.00	0.00	0.00	0.00
Service And Commercial	0.02	0.02	0.02	0.02	0.02	0.02
Total Fuel Combustion	**0.03**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**
Waste Disposal						
Incinerators	0.00	0.00	0.00	0.00	0.00	0.00
Total Waste Disposal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Cleaning And Surface Coatings						
Coatings And Related Process Solvents	0.00	0.00	0.00	0.00	0.00	0.00
Total Cleaning And Surface Coatings	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Petroleum Production And Marketing						
Oil And Gas Production	0.04	0.04	0.04	0.03	0.04	0.04
Petroleum Marketing	0.00	0.00	0.00	0.00	0.00	0.00
Total Petroleum Production And Marketing	**0.04**	**0.04**	**0.04**	**0.03**	**0.04**	**0.04**
TOTAL STATIONARY SOURCES	**0.07**	**0.07**	**0.06**	**0.06**	**0.06**	**0.06**
MOBILE SOURCES						
Other Mobile Sources						
Aircraft	0.05	0.14	0.14	0.14	0.15	0.16
Ships And Commercial Boats	0.02	0.02	0.02	0.02	0.02	0.02
Ocean Going Vessels	0.57	0.79	0.86	1.10	1.37	1.60
Commercial Harbor Craft	0.25	0.28	0.28	0.29	0.29	0.29
Total Other Mobile Sources	**0.89**	**1.23**	**1.30**	**1.55**	**1.83**	**2.07**
TOTAL MOBILE SOURCES	**0.89**	**1.23**	**1.30**	**1.55**	**1.83**	**2.07**
TOTAL OCS AIR BASIN	**0.96**	**1.30**	**1.37**	**1.61**	**1.89**	**2.14**
TOTAL VENTURA COUNTY	**37.76**	**34.72**	**33.50**	**32.44**	**32.21**	**32.27**

Notes:
Source: CEPAM v1.04 (June 2016).
Includes +0.5 tpd adjustment to On-Road Vehicles 2018 ROG for transportation conformity safety margin.
Data rounding may affect totals.

Table A-8
NOx Planning Emissions Forecast by Summary Category and Air Basin

Ventura County	NOx (tons/summer day)					
EIC Summary Category Name	**2012**	**2018**	**2020**	**2025**	**2030**	**2035**
SCC AIR BASIN						
STATIONARY SOURCES						
Fuel Combustion						
Electric Utilities	0.48	0.46	0.47	0.49	0.50	0.51
Cogeneration	0.00	0.00	0.00	0.00	0.00	0.00
Oil And Gas Production (Combustion)	0.13	0.11	0.10	0.10	0.09	0.09
Petroleum Refining (Combustion)	0.00	0.00	0.00	0.00	0.00	0.00
Manufacturing And Industrial	0.27	0.32	0.34	0.35	0.36	0.37
Food And Agricultural Processing	0.47	0.31	0.30	0.27	0.24	0.22
Service And Commercial	0.32	0.31	0.31	0.32	0.33	0.34
Other (Fuel Combustion)	0.21	0.17	0.14	0.14	0.14	0.14
Total Fuel Combustion	**1.89**	**1.68**	**1.67**	**1.66**	**1.66**	**1.68**
Waste Disposal						
Sewage Treatment	0.01	0.01	0.01	0.01	0.01	0.01
Landfills	0.09	0.10	0.11	0.11	0.12	0.13
Incinerators	0.00	0.00	0.00	0.00	0.00	0.00
Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00
Other (Waste Disposal)	0.00	0.00	0.00	0.00	0.00	0.00
Total Waste Disposal	**0.10**	**0.11**	**0.12**	**0.12**	**0.13**	**0.14**
Cleaning And Surface Coatings						
Laundering	0.00	0.00	0.00	0.00	0.00	0.00
Degreasing	0.00	0.00	0.00	0.00	0.00	0.00
Coatings And Related Process Solvents	0.00	0.00	0.00	0.00	0.00	0.00
Printing	0.00	0.00	0.00	0.00	0.00	0.00
Adhesives And Sealants	0.00	0.00	0.00	0.00	0.00	0.00
Other (Cleaning And Surface Coatings)	0.00	0.00	0.00	0.00	0.00	0.00
Total Cleaning And Surface Coatings	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Petroleum Production And Marketing						
Oil And Gas Production	0.04	0.03	0.03	0.03	0.03	0.03
Petroleum Refining	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Marketing	0.00	0.00	0.00	0.00	0.00	0.00
Other (Petroleum Production And Marketing)	0.00	0.00	0.00	0.00	0.00	0.00
Total Petroleum Production And Marketing	**0.04**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**
Industrial Processes						
Chemical	0.00	0.00	0.00	0.00	0.00	0.00
Food And Agriculture	0.00	0.00	0.00	0.00	0.00	0.00
Mineral Processes	0.00	0.00	0.00	0.00	0.00	0.00
Metal Processes	0.00	0.00	0.00	0.00	0.00	0.00
Wood And Paper	0.00	0.00	0.00	0.00	0.00	0.00
Electronics	0.00	0.00	0.00	0.00	0.00	0.00
Other (Industrial Processes)	0.06	0.06	0.06	0.06	0.06	0.06
Total Industrial Processes	**0.06**	**0.06**	**0.06**	**0.06**	**0.07**	**0.07**
TOTAL STATIONARY SOURCES	**2.08**	**1.89**	**1.87**	**1.88**	**1.89**	**1.92**

Table A-8 (Cont.)
NOx Planning Emissions Forecast by Summary Category and Air Basin

Ventura County	NOx (tons/summer day)					
EIC Summary Category Name	2012	2018	2020	2025	2030	2035
AREAWIDE SOURCES						
Solvent Evaporation						
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coatings And Related Process Solvents	0.00	0.00	0.00	0.00	0.00	0.00
Pesticides/Fertilizers	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paving / Roofing	0.00	0.00	0.00	0.00	0.00	0.00
Total Solvent Evaporation	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Miscellaneous Processes						
Residential Fuel Combustion	0.86	0.59	0.54	0.54	0.54	0.55
Farming Operations	0.00	0.00	0.00	0.00	0.00	0.00
Construction And Demolition	0.00	0.00	0.00	0.00	0.00	0.00
Paved Road Dust	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	0.00
Fires	0.01	0.01	0.01	0.01	0.01	0.01
Managed Burning And Disposal	0.08	0.08	0.08	0.08	0.07	0.07
Cooking	0.00	0.00	0.00	0.00	0.00	0.00
Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00
Total Miscellaneous Processes	**0.95**	**0.68**	**0.62**	**0.62**	**0.62**	**0.62**
TOTAL AREAWIDE SOURCES	**0.95**	**0.68**	**0.62**	**0.62**	**0.62**	**0.62**
MOBILE SOURCES						
On-Road Motor Vehicles						
Light Duty Passenger (LDA)	2.22	1.11	0.90	0.57	0.41	0.30
Light Duty Trucks - 1 (LDT1)	0.54	0.23	0.18	0.10	0.06	0.03
Light Duty Trucks - 2 (LDT2)	1.38	0.60	0.45	0.26	0.18	0.13
Medium Duty Trucks (MDV)	1.54	0.79	0.60	0.29	0.17	0.12
Light Heavy Duty Gas Trucks - 1 (LHDV1)	0.39	0.27	0.24	0.17	0.11	0.08
Light Heavy Duty Gas Trucks - 2 (LHDV2)	0.05	0.04	0.04	0.03	0.02	0.02
Medium Heavy Duty Gas Trucks (MHDV)	0.10	0.06	0.05	0.03	0.03	0.02
Heavy Heavy Duty Gas Trucks (HHDV)	0.02	0.01	0.01	0.01	0.02	0.02
Light Heavy Duty Diesel Trucks - 1 (LHDV1)	1.24	0.92	0.79	0.50	0.30	0.17
Light Heavy Duty Diesel Trucks - 2 (LHDV2)	0.36	0.23	0.19	0.10	0.04	0.02
Medium Heavy Duty Diesel Trucks (MHDV)	1.52	0.98	0.71	0.42	0.49	0.52
Heavy Heavy Duty Diesel Trucks (HHDV)	2.69	1.62	1.48	0.76	0.74	0.73
Motorcycles (MCY)	0.13	0.11	0.11	0.10	0.10	0.10
Heavy Duty Diesel Urban Buses (UB)	0.16	0.11	0.09	0.06	0.03	0.02
Heavy Duty Gas Urban Buses (UB)	0.01	0.01	0.01	0.01	0.01	0.01
School Buses - Gas (SBG)	0.01	0.00	0.00	0.00	0.00	0.00
School Buses - Diesel (SBD)	0.06	0.05	0.05	0.03	0.02	0.01
Other Buses - Gas (OBG)	0.02	0.02	0.01	0.01	0.01	0.01
Other Buses - Motor Coach - Diesel (OBC)	0.02	0.01	0.01	0.00	0.01	0.00
All Other Buses - Diesel (OBD)	0.04	0.02	0.02	0.01	0.01	0.01
Motor Homes (MH)	0.12	0.08	0.06	0.04	0.02	0.01
Other (On-Road Motor Vehicles)	0.00	0.00	0.00	0.00	0.00	0.00
Total On-Road Motor Vehicles	**12.62**	**7.29**	**6.01**	**3.50**	**2.76**	**2.33**

Table A-8 (Cont.)
NOx Planning Emissions Forecast by Summary Category and Air Basin

Ventura County	NOx (tons/summer day)					
EIC Summary Category Name	2012	2018	2020	2025	2030	2035
Other Mobile Sources						
Aircraft	0.20	0.46	0.48	0.57	0.69	0.84
Trains	0.16	0.17	0.17	0.16	0.16	0.15
Ocean Going Vessels	0.84	0.86	0.84	0.90	0.99	1.07
Commercial Harbor Craft	0.98	0.73	0.72	0.72	0.75	0.78
Recreational Boats	0.56	0.48	0.46	0.42	0.39	0.37
Off-Road Recreational Vehicles	0.01	0.01	0.01	0.02	0.02	0.02
Off-Road Equipment	3.43	2.89	2.66	2.03	1.74	1.66
Farm Equipment	2.60	2.09	1.90	1.44	1.10	0.85
Fuel Storage And Handling	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources	**8.78**	**7.69**	**7.25**	**6.27**	**5.83**	**5.74**
TOTAL MOBILE SOURCES	**21.41**	**14.98**	**13.26**	**9.77**	**8.59**	**8.07**
TOTAL SCC AIR BASIN	**24.44**	**17.54**	**15.75**	**12.27**	**11.11**	**10.61**
ERC Balance	**----**	**0.82**	**0.82**	**0.82**	**0.82**	**0.82**
TOTAL SCC AIR BASIN	**24.44**	**18.36**	**16.57**	**13.09**	**11.93**	**11.43**
OCS AIR BASIN						
STATIONARY SOURCES						
Fuel Combustion						
Cogeneration	0.00	0.00	0.00	0.00	0.00	0.00
Oil And Gas Production (Combustion)	0.03	0.03	0.03	0.02	0.03	0.03
Service And Commercial	0.32	0.27	0.27	0.27	0.27	0.27
Total Fuel Combustion	**0.35**	**0.30**	**0.30**	**0.29**	**0.30**	**0.29**
Waste Disposal						
Incinerators	0.00	0.00	0.00	0.00	0.00	0.00
Total Waste Disposal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Cleaning And Surface Coatings						
Coatings And Related Process Solvents	0.00	0.00	0.00	0.00	0.00	0.00
Total Cleaning And Surface Coatings	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Petroleum Production And Marketing						
Oil And Gas Production	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum Marketing	0.00	0.00	0.00	0.00	0.00	0.00
Total Petroleum Production And Marketing	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
TOTAL STATIONARY SOURCES	**0.35**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**
MOBILE SOURCES						
Other Mobile Sources						
Aircraft	0.02	0.07	0.07	0.07	0.08	0.08
Ships And Commercial Boats	0.07	0.07	0.07	0.06	0.06	0.06
Ocean Going Vessels	13.21	13.89	12.54	10.60	9.82	9.63
Commercial Harbor Craft	2.46	2.53	2.51	2.45	2.44	2.42
Total Other Mobile Sources	**15.76**	**16.56**	**15.19**	**13.18**	**12.40**	**12.20**
TOTAL MOBILE SOURCES	**15.76**	**16.56**	**15.19**	**13.18**	**12.40**	**12.20**
TOTAL OCS AIR BASIN	**16.11**	**16.86**	**15.49**	**13.48**	**12.70**	**12.50**
TOTAL VENTURA COUNTY	**40.55**	**35.23**	**32.06**	**26.57**	**24.62**	**23.93**

Notes:
Source: CEPAM v1.04 (June 2016).
No external ARB Adjustments.
Data rounding may affect totals.

APPENDIX B

VENTURA COUNTY

TRANSPORTATION CONTROL MEASURE COMMITMENTS

Introduction

Transportation Control Measures (TCMs) are projects that reduce air pollutants from transportation sources by reducing vehicle use, traffic congestion, or vehicle miles traveled. TCM projects may be voluntary, incentive-based, market-based, or regulatory programs. Projects that use technology to reduce emissions, such as innovations in fuel technologies or low-emission vehicles, are not considered TCMs. Projects to enhance roadway capacity are also not typically TCMs. Project categories listed in Table 3-5 of the 2016 AQMP show examples of measures that are considered TCMs.

The federal Transportation Conformity regulation is a process designed to ensure timely implementation of TCMs, thus reinforcing the link between air quality and transportation planning. The Southern California Association of Governments (SCAG) is responsible for identifying TCM projects in Ventura County and assuring their timely implementation and completion as prescribed in the conformity regulation. Projects identified as TCMs become committed when:

1) EPA approves the AQMP as part of the State Implementation Plan (SIP).
2) Projects are financially committed for right-of-way or construction in the first two years of the Federal Transportation Improvement Program (FTIP).
3) The FTIP is approved by SCAG, the California Department of Transportation, and the Federal Highway Administration.

The SCAG FTIP Guidelines provide extensive information about TCMs and TCM commitments.

This appendix includes the current projects identified by SCAG and the District as the committed TCMs and thus, subject to the timely implementation requirement of transportation conformity. The process for tracking the implementation and completion of these committed TCMs begins with the Ventura County Transportation Commission (VCTC) and its required reporting of all ongoing transportation projects in Ventura County.

If a project sponsor or the VCTC identifies a committed TCM that cannot be completed or must be significantly delayed, then a substitution process is used to substitute a new TCM or enhance other committed TCMs to make up for the emissions reduction shortfall. The SCAG Transportation Conformity Working Group is the interagency consultation committee for all regional conformity discussion and guidance, including issues involving TCMs.

TCMs are programmed and updated through the FTIP process. The FTIP is updated by SCAG every two years. All uncompleted TCM projects roll forward and the enforceable commitments are automatically revised without the need for a SIP revision. The completed TCMs are reported as complete and removed from subsequent FTIP updates. New committed TCMs are added to the

FTIP, along with the "rollover" committed TCMs, for future timely implementation reports in subsequent FTIP updates.

Table B-1
Ventura County Transportation Control Measure Commitments

Lead Agency	Project ID	Description	2017 FTIP Completion Date
Camarillo	VEN040502	Santa Rosa Road from Upland Road to Woodcreek Road widen from two to four lanes and add bike lanes	2016
Gold Coast Transit	VEN151101	Purchase five buses for expansion	2018
Oxnard	VEN130101	In the northeast community of the City of Oxnard, northeast of Oxnard Transportation Center, install 1.9 miles Class II bike lanes, 6.3 miles Class III bike lanes and improvements to 3.69 miles of existing bike lanes	2016
Oxnard	VEN130102	On C Street from Vineyard Ave to Channel Islands Blvd, construct 4.9 miles of Class II bike lanes, construct Class III bike lanes on Guava St/Hemlock Ave and along Hill St.	2016
Oxnard	VEN150907	Oxnard Blvd bicycle & pedestrian facilities from 101 freeway to Gonzales Road approximately 14,800 feet	2017
San Buenaventura	VEN140804	In San Buenaventura, construct sidewalk and Class II and III bike lanes on Cedar St between Prospect and Poli St (0.3 miles), various sidewalk and curb improvements on Ventura Ave between Kellogg St and Shoshone St (0.9 miles), flashing beacons to be installed on Ventura Ave, existing beacons to be updated	2018
Santa Paula	VEN111102	Santa Paula Bike Trail improvements including bike/pedestrian improvements at 16 adjacent intersections and construction of one rest area shade structure, $127,000 toll credits in prior year for construction	2016
Santa Paula	VEN140806	In Santa Paula on 10th St (SR 150) construct new Class II bike lane between SR 126 and Santa Paula St (1.2 miles), repair sidewalks, enhance crosswalks, add bike amenities, add benches and add landscaping	2016
Simi Valley	VEN120417	West Los Angeles Ave in Simi Valley, widen 10 feet to add bike lanes and sidewalk from the public services center to west city limit (1 mile), CMAQ includes toll credits of $15,000 in prior year for PE, and $406,000 in 15/16 for construction	2016

Lead Agency	Project ID	Description	2017 FTIP Completion Date
Simi Valley	VEN140805	In Simi Valley, Arroyo Simi Greenway Bike Trail Phase 3, pave Class I bike trail on south side of Arroyo Simi from Madera Rd to First St (0.9 miles), includes landscaping along Fifth St Trail and pedestrian/bike bridge over Arroyo Simi near Fifth St.	2017

Table B-1 (Cont.)
Ventura County Transportation Control Measure Commitments

Lead Agency	Project ID	Description	2017 FTIP Completion Date
Ventura County	VEN150615	Near Point Mugu, add Class II bike lanes on both sides of Las Posas Rd between Laguna Road and State Route 1 to eliminate a gap (4.4 miles)	2017
Ventura County	VEN150617	Near Oak View between Ventura and Ojai, widen Santa Ana Rd to provide Class II and III bike lanes on both sides of the road (1.8 miles) between milepost 2.0 (S/O Santa Ana Blvd) and milepost 3.8 (N/O Santa Ana Blvd)	2017
Ventura County Transportation Commission	VEN040405	Automatic vehicle locator system upgrade for real-time bus stop signage (associated transit improvement)	2018
Ventura County Transportation Commission	VEN121002	Fare collection and ridership monitoring equipment and maintenance	2018
Ventura County Transportation Commission	VEN93017	Regional rideshare program for 14/15, 15/16, 16/17, and 17/18	2019

Source: *Adopted 2017 Federal Transportation Improvement Program*, Southern California Association of Governments.

APPENDIX C

KEY ARB MOBILE SOURCE REGULATIONS AND PROGRAMS

Prepared for

Ventura County Air Pollution Control District
Ventura, California

By

California Air Resources Board
Planning and Technical Support Division
Sacramento, California

Overview

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.

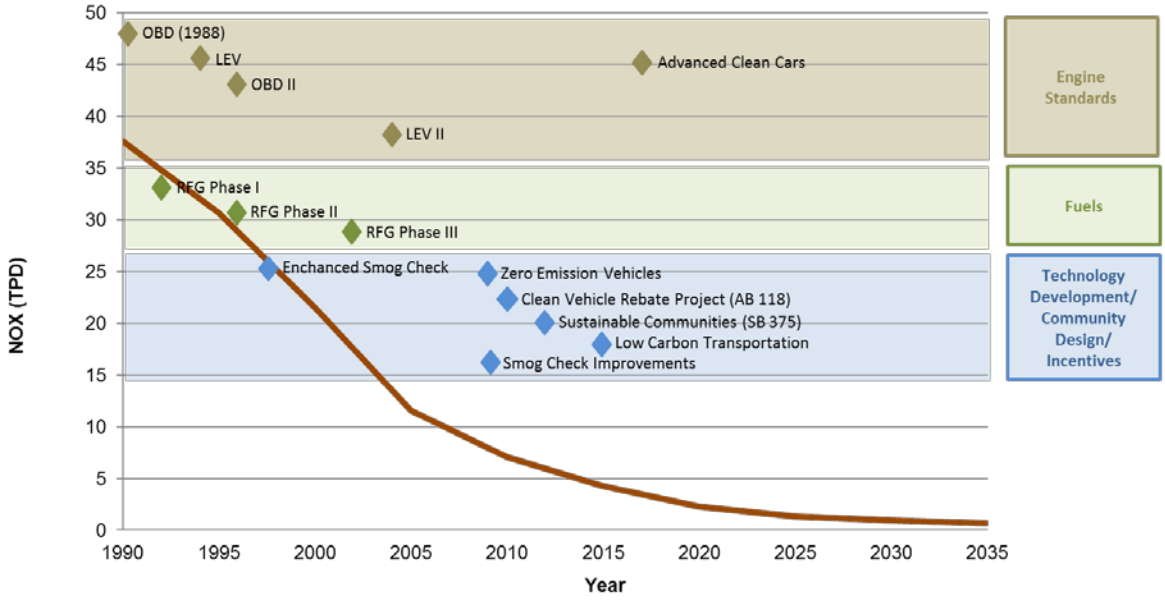
Further, ARB and Ventura County district staff work closely on identifying and distributing incentive funds to accelerate cleanup of engines. Key incentive programs include: the Carl Moyer Program; the Goods Movement Program; the Lower-Emission School Bus Program; and

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 Ventura County have been reduced significantly since 1990 and will continue to drop through 2020 due to the benefits of ARB's longstanding light-duty mobile source program. From today's levels, light-duty vehicle NOx emissions will be reduced 45 percent by 2020. Key light-duty programs include Advanced Clean Cars, On-Board Diagnostics, Reformulated Gasoline, Incentive Programs, and the Enhanced Smog Check Program.

Figure C-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 vehicles 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:

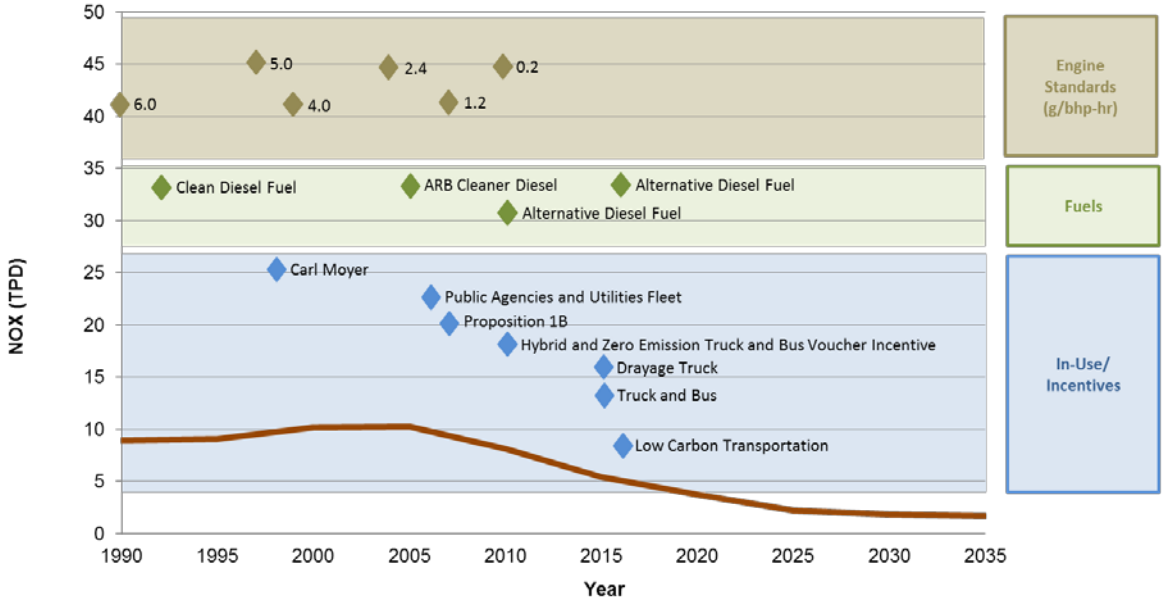
- Low pressure evaporative test;
- More stringent pass/fail cutpoints;
- Visible smoke test; and
- Inspection of light- and medium-duty diesel vehicles.

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 talking 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 NOx emissions from heavy-duty vehicles and key programs contributing to those reductions. As a result of these efforts, heavy-duty vehicle emissions in the Ventura County have been reduced significantly since 1990 and will continue to drop through 2020 due to the benefits of ARB's longstanding heavy-duty mobile source program. From today's levels, heavy-duty NOx emissions will be reduced 30 percent by 2020. Key programs include Heavy-Duty Engine Standards, Clean Diesel Fuel, Truck and Bus Regulation and Incentive Programs.

Figure C-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.

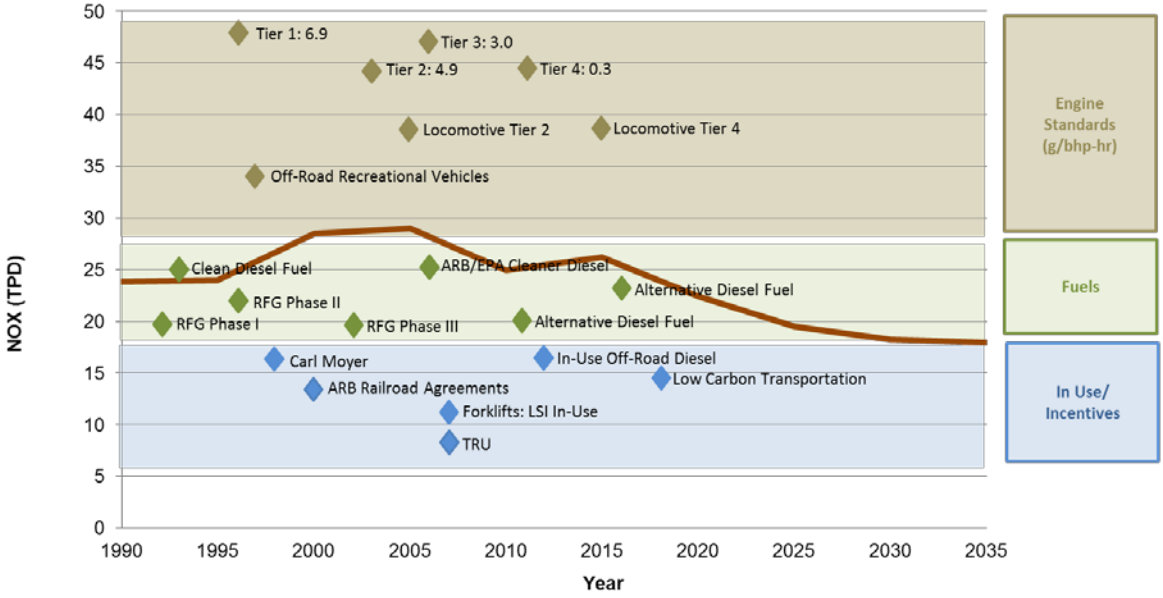
The Air Quality Improvement Program has funded the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) since 2010, and continued Ventura County participation is expected. ARB has also administered a Truck Loan Assistance Program since 2009.

