SUBCHAPTER 4.2

AIR QUALITY

4.2 AIR QUALITY

4.2.1 Introduction

The purpose of the 2012 AQMP is to establish a comprehensive program to lead the region into compliance with the federal 24-hour PM2.5 air quality standard, and to provide an update of the Basin's projections in meeting the federal 8-hour ozone standards. The 2012 AQMP proposes potential attainment demonstration of the federal PM2.5 standard by 2014 through adoption of all feasible measures. In addition, the 2012 AQMP would update specific elements of the previously approved 8-hour ozone SIP: 1) an updated emissions inventory and, 2) new control measures and commitments for emissions reductions to help fulfill the CAA Section 182 (e)(5) portion of the 8-hour ozone SIP.

This subchapter examines the secondary air pollutant emissions that could occur as a consequence of efforts to improve air quality (e.g., emissions from control equipment such as afterburners). The analysis is divided into the following sections: 2012 AQMP Control Measures with Secondary Air Quality Impacts, Future Air Quality Emission Inventories, 2012 AQMP Air Quality Modeling Results, Significance Criteria, Potential Impacts and Mitigation, Ambient Air Quality, and Summary of Secondary Air Quality Impacts.

4.2.2 2012 AQMP Control Measures with Potential Secondary Air Quality Impacts

The air quality impact analysis in this Final Program EIR identifies the net effect on air quality from implementing the 2012 AQMP. All control measures were analyzed to identify adverse impacts.

Evaluation of control measures was based on examination of the impact of the control measures and technologies focusing on potential secondary air quality impacts. Evaluation of control methods for each control measure indicated that there are 27 control measures that could have potential secondary air quality impacts. As shown in Table 4.2-1, four control measures are to reduce short-term PM2.5 emissions and 23 control measures are to reduce ozone formation.

TABLE 4.2-1

Control Measures with Potential Secondary Air Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
SHORT-TERM PM2.5 CONTROL MEASURES			
BCM-03 (*formerly BCM-05*)	Emission Reductions from Under-Fired Charbroilers	Add-On Control Equipment with Ventilation Hood Requirements (e.g., ESPs, HEPA filters, wet scrubbers, and thermal oxidizers).	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant, GHG emissions from operation of control technology and electricity generation.

TABLE 4.2-1 (CONTINUED)

Control Measures with Potential Secondary Air Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
OZONE CONTROL MEASURES			
BCM-04 (formerly MCS-04B)	Further Ammonia Reductions from Livestock Waste (NH3)	Reducing pH level in manure through the application of acidifier sodium bisulfate to	Potential increase in diesel fuel use for delivery and application of acidifier.
CMB-01	Further NOx Reductions from RECLAIM – *Phase I and Phase II* (NOx)	Cement kilns, glass furnaces, and gas turbines were not subject to reduction in the 2005 RECLAIM rule amendment. These sources will be examined for further reductions in this control measure and potential rule making. Selective catalytic reduction, low NOx burners, NOx reducing catalysts, oxy-fuel furnaces, and selective non-catalytic reduction.	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from operation of control technology and electricity generation. Potential increase in ammonia emissions.
IND-01[a]	Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities (NOx, SOx, PM2.5)	Environmental lease conditions, port rules, tariffs or incentives.	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from and electricity generation. Additional emission controls could result in increased electricity use. Increased use of alternative fuels. Potential decrease in engine efficiency could reduce fuel economy. Potential increase in ammonia emissions.
MCS-01[a]	Application of All Feasible Measures Assessment (All Pollutants)	District would adopt and implement new retrofit technology control standards as new BARCT standards become available.	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from operation of control technology and electricity generation.
MCS-02	Further Emission Reductions from Green Waste Processing (Chipping and Grinding Operations not associated with composting) (VOC)	Require chipped or ground greenwaste material to be covered after chipping or grinding or removed from site; and seasonal covering of chipped or ground greenwaste material.	Potential increase in truck trips.
CMB-02	NOx Reductions from Biogas Flares (NOx)	Replacement of existing biogas flares with more efficient biogas flares	Potential criteria pollutant and GHG emissions from construction.
CMB-03	Reductions from Commercial Space Heating (NOx)	This control measure seeks emission reductions from unregulated commercial fan-type central furnaces used for space heating.	Potential criteria pollutant and GHG emissions from construction

TABLE 4.2-1 (CONTINUED)

Control Measures with Potential Secondary Air Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
OZONE CONTROL MEASURES			
CTS-01	Further VOC Reductions from Architectural Coatings (R1113) (VOC)	Reduce the allowable VOC content in product formulations by using alternative low-VOC products & use application techniques with greater transfer efficiency.	Potential change in use of VOC and toxic air contaminants from reformulation.
CTS-02	Further Emission Reduction from Miscellaneous Coatings, Adhesives, Solvents and Lubricants (VOC)	Reduce the allowable VOC content in product formulations by using alternative low-VOC products or non-VOC product/equipment.	Potential change in use of VOC and toxic air contaminants from reformulation.
CTS-03	Further VOC Reductions from Mold Release Products (VOC)	Limitation of VOC content for mold release products.	Potential change in use of VOC and toxic air contaminants from reformulation.
CTS-04	Further VOC Reductions from Consumer Products (VOC)	Eliminate or revise the exemption for low vapor pressure solvents in consumer products.	Potential change in use of VOC and toxic air contaminants from reformulation.
FUG-01	~~Further~~ VOC Reductions from Vacuum Trucks (VOC)	VOC control devices such as carbon adsorption systems, internal combustion engines, thermal oxidizers, refrigerated condensers, liquid scrubbers and positive displacement (PD) pumps.	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from operation of control technology and catalyst replacement.
FUG-02	Emission Reduction from LPG Transfer and Dispensing – Phase II (VOC)	Expand applicability of rule to LPG transfer and dispensing at facilities other than those that offer LPG for sale to end users included currently exempted facilities.	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from vehicles used for inspection and monitoring.
FUG-03	Further ~~VOC~~ Reductions from Fugitive VOC Emissions (VOC)	Upgrade inspection/ maintenance rules to at least a self-inspection program, or to an optical gas imaging-assisted LDAR program where feasible; use of new technologies to detect and verify VOC fugitive emissions	Potential criteria pollutant and GHG emissions from construction and monitoring/inspections.
MCS-01	Application of All Feasible Measures Assessment (All Pollutants)	SCAQMD would adopt and implement new retrofit technology control standards as new BARCT standards become available.	Potential criteria pollutant and GHG emissions from construction.