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 NOx emissions from off-road equipment and key programs contributing to those reductions. As a result of these efforts, off-road emissions in the Ventura County 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. From today, off-road NOx emissions are reduced by almost 15 percent in 2020. Key programs include Off-Road Engine Standards, Locomotive Engine Standards, Clean Diesel Fuel, Cleaner In-Use Off-Road Regulation and In-Use Large Spark Ignition (LSI) Fleet Regulation.

Figure C-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 NOx reductions through Tier 0, 1, and 2 emission standards. Tier 2 NOx emission standards reduced older uncontrolled locomotive NOx 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 NOx and PM emission standards. The U.S. EPA Tier 4 NOx 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 NOx 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.

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APPENDIX D

AIR RESOURCES BOARD CONTROL MEASURES

1985 – 2016

Prepared for

Ventura County Air Pollution Control District
Ventura, California

By

California Air Resources Board
Planning and Technical Support Division
Sacramento, California

Table D-1
Air Resources Board Control Measures, 1985 – 2016

ARB Board Action	Description	Hearing Date
Amendments to the Portable Fuel Container Regulation	Amendments to the Portable Fuel Container (PFC) regulation, which include requiring certification fuel to contain 10 % ethanol, harmonizing aspects of the Board's PFC certification and test procedures with those of the EPA, revising the ARB's certification process, and streamlining, clarifying, and increasing the robustness of ARB's certification and test procedures.	2/18/16
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 On-board Diagnostics Systems (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.	9/25/15
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.	9/24/15
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.	9/24/15
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.	6/25/15

ARB Board Action	Description	Hearing Date
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.	5/21/15
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.	4/23/15
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.	2/19/15
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.	2/19/15
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.	2/19/15
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.	12/18/14

ARB Board Action	Description	Hearing Date
2014 Amendments to ZEV Regulation	Additional compliance flexibility to ZEV manufacturers working to bring advanced technologies to market.	10/23/14
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.	10/23/14
Amendments to Mandatory Reporting Regulation for Greenhouse Gases	Further align reporting methods with EPA methods and factors, and modify reporting requirements to fully support implementation of California's Cap and Trade program.	9/19/14
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 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

ARB Board Action	Description	Hearing Date
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 14,000-19,500 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 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 EPA 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

ARB Board Action	Description	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.	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 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

ARB Board Action	Description	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.	10/18/12 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 MTCO2e 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.	8/23/12 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

ARB Board Action	Description	Hearing Date
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	2/29/12 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 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.	12/16/11 10/25/12 EO

ARB Board Action	Description	Hearing Date
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
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 California Reformulated Gasoline Blendstock for Oxygenate 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

ARB Board Action	Description	Hearing Date
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 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

ARB Board Action	Description	Hearing Date
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
Accelerated Introduction of Cleaner Line-Haul Locomotives	Agreement with railroads sets prescribed reductions in diesel risk and target years through 2020 at four major rail yards.	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.	2/25/10 3/29/10
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

ARB Board Action	Description	Hearing Date
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-GW P 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.	9/24/09 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

ARB Board Action	Description	Hearing Date
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.	5/28/09 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 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
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

ARB Board Action	Description	Hearing Date
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.	12/6/0710/ 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

ARB Board Action	Description	Hearing Date
Emission Control and Environmental Performance Label Regulations	Approved amendments to add a Global Index Label and modify the formal 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

ARB Board Action	Description	Hearing Date
Emergency regulation for portable equipment registration program (PERP), airborne toxic control measures for portable and stationary diesel-fueled engines	N/A	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
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 % 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

ARB Board Action	Description	Hearing Date
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

ARB Board Action	Description	Hearing Date
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
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

ARB Board Action	Description	Hearing Date
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 Superseded by 10/20/15
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 Sept. and Oct. 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

ARB Board Action	Description	Hearing Date
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
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

ARB Board Action	Description	Hearing Date
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

ARB Board Action	Description	Hearing Date
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 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 % 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

ARB Board Action	Description	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.	12/12/0 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

ARB Board Action	Description	Hearing Date
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 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, and streamline test methods for liquid removal equipment.	10/25/01 7/9/02 EO

ARB Board Action	Description	Hearing Date
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
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

ARB Board Action	Description	Hearing Date
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%.	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

ARB Board Action	Description	Hearing Date
Enhanced vapor recovery emergency regulation	Adopted a four-year term for equipment certifications.	5/22/01 EO
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

ARB Board Action	Description	Hearing Date
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.	12/10/81 0/22/99 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

ARB Board Action	Description	Hearing Date
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
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

ARB Board Action	Description	Hearing Date
Locomotive MOA for South Coast	Memorandum of agreement (MOA) signed by ARB, 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 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

ARB Board Action	Description	Hearing Date
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
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

ARB Board Action	Description	Hearing Date
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, 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

ARB Board Action	Description	Hearing Date
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 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
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

ARB Board Action	Description	Hearing Date
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 GVW R.	6/29/95 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

ARB Board Action	Description	Hearing Date
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	N/A	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	N/A	1/14/93
Airborne toxic control measure for emissions of toxic metals from non-ferrous metal melting	N/A	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	N/A	11/30/92

ARB Board Action	Description	Hearing Date
Substitute fuel or clean fuel incorporated test procedures	N/A	11/12/92
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	N/A	5/14/92
Alternative motor vehicle fuel certification fuel specification	N/A	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	N/A	11/14/91
Onboard diagnostic, phase II	N/A	11/12/91
Onboard diagnostics for light-duty trucks and light & medium-duty motor vehicles	N/A	9/12/91

ARB Board Action	Description	Hearing Date
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	N/A	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	N/A	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

ARB Board Action	Description	Hearing Date
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	N/A	2/8/90
Antiperspirants and deodorants	Adopted first consumer products regulation, setting standards for antiperspirants and deodorants.	11/1/89
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-duty 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%.	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

ARB Board Action	Description	Hearing Date
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 %.	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

ARB Board Action	Description	Hearing Date
Suggested control measure for resin manufacturing	Approved a suggested control measure to reduce ROG emissions from resin manufacturing.	1/1/85

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APPENDIX E

VENTURA COUNTY

STATIONARY SOURCE

REASONABLY AVAILABLE CONTROL MEASURE ASSESSMENT

Background

Federal Clean Air Act Sections 172(c)(1) and (c)(2) require the Ventura County Air Pollution Control District (District) to demonstrate that it has adopted all control measures necessary to attain the 2008 federal 8-hour ozone standard as expeditiously as practicable and to meet Reasonable Further Progress (RFP) requirements. Reasonably Available Control Measures (RACM) applies to stationary source control measures, transportation control measures, and mobile source control measures. Reasonably Available Control Technology, or RACT, is a subset of stationary source RACM.

A potential control measure is considered "reasonably available" and must be implemented if it would advance attainment by at least one year, either alone or in combination with other reasonably available control measures. This means the combined emission reductions from RACM must be sufficient to reduce the emission inventory projected for 2019 (or earlier) to the inventory currently projected for 2020, the attainment year, or lower. If such emission reductions can be demonstrated, the combined RACM measures must be implemented.

Stationary Source RACM

The District has been classified as a serious nonattainment area for all historical ozone National Ambient Air Quality Standards (NAAQS). The District has a mature and comprehensive set of prohibitory rules which are some of the strictest in the nation. The stringency and comprehensiveness of existing reactive organic gases (ROG) and nitrogen oxides (NOx) emission control requirements in the District significantly reduce the availability of new measures that could provide additional emission reductions sufficient to advance the attainment year.

As shown in Table K-3 of Appendix K, *Ventura County Weight of Evidence Assessment*, the projected anthropogenic NOx and ROG emissions are 31 and 32 tons per day, respectively, in the attainment year 2020. The projected 2019 NOx and ROG emissions are 33 and 32 tons per day respectively. Therefore, in order to be considered RACM, the combined control measures must reduce NOx emissions by two tons per day.

In addition, Table K-3 shows the projected ROG emissions are stable at 32 tons per day for three years from 2018 through 2020. During this time the ozone design value is projected to decline by 2 ppb, apparently due to NOx emissions reductions. Therefore, at this stage in the attainment planning for Ventura County, it is unclear what level of anthropogenic ROG emission reductions would advance the attainment year.

2014 RACT State Implementation Plan (SIP)

The District approved its RACT SIP on June 10, 2014 and sent it to the California Air Resources Board (ARB) for submittal to the United States Environmental Protection Agency (EPA). ARB submitted the District's RACT SIP to EPA on July 18, 2014 and EPA took final action to approve it on January 15, 2015 (80 FR 2016-2018). The RACT SIP found that all applicable

District rules that apply to ozone precursor emissions fulfill RACT requirements for the 8-hour ozone NAAQS.

Table E-1, *District Rules Determined to Meet RACT in 2014 RACT SIP*, lists the rules determined to meet RACT in the 2014 RACT SIP. Since these rules were determined to be compliant with RACT requirements, they were not evaluated further under this RACM analysis.

Table E-1
District Rules Determined to Meet RACT in 2014 RACT SIP

VCAPCD Rule	Rule Name
59	Electrical Power Generating Equipment Oxides of Nitrogen Emissions
62.6	Ethylene Oxide - Sterilization and Aeration
70	Storage and Transfer of Gasoline
71.1	Crude Oil Production and Separation
71.2	Storage of Reactive Organic Compound Liquids
71.3	Transfer of Organic Reactive Compound Liquids
71.4	Petroleum Sumps, Pits, Ponds, and Well Cellars
71.5	Glycol Dehydrators
74.3	Paper, Fabric and Film Coating Operations
74.4	Cutback Asphalt
74.5.1	Petroleum Solvent Dry Cleaning
74.5.2	Synthetic Solvent Dry Cleaning
74.6	Surface Cleaning and Degreasing
74.6.1	Batch Loaded Vapor Degreasers
74.7	Fugitive Emissions of ROC at Petroleum Refineries and Chemical Plants
74.9	Stationary Internal Combustion Engines
74.10	Components at Crude Oil and Natural Gas Producing and Processing Facilities
74.11	Natural Gas-Fired Residential Water Heaters
74.11.1	Large Water Heaters and Small Boilers
74.12	Surface Coating of Metal Parts and Products
74.13	Aerospace Assembly and Component Manufacturing Operations
74.15	Boilers, Steam Generators and Process Heaters
74.15.1	Boilers, Steam Generators and Process Heaters
74.16	Oilfield Drilling Operations
74.17.1	Municipal Solid Waste Landfills
74.18	Motor Vehicle and Mobile Equipment Coating Operations
74.19	Graphic Arts
74.20	Adhesives and Sealants
74.23	Stationary Gas Turbines
74.24	Marine Coatings Operations
74.24.1	Pleasure Craft Coating and Commercial Boatyard Operations
74.26	Crude Oil Storage Tank Degassing
74.27	Gasoline and ROC Liquid Storage Tank Degassing Operations
74.30	Wood Products Coating

RACM Evaluations

District ROG and/or NOx prohibitory rules that were not fully addressed in the District's 2014 RACT SIP were evaluated for potential RACM emission reductions. Staff compared District rules to rules adopted by other air districts with higher or "worse" nonattainment classifications, namely the South Coast Air Quality Management District (SCAQMD) and the San Joaquin Valley Air Pollution Control District (SJVAPCD). Staff also reviewed rules from other air districts such as the Bay Area Air Quality Management District (BAAQMD). Table E-2 lists the District rules reviewed for the stationary source RACM requirement.

District staff also identified a few rules from other districts that apply to unregulated source categories in Ventura County. District staff conducted preliminary evaluations of the potential emission reductions, including the cost effectiveness and timing of the potential reductions. The identified source categories are shown in Table E-3.

A very conservative estimate of the total emission reductions achievable under RACM with new and amended District rules are as follows:

NOx: 0.008 tons per day

ROG: 0.25 tons per day

As noted above, in order to advance attainment by one year, emission reductions of at least two tons of NOx per day must be achieved. The potential RACM identified by the District are a tiny fraction of the required NOx reductions.

Since the ROG inventory remains stable for the two years prior to the District's modeled attainment, it is unclear how much ROG emissions reductions would be required to advance the attainment date. However, it is clear that reducing ROG emissions less than 1% of the anthropogenic inventory is insufficient to advance the attainment date. Such a reduction is well within the margin of error for the emissions inventory and the annual variability of emissions due to other factors.

Table E-2
District Rules Evaluated for RACM Determination

VCAPCD Rule	Rule Name	Other District Rule Number(s)	Other District Rule(s) Stricter?	NOx Emission Reduction Potential (tons/day)	ROG Emission Reduction Potential (tons/day)
63	Separation and Combination of Emissions	N/A*	N/A	N/A	N/A
69	Asphalt Air Blowing	SC 470	NO	None	None
74.2	Architectural Coatings	This rule will be updated as discussed in Chapter 3 as part of control measure R-303-2017			
74.8	Refinery Vacuum Producing Systems, Wastewater Separators, and Process Turnarounds	No Sources of this type remain in Ventura County			
74.14	Polyester Resin Material Operations	SC 1162 SJV 4684	NO	None	None
74.19.1	Screen Printing Operations	SC 1171	YES	None	0.013
74.21	Semiconductor Manufacturing	SC 1164	YES	None	0.068
74.22	Natural Gas-Fired, Central Fan-Type Furnaces	This rule will be updated as discussed in Chapter 3 as part of control measure N-110-2016			
74.25	Restaurant Cooking Operations	SC 1138 SJV 4692	NO†	None	None
74.28	Asphalt Roofing Operations	None	NO	None	None
74.29	Soil Decontamination Operations	SC 1166 SVJ 4651 BA 8-40	NO	None	None
74.31	Metalworking Fluids and Direct Contact Lubricants	SC 1144	NO	None	None
74.34	NOx Reductions from Miscellaneous Sources	SC 1147 SJV 4309	YES	None†	None

Notes:
SC = South Coast Air Quality Management District
SJV = San Joaquin Valley Air Pollution Control District
* N/A: Not applicable. This rule does not include restrictions or mandate reductions in NOx or ROG emissions.
† See discussion below

Table E-3
Stationary Source Categories for Which Other Districts Have Adopted Rules and VCAPCD Has No Equivalent Rule

Rule Name	Other District Rule Number(s)	Applicable Sources in Ventura County?	NOx Emission Reduction Potential (tons/day)	ROG Emission Reduction Potential (tons/day)
Composting and Organic Material Conversion Operations	SC 1133 SJV 4566	New District Rule 74.32 will be adopted as discussed in Chapter 3 as part of control measure R-607		
Flares at Petroleum Refineries	BA 12-12 SC 1118	NO	None	None
Vacuum Truck Operations	BA 8-53	YES	Potential Increase*	0.16
Emissions of Oxides of Nitrogen from Commercial Food Ovens	SC 1153.1	YES	0.008	None
Food Products Manufacturing and Processing Operations	SC 1131	YES†	None	0.006

Notes:
BA = Bay Area Air Quality Management District
SC = South Coast Air Quality Management District
SJV = San Joaquin Valley Air Pollution Control District
* If a combustion process is used to comply with emissions abatement requirements, this rule will increase NOx emissions
† See discussion below

The summaries below discuss the RACM evaluations and provide a determination whether rule updates or new rules could be considered RACM.

RULE 74.14: POLYESTER RESIN MATERIAL OPERATIONS (Last Revised 4/12/2005)

Rule 74.14 reduces ROG emissions from operations that manufacture products from or otherwise use polyester resin material. ROG emissions from this manufacturing process are controlled by limiting loss rate, monomer ROG content, application technique, or by requiring emission control equipment. Limits are also placed on the ROG content of cleaning materials.

SCAQMD Rule 1162 and SJVAPCD Rule 4684 apply to similar source categories. The limitations on monomer content and control system efficiency are the same in all three rules. Santa Barbara County APCD Rule 349 includes similar requirements but the exemption threshold is lower (50 gal/year versus 20 gal/month for the other rules). However, since Ventura County is in the South Coast distribution area, most exempt facilities likely use compliant materials. In addition, the total emissions from exempt sources are likely very low. Therefore, no additional emission reductions are available as RACM.

RULE 74.19.1: SCREEN PRINTING OPERATIONS (Last Revised 11/11/2003)

Rule 74.19.1 reduces ROG emissions from the use of inks, coatings, adhesives, and cleaners used at screen printing operations. The rule specifies limits on the ROG content of inks, coating, adhesives and fountain solutions, whereas ROG emissions from cleaning solvents are limited by ROG content and ROG composite vapor pressure requirements.

The rule requirements for Rule 74.19.1 and Rule 1130.1 are largely equivalent. Rule 1130.1 has additional categories of materials, but these have higher limits than the general category that would apply in Rule 74.19.1. Limits on ROG content in Rule 1130.1 are stricter for extreme performance and metallic inks.

The inventory of emissions for this category is 0.0266 tons ROG per day. A very conservative estimation of incremental emission reduction from the stricter requirements of Rule 1130.1 is 0.013 tons ROG per day.

RULE 74.21: SEMICONDUCTOR MANUFACTURING (Adopted 4/6/1993)

Rule 74.21 reduces ROG emissions from semiconductor manufacturing operations through various operational requirements and solvent concentration limits. SCAQMD Rule 1164 applies to similar source categories and has some stricter requirements. The inventory of emissions for this category is 0.136 tons ROG per day in Ventura County. A very conservative estimation of incremental emission reduction from the stricter requirements of Rule 1164 is 0.068 tons ROG per day.

RULE 74.25: RESTAURANT COOKING OPERATIONS (Adopted 10/12/2004)

Rule 24.25 reduces ROG and PM emissions from conveyorized charbroilers that are used to cook 875 pounds of meat or more per week. It is similar to SCAQMD Rule 1138 and SJVAPCD Rule 4692. Rule 4692 has a few provisions that are slightly more restrictive than Rule 74.25. Rule 74.25 requires at least 83% reduction of both ROG and PM10 from applicable units, while Rule 4692 requires at least 83% reduction in PM10 and 86% reduction in ROG. In addition, SJVAPCD applies to charbroilers used to cook more than 400 pounds of meat per week.

While the additional restrictions in the SVJAPCD rule could be added to Rule 74.25, it would not be likely to help advance attainment of the ozone NAAQS in Ventura County. The rulemaking process takes approximately one year, which would allow for adoption at about 2018. It is necessary to provide time for industry to adjust to the new requirements and either demonstrate compliance or purchase new equipment that meets the requirements of a new rule. Therefore, any new reductions would not likely occur until the ozone season of 2020, which is the attainment year for Ventura County.

In addition, the incremental cost effectiveness of increasing the control efficiency from 83% to 86% would likely be astronomical. In fact, many of the catalytic oxidizers currently in use likely

meet the 86% ROG reduction requirement in Rule 4692, so changes to Rule 74.25 would not result in emission reductions from those units.

RULE 74.28: ASPHALT ROOFING OPERATIONS (Adopted 5/10/1994)

Rule 74.28 reduces ROG emissions from asphalt roofing equipment and operations by requiring close fitting container lids and temperature limits. Rule 74.28 applies to equipment used for melting, heating or holding asphalt or coal tar pitch. District staff found no rules in other districts that apply to the same source category. Therefore, no additional emission reductions are available and this rule would not qualify as RACM.

RULE 74.29: SOIL DECONTAMINATION OPERATIONS (Last Revised 4/8/2008)

Rule 74.29 reduces ROG emissions from operations that handle soil contaminated with ROG-containing material. SCAQMD Rule 1166, SJVAPCD Rule 4684 and BAAQMD Rule 8-40 apply to similar source categories. Rule 74.29 was amended in April of 2008 specifically to update it so it would incorporate the more stringent provisions of the other districts' rules that were cost effective in Ventura County. These revisions were implemented as required by the "every feasible measure" provisions of the CCAA. Therefore, no additional emission reductions are available as RACM.

RULE 74.31: METALWORKING FLUIDS AND DIRECT CONTACT LUBRICANTS (Adopted 11/12/2013)

Rule 74.31 applies to the production, sale and use of metalworking fluids and direct contact lubricants and reduces ROG emissions by requiring substitution of high-ROG metalworking fluids with low-ROG fluids, including medium napthenic oils, paraffinic oils, vegetable oils, synthetic or semi-synthetic oils, or water-reducible fluids. SCAQMD Rule 1144 applies to similar source categories. Rule 74.31 was designed to adopt all provisions of Rule 1144 that are cost effective in Ventura County. Therefore, no additional emission reductions are available as RACM.

RULE 74.34: NOx REDUCTIONS FROM MISCELLANEOUS SOURCES (Adopted 12/13/2016)

Rule 74.34 applies to dryers, furnaces, kilns, incinerators, and ovens with a rated heat input capacity 5 million BTU per hour or greater. SJVAPCD Rule 4309 applies to similar source categories with a similar heat input threshold. SCAQMD Rule 1147 applies to similar source categories with a lower threshold of applicability at 1 million BTU per hour or greater. During the rule development process, District staff determined it was not cost effective in Ventura County to require retrofit on sources below the adopted threshold of 5 million BTU per hour. Therefore, no additional emission reductions are available under RACM.

VACUUM TRUCK OPERATIONS (BAAQMD Rule 8-53 – No VCAPCD Equivalent Rule)

Rule 8-53 was adopted April 18, 2012 and applies to the following facilities: petroleum refineries, bulk plants, bulk terminals, marine terminals, and organic liquid pipeline facilities. Moreover, on May 2, 2008, the South Coast AQMD revised their Rule 1149, *Storage Tank and Pipeline Cleaning and Degassing*, to, among other provisions, require that until certain other provisions are met, vacuum trucks that remove residual product and sludge from pipeline and storage tanks subject to the rule must exhaust vapors into a control device and the exhaust concentration of control devices must not exceed 500 ppmv, measured as methane. Bay Area AQMD staff estimates that Rule 8-53 will reduce ROG emissions from vacuum truck operations by 1.05 ton per day. This represents an 85 percent reduction in emissions from moving regulated materials and a 70 percent reduction of overall organic emissions from vacuum truck operations.

Opportunities for significant emission reductions from vacuum trucks are more limited in Ventura County than in the Bay Area AQMD and South AQMD regions. Ventura County no longer has any refineries or marine terminals and only a few bulk plants and terminals. It does, however, have numerous oil production, storage, and processing facilities, including storage tanks, sumps, boxes, and pipelines. Moreover, vacuum trucks are often used in Ventura County to transport produced crude oil from small and isolated production locations to storage and processing facilities.

Ventura County oil annual oil production amounts to 2.8% of the refinery capacity in the Bay Area (ratio of DOGGR 2015 oil production data for Ventura County to California Energy Commission refinery capacity data). Therefore, a conservative estimate of the emission reductions from a vacuum truck control rule in Ventura County is 15% of the BAAQMD rule, or 0.16 tons ROG per day. Note that due to rule development time and implementation time, the soonest this could be in effect is 2019.

EMISSIONS OF NITROGEN OXIDES FROM COMMERCIAL FOOD OVENS (SCAQMD Rule 1153.1 – No VCAPCD Equivalent Rule)

SCAQMD Rule 1153.1 applies to in-use ovens, dryers, smokers, and dry roasters with nitrogen oxide (NOx) emissions from fuel combustion that require SCAQMD permits and are used to prepare food or products for making beverages for human consumption. Preliminary calculations based on population ratio indicate possible NOx reductions of 0.008 tons per day from commercial food ovens in Ventura County. This estimate is based on estimated reductions from SCAQMD Rule 1147 when it was originally adopted in November 2008.

SCAQMD adopted Rule 1153.1 to remove commercial food ovens from Rule 1147 applicability. Control technologies have not matured in a timely manner for commercial food ovens. In response, SCAQMD removed food ovens, including roasters and smokehouses, from Rule 1147 applicability and subjected them to new Rule 1153.1 with different emission limits and compliance dates.

Rule 1153.1 extends the compliance time for most applicable units to three years or more after the adoption date in 2014. In order to provide similar compliance timeframes in Ventura County, the emission reductions would not be required until 2020 or later so they would not affect the attainment date. Therefore, reductions from these sources would not be considered RACM.

FOOD PRODUCTS MANUFACTURING AND PROCESSING OPERATIONS (SCAQMD Rule 1131 – No VCAPCD Equivalent Rule)

Rule 1131 was adopted September 15, 2000 and applies to food manufacturing facilities. Rule 1131 reduced ROG emissions from food manufacturing and processing operations by limiting the ROG content of process solvents and solvents used for sterilization of equipment; or requiring control equipment; or requiring equivalent reductions through reformulation or process modifications. Affected operations include distillation, extraction, reacting, blending, drying, crystallizing, granulation, separation, sterilization, and filtering.

SCAQMD staff estimated that Rule 1131 would reduce ROG emissions from food manufacturing operations by two tons per day. This represents an 81 percent reduction in emissions from subject operations.

Ventura County has a number of food processing facilities, but they do not use the kind of processes cited above that require significant solvent use. None of the food processing facilities in Ventura County have permitted equipment or processes that use solvent. Therefore, solvent use at the facilities must be below the exemption threshold of 200 pounds per year. Maximum solvent use at all food processing facilities combined is 2.7 tons of ROG per year, or 0.0074 tons ROG per day. Applying the estimated 81% reduction, a very conservative estimate of the potential emission reductions from this type of rule in Ventura County is 0.006 tons ROG per day.

APPENDIX F

VENTURA COUNTY

TRANSPORTATION CONTROL MEASURES

REASONABLY AVAILABLE CONTROL MEASURE ASSESSMENT

Introduction

The Clean Air Act (CAA) Section 172(c)(1) requires a review of Reasonably Available Control Measures (RACM) during the Air Quality Management Plan/State Implementation Plan (AQMP/SIP) development process to consider possible Transportation Control Measures (TCMs) that are feasible to implement in Ventura County. 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).

The U.S. Environmental Protection Agency (EPA) left the definitions for technologically and economically feasibility vague so that areas of the country could determine what measures would be feasible or infeasible according to local factors. Factors such as the availability of control measures, ability to achieve emission reductions, and degree of cost effectiveness are the primary considerations on an area-by-area basis. In addition, EPA did not provide a conclusive definition on "advancing attainment," so agencies have based their determination of RACM on whether a measure or group of measures would advance attainment of the NAAQS by at least one year.