TABLE 4.2-1 (CONTINUED)

Control Measures with Potential Secondary Air Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
OZONE CONTROL MEASURES			
MCS-02	Further Emission Reductions from Green Waste Processing (Chipping and Grinding Operations not associated with composting) (VOC)	Require chipped or ground greenwaste material to be covered after chipping or grinding or removed from site, and seasonal covering of chipped or ground greenwaste material.	Potential criteria pollutant and GHG emissions from construction.
MCS-03	Improved Start-up, Shutdown and Turnaround Procedures (All Pollutants)	Diverting or eliminating process streams that are vented to flares, and installing redundant equipment to increase operational reliability	Potential criteria pollutant and GHG emissions from construction.
INC-01	Economic Incentive Programs to Adopt Zero and Near-Zero Technologies (NOx)	Installation of cleaner, more efficient combustion equipment, such as boilers, water heaters and commercial space heating or installation of control technologies including fuel cells, diesel particulate filters (DPF), NOx reduction catalysts, alternative electricity generation, such as wind and solar, battery electric, hybrid electric, and usage of low NOx and alternative fuels such as natural gas	Potential criteria pollutant and GHG emissions from construction and related filter and/or catalyst replacement.
ONRD-01	Accelerated Penetration of Partial Zero-Emission and Zero Emission Vehicles (VOC, NOx, PM)	Incentives to replace older vehicles with electric or hybrid vehicles.	Potential criteria pollutant, toxic air pollutant and GHG emissions from and electricity generation.
ONRD-02	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles (VOC, NOx, PM)	Incentives to replace older light- and medium-duty vehicles with new or newer low-emitting vehicles.	Potential criteria pollutant, toxic air pollutant and GHG emissions from and electricity generation.
ONRD-03	Accelerated Penetration of Partial Zero-Emission and Zero Emission Medium Heavy-Duty Vehicles (NOx, PM)	Incentives to replace older medium-duty vehicles with low-emitting vehicles. Highest priority would be given to zero-emission vehicles and hybrid vehicles with a portion of their operation in an "all electric range" mode.	Potential criteria pollutant, toxic air pollutant and GHG emissions from electricity generation.

TABLE 4.2-1 (CONTINUED)

Control Measures with Potential Secondary Air Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
OZONE CONTROL MEASURES			
ONRD-04	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles (NOx, PM)	Incentives replace heavy-duty vehicles with newer or new vehicles. Priority would be placed on replacing older diesel trucks in Mira Loma.	Potential emissions from demolition of retired vehicles.
ONRD-05	Further Emission Reductions from Heavy-Duty Vehicles Serving Near-Dock Railyards (NOx, PM)	Incentives to replace up to 1,000 heavy-duty vehicles with low-emitting vehicles or zero-emission container movement systems.	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from electricity generation.
OFFRD-01	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Accelerate equipment replacement, use of air pollution control technologies (e.g., advanced fuel injection, air induction, and after-treatment technologies).	Potential increase in the use of alternative fuels.
OFFRD-02	Further Emission Reductions from Freight Locomotives (NOx, PM)	Replace existing engines with Tier 4 engines with control equipment (e.g., SCRs, DPM filters, electric batteries, and alternative fuels).	Potential criteria pollutant, toxic air pollutant and GHG emissions from electricity generation. Potential increased use of alternative fuels. Potential decrease in engine efficiency could reduce fuel economy. Potential increase in ammonia emissions.
OFFRD-03	Further Emission Reductions from Passenger Locomotives (NOx, PM)	Repower existing engines with Tier 4 engines with control equipment (e.g., SCRs, DPM filters, electric batteries, and alternative fuels).	Potential criteria pollutant, toxic air pollutant and GHG emissions from electricity generation. Potential increased use of alternative fuels. Potential decrease in engine efficiency could reduce fuel economy. Potential increase in ammonia emissions.
OFFRD-04	Further Emission Reductions from Ocean-Going Marine Vessels at Berth (VOC, NOx, PM)	Shore power of vessels at berth, use of air pollution control technologies on exhaust gases from auxiliary engines and boilers (e.g., SCRs, DPM filters, electric batteries, and alternative fuels).	Potential increase in electricity associated with increased use of shore-side power and additional air pollution control technologies. Construction emissions. Potential decrease in engine efficiency could reduce fuel economy and increase emissions. Potential ammonia emissions.

TABLE 4.2-1 (CONTINUED)

Control Measures with Potential Secondary Air Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
OZONE CONTROL MEASURES			
ADV-01	Proposed Implementation Measures for the Deployment of Zero- and Near-Zero Emission On-Road Heavy-Duty Vehicles (NOx)	Construct "wayside" electric or magnetic infrastructure, construction battery charging and fueling infrastructure.	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from electricity generation. Potential increased use of alternative fuels.
ADV-02	Proposed Implementation Measures for the Deployment of Zero- and Near-Zero Emission Locomotives (NOx)	Construct "wayside" electric, magnetic, battery-hybrid system, or fuel cell infrastructure, construct battery charging or fueling infrastructure.	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from electricity generation. Potential increased use of alternative fuels.
ADV-03	Proposed Implementation Measures for the Deployment of Zero- and Near-Zero Emission Cargo Handling Equipment (NOx)	Construct electric gantry cranes, construct battery charging or fueling infrastructure, and use of alternative fuels.	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from electricity generation.
ADV-04	Actions for the Deployment of Cleaner Commercial Harborcraft (NOx)	Construct battery charging or fueling infrastructure, use of air pollution control equipment (e.g., SCR, and use of alternative fuels).	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from electricity generation. Potential increased use of alternative fuels. Potential decrease in engine efficiency could reduce fuel economy. Potential increase in ammonia emissions.
ADV-05	Proposed Implementation Measures for the Deployment of Cleaner Ocean-Going Marine Vessels (NOx)	Employ after treatment control technologies such as SCR and sea water scrubbers, and use of alternative fuels.	Potential criteria pollutant and GHG emissions from construction. Potential criteria pollutant, toxic air pollutant and GHG emissions from electricity generation. Potential increased use of alternative fuels. Potential decrease in engine efficiency could reduce fuel economy. Potential increase in ammonia emissions.

TABLE 4.2-1 (CONCLUDED)

Control Measures with Potential Secondary Air Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
OZONE CONTROL MEASURES			
ADV-06	Proposed Implementation Measures for the Deployment of Cleaner Off-Road Equipment (NOx)	Construct battery charging or fueling infrastructure, and increased use of alternative fuels.	Potential criteria pollutant, toxic air pollutant and GHG emissions from and electricity generation. Potential increased use of alternative fuels. Potential decrease in engine efficiency could reduce fuel economy. Potential increase in ammonia emissions.
ADV-07	Proposed Implementation Measures for the Deployment of Cleaner Aircraft Engines (NOx)	Use alternative fuels, lean combustion burners, high rate turbo bypass, advanced turbo-compressor design, and engine weight reduction.	Potential increased use of alternative fuels.

[a] The specific actions associated with the control measure are unknown and, therefore, the impacts are speculative. In order to provide a conservative analysis, it is assumed that the control measure could require air pollution control technologies that are similar to those that are currently required (e.g., SCR, electrification, use of alternative fuels, etc., and would have the potential to require construction activities that would generate noise).

4.2.3 Significance Criteria

To determine whether or not air quality impacts from the 2012 AQMP are significant, impacts will be evaluated and compared to the significance criteria in Table 4.2-2. If impacts equal or exceed any of the criteria in Table 4.2-2, they will be considered significant.

TABLE 4.2-2

Air Quality Significance Thresholds

MASS DAILY THRESHOLDS[(a)]		
POLLUTANT	**CONSTRUCTION[(b)]**	**OPERATION[(c)]**
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day

TABLE 4.2-2 (CONCLUDED)

Air Quality Significance Thresholds

TOXIC AIR CONTAMINANTS, ODOR, AND GHG THRESHOLDS	
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Chronic and Acute Hazard Index ≥ 1.0 (project increment) Cancer Burden ≥ 0.5 excess cancer cases (in areas ≥ 1 in 1 million)
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402
GHG	10,000MT/yr CO_2eq for industrial facilities
Ambient Air Quality for Criteria Pollutants[d]	
NO_2 1-hour average annual average	In attainment; significant if project causes or contributes to an exceedance of any standard: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)
PM10 24-hour annual average	10.4 μg/m^3 (construction)[e] and 2.5 μg/m^3 (operation) 1.0 μg/m^3
PM2.5 24-hour average	10.4 μg/m^3 (construction)[e] and 2.5 μg/m^3 (operation)
SO_2 1-hour average 24-hour average	0.255 ppm (state) and 0.075 ppm federal – 99th percentile) 0.04 ppm (state)
Sulfate 24-hour average	25 μg/m^3 (state)
CO 1-hour average 8-hour average	In attainment; significant if project causes or contributes to an exceedance of any standard: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)
Lead 30-day average Rolling 3-month average Quarterly average	1.5 μg/m3 (state) 0.15μg/m3 (federal) 1.5μg/m3 (federal)

a) Source: SCAQMD CEQA Handbook (SCAQMD, 1993)
b) Construction thresholds apply to both the SCAB and Coachella Valley (Salton Sea and Mojave Desert Air Basin)
c) For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
d) Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
e) Ambient air quality threshold based on SCAQMD Rule 403.

KEY: ppm = parts per million; μg/m^3 = microgram per cubic meter; lbs/day = pounds per day; MT/yr CO2eq = metric tons per year of CO_2 equivalents; ≥ greater than or equal to; > = greater than

4.2.4 Future Air Quality Emission Inventories

Figure 4.2-1 and 4.2-2 show baseline and future projected emissions, respectively, by major source categories. These figures are included here to show projected air quality trends through 2023. Baseline emissions for major source categories (e.g., point, area, on-road, and off-road) in 2008 are provided in Figure 4.2-1. Figure 4.2.-2 shows the projected future 2023 emission inventory that would be expected if no new AQMP control measures are promulgated as rules. It does, however, reflect emission reductions for existing rules with future compliance dates. A comparison of Figures 4.2-1 and 4.2-2 indicates the following:

- Consumer products continue to be the major contributor of VOC emissions with on-road vehicles declining from 19 percent in 2008 (121 tons per day) to 25 percent in 2023 (110 tons per day). The contribution to VOC emissions from off-road equipment decreases from 26 percent in 2008 (166 tons per day) to 25 percent in 2023 (110 tons per day). The on-road vehicle emissions decrease from 33 percent in 2008 (211 tons per day) to 16 percent (70 tons per day) due to more-stringent on-road standards in the future. Overall, on-road and off-road source combined contribution decreases from 59 percent (377 tons per day) in 2008 to 41 percent (180 tons per day) in 2023.

- The contribution of SOx emissions from off-road sources including marine vessels decreases from 71 percent in 2008 (38 tons per day) to 32 percent in 2023 (six tons per day) due to more-stringent fuel standards.

- The contribution to NOx emissions from off-road equipment increases from 29 percent in 2008 (~~209~~ 208 tons per day) to ~~43~~ 42 percent in 2023 (~~135~~ 133 tons per day) as the on-road vehicle emissions decrease from 59 percent in 2008 (~~425~~ 426 tons per day) to ~~37~~ 36 percent (~~116~~ 117 tons per day) due to more-stringent on-road standards in the future. It is important to note that the contribution of total NOx emissions increases for off-road equipment, but the NOx emissions from off-road equipment still decreases. Overall, on-road and off-road source combined contribution decreases from 88 percent (634 tons per day) of the emissions in 2008 to ~~80~~ 82 percent in 2023 (250 tons per day).

- The contribution to CO emissions from off-road equipment decreases from 68 percent in 2008 (1,959 tons per day) to 52 percent in 2023 (823 tons per day). The on-road vehicle emissions increases from 27 percent in 2008 (778 tons per day) to 38 percent (602 tons per day) due to more-stringent on-road standards in the future. Overall, on-road and off-road source combined contribution decreases from 95 percent (2,737 tons per day) of the emissions in 2008 to 90 percent in 2023 (1,425 tons per day).