Methodology

A list of candidate RACM was prepared by the District using TCMs from the Clean Air Act (CAA) Section 108(f)(1)(A), the 2008 Ventura County AQMP, other air districts and planning agency plans, such as the 2012 South Coast AQMP, 2007 San Joaquin AQMP, 2013 Sacramento AQMP, and the 2004/2007 Metropolitan Washington Council of Governments SIP.

The District, along with VCTC staff, conducted an initial RACM analysis. Each candidate TCM was given a control measure number, title, and a brief description on the RACM list. If a TCM was found feasible for Ventura County, it was recommended as a potential measure for the 2016 AQMP along with the appropriate implementing agency. If a TCM was determined infeasible for Ventura County, it was not recommended as a measure for the 2016 AQMP and a reasoned justification was provided.

Based on this comprehensive analysis and review, the majority of TCMs that were determined to be feasible are either being implemented, or have been implemented in Ventura County. The TCMs determined to be infeasible did not meet the criteria for RACM because of the individual reasons provided in the analysis. Moreover, implementing all feasible TCMs in the RACM assessments would not advance Ventura County's 8-hour ozone attainment date by at least one year. This criterion also applies to RACM implementation.

The RACM under consideration were organized according to the sixteen TCM categories listed in CAA Section 108(f), shown below.

i. Programs for improved use of public transit;

ii. Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;

iii. Employer-based transportation management plans, including incentives;

iv. Trip-reduction ordinances;

v. Traffic flow improvement programs that achieve emission reductions;

vi. Fringe and transportation corridor parking facilities, serving multiple occupancy vehicle programs or transit service;

vii. Programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration, particularly during periods of peak use;

viii. Programs for the provision of all forms of high-occupancy, shared-ride services, such as the pooled use of vans;

ix. Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;

x. Programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;

xi. Programs to control extended idling of vehicles;

xii. Programs to reduce motor vehicle emissions, consistent with Title II of the Clean Air Act, which are caused by extreme cold start conditions;

xiii Employer-sponsored programs to permit flexible work schedules;

xiv. Programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;

xv. Programs for new construction and major reconstruction of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation, when economically feasible and in the public interest; and

xvi. Programs to encourage the voluntary removal from use and the marketplace of pre-1980 model year light duty vehicles and pre-1980 model light duty trucks.

The RACM list, in this appendix as Table F-1, was posted on the VCAPCD website and was presented to the following committees for their review: the Transportation Conformity Working Group, Technical Transportation Advisory Committee, Transit Operators Committee, Citizen Transportation Advisory Committee, and Social Services Transportation Advisory Committee. Questions and answers followed each presentation. No comments were submitted that altered the RACM analysis.

Summary

The CAA Section 172(c)(1) requires a comprehensive review of RACM during the AQMP/SIP development process to ensure the implementation of TCMs in Ventura County as expeditiously as practicable. For TCMs to be considered RACM they must be both economically and technologically feasible and must advance the attainment date of the NAAQS by at least one year. Based on this comprehensive analysis, the majority of TCMs determined to be feasible are either being implemented, or have been implemented, in Ventura County. The TCMs determined to be infeasible did not meet the criteria for RACM because of the individual reasons provided in the analysis. Moreover, implementing all feasible TCMs in the RACM analysis would not advance Ventura County's 2008 8-hour ozone NAAQS attainment date by at least one year.

Table F-1
2016 Ventura County Reasonably Available Control Measures Analysis

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
Section 108(f) 1. Programs For Improved Public Transit						
1.1	Regional Express Bus Program	Purchase of buses to operate regional express bus services.	yes	yes		Transit Operators, VCTC
1.2	Transit Access to Airports	Operation of transit to airport to serve air passengers.	no	no	Not economically feasible because there are not enough air passengers in Ventura County.	
1.3	Study Benefits of a Particulate Trap Retrofit Program	Examine potential to accelerate application of particulate traps on diesel-powered buses to achieve earlier compliance with State regulations.	yes	yes		Transit Operators, VCAPCD, VCTC
1.4	Major Expansion of Mass Transit	Major change to the scope and service levels.	no	no	Not economically feasible because there is not enough transit demand for order of magnitude increases in spending.	
1.5	Expansion of Public Transportation Systems	Expand and enhance existing public transit services.	yes	yes		Transit Operators, VCTC
1.6	Transit Service Improvements in Combination with Park-and-Ride Lots and Parking Management	Local jurisdictions and transit agency improve the public transit system and add new Park-and-Ride facilities and spaces on an as needed basis.	yes	yes		Cities, County, Transit Operators, VCTC
1.7	Free transit during special events	Offer free transit during selected special events to reduce event-related congestion and associated emission increases.	no	no	No authority to implement, however, individual transit agencies could decide whether this measure would be feasible to implement for them.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
1.8	Require that government employees use transit for home to work trips, expand transit, and encourage large businesses to promote transit use	Require all government employees to use transit a specified number of times per week.	no	no	No authority to implement.	
1.9	Increase parking at transit centers or stops	Encourage transit convenience by providing additional parking at transit centers.	yes	yes		Cities, County, Transit Operators, VCTC
1.10	Expand regional transit connection ticket distribution	Provides interchangeability of transit ticket.	yes	yes		Transit Operators, VCTC
1.11	Provide free public transit during episodes	Provide free transit rides during high level ozone episodes.	no	no	Not economically feasible.	
1.12	Dedicated Bus Lanes	Dedicate or construct lanes for transit bus service.	yes	yes		Cities, County, Transit Operators
1.13	Half Price Fares on Feeder Bus Service	All local transit bus services to rail stations reduce fare by half.	no	yes	Not economically feasible, however, one transit agency has reported reduced fares to rail stations.	
1.14	Real-Time Bus Schedule information	Expand trials of real-time bus schedule information to local transit providers.	yes	yes		Transit Operators, VCTC
1.15	Shorter Distance from Buildings to Bus Stops	For existing buildings, re-route traffic to allow buses to come closer to the building. For new buildings, alter setback requirements to allow closer bus access.	no	no	Not economically feasible, however, some jurisdictions may already have existing requirements for new development.	
1.16	Subscription Services	Free van service to provide transportation for the elderly, handicapped or individuals who have no access to transportation.	no	yes	Not economically feasible, however, some transit agencies provide free bus service w/ ADA or DAR ID.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
1.17	Consolidation of Public Transit Operators	Consolidate all public transit agencies in the County.	no	no	No authority to implement.	
1.18	Transit Voucher Program	Transit vouchers for elderly and low income commuter.	yes	yes		Transit Operators, VCTC
Section 108(f) 2. Restriction Of Certain Roads Or Lanes To, Or Construction Of Such Roads Or Lanes For Use By, Passenger Buses Or High Occupancy Vehicles						
2.1	Update High Occupancy Vehicle (HOV) Lane Master Plan	Analysis of increased enforcement, increasing occupancy requirements, conversion of existing HOV lanes to bus only lanes and/or designation of any new carpool lanes as bus-only lanes; utilization of freeway shoulders for peak-period express bus use; commercial vehicle buy-in to HOV lanes; and appropriateness of HOV lanes for corridors that have considered congestion pricing or value pricing.	yes	yes		Caltrans, SCAG, VCTC
2.2	Fixed Lanes for Buses and Carpools on Arterials	Provide fixed lanes for buses and carpools on arterial streets where appropriate.	yes	yes		Caltrans, SCAG, VCTC
2.3	Expand number of freeway miles available, allow use by alternative fuel vehicles, changes to HOV lane requirements and hours	Various measures evaluated in many ozone nonattainment areas. Specifics vary according to freeway system, use patterns and local characteristics.	yes	yes		ARB, Caltrans

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
Section 108(f) 3. Employer-Based Transportation Management Plans, Including Incentives						
3.1	Commute Solutions	The federal law that complements parking cash-out is called the Commuter Choice Program. It provides for benefits that employers can offer to employees to commute to work by methods other than driving alone.	yes	yes		Employers, Transit Operators, VCTC
3.2	Parking Cash-Out	State law requires certain employers who provide subsidized parking for their employees to offer cash allowance in lieu of a parking space.	yes	yes		ARB, Employers
3.3	Employer Rideshare Program Incentives	Employer rideshare incentives and introduction of strategies designed to reduce single occupant vehicle trips. Examples include: public awareness campaigns, Transportation Management Associations among employers, alternative work hours, and financial incentives for TCM participants as well as tax breaks for employers.	yes	yes		Employers, VCAPCD, VCTC
3.4	Implement Parking Charge Incentive Program	Evaluate feasibility of an incentive program for cities and employers that convert free public parking spaces to paid spaces. Review existing parking polices as they relate to new development approvals.	yes	yes		Cities, County, Employers

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
3.5	Preferential Parking for Carpools and Vanpools	This measure encourages public and private employers to provide preferential parking spaces for carpools and vanpools to decrease the number of single occupant automobile work trips. The preferential treatment could include covered parking spaces or nearby spaces.	yes	yes		Employers, VCAPCD
3.6	Employee Parking Fees	Encourage public and private employers to charge employees for parking.	no	no	Not technologically feasible because the region is not urbanized enough to make it effective and could have negative effect to public parking areas (curb parking).	
3.7	Merchant Transportation Incentives	Implement "non-work" trip reduction ordinances requiring merchants to offer customers mode shift travel incentives such as free bus passes and requiring owners, managers & developers of large retail establishments to provide facilities for non-motorized modes.	no	no	No authority to implement.	
3.8	Purchase vans for vanpools	Purchase a specified number of vans for use in employee commute travel.	yes	yes		Employers
3.9	Encourage merchants and employers to subsidize the cost of transit for employees	Provide outreach and possible financial incentives to encourage local employers to provide transit passes or subsidies to encourage less individual vehicle travel.	yes	yes		VCAPCD, VCTC

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
3.10	Off-days for ozone alerts just like sick days	On ozone alert days, notify employees through email that there is an ozone alert. Employees are given a pre-specified number of days they can decide not to come in to work on ozone forecast days.	no	no	No authority to implement. Not economically feasible.	
3.11	Pay for in-house meals on ozone action days	Employer pays for meals in-house on ozone alert days so that employees do not travel to off-site locations.	no	no	No authority to implement.	
3.12	Voluntary business closures on ozone action days	A more expensive version of "off-days" for ozone alerts.	no	no	No authority to implement. Not economically feasible.	
3.13	Close government offices on ozone action days to serve as an example	Similar to voluntary business closures.	no	no	No authority to implement.	
3.14	Mandatory compressed work weeks	Self-explanatory.	no	no	No authority to implement. Employer could decide individually if this measure is feasible for them.	
3.15	Telecommuting	Goal of specified percentage of employees telecommuting at least once per week.	no	no	No authority to implement. Employer could decide individually if this measure is feasible for them.	
3.16	Adopt a Safe Routes to School Policy	Adopt policy to increase the number of students that walk/bike to school by removing barriers that prevent children and adults from doing so.	yes	yes		Cities, County, School Districts, State, VCAPCD, VCTC
3.17	Increase Walk-to-School Programs	Develop and promote programs that encourage students to walk to school.	yes	yes		Cities, County, School Districts, VCAPCD, VCTC
3.18	Showers and Lockers at Work	Provide showers and lockers to encourage walking and biking to work.	yes	yes		Cities, County, State

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
3.19	Voluntary Employer Parking Cash-out Subsidy	Employers who provide free parking would voluntarily provide the cash equivalent of the parking subsidy to employees who do not drive to work.	yes	yes		Cities, County, Employers, State
3.20	Bike to Work Day	Conduct a one-day bike-to-work event. Provide outreach activities, education on the bike-to-work option, and provide assistance in trying bike to work.	yes	yes		Cities, County, VCAPCD, VCTC
Section 108(f) 4. Trip Reduction Ordinance						
	In December 1995, Congress changed the Clean Air Act Amendments to make the Employee Commute Option program voluntary (no longer mandatory). California State Law prohibits mandatory employer based trip reduction ordinance programs (SB437). Therefore, no mandatory programs can be imposed.					
Section 108(f) 5. Traffic Flow Improvement Programs That Achieve Emission Reductions						
5.1	Develop Intelligent Transportation Systems	A variety of technological applications intended to produce more efficient use of existing transportation corridors.	yes	yes		Caltrans, Cities, County, SCAG, Transit Operators, VCTC
5.2	Coordinate Traffic Signal Systems	This measures implements and enhances synchronized traffic signal systems to promote steady traffic flow at moderate speeds.	yes	yes		Cities, County, VCTC
5.3	Reduce Traffic Congestion at Major Intersections	This measure implements a wide range of traffic control techniques designed to facilitate smooth, safe travel through intersections: signalization, turn lanes, median dividers, grade separations.	yes	yes		Cities, County

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
5.4	Site-Specific Transportation Control Measures	This measure could include geometric or traffic control improvements at specific congested intersections or at other substandard locations. Another example might be programming left turn signals at certain intersections to lag, rather than lead, the green time for through traffic.	yes	yes		Cities, County
5.5	Removal of On-Street Parking	Require all commercial & industrial development to design and implement off-street parking.	no	no	No authority to implement.	
5.6	Reversible Lanes	Implement reversible lanes on arterial streets to improve traffic flow where appropriate.	no	no	Not technologically feasible because there is not sufficient congestion.	
5.7	One-Way Streets	Redesignate streets (or portions of downtown areas) as one-way to improve traffic flow where appropriate.	yes	yes		Cities, County
5.8	On-Street Parking Restrictions	Restrict on-street parking where appropriate.	no	no	No authority to implement.	
5.9	Bus Pullouts in Curbs for Passenger Loading	Provide bus pullouts in curbs, or queue jumper lanes for passenger loading and unloading.	yes	yes		Cities, County, Transit Operators, VCTC
5.10	Additional Freeway Service Patrol	Operation of additional lane miles of new roving tow truck patrols to clear incidents and reduce delay on freeways during peak periods.	no	no	Not economically feasible. Current and projected congestion levels are too low to warrant measure.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
5.11	Consider coordinating scheduling of arterial and highway maintenance to exclude ozone action days if the maintenance activities require lane reductions on heavily utilized arterials and highways	Self-explanatory.	yes	no		Caltrans, Cities, County, VCAPCD
5.12	Re-routing of trucks on ozone days	Self-explanatory.	yes	no		VCAPCD
5.13	Fewer stop signs	Improve flow-through traffic by removing stop signs.	no	no	Not technologically feasible because the safety issue outweighs the potential small air quality benefit.	
5.14	Ban left turns	Banning all left turns would stop the creation of bottlenecks, although slightly increasing travel distances.	no	no	No clear demonstration of air quality benefits.	
5.15	Adaptive traffic signals and signal timing	Self explanatory.	yes	yes		Caltrans, Cities, County
5.16	Freeway bottleneck improvements (add lanes, construct shoulders, etc.)	Identify key freeway bottlenecks and take accelerated action to mitigate them.	yes	yes		Caltrans, SCAG, VCTC
5.17	Minimize impact of construction on traveling public. Have contractors pay when lanes are closed as an incentive to keep lanes open	Prohibit lane closures during peak hours, limit construction to weekends or nights.	yes	yes		Caltrans, Cities, County
5.18	Internet provided road and route information	Reduce travel on highly congested roadways by providing accessible information on congestion and travel.	yes	yes		Caltrans

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
5.19	Regional route marking systems to encourage underutilized capacity	Encourage travel on local roads and arterials by better route marking to show alternatives.	yes	yes		Caltrans, Cities, County, VCTC
5.20	Congestion management field team to clear incidents	Self-explanatory.	no	no	Not economically feasible. Current and projected congestion levels are too low to warrant measure.	
5.21	Use dynamic message signs to direct/smooth speeds during incidents	Self-explanatory.	yes	yes		Caltrans
5.22	Get real-time traffic information to drivers	Self-explanatory.	yes	yes		Caltrans, VCTC
5.23	55 mph speed limit during ozone season	Self-explanatory.	no	no	No authority to implement. The measure requires state legislative change.	
5.24	Require 40 mph speed limit on all facilities	Depends on area's emission factors.	no	no	No authority to implement. The measure requires state legislative change.	
5.25	Require lower speeds during peak periods	Self-explanatory.	no	no	No authority to implement. The measure requires state legislative change.	
5.26	Street Intersection Realignment	Realign skewed intersections to provide better traffic flow and safety.	yes	yes		Caltrans, Cities, County
5.27	Extend Ramp Metering	Install signals to control flow of vehicles at selected freeway ramp entrances to maintain level of service.	yes	yes		Caltrans
5.28	Road Hazard Reporting	Provide real-time traffic information to help drivers make decisions about when and where to travel.	yes	yes		Caltrans
Section 108(f) 6. Fringe And Transportation Corridor Parking Facilities Serving Multiple Occupancy Vehicle Programs Or Transit Service						
6.1	Park and ride lots	Develop, design and implement new Park and Ride facilities in locations where they are needed.	yes	yes		Caltrans, Cities, County, Transit Operators, VCTC

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
6.2	Park and ride lots serving perimeter counties	Specific to a locality.	yes	yes		Cities, County, SCAG, VCTC
6.3	Regional Parking Regulation to Provide Incentives for alternative transportation modes	Regulation to provide parking facilities and designs to encourage carpools, vanpools, and bicycling.	yes	yes		Cities, County, SCAG, VCTC
Section 108(f) 7. Programs To Limit Or Restrict Vehicle Use In Downtown Areas Or Other Areas Of Emission Concentration Particularly During Periods Of Peak Use						
7.1	Off-Peak Goods Movement	Implement an ordinance to restrict truck deliveries by time or place in order to minimize traffic congestion during peak periods.	no	no	No authority to implement.	
7.2	Truck Restrictions During Peak Periods	Implement an ordinance to restrict truck travel during peak periods in order to minimize traffic congestion.	no	no	No authority to implement.	
7.3	Involve school districts to encourage walking to school	Decrease vehicle emissions due to school trips by reducing these trips through education and out-reach programs.	yes	yes		School Districts, VCAPCD
7.4	Adjust school hours so they do not coincide with peak traffic periods and ozone seasons	Measure to reduce travel during peak periods and ozone-contributing periods in the early morning.	no	no	No authority to implement.	
7.5	Area-wide tax for parking	Reduce driving by limiting parking through pricing measures.	no	no	No authority to implement.	
7.6	Increase parking fees	Same as above.	no	no	No authority to implement.	
7.7	Graduated pricing starting with highest in Central Business District (CBD)	Charge the most for parking in the central business or other high volume areas in a city to discourage vehicle travel in these areas.	no	no	No authority to implement.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
7.8	Buy parking lots and convert to other land use	Limit parking by converting available parking to other land uses to discourage driving.	no	no	Not technologically feasible because the area is too rural to be able to make this effective.	
7.9	Limit the number of parking spaces at commercial airlines to support mass transit	Reduce airport travel by limits on parking at airports.	no	no	Not technologically feasible because it is at the discretion of regional and local airport authority to make land use decisions pertaining to airports.	
7.10	No CBD vehicles unless LEV, alternative fuel, or electric	Define high-use area and ticket any vehicles present unless they are low emitting, alternative fueled or electric.	no	no	No authority to implement.	
7.11	Auto restricted zones	No vehicles allowed in certain areas where high emissions and, congestion contribute to ozone problems.	no	no	No authority to implement.	
7.12	Incentives to increase density around transit centers	Lower travel by increasing residential and commercial density in areas near transit.	yes	yes		Cities, County
7.13	Land use/air quality guidelines	Guidelines for development that contributes to air quality goals.	yes	yes		VCAPCD
7.14	Incentives for cities with good development practices	Provide financial or other incentives to cities that practice air quality-sensitive development.	yes	yes		ARB, SCAG, State Legislature
7.15	Cash incentives to foster jobs/housing balance	Specific to locality – encouraged by California Clean Air Plan.	yes	yes		ARB, Cities, County, SCAG, VCAPCD
7.16	Trip reduction oriented development	Specific to locality – encouraged by California Clean Air Plan.	yes	yes		ARB, Cities, County, SCAG, VCAPCD
7.17	Transit oriented development	Specific to locality – encouraged by California Clean Air Plan.	yes	yes		ARB, Cities, County, SCAG, VCAPCD
7.18	Sustainable development	Specific to locality – encouraged by California Clean Air Plan.	yes	yes		ARB, Cities, County, SCAG, VCAPCD

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
7.19	Increase fees for parking garages and meters during ozone episodes	Increase fees for parking garages to deter vehicle use during high ozone level days.	no	no	Not economically feasible.	
7.20	Charge city-owned parking garage pass holders a fee for more than one entrance and exit each day	Extra charges for pass holders to deter vehicle use and vehicle trips.	no	no	Not economically feasible.	
7.21	VMT Tax	Charge VMT tax of $0.02 per mile for all vehicles registered or garaged in the region.	no	no	Need state legislation.	
Section 108(f) 8. Programs For The Provision Of All Forms Of High-Occupancy, Shared-Ride Services						
8.1	Financial Incentives, Including Zero Bus Fares	Provide financial incentives or other benefits, such as free or subsidized bus passes and cash payments for not driving, in lieu of parking spaces for employees who do not drive to the workplace.	yes	yes		Employers
8.2	Internet ridematching services	Provide match-lists, route info, hours and contact information over the internet to assist individuals in joining or developing carpools.	yes	yes		SCAG, VCTC
8.3	Preferential parking for carpoolers	Provide free, covered, near-building or similar incentives to carpoolers.	yes	yes		Cities, County, Employers, VCTC
8.4	Credits and incentives for carpoolers	Self-explanatory.	yes	yes		Cities, County, Employers, VCTC
8.5	Employers provide vehicles to carpoolers for running errands or emergencies	Having vehicles available for work-day errands makes it easier to go to work without one.	yes	yes		Cities, County, Employers
8.7	School carpools	Self-explanatory.	no	no	No authority to implement.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
8.8	Guaranteed ride home	Provide guaranteed rides via taxi, rental cars, etc. to carpoolers & vanpoolers who are left without a ride home.	yes	yes		Employers, VCTC
8.9	Auto sharing Program	Fund incentives for new auto sharing customers (i.e., Flexcar or Zipcar services).	yes	yes		Cities, County, VCTC
Section 108(f) 9. Programs To Limit Portions Of Road Surfaces Or Certain Sections Of The Metropolitan Area To The Use Of Non-Motorized Vehicles Or Pedestrian Use, Both As To Time And Place						
9.1	Establish Auto Free Zones and Pedestrian Malls	Establish auto free zones and pedestrian malls where appropriate.	yes	yes		Cities, County
9.2	Encouragement of Pedestrian Travel	Encourage the use of pedestrian travel as an alternative to automobile travel. Pedestrian travel is quite feasible for short shopping, business, or school trips. Promotion of pedestrian travel could be included in air pollution public awareness efforts to remind people of this basic alternative.	yes	yes		SCAG, VCTC, VCAPCD
9.3	Bicycle & Pedestrian Program	Fund high priority projects in countywide plans consistent with funding availability.	yes	yes		Cities, County, VCTC
9.4	Close certain roads for use by non-motorized traffic	During special events, weekends, or certain times of the day, close some roads to all but non-motorized traffic.	yes	yes		Cities, County

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
9.5	Encouragement of Bicycle Travel	Promotion of bicycle travel to reduce automobile use and improve air quality. Bikeway system planning, routes for inter-city bike trips to help bicyclists avoid other, less safe facilities. Another area for potential actions is the development and distribution of educational materials regarding bicycle use and safety.	yes	yes		Caltrans, Cities, County, VCAPCD, VCTC
9.6	Free Bikes	Provide simple utilitarian bikes that can be used throughout the metro area and dropped off at destination for use by anyone desiring use.	no	no	No authority to implement. Evidence suggests that bicycle theft is a problem in other programs and renders this measure technically and economically infeasible.	
9.7	Cash Rebates for Bikes	Provide financial incentives to purchase bicycles and thereby encourage use.	no	no	No clear demonstration of air quality benefits.	
9.8	Close streets for special events for use by bikes and pedestrians	Self-explanatory.	yes	yes		Cities, County
9.10	Use condemned dirt roads for bike trails	Self-explanatory.	no	no	Not applicable because there are no condemned dirt roads in the region.	
Section 108(f) 10. Programs For Secure Bicycle Storage Facilities And Other Facilities, Including Bicycle Lanes, For The Convenience And Protection Of Bicyclists, In Both Public And Private Areas						
10.1	Bike racks at work sites	Self explanatory.	yes	yes		Cities, County, Employers, VCTC
10.2	Bike Racks on Buses	Bike racks would be placed on a to-be-determined number of buses to increase bicycle travel.	yes	yes		Transit Operators, VCTC

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
10.3	Regional Bike Parking Ordinance for all new construction	Bike Transit Centers for/at all employment centers 100+ employees: Bike lockers, clothing lockers, showers, cleaners drop-off and pick-up. Bike repair and rental.	no	no	No authority to implement.	
10.4	Bike lockers at Metro stations, park & ride lots, other locations	Expand existing bike lockers at Metrorail stations; install bicycle storage spaces in parking lots.	no	no	Not economically feasible.	
10.5	Development of bicycle travel facilities	Encourages a variety of capital improvements to increase bicycle use. Off-street bikeways where high-speed roadways preclude safe bicycling. Clearly mark travel facilities signs and provide adequate maintenance.	yes	yes		Cities, County, VCTC
10.6	Provide bike pedestrian facilities safety patrols	Self-explanatory.	yes	yes		Cities, County
10.7	Inclusion of bicycle lanes on thoroughfare projects	Self-explanatory.	yes	yes		Cities, County, State
10.8	Bicycle lanes on arterial and frontage roads	Self-explanatory.	yes	yes		Cities, County, State
10.9	Bicycle route lighting	Self-explanatory.	yes	yes		Cities, County, State
10.10	Expedite bicycle projects from the RTP	Create bicycle and pedestrian master plan and build out at an accelerated rate to achieve benefits in time for attainment deadline.	yes	yes		Cities, County, SCAG, VCTC

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
Section 108(f) 11. Programs To Control Extended Idling Of Vehicles						
11.1	Limit Excessive Car Dealership Vehicle Starts	Require car dealers to limit the starting of vehicles for sale on their lot(s) to once every two weeks. Presently, a number of new and used car dealers start their vehicles daily to avoid battery failure and assure smooth start-ups for customer test drives.	no	no	Not technologically feasible because vehicles in the South Central Coast are started much less frequently than in colder climates.	
11.2	Limitations on Vehicle Idling	Limitations to limit extended idling operations of trucks.	yes	yes		ARB, VCAPCD
11.3	Turn off engines while stalled in traffic	Public outreach or police-enforced program.	no	no	The measure raises safety and congestion concerns and has no clear demonstration of air quality emissions benefits.	
11.4	Restrict idling	Require idle limits for trucks.	yes	yes		ARB, VCAPCD
11.5	Reduced idling at drive-throughs. Close window service	Mandate no idling or do not allow drive-through windows during ozone season.	no	no	No clear demonstration of air quality emissions benefits. This measure is not economically feasible.	
11.6	Promote use of Pony engines	Use special battery engines to keep air conditioning and other truck systems working while truck not in use.	yes	yes		ARB, VCAPCD
11.7	Idle restrictions at airport curbsides	Police enforced.	no	no	No commercial airport in county. This measure is implemented based on security restrictions.	
11.8	Control extended idling of Buses and Trucks	Step-up enforcement of existing regulations to prevent extended vehicle idling.	no	no	Not economically feasible. Enforcement of idle restrictions is a low priority for police relative to their other missions.	