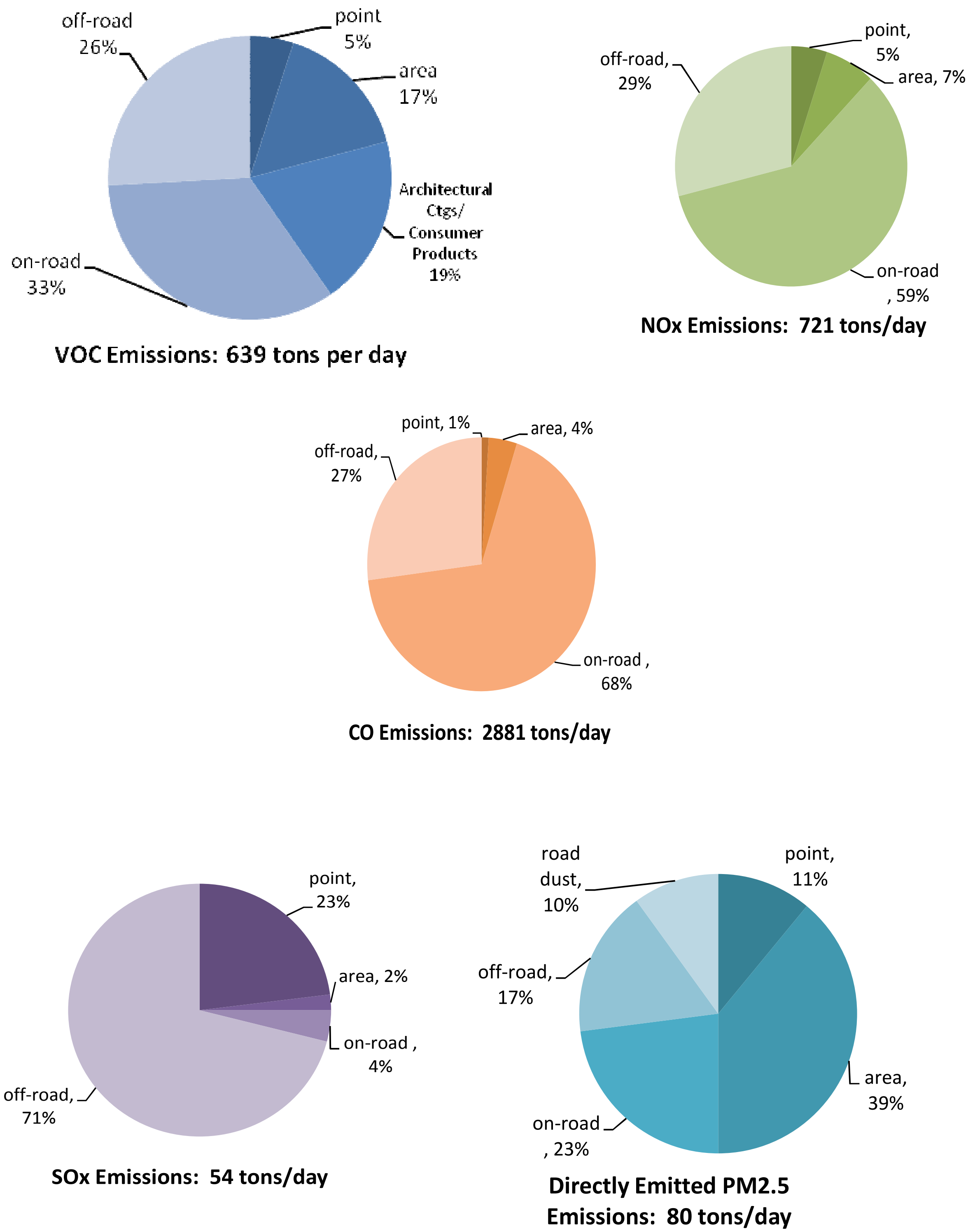

FIGURE 4.2-1

Relative Contribution by Source Category to 2008 Emission Inventory
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)

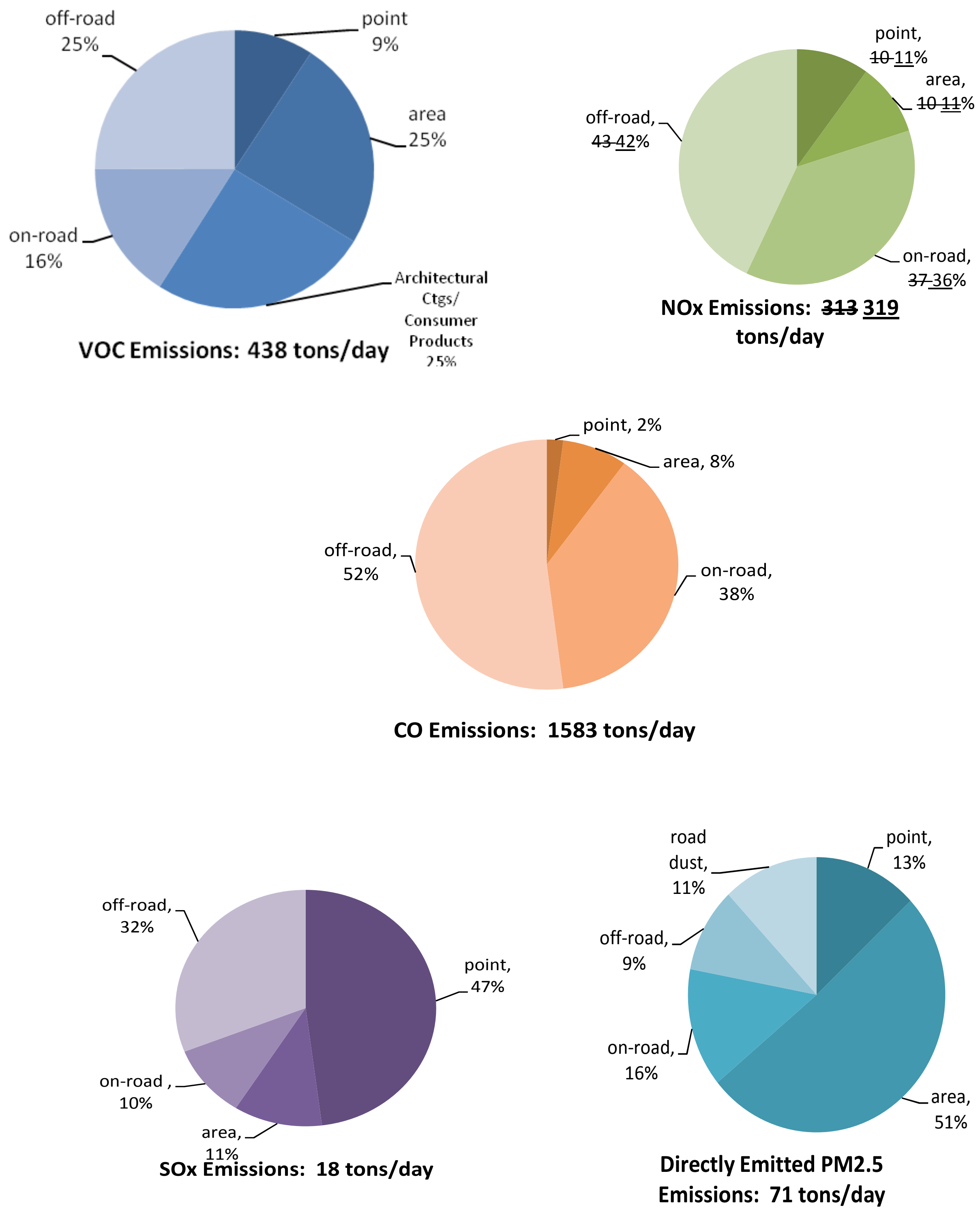

FIGURE 4.2-2

Relative Contribution by Source Category to 2023 Emission Inventory
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)

- The major contributor of PM2.5 emissions is area sources at 39 percent in 2008 (31 tons per day), which increases to 51 percent in 2023 (36 tons per day) primarily due to the reduction in on- and off-road source emissions. The contribution to PM2.5 emissions from off-road equipment decreases from 17 percent in 2008 (14 tons per day) to nine percent in 2023 (six tons per day). The on-road vehicle emissions decrease from 23 percent in 2008 (18 tons per day) to 16 percent (11 tons per day) due to more-stringent on-road standards in the future. Overall, on-road and off-road source combined contribution decreases from 40 percent (32 tons per day) in 2008 to 25 percent (18 tons per day) in 2023.

- Emission reductions from the 2008 to 2023 are expected due to the effect of more-stringent on-road standards in the future.

4.2.5 2012 AQMP Air Quality Modeling Results

The objective of the 2012 AQMP is to attain and maintain ambient air quality standards. The purpose of the 2012 AQMP is to set forth a comprehensive and integrated program that will lead the Basin into compliance with the federal 24-hour PM2.5 air quality standard, and to provide an update of the Basin's projections in meeting the federal 8-hour ozone standards. The 2012 AQMP demonstrates attainment of the federal 24-hour PM2.5 standard by 2014 in the Basin through adoption of all feasible measures (see Table 4.2-3).

The Basin is currently designated nonattainment for PM2.5, and extreme nonattainment for ozone. Table 4.2-3 shows the attainment designation and date when attainment would be achieved.

4.2.5.1 PM2.5 Air Quality

Within the Basin, PM2.5 particles are either directly emitted into the atmosphere (primary particles), or are formed through atmospheric chemical reactions from precursor gases (secondary particles). Primary PM2.5 includes road dust, diesel soot, combustion products, and other sources of fine particles. Secondary products, such as sulfates, nitrates, and complex carbon compounds are formed from reactions with oxides of sulfur, oxides of nitrogen, VOCs, and ammonia.

The U.S. EPA supported Community Multiscale Air Quality (CMAQ) (version 4.7) modeling platform with SAPRC99 chemistry and Weather Research and Forecasting Model (WRF) meteorology is used as the primary tool to demonstrate future year attainment of the 24-hour average PM2.5 standard in the 2012 AQMP. A detailed discussion of the features of the CMAQ approach is presented in Appendix V of the 2012 AQMP. The analysis was also conducted using the Comprehensive Air Quality Model with Extensions (CAMx) modeling platform using the "one atmosphere" approach comprised of the SAPRC99 gas phased chemistry and a static two-mode particle size aerosol module as the particulate modeling platform. Parallel testing was conducted to evaluate the CMAQ performance against CAMx and the results indicated that the two model/chemistry packages had similar performance. The CAMx results are provided in Appendix V of the 2012 AQMP as a component of the weight of evidence discussion.

TABLE 4.2-3

Expected Year of Compliance with Federal Ambient Air Quality Standards

CRITERIA POLLUTANT	AVERAGING TIME	DESIGNATION [a]	ATTAINMENT DATE [b]
1979 **1-Hour Ozone**[c]	1-Hour (0.12 ppm)	Nonattainment (Extreme)	11/15/2010 (Not Attained)[c]
1997 **8-Hour Ozone**[d]	8-Hour (0.08 ppm)	Nonattainment (Extreme)	6/15/2024
2008 **8-Hour Ozone**	8-Hour (0.075 ppm)	Nonattainment (Extreme)	12/31/2032
CO	1-Hour (35 ppm) 8-Hour (9 ppm)	Attainment (Maintenance)	6/11/2007 (Attained)
NO_2[e]	1-Hour (100 ppb)	Unclassifiable/Attainment	Attained
	Annual (0.053 ppm)	Attainment (Maintenance)	9/22/1998
SO_2[f]	1-Hour (75 ppb)	Designations Pending	Pending
	24-Hour (0.14 ppm) Annual (0.03 ppm)	Unclassifiable/Attainment	3/19/1979 (Attained)
PM10	24-hour (150 $\mu g/m^3$)	Nonattainment (Serious)[g]	12/31/2006 (Redesignation request submitted)[g]
PM2.5	24-Hour (35 $\mu g/m^3$)	Nonattainment	12/14/2014[h]
	Annual (15.0 $\mu g/m^3$)	Nonattainment	4/5/2015
Lead	3-Months Rolling (0.15 $\mu g/m^3$)	Nonattainment (Partial)[i]	12/31/2015

U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable

a) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for attainment demonstration
b) 1-hour O_3 standard (0.12 ppm) was revoked, effective June 15, 2005 ; however, the Basin has not attained this standard based on 2008-2010 data and has some continuing obligations under the former standard
c) The 1997 8-hour O_3 standard (0.08 ppm) was reduced (0.075 ppm), effective May 27, 2008; the 1997 O_3 standard and most related implementation rules remain in place until the 1997 standard is revoked by U.S. EPA
d) New NO_2 1-hour standard, effective August 2, 2010; attainment designations January 20, 2012; annual NO_2 standard retained
e) The 1971 annual and 24-hour SO_2 standards were revoked, effective August 23, 2010; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard. Area designations are expected in 2012, with Basin designated Unclassifiable /Attainment
f) Annual PM10 standard was revoked, effective December 18, 2006; redesignation request to Attainment of the 24-hour PM10 standard is pending with U.S. EPA
g) Attainment deadline for the 2006 24-Hour PM2.5 NAAQS is December 14, 2014
h) Partial Nonattainment designation – Los Angeles County portion of Basin only

The 2012 AQMP modeling attainment demonstrations using the CMAQ (and CAMx) platform were conducted in a vastly expanded modeling domain compared with the analysis conducted for the 2007 AQMP modeling attainment demonstration. In this analysis, the PM2.5 and ozone base and future simulations were modeled simultaneously. The simulations were conducted using a Lambert Conformal grid projection where the western boundary of the domain was extended to 084 UTM, over 100 miles west of the ports of Los Angeles and Long Beach. The eastern boundary extended beyond the Colorado river, while the northern and southern boundaries of the domain extend to the San Joaquin Valley and the Northern portions of Mexico (3543 UTM). The grid size has been reduced from five kilometers squared to four kilometers squared and the vertical resolution has been increased from 11 to 18 layers.

The final WRF meteorological fields were generated for the identical domain, layer structure and grid size. The WRF simulations were initialized from National Centers for Environmental Prediction (NCEP) analyses and run for three-day increments with the option for four dimensional data assimilation (FDDA). Horizontal and vertical boundary conditions were designated using a "U.S. EPA clean boundary profile."

PM2.5 data measured as individual species at six-sites in the SCAQMD's air monitoring network during 2008 provided the characterization for evaluation and validation of the CMAQ annual and episodic modeling. The six sites include the historical PM2.5 maximum location (Riverside- Rubidoux), the stations experiencing many of the highest county concentrations (among the four-county jurisdiction including Fontana, North Long Beach and Anaheim) and source oriented key monitoring sites addressing goods movement (South Long Beach) and mobile source impacts (Central Los Angeles). It is important to note that the close proximity of Mira Loma to Rubidoux and the common in-Basin air flow and transport patterns enable the use of the Rubidoux speciated data as representative of the particulate speciation at Mira Loma. Both sites are directly downwind of the dairy production areas in Chino and the warehouse distribution centers located in the northwestern corner of Riverside County. Speciated data monitored at the selected sites for 2006-2007 and 2009-2010 were analyzed to corroborate the applicability of using the 2008 profiles.

Day-specific point source emissions were extracted from the SCAQMD's ~~District~~ stationary source and RECLAIM inventories. Mobile source emissions included weekday, Saturday and Sunday profiles based on CARB's EMFAC2011 emissions model, CALTRANS weigh-in-motion profiles, and vehicle population data and transportation analysis zone (TAZ) data provided by SCAG. The mobile source data and selected area source data were subjected to daily temperature corrections to account for enhanced evaporative emissions on warmer days. Gridded daily biogenic VOC emissions were provided by CARB using BEIGIS biogenic emissions model. The simulations benefited from enhancements made to the emissions inventory including an updated ammonia inventory, improved emissions characterization that split organic compounds into coarse, fine, and primary particulate categories, and updated spatial allocation of primary paved road dust emissions.