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
11.9	Outlaw idling in parking lots	Self-explanatory and police enforced program.	no	no	Not economically feasible. Enforcement of idle restrictions is a low priority for police relative to their other missions. The cost effectiveness of this measure has not been demonstrated.	
11.10	Truck Stop Electrification	Provide electric charging stations at truck stops to power heating/AC units and other on-board equipment.	yes	yes		ARB, Caltrans, VCTC
Section 108(f) 12. Program To Reduce Motor Vehicle Emissions, Consistent With Title II, Which Are Caused By Extreme Cold Start Conditions						
The definition of an "extreme cold start" specifies temperatures below 20 degrees Fahrenheit. Not applicable in the South Central Coast - no extreme cold start conditions.						
Section 108(f) 13. Employer-Sponsored Programs To Permit Flexible Work Schedules						
13.1	Alternative Work Schedules	Enables workers to choose their own working hours within certain constraints. Flextime provides the opportunity for employees to use public transit, ridesharing, and other nonmotorized transportation. A related strategy, staggered work hours, is designed to reduce peak congestion in the vicinity of the workplace.	yes	yes		Employers, VCAPCD
13.2	Modifications of Work Schedules	Implement alternate work schedules that flex the scheduled shift time for employees. Encourage the use of flexible or staggered work hours to promote off-peak driving and accommodate the use of transit and carpooling.	yes	yes		Employers, VCAPCD

13.3	Telecommunications-Telecommuting	Encourage the use of telecommuting in place of motor vehicle use where appropriate.	yes	yes		SCAG, VCAPCD
Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
13.4	Telecommunications -Teleconferencing	Encourage the use of teleconferencing in place of motor vehicle use where appropriate.	yes	yes		SCAG, VCAPCD
Section 108(f) 14. Programs And Ordinances To Facilitate Non-Automobile Travel, Provision And Utilization Of Mass Transit, And To Generally Reduce The Need For Single-Occupant Vehicle Travel, As Part Of Transportation Planning And Development Efforts Of A Locality, Including Programs And Ordinances Applicable To New Shopping Centers, Special Events, And Other Centers Of Vehicle Activity						
14.1	Areawide Public Awareness Programs	This measure focuses on conducting ongoing public awareness programs throughout the year to provide the public with information on air pollution and encourage changes in driving behavior and transportation mode use.	yes	yes		VCAPCD, VCTC
14.2	Special Event Controls	This measure would require new and existing owners/operators of the special event centers to reduce mobile source emissions generated by their events. A list of optional strategies would be available that reduce mobile source emissions. The definition of "special event center" could be developed through the rule development process.	yes	yes		VCAPCD

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
14.3	Land Use/Development Alternatives	This measure includes encouraging land use patterns which support public transit and other alternative modes of transportation. In general, this measure would also encourage land use patterns designed to reduce travel distances between related land uses (e.g., residential-commercial). Shorter trip lengths ultimately relieve traffic congestion and improve air quality.	yes	yes		Cities, County, SCAG, VCTC
14.4	Voluntary No Drive Day Programs	Conduct voluntary no drive day programs during the ozone season through media and employer based public awareness activities.	yes	yes		VCAPCD
14.5	Evaluation of the Air Quality Impacts of New Development and Mitigation of Adverse Impacts	Evaluate the air quality impacts of new development and mitigate any adverse impacts.	yes	yes		Cities, County, VCAPCD
14.6	Transportation for Livable Communities (TLC)/Housing Incentive Program	Program provides planning grants, technical assistance, and capital grants to help cities and nonprofit agencies define and implement transportation projects that support community plans including increased housing near transit.	yes	yes		SCAG, State, VCTC
14.7	Incentives to increase density around transit centers	Lower travel by increasing residential and commercial density in areas near transit.	yes	yes		Cities, County

14.8	Incentives for cities with good development practices	Provide financial or other incentive to local cities that practice air quality sensitive development.	yes	yes		Cities, SCAG, State
Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
14.9	Increase state gas tax	Self-explanatory.	no	no	No authority to implement and no clear demonstration of air quality benefits.	
14.10	Notification of Spare The Air	This measure focuses on conducting ongoing public awareness programs throughout the year to provide the public with information on air pollution and encourage changes in driving behavior and transportation mode use.	yes	yes		VCAPCD
14.11	Display air quality data on billboards	Self-explanatory.	no	no	Not economically feasible.	
14.12	Sell clean air license plate to fund air quality programs	Self-explanatory	no	no	Need state legislation. No clear demonstration of air quality benefits.	
14.13	Government Action Days (spare the air day, ozone action day)	Declare a Spare The Air day when ozone levels reach episodic thresholds so that the public is informed and encouraged to scale back activities generating pollutants.	yes	yes		VCAPCD
14.14	Vehicle tax for two or more vehicles per household	Initiate legislation to put a vehicle tax on household with two or more vehicles.	no	no	Need state legislation. No clear demonstration of air quality benefits. Not economically feasible.	
14.15	Pay-As-You-Drive Insurance	Self-explanatory.	no	no	Need state legislation. No clear demonstration of air quality emissions benefits.	
Section 108 (f) 15. Programs For New Construction And Major Reconstructions Of Paths, Tracks Or Areas Solely For The Use By Pedestrian Or Other Non-Motorized Means Of Transportation When Economically Feasible And In The Public Interest. For Purposes Of This Clause, The Administrator Shall Also Consult With The Secretary Of The Interior						
15.1	Encouragement of Pedestrian Travel	Promote public awareness and use of walking as an alternative to the motor vehicle	yes	yes		ARB, SCAG, VCAPCD

Measure No.	Measure Title	Description	Feasible for VC?	Used before in VC?	Reasoned Justification for Infeasible Measure	Potential Implementing Agency
15.2	Pedestrian and Bicycle Overpasses Where Safety Dictates	Ongoing implementation as development occurs.	yes	yes		Cities, County
15.3	Require inclusion of bicycle lanes on state and federally funded thoroughfare projects	Require bicycle lanes on all state and federally funded road projects.	no	no	No authority to implement. Not economically feasible.	
15.4	Require inclusion of paved shoulders adequate for bicycle use on state or federally funded reconstruction or widening of federal collectors	Require paved shoulders on state and federally funded roads that require reconstruction or widening.	no	no	No authority to implement. Not economically feasible.	
Section 108(f) 16. Program To Encourage The Voluntary Removal From Use And The Marketplace Of Pre-1980 Model Year Light Duty Vehicles And Pre-1980 Model Light Duty Trucks						
16.1	Counties assess ten dollar license plate fee to fund repair/replacement program for high-emitters	Self-explanatory.	no	no	No authority to implement.	
16.2	Buy vehicles older than 1975	Self-explanatory.	yes	yes		ARB, VCAPCD
16.3	Demolish impounded vehicles that are high emitters	Self-explanatory.	no	no	No authority to implement. Not economically feasible.	
16.4	Do whatever is necessary to allow cities to remove the engines of high emitting vehicles (pre-1980) that are abandoned and to be auctioned	Self-explanatory.	no	no	No authority to implement. Not economically feasible.	
16.5	Accelerated retirement program	Identify high emitting vehicle age groups and develop a program to remove them from use.	yes	yes		ARB, VCAPCD

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APPENDIX G

VENTURA COUNTY

MOBILE SOURCE

REASONABLY AVAILABLE CONTROL MEASURES ASSESSMENT

Prepared for

Ventura County Air Pollution Control District
Ventura, California

By

California Air Resources Board
Planning and Technical Support Division
Sacramento, California

Overview

To fulfill Clean Air Act (the Act) control measure requirements for ozone nonattainment areas an assessment of control measures in the SIP must be performed. For ozone nonattainment areas, the control measures must be shown to be Reasonable Available Control Measures (RACM). Since ARB is responsible for measures to reduce emissions from mobile sources needed to attain the national ambient air quality standards (standards), this chapter will discuss how California's mobile source measures meet RACM.

Given the severity of California's air quality challenges, ARB has implemented the most stringent mobile source emissions control program in the nation. ARB'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.

RACM Requirements

Subpart 1, section 172(c)(1) of the Act requires SIPs to provide for the implementation of RACM as expeditiously as practicable. U.S. EPA has interpreted RACM to be 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.

ARB developed its State SIP Strategy through a multi-step measure development process, including extensive public consultation, to develop and evaluate potential strategies for mobile source categories under ARB's regulatory authority that could contribute to expeditious attainment of the standard. First, ARB developed a series of technology assessments for heavy-duty mobile source applications and the fuels necessary to power them[1] along with ongoing review of advanced vehicle technologies for the light-duty sector in collaboration with U.S. EPA and the National Highway Traffic Safety Administration. ARB staff then used a scenario planning tool to examine the magnitude of technology penetration necessary, as well as how quickly technologies need to be introduced to meet attainment of the standard.

ARB staff released a discussion draft Mobile Source Strategy[2] for public comment in October 2015. This strategy specifically outlined a coordinated suite of proposed actions to not only meet federal air quality standards, but to also achieve greenhouse gas emission reduction targets, reduce petroleum consumption, and decrease health risks from transportation emissions over the next 15 years. ARB staff held a public workshop on October 16, 2015 in Sacramento, and on October 22, 2015, ARB held a public Board meeting to update the Board and solicit public comment on the Mobile Source Strategy in Diamond Bar.

[1] Technology and Fuel assessments http://www.arb.ca.gov/msprog/tech/tech.htm
[2] 2016 Mobile Source Strategy http://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.htm

Staff continued to work with stakeholders to refine the measure concepts for incorporation into related planning efforts including the 75 ppb 8-hour ozone SIPs. On May 2016, ARB released an updated Mobile Source Strategy. On May 17, 2016, ARB released the proposed State SIP strategy for a 45-day public comment period.

The current mobile source program and proposed measures included in the State SIP Strategy provide attainment of the ozone standard as expeditiously as practicable and meet RFP requirements.

Waiver Approvals

While the Act preempts most states from adopting emission standards and other emission-related requirements for new motor vehicles and engines, it allows California to seek a waiver or authorization from the federal preemption to enact emission standards and other emission-related requirements for new motor vehicles and engines and new and in-use off-road vehicles and engines that are at least as protective as applicable federal standards, except for locomotives and engines used in farm and construction equipment which are less than 175 horsepower (hp).

Over the years, California has received waivers and authorizations for over 100 regulations. The most recent California standards and regulations that have received waivers and authorizations are Advanced Clean Cars (including ZEV and LEV III) for Light-Duty vehicles, and On-Board Diagnostics, Heavy-Duty Idling, Malfunction and Diagnostics System, In-Use Off-Road Diesel Fleets, Large Spark Ignition Fleet, Mobile Cargo Handling Equipment for Heavy-Duty engines. Other Authorizations include Off-Highway Recreational Vehicles and the Portable Equipment Registration Program.

Finally, ARB obtained an authorization from U.S. EPA to enforce adopted emission standards for off-road engines used in yard trucks and two-engine sweepers. ARB adopted the off-road emission standards as part of its "Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants from In-Use Heavy-Duty Diesel-Fueled Vehicles," (Truck and Bus Regulation). The bulk of the regulation applies to in-use heavy-duty diesel on-road motor vehicles with a gross vehicle weight rating in excess of 14,000 pounds, which are not subject to preemption under section 209(a) of the Act and do not require a waiver under section 209(b).

Light- and Medium-Duty Vehicles

Light- and medium-duty vehicles are currently regulated under California's Advanced Clean Cars program including the Low-Emission Vehicle III (LEV III) and Zero-Emission Vehicle (ZEV) programs. Other California programs such as the 2012 Governor Brown Executive Order to put 1.5 million zero-emission vehicles on the road by 2025, and California's Reformulated Gasoline program (CaRFG) will produce substantial and cost-effective emission reductions from gasoline-powered vehicles.

ARB is also active in implementing programs for owners of older dirtier vehicles to retire them early. The "car scrap" programs, like the Enhanced Fleet Modernization Program, and Clean Vehicle Rebate Project provide monetary incentives to replace old vehicles with zero-emission vehicles. The Air Quality Improvement Program (AQIP) is a voluntary incentive program to fund clean vehicle.

Taken together, California's emission standards, fuel specifications, and incentive programs for on-road light- and medium-duty vehicles represent all measures that are technologically and economically feasible within California.

Heavy-Duty Vehicles

California's heavy-duty vehicle emissions control program includes requirements for increasingly tighter new engine standards and address vehicle idling, certification procedures, on-board diagnostics, emissions control device verification, and in-use vehicles. This program is designed to achieve an on-road heavy-duty diesel fleet with 2010 engines emitting 98 percent less NOx and PM2.5 than trucks sold in 1986.

Most recently in the ongoing efforts to go beyond federal standards and achieve further reductions, ARB adopted the Optional Reduced Emissions Standards for Heavy-Duty Engines regulation in 2014 that establishes the new generation of optional NOx emission standards for heavy-duty engines.

The recent in-use control measures include On-Road Heavy-Duty Diesel Vehicle (In-Use) Regulation, Drayage (Port or Rail Yard) Regulation, Public Agency and Utilities Regulation, Solid Waste Collection Vehicle Regulation, Heavy-Duty (Tractor-Trailer) Greenhouse Gas Regulation, ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling, Heavy-Duty Diesel Vehicle Inspection Program, Periodic Smoke Inspection Program, Fleet Rule for Transit Agencies, Lower-Emission School Bus Program, and Heavy-Duty Truck Idling Requirements. In addition, ARB's significant investment in incentive programs provides an additional mechanism to achieve maximum emission reductions from this source sector.

Taken together, California's emission standards, fuel specifications, and incentive programs for heavy-duty vehicles represent all measures that are technologically and economically feasible within California.

Off-Road Vehicles and Engines

California regulations for off-road equipment include not only increasingly stringent standards for new off-road diesel engines, but also in-use requirements and idling restrictions.

The Off-Road Regulation is an extensive program designed to accelerate the penetration of the cleanest equipment into California's fleets, and impose idling limits on off-road diesel vehicles.

The program goes beyond emission standards for new engines through comprehensive in-use requirements for legacy fleets.

Engines and equipment used in agricultural processes are unique to each process and are often re-designed and tailored to their particular use. Fleet turnover to cleaner engines is the focus for these engines.

Taken together, California's comprehensive suite of emission standards, fuel specifications, and incentive programs for off-road vehicles and engines represent all measures that are technologically and economically feasible within California and when considered in aggregate, would advance the attainment date by at least one year.

Other Sources and Fuels

The emission limits established for other mobile source categories, coupled with U.S. EPA waivers and authorization of preemption establish that California's programs for motorcycles, recreational boats, off-road recreational vehicles, cargo handling equipment, and commercial harbor craft sources meet the requirements for RACM and BACM.

Cleaner burning fuels also play an important role in reducing emissions from motor vehicles and engines as ARB has adopted a number of more stringent standards for fuels sold in California, including the Reformulated Gasoline program, low sulfur diesel requirements, and the Low Carbon Fuel Standard. These fuel standards, in combination with engine technology requirements, ensure that California's transportation system achieves the most effective emission reductions possible.

Taken together, California's emission standards, fuel specifications, and incentive programs for other mobile sources and fuels represent all measures that are technologically and economically feasible within California.

Summary

California's long history of comprehensive and innovative emissions control has resulted in the most stringent mobile source control program in the nation. U.S. EPA has previously acknowledged the strength of the program in their approval of ARB's regulations and through the waiver process. In its 2011 approval of the Valley's 8-hour ozone plan which included the State's current program and new measure commitments, U.S. EPA found that there were no further reasonably available control measures that would advance attainment of the standard in the Valley.

In addition, U.S. EPA has provided past determinations that ARB's mobile source control programs meet Best Available Control Measure (BACM) requirements, which are more stringent than RACM, as part of their 2004 approval of the San Joaquin Valley's 2003 PM10 Plan: "We believe that the State's control programs constitute BACM at this time for the mobile source and

fuels categories, since the State's measures reflect the most stringent emission control programs currently available, taking into account economic and technological feasibility."

Since then, ARB has continued to substantially enhance and accelerate reductions from our mobile source control programs through the implementation of more stringent engine emissions standards, in-use requirements, incentive funding, and other policies and initiatives as described in the preceding sections.

ARB finds that with the current mobile source control program; there are no additional reasonable available control measures that would advance attainment of the 75 ppb 8-hour ozone standard in Ventura County. There are no reasonable regulatory control measures excluded from use in this plan; therefore, there are no emissions reductions associated with unused regulatory control measures. As a result, California's mobile source control programs fully meet the requirements for RACM.

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APPENDIX H

PROTOCOL FOR PHOTOCHEMICAL MODELING OF OZONE IN VENTURA COUNTY

Prepared for

Ventura County Air Pollution Control District
Ventura, California

By

South Coast Air Quality Management District
Diamond Bar, California

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Preface

This appendix contains the first component of Ventura County's attainment demonstration for the 2008 federal ozone standard: the *Protocol for Photochemical Modeling of Ozone for Ventura County* (Protocol). The second component is the *Ventura County CMAQ Model Performance Analysis*, which can be found in Appendix I, and the third is the *Ventura County Unmonitored Area Analysis*, which can be found in Appendix J.

All three components were prepared by the South Coast Air Quality Management District (SCAQMD) as part of the Southern California regional air quality modeling effort for the 2008 federal ozone standard. This effort covered the South Coast, San Diego County, Imperial County, Coachella Valley, Western Mojave Desert, and Ventura County ozone nonattainment areas.

The Protocol is directly from Appendix V, *Modeling and Attainment Demonstrations*, of the SCAQMD's Final 2016 Air Quality Management Plan (AQMP). The only changes made to it were minor formatting and editing changes. Therefore, references to the 2016 AQMP and prior AQMPs refer to the 2016 SCAQMD AQMP and prior SCAQMD AQMPs, respectively. Likewise, references to other air quality standards in the Protocol, such as PM2.5, are those air quality standards subject to the 2016 SCAQMD AQMP and not the 2016 Ventura County AQMP. The 2016 Ventura County AQMP only addresses the 2008 federal ozone standard in Ventura County.

Introduction

One of the basic requirements of a modeling attainment demonstration is the development of a comprehensive modeling protocol that defines the scope of the regional modeling analyses including the attainment demonstration methodology, meteorological and chemical transport platforms, gridded and speciated emission inventories, and geographical characteristics of the modeling domains. The Protocol also defines the methodology used to assess model performance and the selection of the simulation periods.

The 2012 AQMP provided a comprehensive discussion of the modeling protocol used for the development of the PM2.5 and ozone attainment demonstrations. The 2012 AQMP Modeling Protocol, presented in the Chapter 2 of Appendix V of the 2016 AQMP, served as the prototype for the 2016 AQMP modeling protocol.

The 2016 AQMP demonstrated the attainment of ozone and PM2.5 standards in 12 future landmark years (See Table H-1). The future attainment years are identified based on nonattainment designation, pollutant standards, and geographical area. 2012 was chosen as the base year to maintain consistency with the base year employed in the Southern California Association of Government's (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS).

Table H-1
Modeling Years for 2016 AQMP

Modeling Year	Plan	NAAQS	Areas
2012	Base Year	Modeling Base Year	
2017	2008 8-hour ozone	75 ppb	Imperial, San Diego
2018	1997 8-hour ozone	80 ppb	Coachella, W. Mojave Desert
2019	2006 24-hour PM2.5	35 µg/m3	South Coast
2020	**2008 8-hour ozone**	**75 ppb**	**Ventura**
2021	Annual PM2.5	12 µg/m3	South Coast
2022	1-hour ozone	120 ppb	South Coast
2023	1997 8-hour ozone	80 ppb	South Coast
	Annual PM2.5	12 µg/m3	South Coast
2025	Annual PM2.5	12 µg/m3	South Coast
2026	2008 ozone	75 ppb	Coachella, W. Mojave Desert
2031	2008 ozone	75 ppb	South Coast
2037	2015 ozone	70 ppb	South Coast

Attainment Demonstration

8-hour Ozone

The strategy used to demonstrate attainment depends on the pollutant of interest. The 8-hour attainment demonstration was performed based on the EPA guidance document, "Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze," issued on Dec 3, 2014. Compared to the previous guidance, (U.S. EPA, 2007), the ozone attainment demonstration has been significantly updated.

The new guidance requires that a maximum concentration be determined among 9 grids around a monitoring station and the specific grid location to be carried to a future year modeling scenario when calculating relative response factors (RRF). This 3X3 grid is recommended for all model grid resolutions. This differs from the previous modeling guidance that recommended a 7X7 grid for a 4 km grid resolution simulation - the grid resolution used in the modeling. Another major difference is the number of days accounted in the attainment demonstration.

In the 2012 and earlier AQMPs, all days that met the selection criteria were used to calculate future year design values. The specific criteria used in the last AQMP required that the predicted daily max was within the 20% error of the site-specific design value, the unpaired daily-max prediction error was less than 20%, and the prediction was higher than the federal standard for

inclusion. In the new guidance, the number of days accounted for in the RRF calculation is limited to the top 10 days of the base year simulated concentrations. In the past, the uniquely high ozone concentrations in the basin led to the inclusion of tens of days in the RRF calculation. For example, the Crestline site, a design site in the 2012 AQMP, typically would have over 50 days or more included in the RRF calculation. On the other hand, a focus on the top ten days meeting the selection criteria in the new methodology produces future-year design values that are more responsive to emission reductions.

Annual PM2.5

The Final 2016 AQMP annual PM2.5 modeling employs the same approach to estimate the future year annual PM2.5 levels as described in the 2012 and 2007 AQMP attainment demonstrations, except for the changes described in the 2014 U.S. EPA guidance document (U.S. EPA, 2014). The site- and species-specific RRF approach is consistent with the previous AQMPs. Four Speciation Air Sampler System (SASS) sites and Mira Loma, the design site of the Basin, were used in the analysis. Quarterly averaged speciation fractions from the 2012 SASS measurements and quarterly-mean PM2.5 concentrations from corresponding Federal Reference Method (FRM) monitors (five years and 20 quarters) were used to determine quarterly averaged concentrations for nitrate ion (NO3), ammonium ion (NH4), sulfate ion (SO4), elemental carbon (EC), organic carbon (OC), sea salt, and other primary PM2.5 material.

The modeling platform developed for the ozone attainment demonstration was extended to the entire year to acquire quarterly average RRFs for each of the seven relevant species. Component-specific RRF values were applied to the base-year species concentrations to forecast future year component-specific concentrations. Particle bound water is then calculated using EPA's regression model approximation of the AIM model based on simulated concentrations of the ammonium, nitrate, and sulfate ions (U.S. EPA, 2006). All species concentrations, along with a "blank" concentration, are summed for each quarter to produce quarterly averaged future total PM2.5 concentrations. A five-year weighted average of the annual mean concentrations is then calculated to produce a future-year five-year weighted design value.

24-hour PM2.5

FRM mass and species specific mass were calculated using an approach similar to the one followed for the annual design value, except that the eight highest days from each quarter were included in the calculation. This is based on the assumption that the 98^{th} percentile value can occur in any quarter and the 8^{th} highest is the 98^{th} percentile of 365 samples. Then, 32 sets of FRM mass and corresponding species fractions were retrieved per year, for the five-year period from 2010 to 2014. A set of species-specific RRFs were generated for each future year simulation from the top 10% of modeled PM2.5 days. RRFs were generated for the NH4, NO3, SO4, OC, EC, salt and a combined grouping of other primary PM2.5 material (Other).

A total of seven species specific RRFs were generated per quarter. Then future year concentrations of the seven component species were calculated by applying the model generated

quarterly RRFs to the speciated 160 base year design values (eight days per quarter, four quarters per year and five year period). Particle bound water was determined using EPA's regression model approximation of the AIM model based on simulated concentrations of the ammonium, nitrate and sulfate ions (U.S. EPA, 2006). A blank mass of 0.5 µg/m3 was added to each base and future year simulation. The 32 days in each year (eight per quarter) were then re-ranked based on the sum of all predicted PM species to establish a new 98th percentile concentration. A weighted average of the resulting future year 98th percentile concentrations for each of the five years was used to calculate future design values for the attainment demonstration.

1-hour Ozone

No specific modeling guidance applies to the 1-hour ozone analysis since the standard has been revoked.

The 1997 AQMP and 2003 AQMP 1-hour ozone attainment demonstrations relied on direct output from model simulations to project future year air quality and design values. This "deterministic" approach was based on the premise that future year projected baseline inventories were accurate and the impacts of implementing the control program were well simulated. In addition, the form of the 1-hour ozone standard was directed at the fourth highest concentration in a three-year period for a given air monitoring station. In essence, the analysis looked at the 2nd highest concentration in a given year, typically occurring during the worst-case meteorological scenario.

The 2012 AQMP attainment demonstration relied primarily on the "deterministic approach" and included the RRF methodology as weight of evidence discussion. Similar to the 2012 AQMP, the current AQMP utilized both "deterministic" and RRF approaches, given the fact that there is no official guidance for 1-hour ozone and both approaches have their limitations and strengths.

The deterministic method relies on accurate modeling and the proper selection of a meteorological episode while the RRF approach tends to place less reliance on individual day model performance since the factor is based on an average of several events having similar meteorological profiles. However, basing the RRF on multiple days may mask the meteorological profile characteristics of an extreme event such as an annual second maximum concentration.