Model performance was evaluated against speciated particulate PM2.5 air quality data for ammonium, nitrates, sulfates, secondary organic matter, elemental carbon, primary and total particulate mass for the six monitoring sites (Rubidoux, Central Los Angeles, Anaheim, South Long Beach, Long Beach, and Fontana).

4.2.5.2 Ozone Air Quality

The 2007 AQMP provided a comprehensive 8-hour ozone analysis that demonstrated future year attainment of the 1997 federal ozone standard (80 ppb) by 2023 with implementation of short-term measures and CAA Section 182 (e)(5) long term emissions reductions. The analysis concluded that NOx emissions needed to be reduced approximately 76 percent and VOC 22 percent from the 2023 baseline in order to demonstrate attainment. The 2023 base year VOC and NOx summer planning emissions inventories included 536 and 506 tons per day, respectively.

As presented in Chapter 3 of the 2012 AQMP, the 2012 AQMP controlled 2023 emissions of both precursor pollutants are estimated to be lower than the 2023 baseline established in the 2007 AQMP. The 2023 baseline VOC and NOx emission summer planning emissions have been revised to 434 and 313 tons per day, respectively. The emissions revision incorporated changes made to the on-road truck and off-road equipment categories that resulted from CARB rulemaking. The new emissions inventory also reflects the impact of the economic slowdown and revisions to regional growth estimates. As a consequence, it is important to revisit the projections of 2023 baseline ozone to investigate the impact of the inventory revision on the attainment demonstration and equally important, what is the impact on the size of the proposed long term NOx emissions reduction commitment.

4.2.6 Potential Secondary Air Quality Impacts and Mitigation Measures

Secondary air quality impacts are potential increases in air pollutant that can occur directly or indirectly from implementation of control measures in the 2012 AQMP. SCAQMD evaluated all 2012 AQMP control measures to identify those control measures that have the potential to generate secondary adverse air quality impacts. Table 4.2-1 identifies all control measures that have the potential to generate secondary air quality impacts. All air quality impacts identified in this subchapter are based on impacts from control measures identified in Table 4.2-1.

4.2.6.1 Criteria Pollutants - Construction Activities

Regulation of Port and Port-Related Sources: In 2006 the Ports of Los Angeles and Long Beach, with the participation and cooperation of the staff of the SCAQMD, CARB, and U.S. EPA, adopted the San Pedro Bay Ports Clean Air Action Plan (CAAP). The CAAP was further amended in 2010, updating many of the goals and implementation strategies to reduce air emissions and health risks associated with port operations while allowing port development to continue. In addition to addressing health risks from port-related sources, the CAAP sought the reduction of criteria pollutant emissions to the levels that assure port-related sources decrease their "fair share" of regional emissions to enable the Basin to attain state and federal ambient air quality standards. The IND-01 control measure is the "backstop" for the CAAP.

IND-02 would establish enforceable nonattainment pollutant emission reduction goals for the ports in order to ensure attainment of the 24-hr PM2.5 attainment strategy in the 2012 AQMP. IND-02 would be implemented if aggregate emissions from port-related sources exceed specified emissions targets. If emissions do not exceed such targets, the ports would have no further control obligations and this control measure would not need to be implemented.

The overall impact of the CAAP is beneficial to air quality; however, implementation of some of the control measures in the CAAP will generate secondary impacts to air quality from infrastructure projects construction, increased electricity usage, and increased production of alternative fuels. Although the secondary air quality impacts from construction of infrastructure projects cannot be quantified from data in the CAAP, it is expected that construction to install the electrical distribution network in the Ports of Long Beach and Los Angeles as well as implement other control measures will require an intensive effort and is expected to have short-term significant air quality impacts.

4.2.6.1.1 General Construction Emissions from Control Measures

While implementing the 2012 AQMP control measures is expected to reduce operational emissions, construction-related activities associated with installing or replacing equipment, for example, are expected to generate emissions from construction worker vehicles, trucks, and construction equipment. Implementation of some of the measures in the 2012 AQMP would require constructing the following types of new infrastructure including: 1) additional infrastructure to support alternative-fueled vehicles (electric, hydrogen, natural gas); 2) additional infrastructure to support electrification of new sources (e.g., additional on-road vehicles and marine vessels, "wayside" electric or magnetic power such as catenary lines); and, 3) construction of controls at stationary sources (e.g., SCRs, particulate controls, and vapor recovery systems). The following control measures in the 2012 AQMP may require construction activities in connection with implementing the emission control requirements, BCM-03 - Emission Reductions from Under-Fired Charbroilers, CMB-01 - Further NOx Reductions from RECLAIM – *Phase I and Phase II*, CMB-02 - NOx Reductions from Biogas Flares, CMB-03 - Reductions from Commercial Space Heating, IND-01 - Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities, FUG-01 - ~~Further~~ VOC Reductions from Vacuum Trucks, FUG-02 - Emission Reduction from LPG Transfer and Dispensing – Phase II, FUG-03 - Further ~~VOC~~ Reductions from Fugitive VOC Emissions, MCS-01 - Application of All Feasible Measures Assessment, MCS-03 - Improved Start-up, Shutdown and Turnaround Procedures, INC-01 - Economic Incentive Programs to Adopt Zero and Near-Zero Technologies, OFFRD-01 - Extension of the SOON Provision for Construction/Industrial Equipment, OFFRD-04 - Further Emission Reductions from Ocean-Going Marine Vessels at Berth, ONRD-03 - Accelerated Penetration of Partial Zero-Emission and Zero Emission Medium Heavy-Duty Vehicles, ONRD-05 - Further Emission Reductions from Heavy-Duty Vehicles Serving Near-Dock Railyards, ADV-01 - Proposed Implementation Measures for the Deployment of Zero- and Near-Zero Emission On-Road Heavy-Duty Vehicles, ADV-02 - Proposed Implementation Measures for the Deployment of Zero- and Near-Zero Emission Locomotives, ADV-03 - Proposed Implementation Measures for the Deployment of Zero- and Near-Zero Emission Cargo Handling Equipment, ADV-04 - Actions for the Deployment of Cleaner Commercial Harborcraft, ADV-05 - Proposed Implementation Measures for the Deployment of Cleaner Ocean-Going Marine Vessels, and ADV-06 - Proposed Implementation Measures for the Deployment of Cleaner Off-Road Equipment.

The inventory prepared for the 2012 AQMP includes emissions estimates associated with construction activities, which are summarized in Table 4.2-4 for the key years of 2014 and 2023. It is assumed that the following types of construction activities to implement AQMP control measures contribute to construction activities emission inventories: 1) additional infrastructure to support electric and alternative fuel vehicles; 2) additional infrastructure for stationary source controls; and, 3) additional infrastructure to support electrification of new sources. Table 4.2-4 also presents comparisons of the future construction emission inventories to the year 2008 baseline emissions inventory. For 2023, emissions of CO and PM10 are expected to be significant without an estimate of construction associated with the proposed control measures. The scope of the construction to implement the proposed control measures is not known at this time. However, additional construction to implement the proposed measures could potentially increase the construction emissions and, therefore would be considered potentially significant.

TABLE 4.2-4

Annual Average Construction Emissions by Source Category in the District (tons/day)

Source Category	VOC	CO	NOx	SOx	PM10	PM2.5
2008 Emission Inventory						
Construction and Demolition	--	--	--	--	21	2
Off-Road Equipment	64	606	94	0.08	5.8	5.4
2008 Total	64	606	94	0.08	27	7.5
2014 Emission Inventory						
Construction and Demolition	--	--	--	--	19	1.9
Off-Road Equipment	49	594	66	0.08	4.3	4.0
2014 Total	49	594	66	0.08	24	5.9
Emission Increase (emissions in 2014 – emission in 2008)	-15	-12	-28	0	-3.3	-1.6
Emissions Increase (lbs/day)	-30,320	-23,620	-56,980	0	-6,500	-3,120
SCAQMD Significance Thresholds (lbs/day)	75	550	700	150	150	55
Significant?	NO	NO	NO	NO	NO	NO
2023 Emissions Inventory						
Construction and Demolition	--	--	--	--	27	2.7
Off-Road Equipment	43	633	44	0.11	3.0	2.8
2023 Total	43	633	44	0.11	30	5.5
Emission Increase (emissions in 2023 – emission in 2008)	-21	27	-50	0.03	3.0	-2.0
Emissions Increase (lbs/day)	-42,820	53,300	-100,200	60	6,040	-3,920
SCAQMD Significance Thresholds (lbs/day)	75	550	100	150	150	55
Significant?	NO	YES	NO	NO	YES	NO

Source: SCAQMD, 2012

Note: Negative numbers represent emissions reductions.

The SCAQMD has developed localized significance thresholds for criteria pollutant emissions to determine whether or not a project may generate significant adverse localized air quality impacts. An analysis of localized air quality impacts for criteria pollutant emissions is not applicable to regional projects such as local general plans, specific plans, or AQMPs (SCAQMD, 2008) because the details of the individual projects to implement the these types of plans and their locations are not known at this time. Therefore, a localized air quality impact analysis has not been performed for the 2012 AQMP in this Final Program EIR.

PROJECT-SPECIFIC MITIGATION: Mitigation measures are required to minimize the significant air quality impacts associated with the potential significant construction impacts on air quality. The following feasible mitigation measures are required:

On-Road Mobile Sources:

AQ-1 Develop a Construction Emission Management Plan for the proposed project. The Construction Emission Management Plan shall be submitted to SCAQMD CEQA for approval prior to the start of construction. The Plan shall include measures to minimize emissions from vehicles including, but not limited to consolidating truck deliveries, description of truck routing, description of deliveries including hours of delivery, description of entry/exit points, locations of parking, and construction schedule. At a minimum the Construction Emission Management Plan would include the following types of mitigation measures.

Off-Road Mobile Sources:

AQ-2 Maintain construction equipment tuned up and with two to four degree retard diesel engine timing or tuned to manufacturer's recommended specifications that optimize emissions without nullifying engine warranties.

AQ-3 The project proponent shall survey and document the proposed project's construction areas and identify all construction areas that are served by electricity. This documentation shall be provided as part of the Construction Emissions Management Plan. Electric welders shall be used in all construction areas that are demonstrated to be served by electricity.

AQ-4 The project proponent shall survey and document the proposed Project's construction areas and identify all construction areas that are served by electricity. This documentation shall be provided as part of the Construction Emissions Management Plan. Onsite electricity rather than temporary power generators shall be used in all construction areas that are demonstrated to be served by electricity.

AQ-5 The project proponent shall use cranes rated 200 hp or greater equipped with Tier 3 or equivalent engines. Engines equivalent to Tier 3 may consist of Tier 2 engines retrofitted with diesel particulate filters and oxidation catalysts, selective catalytic reduction, or other equivalent NOx control equipment. Retrofitting cranes rated 200 hp or greater with PM and NOx control devices must occur before the start of construction. If cranes rated 200 hp or greater equipped with Tier 3 engines are not available or cannot be retrofitted with PM and NOx control devices, the project proponent shall use cranes rated 200 hp or greater equipped with Tier 2 or equivalent engines. The project proponent shall provide documentation that cranes rated 200 hp or greater equipped with Tier 3 or equivalent engines are not available in the Construction Emissions Management Plan.

AQ-6 For off-road construction equipment rated 50 to 200 hp that will be operating for eight hours or more, the project proponent shall use equipment rated 50 to 200 hp equipped with Tier 3 or equivalent engines. Engines equivalent to Tier 3 may consist of Tier 2 engines retrofitted with diesel particulate filters and oxidation catalysts, selective catalytic reduction, or other equivalent NOx control equipment Retrofitting equipment rated 50 to 200 hp with PM and NOx control devices must occur before the start of construction If equipment rated 50 to 200 hp equipped with Tier 3 engines are not available or cannot be retrofitted with PM and NOx control devices, the project proponent shall use equipment rated 50 to 200 hp equipped with Tier 2 or equivalent engines. The project proponent shall provide documentation that equipment rated 50 to 200 hp equipped with Tier 3 or equivalent engines are not available in the Construction Emissions Management Plan or associated subsequent status reports as information becomes available.

AQ-7 Suspend use of all construction activities that generate air pollutant emissions during first stage smog alerts.

As improved emission reduction technologies become available, construction mitigation measures will be updated and implemented as specific control measures are developed and projects proposed.

REMAINING CONSTRUCTION AIR QUALITY IMPACTS: The air quality analysis concluded that significant adverse construction air quality impacts could be created by the proposed project because future construction inventories for CO and PM10 emissions indicate these pollutants would exceed the SCAQMD's applicable significance thresholds of 550 and 150 pounds per day, respectively. Since it is expected that construction activities to implement 2012 AQMP control measures would contribute to these exceedances, construction air quality impacts were concluded to be significant. In spite of implementing the above mitigation measures, construction CO and PM10 air quality impacts would likely remain significant.

4.2.6.2 Criteria Pollutants - Operational Activities

4.2.6.2.1 Secondary Impacts from Increased Electricity Demand

PROJECT-SPECIFIC IMPACTS Electricity is often used as the power source to operate various components of add-on control equipment, such as electrostatic precipitators, ventilation systems, fan motors, vapor recovery systems, etc. Increased demand for electrical energy may require generation of additional electricity, which in turn could result in increased indirect emissions of criteria pollutants in the district and in other portions of California. The stationary source measures that may result in increased demand for electrical energy due to operation of add-on control equipment are included in Table 4.2-1.

Control Measure BCM-03 calls for emission reductions from PM control devices (e.g., electrostatic precipitators (ESP)) for under-fired charbroiler restaurant operations, which could increase electricity demand. Other control measures that could result in an increase in electricity include measures that would require add-on controls or retrofit and replacement of equipment, including CMB-01, IND-01, INC-01, FUG-01, and MCS-01. The required emissions reduction may be achieved through various types of add-on control equipment such as selective catalytic reduction (SCR) technology, PM filters, refrigerated condensers, liquid scrubbers, and positive displacement pumps. Each of the possible control types may have potential adverse energy impacts because the control technology uses electricity. The analysis of the effect of energy resources and electricity demand due to implementation of the 2012 AQMP can be found in Subchapter 4.3 of this Final Program EIR.