However, even if the RRF approach similar to the 8-hour demonstration was employed, the number of days included in the RRF calculation was re-evaluated. This was intended to accommodate the definition of the 1-hour design value in contrast to that of the 8-hour. The 8-hour ozone standard takes the 4th highest readings of a year and averages over a three-year period. However, the 1-hour standard allows one exceedance a year, resulting in the 4th highest of a three-year period to be a design value. In other words, the 1-hour standard focuses on the 1st or the 2nd highest of a year, while the 8-hour accounts for the 4th highest. Therefore, the number

of days included in the RRF calculation was determined to be three days, after carefully examining CMAQ performance to capture episode days which occurred in 2012.

Numerical Models Employed for the 2016 AQMP

Table H-2 provides a side-by-side comparison of the 2007, 2012 and the current 2016 AQMP modeling protocols. The modeling protocol was significantly updated from the 2007 to the 2012 AQMP; however, changes between the 2012 and 2016 AQMP were minimal. In general, changes have occurred in the following categories: emissions inventories, future-year simulations, the level of the non-attainment designation and attainment demonstration methodology. As such, these changes are expected to occur as part of each modeling update.

Table H-2
Numerical Modeling Platforms and Domains for 2016 and Previous AQMPs

	2007 AQMP	2012 AQMP	2016 AQMP
Modeling Base Year	2005 Ozone: episode based PM: Annual	2008 Ozone: June – Aug PM: Annual	2012 Ozone: May – Sep PM: Annual
Chemical Transport Model	CAMx	CMAQ as primary tool CAMx as weight of evidence	CMAQ
Meteorological Model	MM5 version 3, Non-Hydrostatic model Hybrid of MM5/CALMET as weight of evidence	WRF version 3.3 with Updated Land Use	WRF version 3.6 with Updated Land Use
Emission: On-Road	EMFAC 2007	EMFAC 2011 EMFAC-LDV EMFAC-HD EMFAC-SG	EMFAC 2014 Single package
Off-Road	CARB OFFROAD Model	Category Specific Calculation	Category Specific Calculation
Modeling Domain	Separate domains for O3 and PM modeling O3: 550 km by 370 km in E-W and N-S PM: 325 km by 200 km	624 km by 408 km	624 km by 408 km
Grid Resolution	5 km by 5 km grid	4 km by 4 km grid	4 km by 4 km grid
Vertical Layer	O_3: 16 layers up to 5km above the ground level (agl) PM: 8 layers	18 layers with 14 layers below 2,000 m agl and 50 hPa as top boundary	18 layers with 14 layers below 2,000 m agl and 50 hPa as top boundary

An entire year from January to December was simulated for the PM attainment demonstration – both 24-hour and annual averages. Similarly, five consecutive months starting from May 1st until September 30th were modeled for the ozone analysis. While this approach is similar to the approach used in the 2012 AQMP, it differs from the 2007 AQMP and prior AQMPs, which focused on selected high ozone episodes.

As in the 2012 AQMP, CMAQ was selected as the primary chemical transport modeling platform in the 2016 AQMP. CMAQ is a community model readily available in the public domain, allowing for the incorporation of the most recent algorithms and parameterizations as compared to models maintained by the private sector. For example, CMAQ has been recently equipped with the newest chemical mechanism, SAPRC07, however, CAMx still uses the older version of SAPRC99. In addition, as demonstrated in the 2012 AQMP, CMAQ performed comparatively to or better than CAMx when simulating photochemistry within the Basin. Note that CAMx was employed for a weight of evidence analysis in the 2012 AQMP and as the primary dispersion platform in the 2007 AQMP.

The CMAQ version used for 2016 AQMP included a modification in the subroutine "rdbcon.F," which reads lateral boundary values from the boundary conditions file. The original " rdbcon.F" repeatedly accesses boundary files at evert chemical sync step, even though the boundary values stay constant during an hour window. The updated version reads the boundary values only once in every hour, which is the frequency interval of both the MCIP meteorological input file and the boundary conditions file. This modification reduces CPU time substantially by decreasing the input read time, while results do not change because the boundary values read by CMAQ are the same.

The update was reported to Community Modeling and Analysis System (CMAS) center that is in charge of CMAQ update and maintenance. An additional modification was included in the AERO_DATA.F subroutine to by-pass the reading of PH2O emissions. Emissions of PH2O is not included in the AQMP inventory. The default AERO6 subroutine in CMAQ requires PH2O emissions, and if these species are not present in the emission files, CMAQ does not run. This subroutine was modified so that these species are no longer required to continue with the simulation. Details of the CMAQ configuration are given in Table H-3.

Table H3
Chemical Transport Modeling Platform for 2016 and 2012 AQMPs

Options	2012 AQMP	2016 AQMP
Numerical Model	CMAQ version 4.7.1 as primary CAMx as Weight of Evidence	CMAQ version 5.0.2
Modeling Grid	156 by 102 grids with 4 km grid distance	Same
Gas Phase Chemical Mechanism	SAPRC99	SAPRC07 with version "c" toluene updates
Aerosol Mechanism	AERO5	AERO6
Chemical Solver	Euler Backward Iterative solver (EBI)	Same
Horizontal Advection	Piecewise Parabolic Method (PPM)	Yamo
Vertical Advection	PPM	WRF
Horizontal Diffusion	Multiscale CMAQ scheme	Same
Vertical Diffusion	ACM2	Same
Photolysis	Lookup table	In-line Calculation
Initial Values	Clean Homogeneous Condition	Same
Boundary Values	Model for OZone and Related chemical Tracers (MOZART)	Same

The Weather Research and Forecast (WRF) model remained the primary tool for meteorological modeling. For the 2016 AQMP, WRF was updated with the most recent version (version 3.6) available at the time of this protocol preparation and was evaluated with a set of input data, which include land-use classification and sea-surface temperature initialization fields as shown in Table H-4.

Table H-4
Meteorological Modeling Platform for 2016 and 2012 AQMPs

Options	2012 AQMP	2016 AQMP
Numerical Model	WRF version 3.3	WRF Version 3.6.1
Nesting	Same	Same
Vertical Layers	30 layers with the lowest layer at 20 m agl	Same
Simulation Length	4 day with 24 hour spin-up	Same
Initial & Boundary Value	NAM Analysis field	NAM analysis field NARR analysis field
Land use	Modified USGS land use with 24 categories	Modified USGS land use with 24 categories MODIS satellite retrieved land use
Sea Surface Temperature	NAM surface analysis field	NAM surface analysis field Global Ocean Data Assimilation Experiment (GODAE) SST
Surface Layer Scheme	Slab Thermal Diffusion scheme	Slab Thermal Diffusion scheme NOAH scheme
Planetary Boundary Layer (PBL) scheme	YSU	Same
Data Assimilation	Analysis nudging at every 6 hours for the outermost domain only No temperature and moisture nudging for the PBL	Same

WRF simulations were conducted with three nested domains with grid resolutions of 36, 12 and 4 km (Figure H-1). The innermost domain spans 652 km by 460 km in the east–west and north–south directions, respectively, which includes the greater Los Angeles area, its surrounding mountains, and ocean waters off the coast of the Basin (Figure 2). A Lambert conformal map projection was used with reference latitudes of 30° and 60° N and the center of the modeling domain positioned at 37° N and 120° 30 ′ W.

Figure H-1
Three nested domains used in WRF simulation

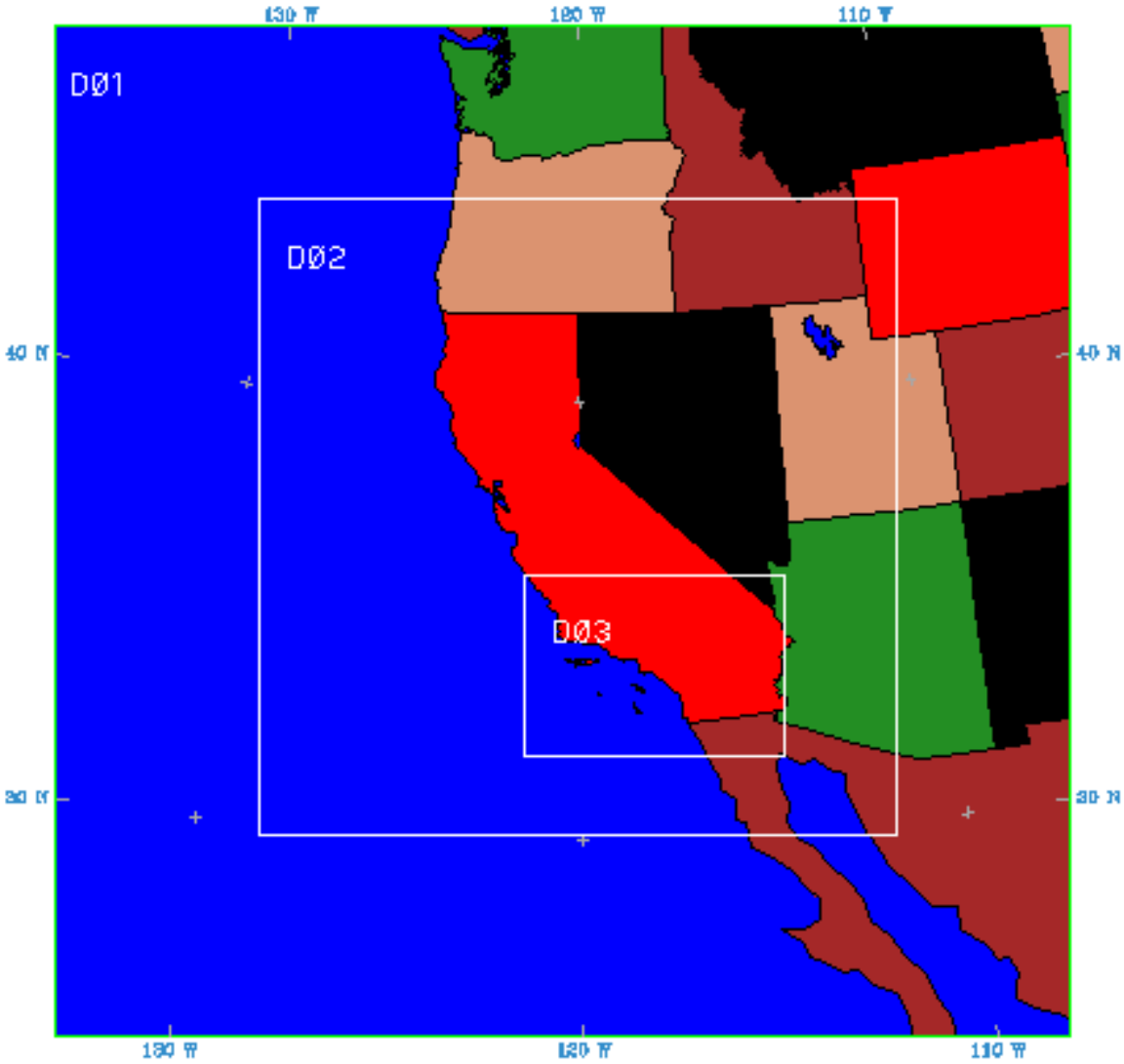
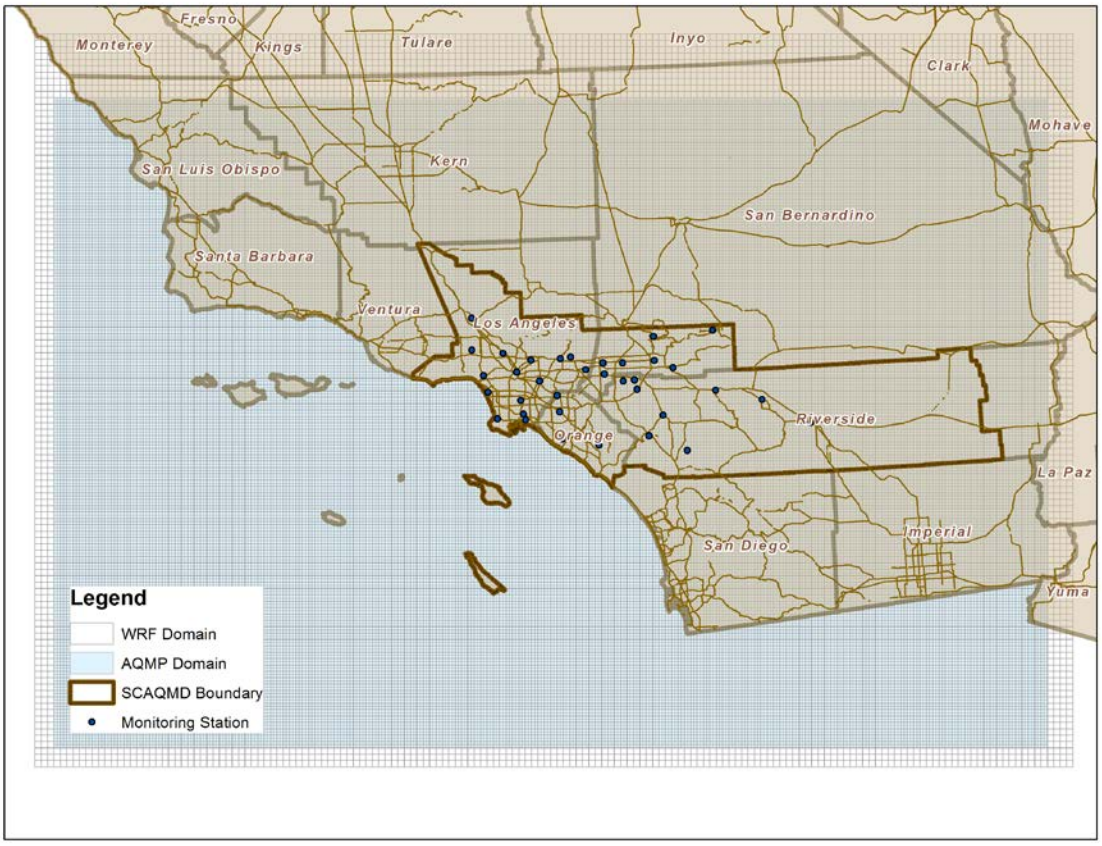


Figure H-2
The relative locations of the innermost WRF domain compared to the CMAQ domain



The South Coast AQMD boundaries and air monitoring locations are overlaid by a thick solid line and black dots, respectively, in Figure 2 above. The model employed 30 vertical layers, with the lowest computational layer centered approximately at 20 m agl and a top layer centered at 50 hPa. Note that the WRF layers given in the Table H-5 are layer interfaces, meaning that actual computational volume is defined as the space between layer interfaces. The National Center for Environmental Prediction (NCEP) North American Model (NAM) output (grid 212, 40 km grid spacing) together with vertical soundings and surface measurements were used to compile initial and boundary values for the outermost domain as well as for the Four Dimensional Data Assimilation (FDDA) to WRF.

The YSU planetary boundary layer scheme, WSM 3-class simple ice microphysics scheme, RRTM longwave radiation, and Dudhia shortwave radiation were chosen as the default methods for the AQMP simulations after carefully considering various options available for WRF. Kain–Fritsch cumulus schemes were employed for the outer two domains, while no cumulus parameterization was used for the innermost domain. The thermal diffusion land-surface scheme was employed after evaluating the NOAH and Pleim-Xu schemes extensively.

Table H-5
Vertical Computational Layer Interfaces
for 2016 AQMP Modeling

Layer Index	Eta Level for WRF	Eta Level for CMAQ
31	0.0000	0.0000
30	0.0232	
29	0.0493	
28	0.0788	0.0788
27	0.1120	
26	0.1495	
25	0.1917	
24	0.2394	
23	0.2930	0.2930
22	0.3536	
21	0.4218	
20	0.4954	
19	0.5635	
18	0.6254	0.6254
17	0.6809	
16	0.7301	
15	0.7733	0.7733
14	0.8107	0.8107
13	0.8431	0.8431
12	0.8709	0.8709
11	0.8946	0.8946
10	0.9148	0.9148
9	0.9319	0.9319
8	0.9463	0.9463
7	0.9585	0.9585
6	0.9688	0.9688
5	0.9774	0.9774
4	0.9846	0.9846
3	0.9907	0.9907
2	0.9958	0.9958
1	1.0000	1.0000

Emission Processing

On-Road mobile source emissions were calculated based on EMFAC 2014 and the 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). Temporal and spatial allocation of on-road emissions were improved to accurately represent continuous measurements from in-road traffic sensors. Traditionally, on-road vehicle count is specified at five time periods of the day: morning peak (7-9am), mid-day (10am-3pm), afternoon peak (4-7pm), evening peak (8-9pm) and night (10pm-6am). This profile was used to simulate a typical weekday traffic pattern in the Basin.

The traffic count was then scaled to reflect changes in volume during each day of week based on an adjustment factor from CARB. However, this approach does not account for variations in traffic patterns due to seasonal changes, holidays, cultural activities or weather since it simulates a 'typical weekday' traffic flow. In an attempt to reflect such seasonal and cultural effects within the on-road emissions, new temporal allocation profiles were constructed from traffic measurements available through the California Department of Transportation Performance Measurement System (PeMS).

The PeMS network collects traffic data over 9,000 sensor locations within the Basin on a real-time basis at 5-minute time resolution, providing an actual real world traffic allocation that reflects social events, responses to weather conditions, and cultural behavior. This new PeMS-based methodology reallocates emissions temporally and spatially but does not affect the total amount of emissions from on-road mobile sources.

Off-Road emissions reflect updated speciation profiles and spatial surrogate factors for the following categories: construction equipment, recreational boats, composting, dairy cattle count, prescribed burning in future years, agricultural burning, architectural coatings, aircraft emissions, and military ordinance and vehicles on the San Clemente Naval Station. Gasoline dispensing facilities and oil and gas operations are subject to changes based on revised CARB and EPA emission calculation methodologies, respectively. Table H-6 summarizes changes in emission processing methodology between the 2012 and 2016 AQMP. The list of categories adjusted for day specific weather and activity is given in Table H-7.

Table H-6
Summary of Emission Processing for 2012 and 2016 AQMPs

Options	2012 AQMP	2016 AQMP
On-Road Emissions	EMFAC 2011 o Three modules Light Duty Vehicles (LDV), Heavy Duty vehicles (HD) and Scenario Generating module (SG) o Modified DTIM	EMFAC 2014 o Single package integrated all the three components of the previous version o Emissions mode to get total amount of emissions in Tons per Day o Emissions rate to estimate grams per emissions of specific vehicle category, activity, etc.
	Temporal Allocation using CARB/Caltrans Adjustment Factors	Temporal Allocation using Caltrans real-time traffic data
Vehicle Miles Traveled	2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)	SCAG RTP 2016
Off-Road Emissions	Category Specific Calculation	Same
Mexico Emissions	Revised Mexican emissions profile	Same

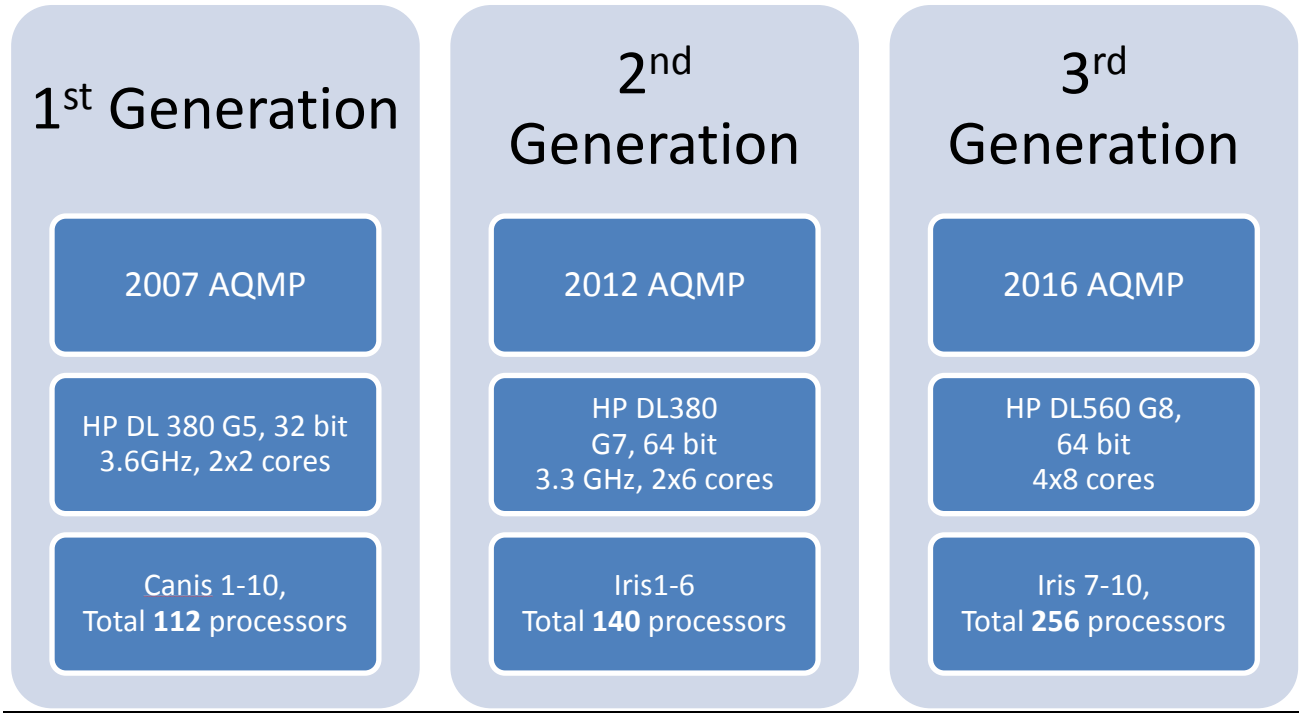
Table H-7
List of Emission Categories with Day-Specific Adjustments

Day-Specific Emission Categories
• Ocean-going vessels • Agricultural burning • Wildfires • Prescribed burns • Residential wood combustion (curtailment programs) • Facilities that have closed since 2012 • Facilities that have had large upsets • Paved road dust • Unpaved road dust • Windblown dust • Livestock dust • Biogenic and On-Road motor vehicle emissions are adjusted using day/hour-specific meteorological data.

Computational Resources

The main computation platform employs Linux-based parallel processing computers. New servers, compiled to enhance computational capability, were configured with Red-Hat version 6.4 O/S and 64 bit operating systems. The Fortran and C compilers were transitioned to Intel group compilers for the current AQMP, while Portland Group Compilers were used in the default configuration for the 2012 AQMP. The shift to the Intel compilers was initiated to provide a 10-20% improvement in computational speed. Details of the computing resources are summarized in Table H-8.

Table H-8
Details of Computational Resources used in the 2007, 2012 and 2016 AQMPs



References

U.S. EPA (2007) Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze, EPA-454/B-07-002.

U.S. EPA (2014) Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze.

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APPENDIX I

VENTURA COUNTY COMMUNITY MULTISCALE AIR QUALITY MODEL

PERFORMANCE ANALYSIS

Prepared for

Ventura County Air Pollution Control District
Ventura, California

By

South Coast Air Quality Management District
Diamond Bar, California

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Preface

This appendix contains the second component of Ventura County's attainment demonstration for the 2008 federal ozone standard: the Ventura County Community Multiscale Air Quality (CMAQ) Model Performance Analysis. The first component is the Protocol for Photochemical Modeling of Ozone for Ventura County, which can be found in Appendix H, and the third is the Ventura County Unmonitored Area Analysis, which can be found in Appendix J.

All three components were prepared by the South Coast Air Quality Management District (SCAQMD) as part of the Southern California regional air quality modeling effort for the 2008 federal ozone standard. This effort covered the South Coast, San Diego County, Imperial County, Coachella Valley, Western Mojave Desert, and Ventura County ozone nonattainment areas. The Ventura County CMAQ Model Performance Analysis is as provided by the SCAQMD. The only changes made to it were minor formatting and editing changes.

Introduction

The 2016 AQMP was developed using the EPA recommended CMAQ (version 5.0.2) modeling platform with SAPRC07 chemistry, and the Weather Research and Forecasting Model (WRF) (version 3.6) meteorological fields. Comprehensive descriptions of the CMAQ modeling system are provided by EPA at their SCRAM website: http://www.epa.gov/scram001/. Additional descriptions of the SAPRC99 chemistry module are provided at the UCR website: http://www.engr.ucr.edu/~carter/SAPRC/. Documentation of the NCAR WRF model is available from UCAR website: http://www.wrf-model.org. Further information regarding CMAQ can also be found in Appendix V, Modeling and Attainment Demonstration, of the SCAQMD's Final Draft 2016 AQMP.

Statistical Evaluation

The statistics used to evaluate 8-hour average CMAQ ozone performance include the following:

Statistic for O_3	Definition
Daily-Max Bias Error Unpaired	Average of the differences in observed and predicted daily maximum values. Negative values indicate under-prediction $BiasError = \frac{1}{N}\sum(Obs - Pred)$
Daily-Max Bias Error Paired	Average of the differences in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached. Negative values indicate under-prediction

	$BiasError = \frac{1}{N}\sum(Obs - Pred)$
Daily-Max Gross Error Unpaired	Average of the absolute differences in observed and predicted daily maximum values $GrossError = \frac{1}{N}\sum\lvert Obs - Pred\rvert$
Daily-Max Gross Error Paired	Average of the absolute differences in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached $GrossError = \frac{1}{N}\sum\lvert Obs - Pred\rvert$
Normalized Daily-Max Bias Error Unpaired	Average of the quantity: difference in observed and predicted daily maximum values normalized by the observed daily maximum values. Negative values indicate under-prediction $NormBiasError = \frac{1}{N}\sum\left(\frac{Obs-Pred}{Obs}\right)\cdot 100$
Normalized Daily-Max Bias Error Paired	Average of the quantity: difference in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached normalized by the observed daily maximum concentration. Negative values indicate under-prediction $NormBiasError = \frac{1}{N}\sum\left(\frac{Obs-Pred}{Obs}\right)\cdot 100$
Normalized Daily-Max Gross Error Unpaired	Average of the quantity: absolute difference in observed and predicted daily maximum values normalized by the observed daily maximum concentration $NormGrossError = \frac{1}{N}\sum\left\lvert\frac{Obs-Pred}{Obs}\right\rvert\cdot 100$
Normalized Daily-Max Gross Error Paired	Average of the quantity: absolute difference in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was

	reached normalized by the observed daily maximum concentration $NormGrossError = \frac{1}{N}\sum\left\|\frac{Obs-Pred}{Obs}\right\| \cdot 100$
Peak Prediction Accuracy Unpaired	Difference in the maximum of the observed daily maximum and the maximum of the predicted daily maximum normalized by the maximum of the observed daily maximum $PPA = \frac{(maximum(Pred)-\text{maximum}(Obs))}{\text{maximum}(Pred)}$

Predicted concentrations are extracted from model output in the grid cell that each monitoring station resides.

Staff evaluated the base year average regional model performance for May through September 2012 for days when Basin maximum 8-hour ozone levels were at least 60 ppb. Ozone performance criteria are presented in Table I -1. Only stations with more than 74.5% (EPA's data completeness requirement) of the hourly measurements during each month of the ozone season were included in the analysis.

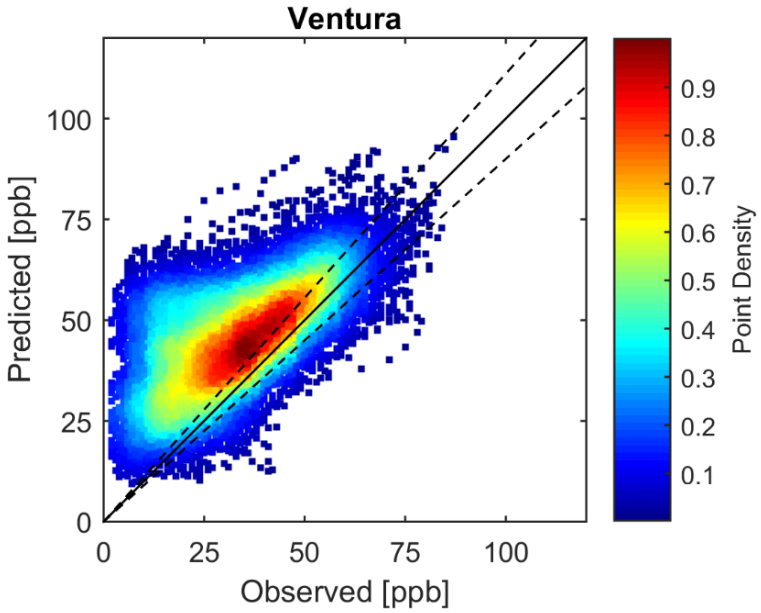
Ozone measurements from monitors in Thousand Oaks, Piru, Ojai, Simi Valley, and El Rio were compiled for the analysis.

Table I-1
2012 Base Year 8-Hour Average Ozone Performance for Days When Regional 8-Hour Maximum ≥ 60 ppb

Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Number of Daily Max > 60 ppb	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Error Paired [ppb]	Daily-Max Gross Error Unpaired [ppb]	Daily-Max Gross Error Paired [ppb]	Norm Daily-Max Bias Error Unpaired [%]	Norm Daily-Max Bias Error Paired [%]	Norm Daily-Max Gross Error Unpaired [%]	Norm Daily-Max Gross Error Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	53.3	36.6	90	63.8	63.1	57.6	6.2	5.5	7.8	7.6	9.4	8.3	12.2	12.1	5
Jun	48.7	37.6	50	60.2	59.5	57	3.2	2.5	8.1	8	4.3	3	13.6	13.7	8.6
Jul	46.9	36.1	60	60.3	59.7	58.2	2.1	1.4	11.2	11.1	2.1	0.9	18.6	18.8	6.2
Aug	49.80	34.3	105	64.1	63.5	59	5.1	4.5	8.8	8.8	7.7	6.7	13.9	14	8.5
Sep	50.8	34.6	85	64.2	63.4	60	4.2	3.4	9.2	9.1	6	4.7	14.8	14.9	-1.8

Density scatter plots displaying all 17,854 8-hour ozone measurements from all monitors in the region are shown in Figure I-1.

Figure I-1
Density scatter plot of all 8-hour ozone values in the Ventura County air district. Dashed lines indicate the bounds of 10% agreement

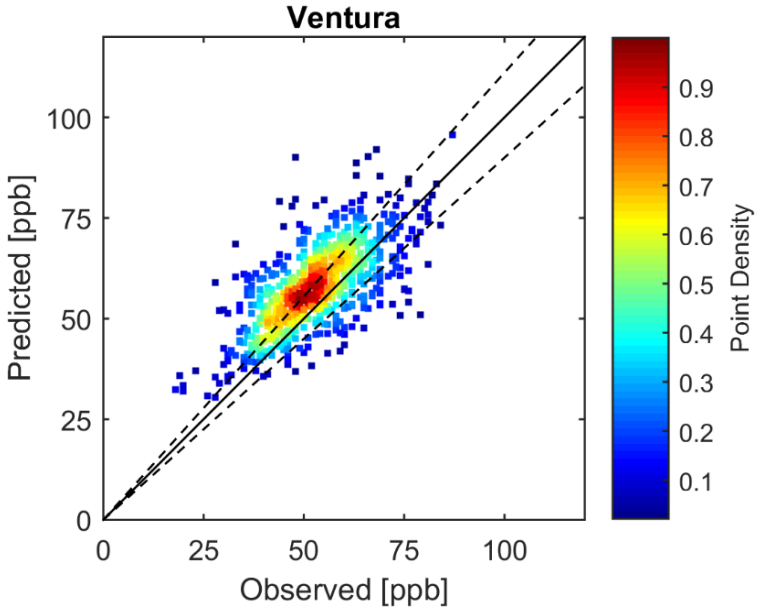


The model over-predicts 8-hour measurements at the lower end of the observational values. However, performance is relatively robust at higher observational values. Since the ozone standards are based on the daily maximum ozone values, model prediction of higher concentrations is more consequential.

Figure I-2 illustrates the model performance of daily maximum 8-hour ozone.

Figure I-2

Density scatter plot of 8-hour ozone daily maximum values in the Ventura County air district. Dashed lines indicate the bounds of 10% agreement



Daily maxima are slightly over-predicted, but most of the data lie within 10% of the measured values.

The model performance of 8-hour ozone daily maxima at each specific station in the air basin is illustrated in Figures I-3 through I-7.

Figure I-3
Eight-hour ozone daily maxima model performance at Thousand Oaks (s0007)

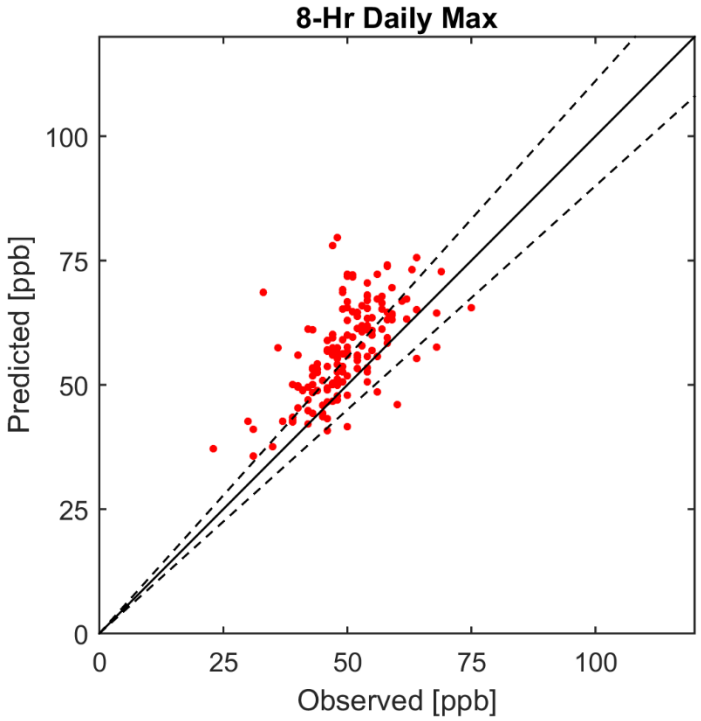


Figure I-4
Eight-hour ozone daily maxima model performance at Piru (s0009)

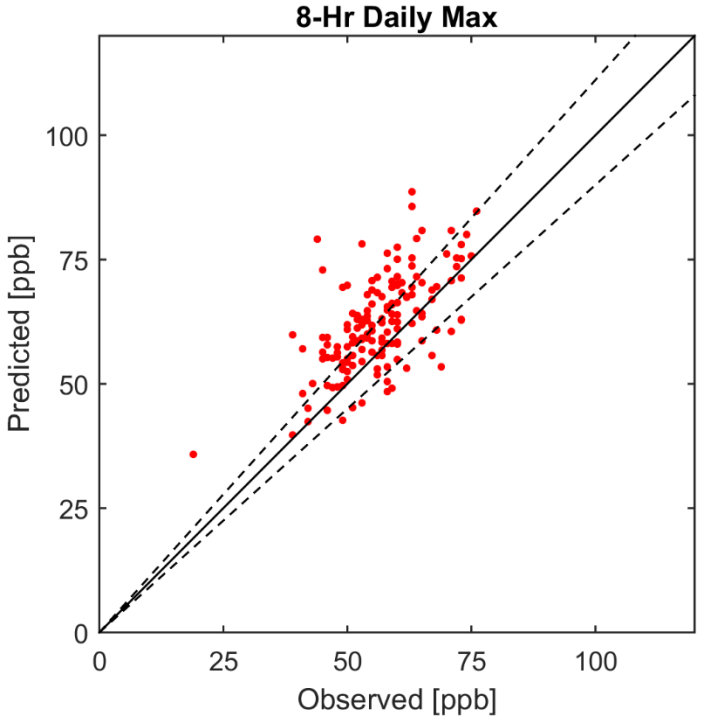
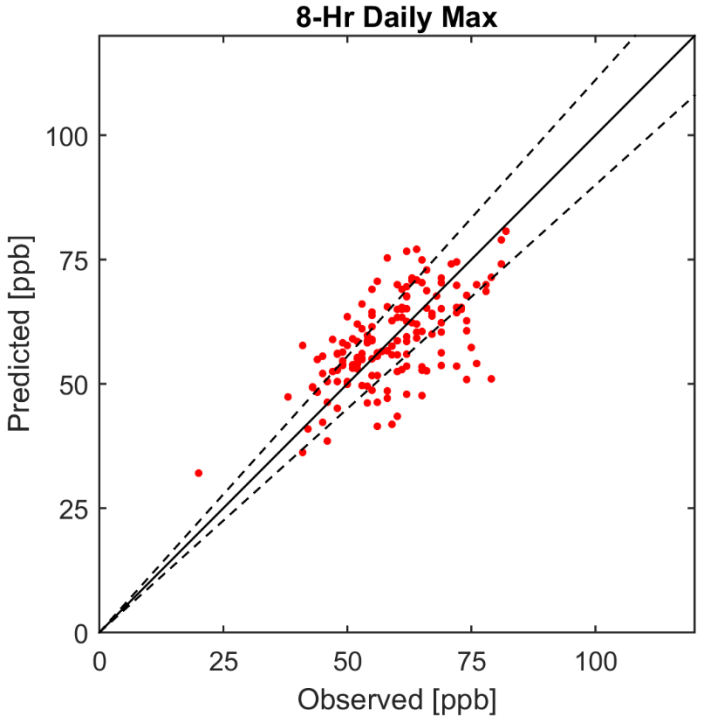


Figure I-5
Eight-hour ozone daily maxima model performance at Ojai (s1004)



Model under-predicts ozone concentration at and above 75-ppb standard.

Figure I-6
Eight-hour ozone daily maxima model performance at Simi Valley (s2002)

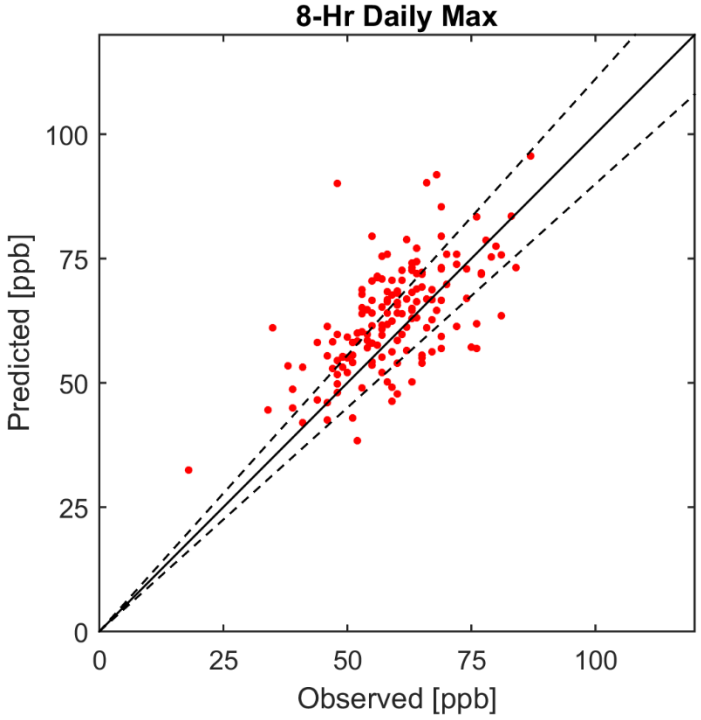
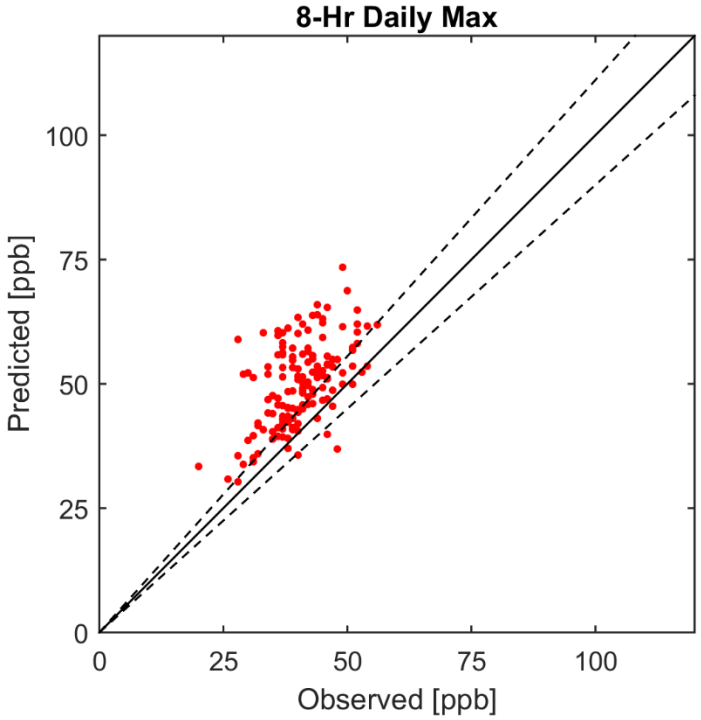


Figure I-7
Eight-hour ozone daily maxima model performance at El Rio (s3001)



Base and Future Year Ozone Design Values

Table I-2 details the base and future year ozone design values for all stations with design values that meet the data completeness criteria. The base design value represents the five-year weighted 8-hr ozone design value from 2012. Future design values were determined with comprehensive meteorological and chemical transport modeling and spatially resolved emissions projections.

Table I-2 also shows that all ozone monitoring stations in Ventura County will be in attainment of the 2008 federal 8-hour ozone standard by 2020.

Table I-2
Base Year and Future Year Ozone Design Values (ppb)

Station Name	Station Number	2012 Design Value*	2020 Design Value
Thousand Oaks-Moorpark Road	0007	69.0	66.8
Piru-3301 Pacific Avenue	0009	72.7	66.0
Ojai-Ojai Avenue	1004	76.3	70.0
Simi Valley-Cochran Street	**2002**	**79.7**	**72.5**

Note: Design values for the El Rio monitoring station were not include because there were not at least five days in the base year (2012) that had maximum daily 8-hour ozone concentrations greater than or equal to 60 ppm and the 2014 draft EPA modeling guidance recommends that future design values not be calculated when this is the case.

APPENDIX J

VENTURA COUNTY UNMONITORED AREA ANALYSIS

Prepared for

Ventura County Air Pollution Control District
Ventura, California

By

South Coast Air Quality Management District
Diamond Bar, California

Preface

This appendix contains the third component of Ventura County's attainment demonstration for the 2008 federal ozone standard: the Ventura County Unmonitored Area Analysis. The first component is the Protocol for Photochemical Modeling of Ozone for Ventura County, which can be found in Appendix H, and the second is the Ventura County CMAQ Model Performance Analysis, which can be found in Appendix I.

All three components were prepared by the South Coast Air Quality Management District (SCAQMD) as part of the Southern California regional air quality modeling effort for the 2008 federal ozone standard. This effort covered the South Coast, San Diego County, Imperial County, Coachella Valley, Western Mojave Desert, and Ventura County ozone nonattainment areas. The Ventura County CMAQ Model Performance Analysis is as provided by the SCAQMD. The only changes made to it were minor formatting and editing changes.

Introduction

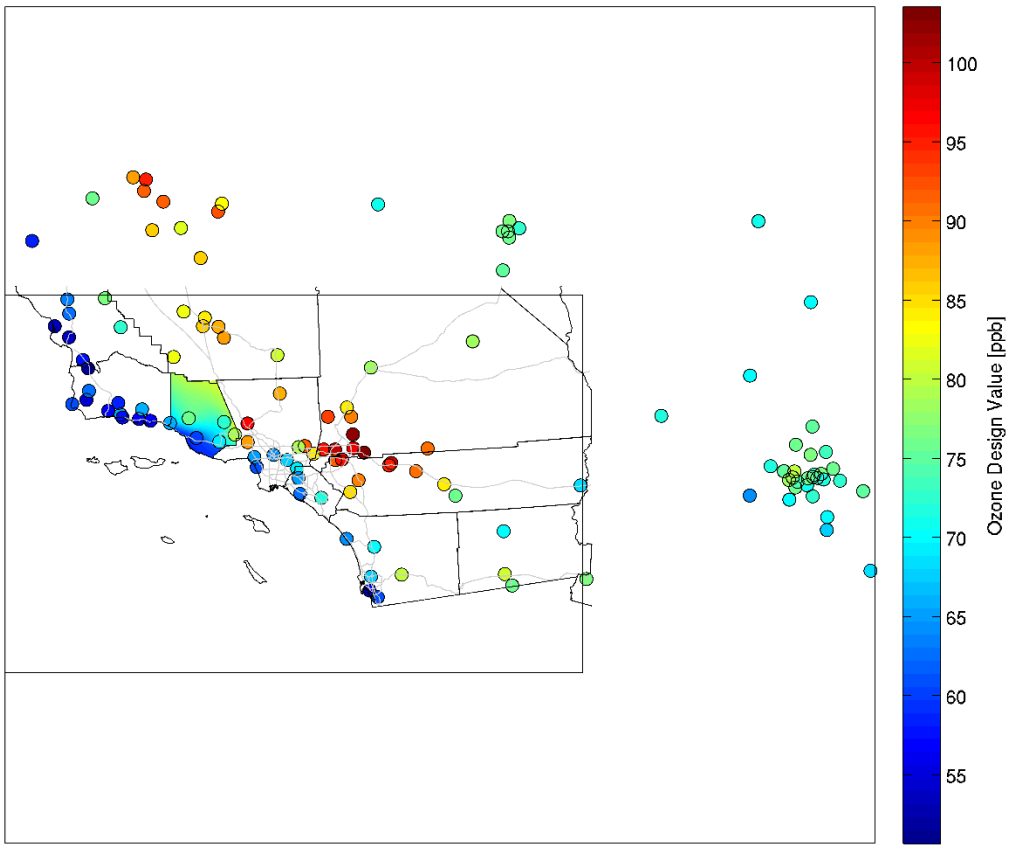
This analysis estimated 8-hour ozone design values in areas of Ventura County that do not have ambient ozone monitors, such as the Los Padres National Forest region of the county. It is required by EPA modeling guidance as part of the attainment demonstration to show that all modeling grid cells in Ventura County and elsewhere in the modeling domain meet the federal ozone standard.

Analysis

This analysis uses both the measurement design values and the modelled ozone profiles throughout the modeling domain. Details of this analysis are presented in Appendix 5, Chapter 5 of the South Coast Final Draft 2016 AQMP. The same procedures and methodology were used for the South Coast Air Basin unmonitored area analysis.

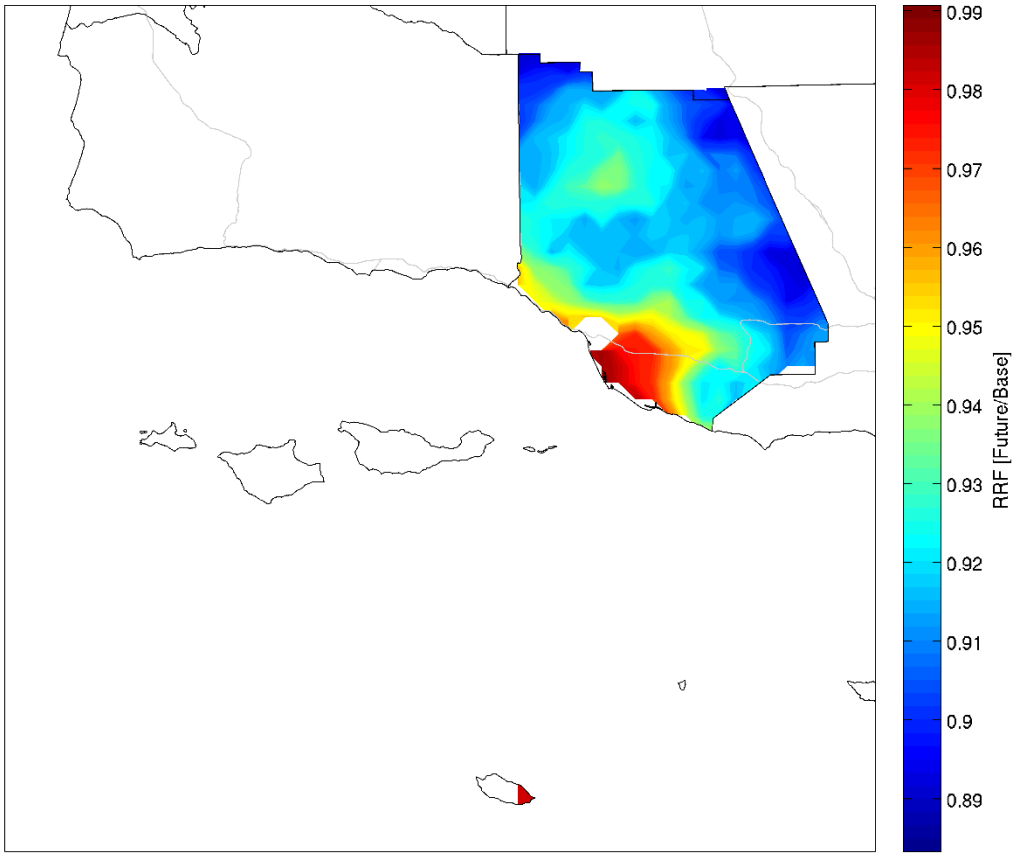
The same interpolation scheme was used to calculate the spatial distribution of design values throughout the County. Figure J-1 illustrates the interpolated measured design value field.

Figure J-1
Interpolated 5-year weighted 2012 design values



Design values were interpolated and not extrapolated, leading to missing data along the southern border of the County. The relative response factors representing the ratio between the 2020 simulated ozone and the base-year (2012) simulated ozone are presented below in Figure J-2.

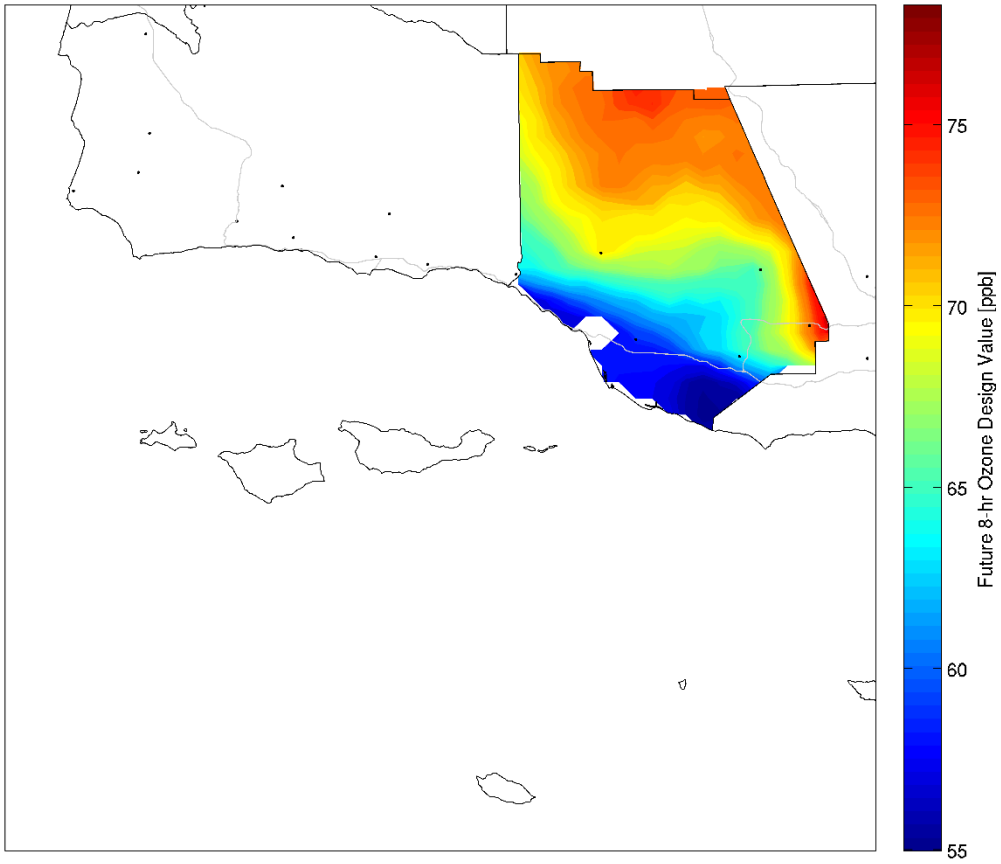
Figure J-2
2020 RRF Fields



The relative response factors suggest that ozone will decrease faster in the northern portion of Ventura County. Coastal Ventura County will exhibit the slowest decrease in future ozone concentrations.

The calculated RRF field is then used to project the interpolated measurement field to simulate future year concentrations. Figure J-3 shows the predicted future ozone concentrations for Ventura County's mandate attainment of 2020.

Figure J-3
2020 Predicted 8-hr Ozone Design Values



Note: Monitoring stations are denoted by black dots.

Conclusion

Eastern Ventura County is projected to exhibit the highest concentrations in the County. The maximum ozone design value is projected to be 75.2 ppb, which attains the federal standard of 0.075 ppm.

APPENDIX K

VENTURA COUNTY WEIGHT OF EVIDENCE ASSESSMENT

Prepared for

Ventura County Air Pollution Control District
Ventura, California

By

California Air Resources Board
Planning and Technical Support Division
Sacramento, California

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Preface

This appendix contains the Ventura County Weight of Evidence Assessment (WOE). The WOE was prepared by the California Air Resources Board (ARB) to verify the modeled predictions of future ozone levels in the county relative to the 2008 federal ozone standard, especially at levels near the federal standard. It is as provided by the ARB and only minor formatting changes and editing changes were made.

Introduction

Ventura County (County) is currently classified as a serious nonattainment area for the 0.075 parts per million (ppm) federal ozone standard. For areas designated as moderate or above nonattainment for the federal ozone standard, photochemical modeling is a required element of the State Implementation Plan (SIP) to determine whether existing and planned 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 (EPA) guidance, *Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze,* recommends that supplemental analyses accompany all model attainment demonstrations. Further, EPA guidance indicates that as an area approaches the target attainment date, ambient air quality and emissions data become an increasingly important element in demonstrating progress toward air quality goals.

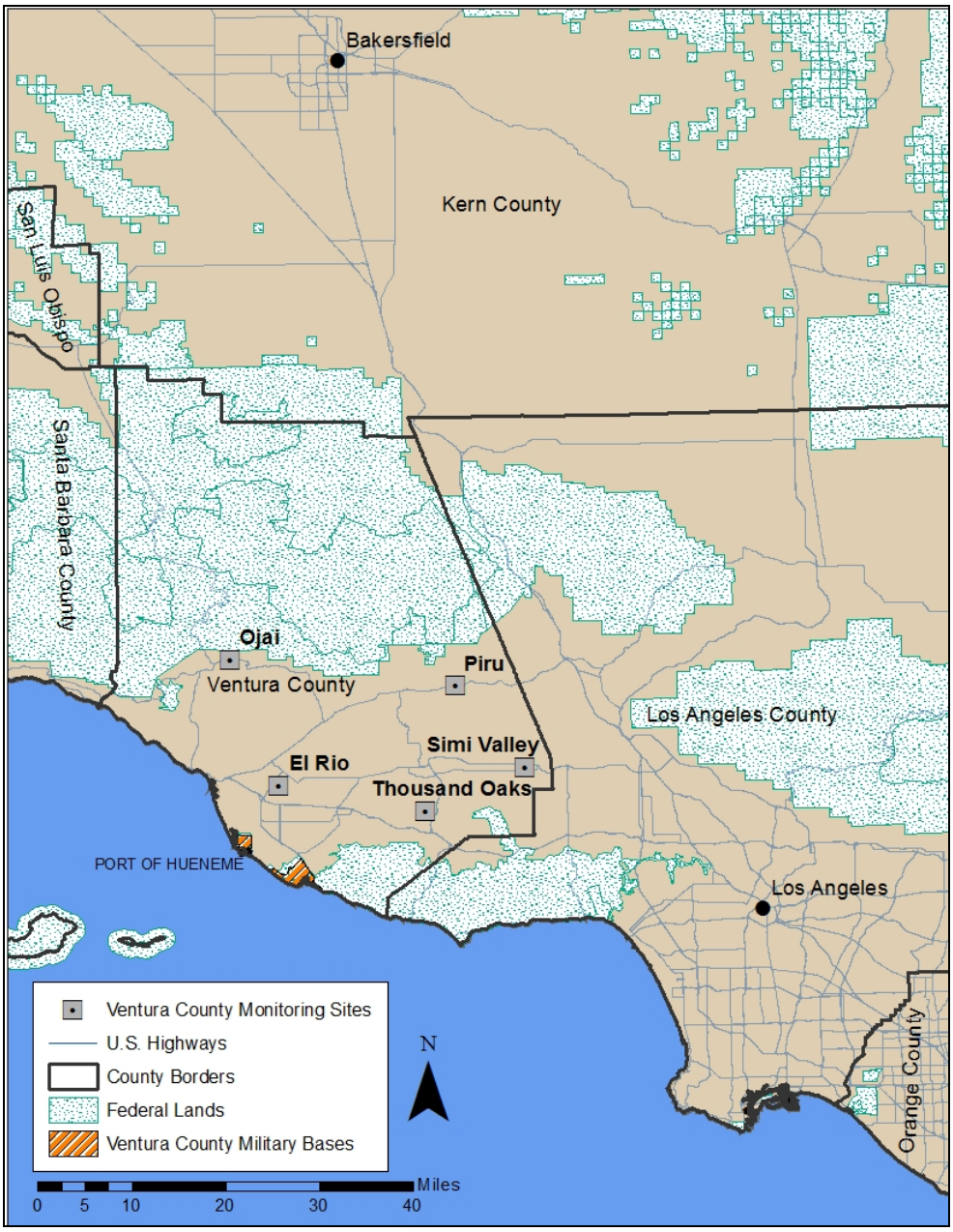
To complement regional photochemical modeling analyses included in the Ventura County SIP, the following Weight Of Evidence (WOE) demonstration includes detailed analyses of ambient ozone data, county level precursor emission trends, population exposure trends, and a discussion of conditions that contribute to exceedances of the 0.075 ppm federal ozone standard. Further, the rate of progress toward air quality goals was evaluated by considering trends in ozone design values, precursor emission reductions, and the relationship between ozone air quality and past emission reductions.

Photochemical modeling for Ventura County has demonstrated that all sites will meet the standard by the 2020 attainment deadline for serious nonattainment areas. Air quality analyses show that measured ozone concentrations and emissions of ozone precursors in Ventura County have declined markedly over the last two decades and consistent with the modeling results, indicate that the County will meet the 2020 attainment date.

Located in the South Central Coast Air Basin, Ventura County is west of Los Angeles County, south of Kern County, and east of Santa Barbara County. Nearly 850,000 people live in the County, making it the eleventh most populous in California. The largest employer is the U.S. military which hosts two Navy bases and one Air National Guard base in Ventura County. The other major industries are agriculture, biotechnology, oil production, technology, and tourism.

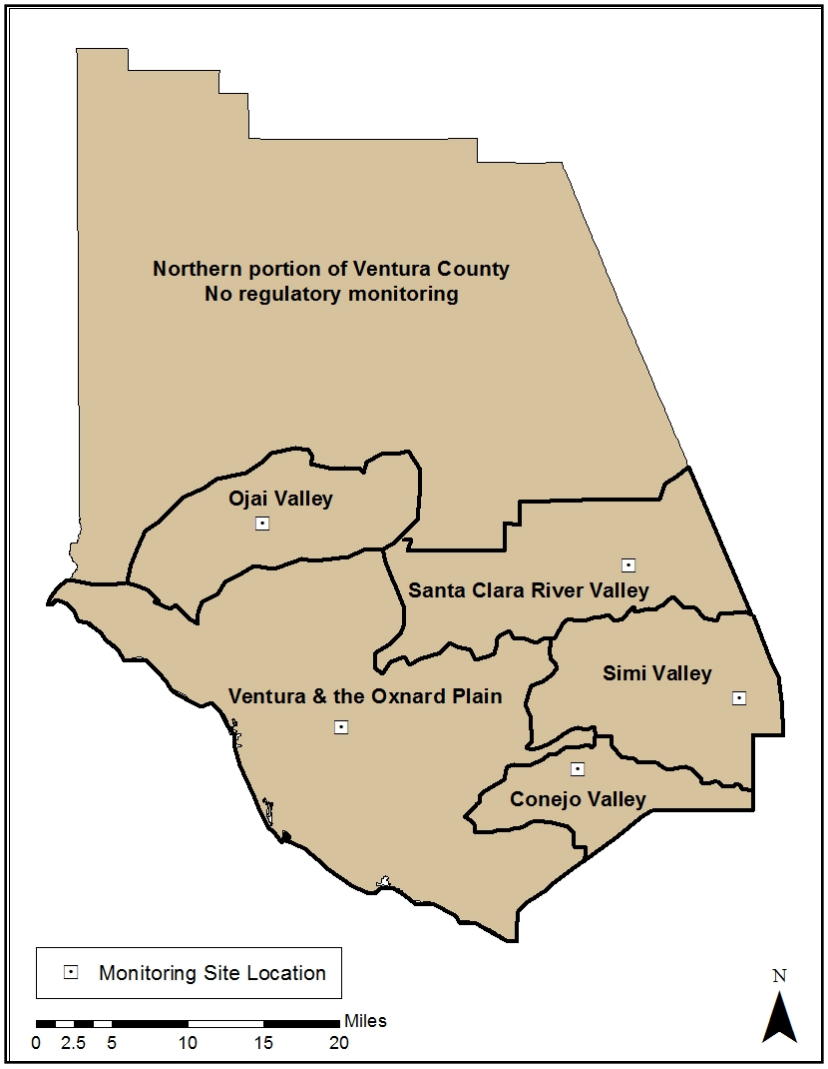
Ventura County encompasses 1,843 square miles. The northern portion of the County is comprised of the rural, mountainous Los Padres National Forest. The southern portion of the County is comprised of 42 miles of coastline that gives way to coastal plain and broad inland valleys. Most of the population resides in the southern portion of the County. Figure K-1 presents an area map of Ventura County and surrounding areas.

Figure K-1
Area Map of Ventura County and Surrounding Areas



The Ventura County Air Pollution Control District currently operates a network of five ozone monitoring sites, which are sited to represent the five distinct geographical areas of the southern portion of the County that are shown in Figure K-2. The coastal monitoring sites include El Rio and Thousand Oaks, which measure air quality that is representative of conditions in Ventura and the Oxnard Plain, and Conejo Valley, respectively. The inland monitoring sites include Ojai, Piru, and Simi Valley, which measure air quality that is representative of conditions in Ojai Valley, Santa Clara River Valley, and Simi Valley, respectively.

Figure K-2
Map of Geographical Regions in Ventura County and Locations of Representative Air Monitoring Sites



Regional boundaries based on Ventura County APCD's 2014 Annual Network Plan

There is a large gradient in ozone concentrations between the coastal and inland areas due to the difference in prevailing meteorological conditions between these two areas. As shown in Table K-1, higher ozone concentrations measured at the inland monitoring sites drive Ventura County's serious nonattainment status. The nonattainment area is limited to the mainland portions of the county and does not include the Channel Islands.

Table K-1
Ozone Design Values at Ventura County Monitoring Sites

Site Name	AQS ID	Region	2014 Design Value (ppm)	2015 Design Value (ppm)	Meets Standard?
Thousand Oaks	061110007	Conejo Valley	0.068	0.067	Yes
Piru	061110009	Santa Clara River Valley	0.073	0.073	Yes
Ojai	061111004	Ojai Valley	0.076	0.073	Yes
Simi Valley	**061112002**	**Simi Valley**	**0.079**	**0.077**	**No**
El Rio	061113001	Ventura and Oxnard Plain	0.060	0.062	Yes

Conceptual Model

Local emissions and transport of ozone and ozone precursors from neighboring areas, including the South Coast Air Basin, contribute to elevated ozone in Ventura County. The majority of days with elevated ozone concentrations occur during the late spring, summer, and early fall and, historically, under conditions that are conducive to photochemical production from accumulated local and regional precursor emissions.

In the spring, summer, and early fall, the predominant weather pattern in the coastal area of Ventura County consists of a persistent marine layer of clouds situated at 1,000 to 3,000 feet above sea level. The marine layer extends into the valleys in the southern portion of the County on many days, carried by a daily afternoon breeze that flows from the cooler coastal area into the warmer inland areas.

Once the sun sets, air over the land cools faster than air over the ocean, which causes air to flow back toward the coastline at night. The east-to-west downward sloping terrain further promotes the flow of air from the valleys back toward the coastal plain at night. This sea/land breeze circulation pattern moves air masses back and forth over the same populated areas of the County, accumulating emissions with each pass. Ozone exceedances can occur when these recirculated emissions stagnate throughout the County's inland valleys.

Ventura County can intercept ozone and ozone precursor emissions from neighboring areas, including South Coast, under a number of scenarios. Due to the terrain and predominant meteorological patterns in southern California, inland emissions will accumulate offshore, typically at night. During periods of offshore accumulation, emissions derived from Ventura County can intermingle with pollution derived from other regional source areas. When onshore flow resumes, air masses with accumulated, intermingled regional pollution will move inland and potentially impact air quality in Ventura County.

Alternatively, when areas of upper level high pressure build over inland areas, vertical mixing is limited and weak offshore winds can develop and draw emissions from areas upwind into the County. Under this scenario, a sea breeze begins mid-morning and works its way inland carrying the upwind emissions along with local emissions back to inland areas where the stagnant conditions and limited vertical mixing promote elevated ozone levels.

Air quality problems may also arise episodically due to regional wildfires. Certain meteorological conditions promote wildfire outbreaks. In the fall through spring, surface high pressure can form in the Great Basin, north to east of Ventura County, creating a northeast to southwest surface pressure gradient oriented towards Ventura County and the Pacific Ocean. Surface winds generally blow from high to low surface pressure and during these months, temperatures throughout southern California are typically warmer than those in the Great Basin.

The cooler and denser desert air along with the pressure gradient causes air to be pushed southwestward through mountain passes and into southern California. The descending flow of air accelerates, warms, and loses moisture as it moves through mountain passes and into lower elevation areas of southern California. The resultant strong, warm, and dry northeasterly downslope flow is termed a Santa Ana wind.

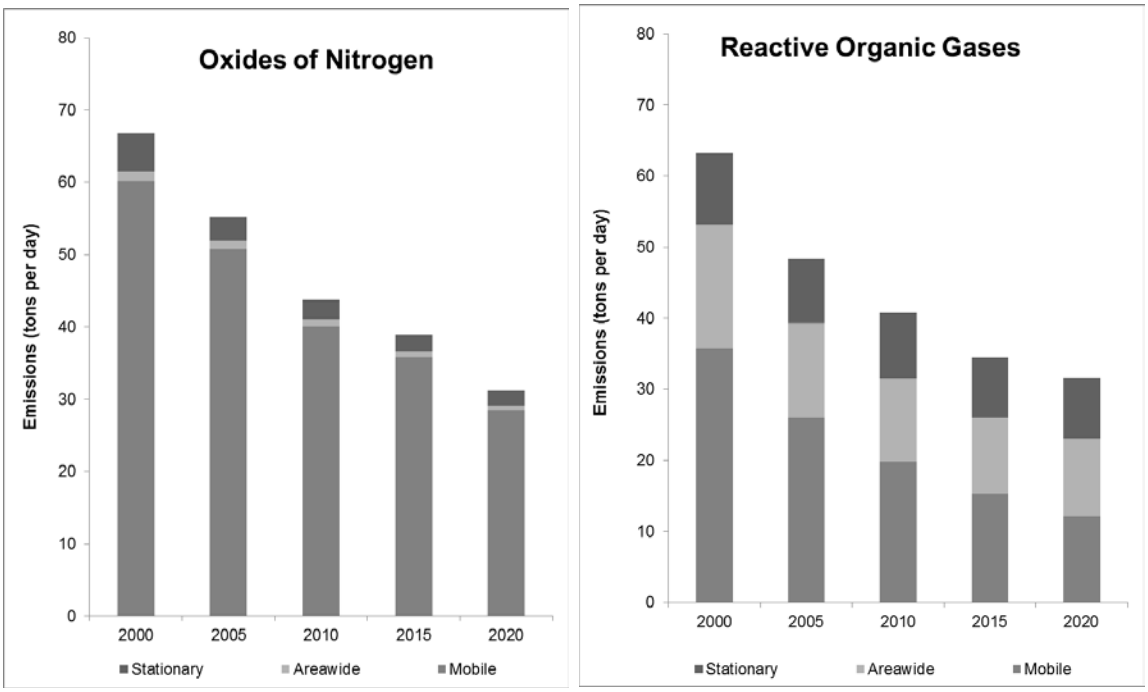
Santa Ana winds, typically lasting a few days at a time, significantly increase the risk of wildfire in Ventura County and other areas of southern California. Wildfires, like other combustion sources, produce ozone precursors and can contribute to elevated ozone in adjacent and downwind areas. In the south central coast in particular, easterly winds can cause emissions from regional wildfires to accumulate locally and offshore. These accumulated wildfire emissions can be recirculated throughout Ventura County and exacerbate air quality problems.

Anthropogenic Emissions

Ozone precursor emissions in Ventura County, which include reactive organic gases (ROG) and oxides of nitrogen (NOx), are predominantly from mobile sources, as shown in Figure K-3. Data from the Air Resources Board's (ARB) 2016 Ozone SIP Inventory for Summer (Version 1.03 with approved external adjustments) for Ventura County indicate that in 2015 mobile sources accounted for 92% of NOx emissions whereas areawide and stationary sources accounted for 2% and 6% of NOx emissions, respectively. In contrast, mobile, areawide, and stationary sources accounted for 44%, 31%, and 25% of ROG emissions, respectively.

Although mobile sources dominate the emission inventory in Ventura County, emissions from a deep water port, agriculture, natural gas electric generation facilities, naval base operations, oil production and processing, and other industrial operations also contribute to ozone formation in the County.

Figure K-3
Inventory of Ventura County Emissions



Data source: ARB 2016 Ozone SIP Inventory for summer (Version 1.03 with approved external adjustments)

Significant reductions of ozone precursor emissions were achieved in the County between 2000 and 2015.

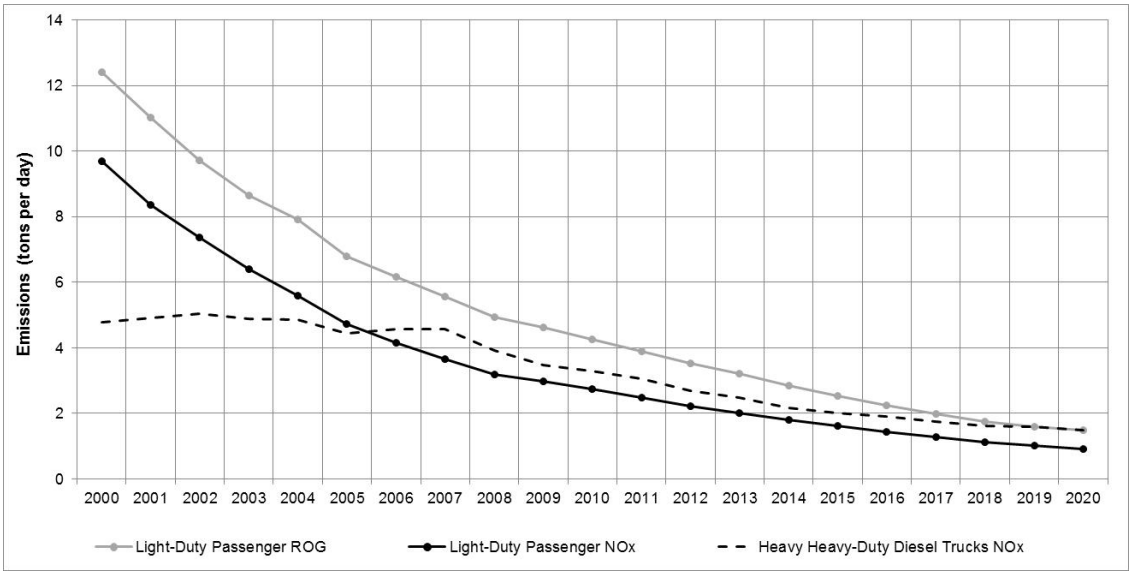
- Total NOx emissions declined by 42 percent, and
- Total ROG emissions declined by 45 percent.

Emissions from mobile sources, which contribute the largest magnitude of ozone precursors in the County, declined substantially between 2000 and 2015.

- Mobile source NOx emissions declined by 40 percent, and
- Mobile source ROG emissions declined by 57 percent.

In Ventura County, light-duty passenger vehicles and heavy heavy-duty diesel trucks are the largest on-road mobile source subcategories in the NOx emission inventory, whereas light-duty passenger vehicles are the largest on-road mobile source subcategory in the ROG emission inventory. Statewide emission control programs targeting mobile sources, particularly passenger vehicles and diesel trucks have yielded substantial reductions in ozone precursor emissions in Ventura County. For example, ARB's 2008 adoption of regulations targeting heavy duty trucks and buses has led to marked progress in reducing NOx emissions. As shown in Figure K-4, between 2000 and 2015, NOx emissions from light-duty passenger and heavy heavy-duty diesel truck subcategories declined 83% and 58%, respectively. For the same period, ROG emissions from the light-duty passenger vehicle subcategory declined 80%.

Figure K-4
Emissions from the Largest Mobile Source Categories in Ventura County for 2000 – 2020



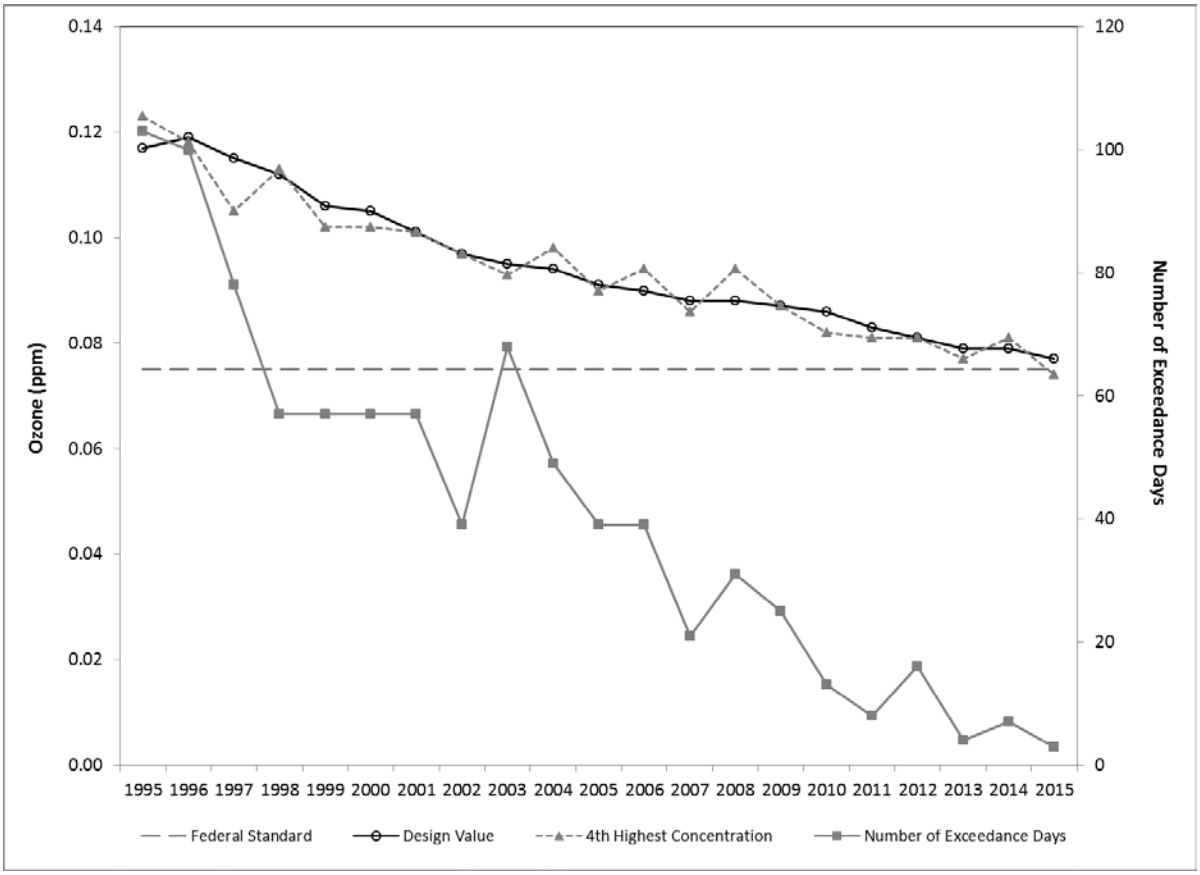
Emissions inventory projections for Ventura County indicate that ongoing implementation of current emission control programs will continue to yield reductions in the coming years. Between 2015 and 2020, in Ventura County, NOx emissions are projected to decline an additional 44 percent and ROG emissions are projected to decline 41 percent for light-duty passenger vehicles. Emissions of NOx from heavy heavy-duty trucks are expected to decline an additional 26 percent between 2015 and 2020.

As described above, statewide programs, particularly those targeting emissions from mobile sources, have yielded significant reductions in emissions of ozone precursors in Ventura County. Although mobile sources account for the majority of ozone precursor emissions in Ventura County, marked reductions in emissions from areawide and stationary sources were also achieved between 2000 and 2015. NOx emissions from stationary and areawide sources declined by 58 percent and 41 percent, respectively, between 2000 and 2015. Moreover, ROG emissions from stationary and areawide sources declined by 16 and 39 percent, respectively, during this time period. In response to persistent reductions in ozone precursors, ozone air quality throughout Ventura County has improved markedly.

Ozone Air Quality

In response to declining emissions over the last 20 years, the frequency, magnitude, and spatial extent of ozone exceedances in Ventura County has significantly declined. As shown in Figure K-5, between 1995 and 2015, the number of ozone exceedance days in the County declined by 97 percent, from 103 days to 3 days. Over this same period, the annual fourth highest daily maximum 8-hour concentration decreased from 0.123 to 0.074 ppm, a decrease of nearly 40 percent; and Ventura County's design value decreased 34 percent, from 0.117 to 0.077 ppm.

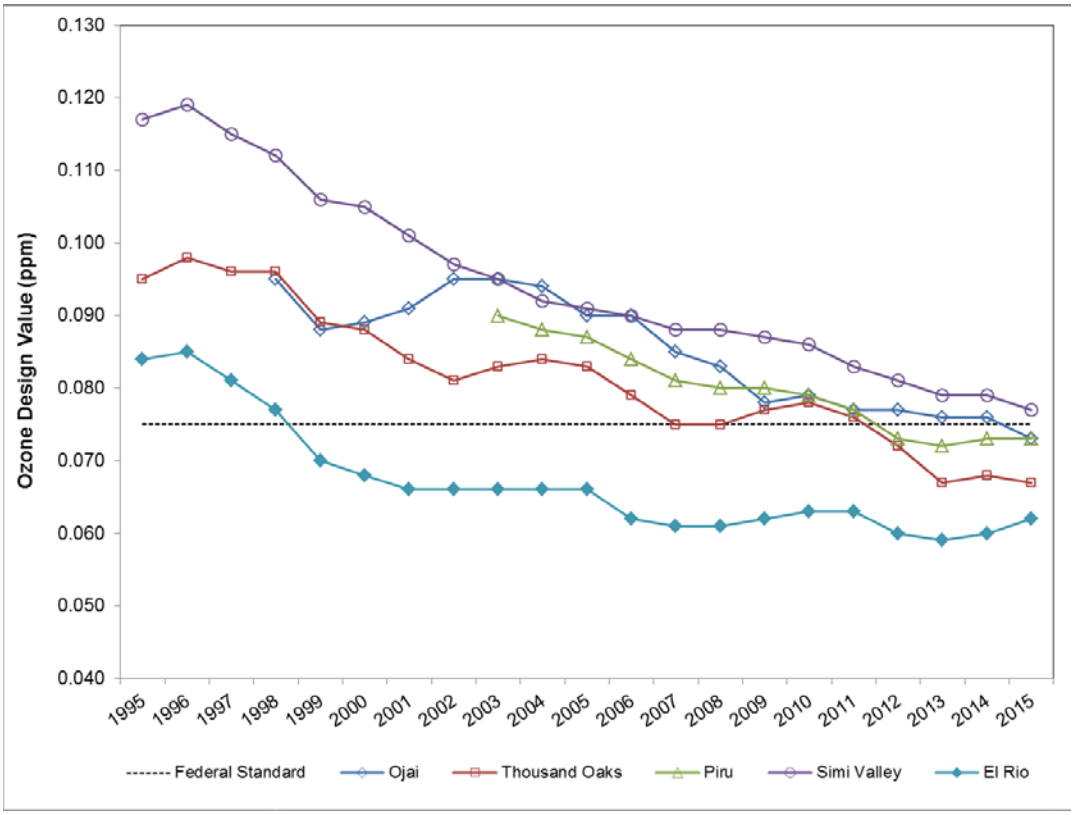
Figure K-5
1995 – 2015 Ventura County Ozone Statistics



In 1995, all sites in operation exceeded the 0.075 ppm standard but in response to declining precursor emissions, ozone air quality has been steadily improving over the last 20 years, as shown in Figure K-6. Four out of the five monitoring sites currently meet the 0.075 ppm federal standard. The El Rio monitoring site has been in attainment since 1999. Thousand Oaks and Piru have been in attainment since 2012. Ojai attained the 0.075 ppm federal standard in 2015 and Simi Valley is on track to attain the standard within the next few years.

Prior to 1995, only three of the five current monitoring sites were in operation. The monitoring sites at Ojai and Piru were established in 1996 and 2000, respectively. The time scale considered in the analyses of ambient measurements, 1995 to 2015, was selected to provide the most complete and representative sample of progress made toward air quality goals throughout Ventura County.

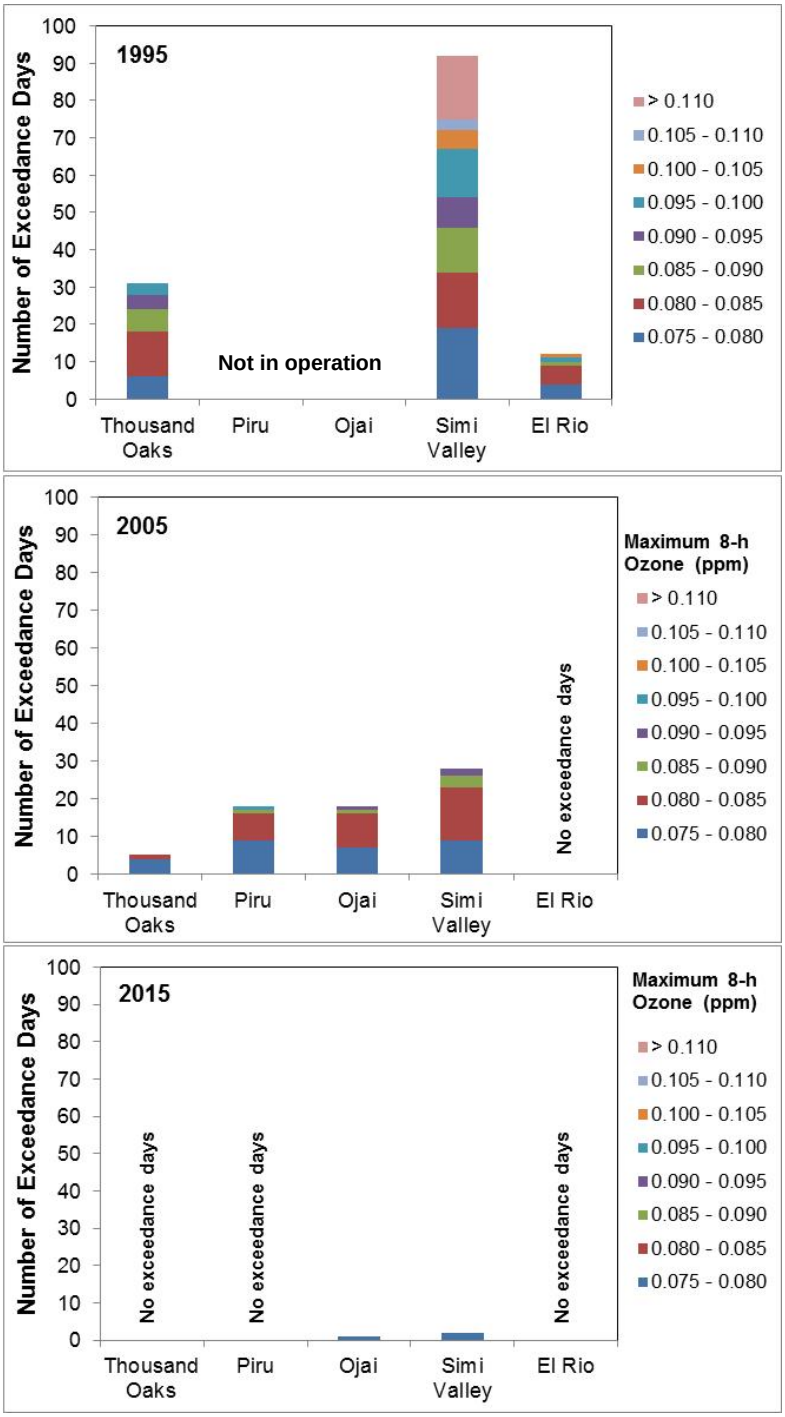
Figure K-6
Ozone Design Values at Ventura County Monitoring Sites



The site level data presented in Figure K-7 demonstrate the ongoing decrease in the frequency, magnitude, and spatial extent of ozone exceedance days in Ventura County over the last 20 years. In 2015, exceedances of the 0.075 ppm standard were limited to three days and only two monitoring sites, Simi Valley and Ojai. This is a remarkable improvement from 1995 when the 0.075 ppm threshold was routinely exceeded at all three sites that were in operation at the time.

At the Simi Valley monitoring site, which is positioned to capture the highest ozone concentrations in the County, the number of exceedance days declined by nearly 98 percent between 1995 and 2015. On exceedance days in 1995, maximum 8-hour ozone concentrations ranged from 0.076 to 0.144 ppm, up to 92 percent above the federal standard. In contrast, maximum 8-hour ozone concentrations on exceedance days in 2015 ranged from 0.076 to 0.078 ppm, less than 5 percent above the federal standard.

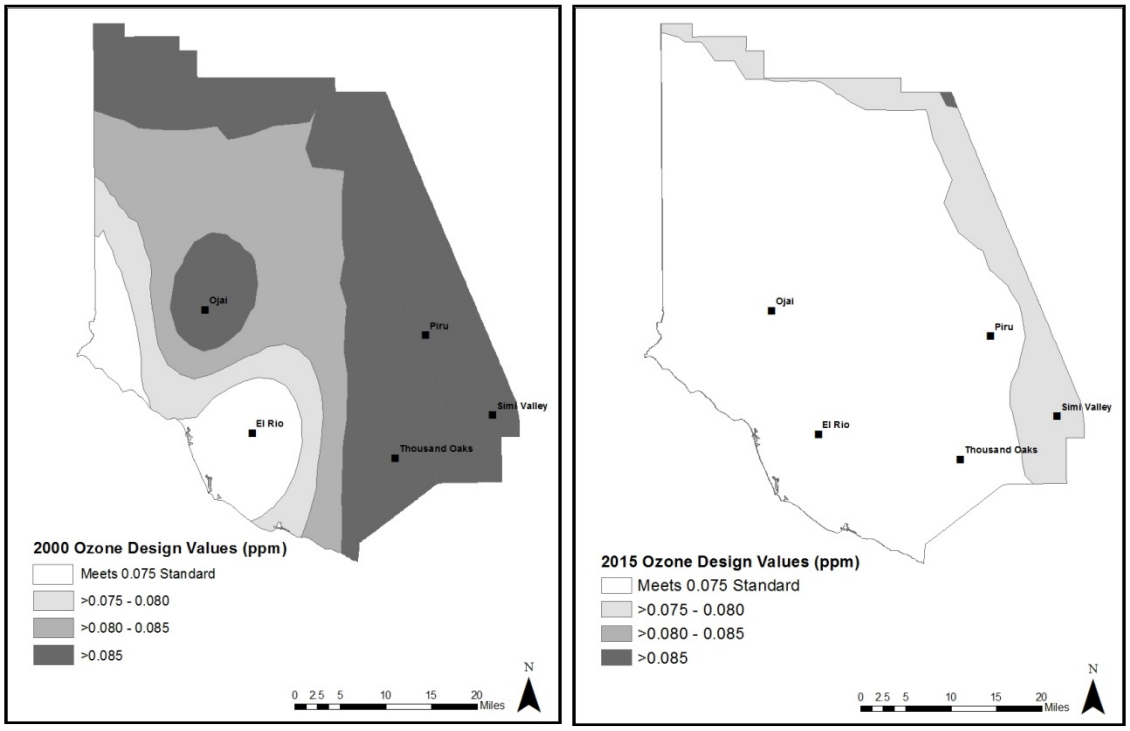
Figure K-7
Frequency and Magnitude of Exceedance Days at Ventura County Monitoring Sites in 1995, 2005, and 2015



As a result of the marked decline in the magnitude, frequency, and spatial extent of exceedances in Ventura County, the number of people exposed to elevated ozone has been reduced substantially. The contour maps in Figure K-8 illustrate the change in population exposure over

the last 15 years. In 2000, the areas in Ventura County that met the standard were limited to portions of the coast and inland areas adjacent to those coastal areas. Areas in the northern and eastern part of the County were more than 0.010 ppm above the standard. In 2015, all of the coastal areas were in attainment with the 0.075 ppm standard and the only inland areas that had yet to meet the standard was within 7 percent of the 0.075 ppm threshold.

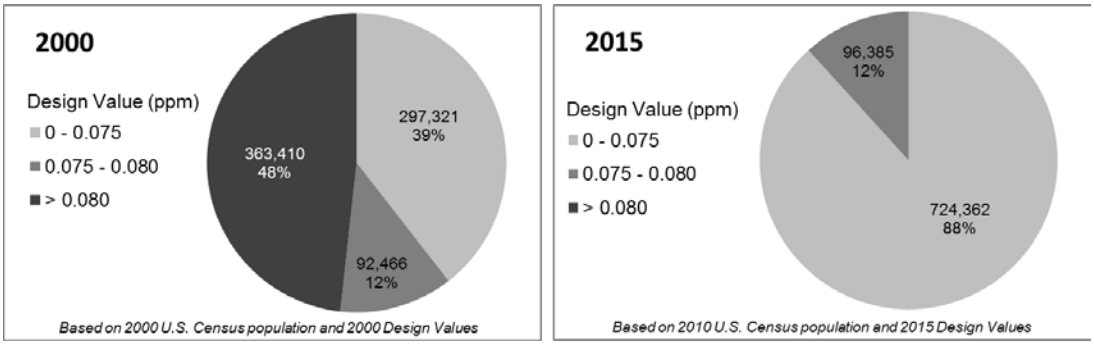
Figure K-8
Contour Maps Representing the Spatial Distribution of Ozone Air Quality in Ventura County for 2000 and 2015



Contour maps were developed using inverse distance weighting (IDW) to spatially interpolated design values from sites throughout the State.

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 K-9, between 2000 and 2015, the number of people residing in areas of the County that exceeded the federal standard substantially declined. In 2015, 88 percent of the population resided in areas with air quality that met the 2008 federal standard compared to 39 percent in 2000. Furthermore, although 12 percent of the population lives in areas that are above the 0.075 ppm threshold, the ozone levels are just slightly above the current standard.

Figure K-9
Population Distribution by Ozone Design Value in 2000 and 2015



In summary, ozone air quality has improved throughout Ventura County in response to declining emissions of ozone precursors. The analyses presented above illustrate the extent of improvement over the last 20 years. Currently, four of the five monitoring sites meet the 0.075 ppm standard and Simi Valley, with a 2015 design value that is within 0.002 ppm of the 0.075 ppm standard, is continuing to make progress toward attainment. The improvement in air quality, in terms of a declining ozone design value, has progressed at a consistent rate over the past 15 years indicating that Ventura County is on track to meet the 2020 attainment date.

Attainment Projections

Photochemical Modeling Results

In 2016, South Coast Air Quality Management District (AQMD) released results of the regional photochemical modeling assessment conducted for Ventura County, which are shown in Table K-2. Based on implementation of existing state and local control measures, the regional modeling analyses indicate ozone design values at all sites in Ventura County will meet the 0.075 ppm standard in 2018.

Table K-2
Regional Modeling Design Value Projections

Site	2017	2018	2019	2020
Thousand Oaks	0.067	0.067	0.067	0.067
Piru	0.068	0.068	0.067	0.066
Ojai	0.072	0.072	0.071	0.070
Simi Valley	0.075	0.074	0.073	0.072

To maintain consistency in the units presented throughout the document, projected design values were converted from ppb, which were reported by the South Coast AQMD, to ppm by dividing each number by 1,000 and truncating the result to 3 decimal places.

To complement the regional photochemical modeling assessment, the following analyses were conducted to connect past trends in air quality and emissions with what is expected to occur in the near future.

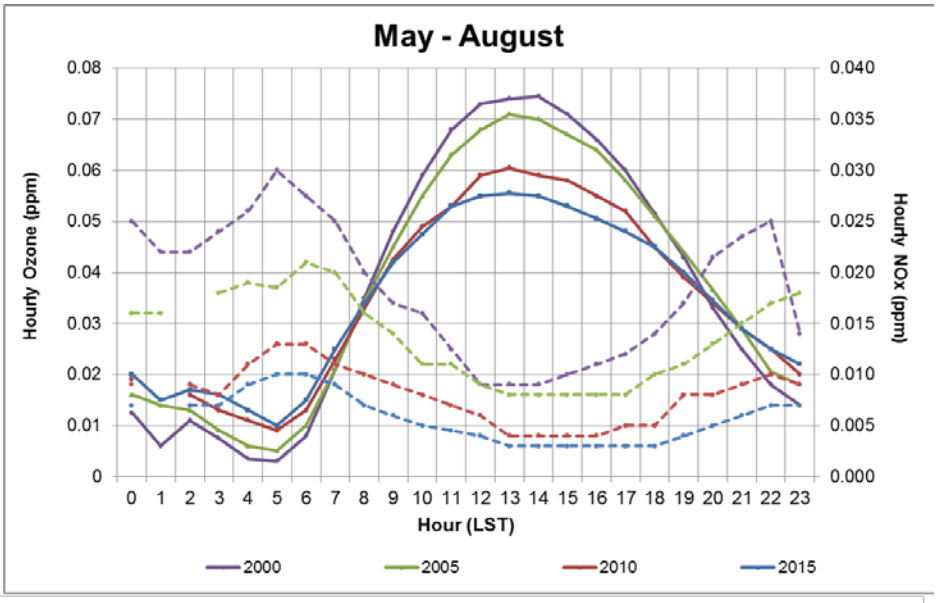
Changes in Diurnal (24-hour) Ozone Patterns

Measured ozone in Ventura County is largely the result of photochemical production from local and regional emissions, which is confirmed by the substantial improvements in measured ozone air quality that are coincident with reductions in precursor emissions. Diurnal patterns in ozone and NOx were analyzed to evaluate changes in local photochemical production.

For this analysis, hourly data for the months of May to August were considered because the number of hours of daylight during these months is similar, ranging from 13 to 14 hours each day. Median hourly concentrations were considered because the median provides a generally more robust metric than the mean, which can be influenced by outliers. All data collected during the month for the year of interest were included in the analysis to provide a robust sample size.

As shown in Figure K-10, at Simi Valley the median of peak hourly ozone concentrations was 0.019 ppm lower in 2015 relative to 2000 whereas median minimum hourly concentrations were 0.007 ppm higher in 2015 relative to 2000. Median peak hourly NOx concentrations were 0.020 ppm lower for the same period with the change in ozone concentrations.

Figure K-10
Diurnal (24-hour) Pattern of Median Hourly Ozone and NOx Concentrations at Simi Valley in 2000, 2005, 2010, and 2015



Solid lines and dashed lines represent ozone and NOx concentrations, respectively.

In an urban setting such as Simi Valley, daily minimum ozone concentrations largely result from titration of ozone with NOx during the nighttime hours. As NOx emissions are reduced, titration would be expected to decline leading to relatively higher nocturnal minimum ozone

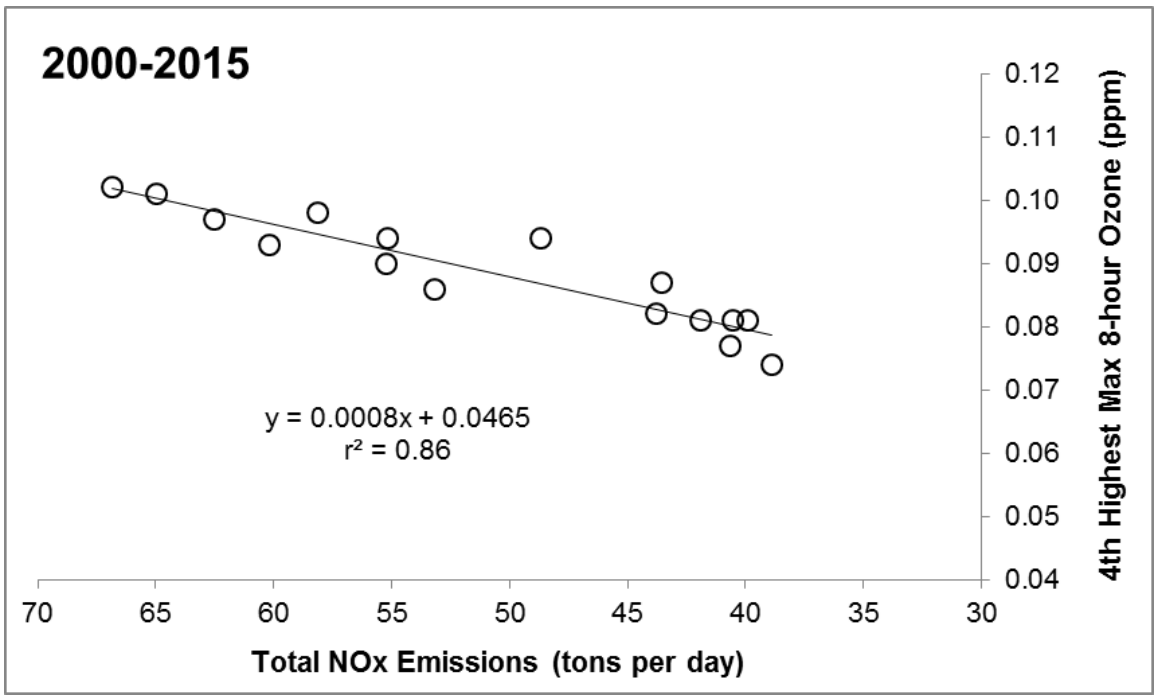
concentrations. Peak concentrations, which are generally coincident with periods of peak solar radiation would decline because lower available precursor emissions will limit photochemical production of ozone.

Regression Trends

To measure Ventura County's progress toward meeting the 2020 attainment date, regression analyses were applied to county level emissions data and ambient ozone data measured at the design value site (Simi Valley). The first regression analysis evaluated the association between declining NOx emissions and the further highest maximum 8-hour ozone concentration. The second analysis evaluated the trend in ozone design values at Simi Valley between 2000 and 2015.

As shown in Figure K-11, there is a strong association ($r^2 = 0.86$) between daily total NOx emissions in Ventura County and the fourth highest maximum 8-hour ozone concentrations. Using the resultant regression equation, 35.6 tons per day of NOx would be expected for a fourth highest maximum 8-hour ozone concentration of 0.075 ppm.

Figure K-11
Association between Total NOx Emissions and 4th Highest Maximum 8-hour Ozone Concentration for 2000 – 2015



Based on the most recent inventory available, a subset of which is shown in Table K-3, total NOx emissions will be below this level in 2018. Based on this exercise, in the most conservative scenario, Ventura County would meet the 2020 attainment date because NOx emissions are projected to decline through 2020, which would yield fourth highest maximum 8-hour ozone concentration below 0.075 ppm in 2018 through 2020, the years considered for the 2020 design value calculation.

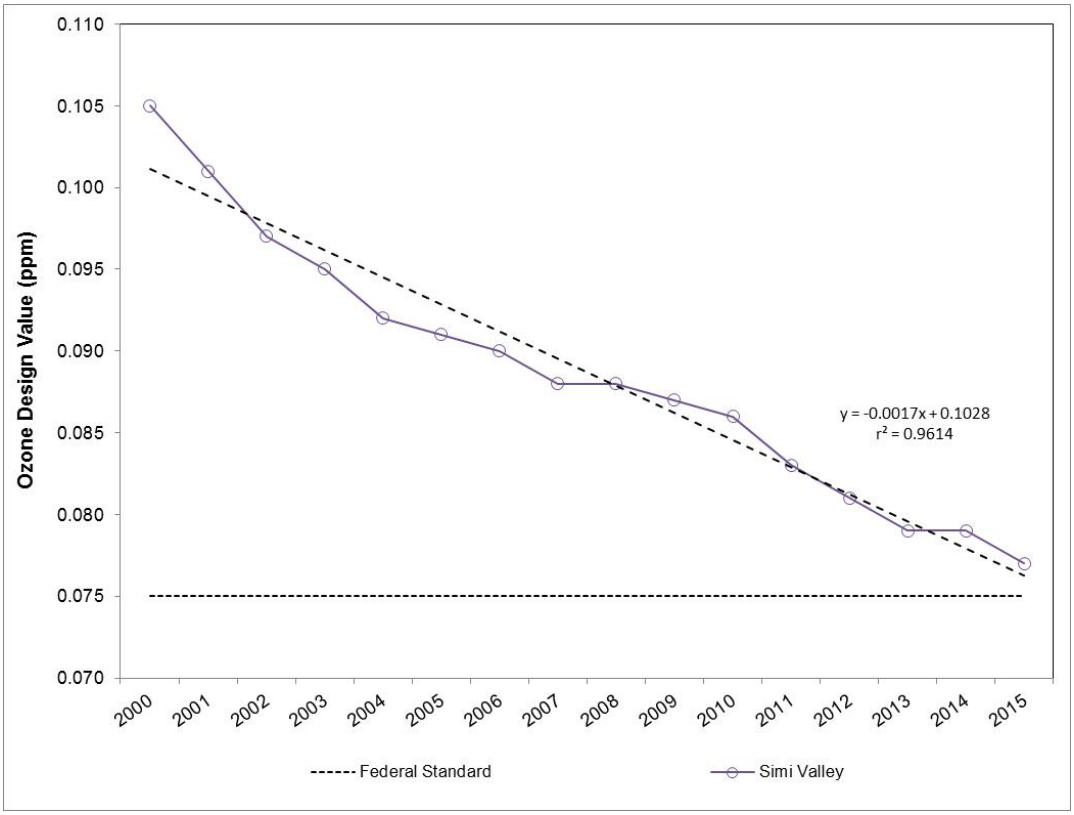
Table K-3
Ventura County NOx and ROG Emissions (tons per day) from the 2016 Ozone SIP Inventory for Summer (Version 1.03)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
NOx	67	65	63	60	58	55	55	53	49	44	44	42	41	41	40	39	38	36	34	33	31
ROG	63	31	58	57	52	48	47	46	42	41	41	39	38	36	35	34	34	33	32	32	32

As shown in Figure K-12, a strong linear trend ($r^2 = 0.96$) is observed when a regression trend analysis is applied to evaluate ozone design values for Simi Valley for the period ranging from 2000 to 2015. Using the resultant linear regression equation, a design value of 0.075 ppm is expected 16.35 years after the initial year (2000) included in the trend analysis. Following this result and because design values are calculated annually rather than incrementally, ambient data indicate that a design value below the attainment threshold is expected in 2017.

Patterns in the diurnal ambient ozone and NOx concentration indicate that maximum ozone concentrations are declining in response to declining NOx emissions. Regression trends developed using historical ozone air quality data as well as the association between the fourth highest daily maximum 8-hour ozone and daily NOx emissions are consistent with the results of regional photochemical modeling analyses which indicate that Ventura County will meet the standard by the 2020 attainment date.

Figure K-12
Linear Regression Trend in 2000 – 2015 Design Values



Summary and Conclusions

This WOE demonstration evaluated ambient air quality and emission trends to complement the regional photochemical modeling analyses conducted to evaluate Ventura County's progress toward meeting the 2020 attainment date. Control measures implemented in the County through federal, state, and local programs have led to a substantial decline in emissions of ozone precursors and a substantial improvement in ozone air quality.

Between 2000 and 2015, total NOx emissions in Ventura County declined by 42 percent whereas total ROG emissions declined by 45 percent. Moreover, between 2000 and 2015, the number of exceedance days in the County declined by 95 percent and the design value decreased by over 27 percent, from 0.105 ppm to 0.077 ppm. In 2015, four out of five monitoring sites in the County met the standard.

Ventura County is currently classified as a serious nonattainment area with a 2020 attainment date. Regression trends derived from ozone design values as well as the association between NOx emissions and the fourth highest 8-hour ozone concentration indicate that Ventura County is on track to attain the 0.075 ppm standard by 2020, which is consistent with design value projections derived from the regional photochemical modeling assessment conducted by South Coast AQMD.

References

U.S. EPA *Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze*, December 2014.