Several of the control measures would require support facilities and potentially increased use of electricity for on-road vehicles and off-road vehicles (e.g., ONRD-01, ONRD-02, ONRD-03, ONRD-05, OFFRD-02, OFFRD-03, OFFRD-04, ADV-01, ADV-02, ADV-03, ADV-04, ADV-05, and ADV-06). An increase in electric vehicles would require the generation of additional electricity in the district and other areas of California. In addition, shore-side electricity may be required associated with "cold ironing" of marine vessels (e.g., use of shore-side electricity while at berth, instead of use of diesel-fired auxiliary engines). As detailed in Subsection 4.3 of this Final Program EIR, the potential increase in the amount of electricity is expected to be 1,691.2 gigawatt-hours (GWh). The criteria pollutant emissions associated with the increase in energy demand is shown in Table 4.2-5 for the control measures which can be quantified.

TABLE 4.2-5

Estimated Criteria Pollutant Emissions from Increased Electricity Demand

	ESTIMATED EMISSIONS INCREASE (lbs/day)[(a)]					
CONTROL MEASURE	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
ONRD-01	0.71	6.9	2.1	0.24	0.83	0.82
ONRD-02	1.4	14	4.2	0.48	1.7	1.6
ONRD-03	1.5	15	4.5	0.51	1.8	1.8
ONRD-05	0.91	8.9	2.7	0.31	1.1	1.1
ADV-01	10	101	31	3.5	12	12
ADV-02	16	158	48	5.5	19	19
Total Emissions Increase	31	303	92	10	36.	36

(a) The emission estimates are ratioed from the 2008 inventory emissions reported for Electric Utilities and Cogeneration from Appendix III of the 2012 AQMP (SCAQMD, 2012).

Two of the on-road control measures, ONRD-01 and ONRD-02, target emission reductions from transportation measures that would accelerate the penetration and deployment of partial zero-emission vehicles in the light- and medium-duty vehicles categories. One on-road control measure, ONRD-03, targets early deployment of partial zero-emission and zero-emission light- and medium-heavy duty vehicle. One on-road control measure, ONRD-05, seeks emission reductions at near-dock railyards through the deployment of zero-emission heavy-duty vehicles. All four of these control measures are expected to increase the use of electric and advanced hybrid electric vehicles, which would increase the demand for electricity and result in the increase in indirect emissions associated with electricity production. The amount of electricity generated is described in the energy impact Subchapter 4.3 of this Final Program EIR.

Electrification of motor vehicles and other commercial and industrial equipment would greatly reduce fossil fuel usage in the district. At that time, there may be an increase in emissions due to increased electric power generation due to increased demand. Although the control measures include projections regarding the penetration rate of electric vehicles, the actual number of electric vehicles is unknown and would need to be calculated during any rule development for these control measures. An incremental increase in electricity demand is not expected to create significant adverse air quality impacts compared to emission reductions from mobile and stationary sources. However, if electricity demand exceeds available power, additional sources of electricity would be required. Additional power plants would be required to supply the projected electricity due to general population growth, both in California and outside of California. Currently, there are a number of power plant projects planned in southern California to meet future needs. Relative to the existing electricity use and the projected future peak electricity demand, implementation of all the control measures is expected to result in an overall worst-case increase from the year 2008 baseline of approximately 1.5 percent (see Subsection 4.3 of this Final Program EIR).

Electricity generation within the district is subject to applicable SCAQMD rules such as Rule 1134 – Emissions Oxides of Nitrogen from Stationary Gas Turbines, Rule 1135 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines, and Regulation XX – RECLAIM. These rules and regulations regulate NOx emissions (the primary pollutant of concern from natural gas combustion to generate electricity) from existing power generating equipment. Although emissions from electric utilities in the district are capped under the RECLAIM program (and under Rule 1135), any new power generating facilities in the district to accommodate increased electricity demand would be subject to SCAQMD Regulation XIII – New Source Review, or Rule 2005 which requires installation of BACT, air quality modeling would be required to demonstrate that new emissions would not result in significant ambient air quality impacts (so there would be no localized impacts), and emission offsets (through either emission reduction credits or RECLAIM trading credits) before permits could be issued emissions offsets, which for NOx emissions, for example, would be at a ratio of 1.2 to 1.0, or 1.2 pounds of emission reduction credits required for every new pound of NOx emitted from the power generating source or a ratio of 1.0 to 1.0 for RECLAIM sources. Any new power generating projects would be incorporated into the emission inventories used in future AQMPs and additional control measures would be identified if necessary and feasible. While the control measures may cause an increase in NOx emissions from power plants, overall the 2012 AQMP is expected to achieve net NOx emission reductions to maintain attainment of all NO2 ambient air quality standards and continue making expeditious progress in achieving the federal one-hour and eight-hour standards. Further, emissions from the combustion of gasoline or diesel fuels are generally the emissions that would be reduced when electrification is proposed and replaced with emissions from the combustion of natural gas (as would generally occur from electricity generating facilities in the district). Emissions from diesel combustion (e.g., marine vessel engines) are orders of magnitude higher than emissions from the combustion of natural gas. So, overall emissions are expected to decrease. No significant adverse impacts to air quality are expected from control measures requiring increased demand for electricity.

There could be an increase in emissions from generators that may be used to charge batteries in remote locations where no grounded power source is available. Generators are regulated sources in the district. Existing SCAQMD regulations that apply to generators and emergency generators would apply to generators used to charge batteries. New generators would be subject to Regulation XIII or Rule 2005. Existing generators are subject to SCAQMD Rule 1110.2 – Emissions from Gaseous and Liquid Fueled Internal Combustion Engines. Rule 1110.2 does not establish a facility emission cap, but establishes a stringent NOx emission rate. Truly portable equipment may also be regulated under the state registration program, which establishes emission limitations on NOx, VOCs, and CO.

The emissions from electrical generation have been included in the emissions inventory prepared for the 2012 AQMP. Table 4.2-6 summarizes the emissions associated with electric generation in the key years 2104 and 2023.

TABLE 4.2-6

Annual Average Operational Emissions for Electric Generation in the District (tons/day)

Source Category	VOC	CO	NOx	SOx	PM10	PM2.5
2008 Emission Inventory						
Electric Utilities	1.0	9.9	2.7	0.33	1.2	1.2
Cogeneration	0.05	0.04	0.43	0.03	0.05	0.05
2008 Total	1.1	10	3.1	0.34	1.2	1.2
2014 Emission Inventory						
Electric Utilities	0.88	8.7	2.4	0.29	1.0	1.0
Cogeneration	0.05	0.39	0.43	0.03	0.05	0.05
2014 Total	0.93	9.1	2.8	0.32	1.1	1.1
Emission Increase (emissions in 2014 – emission in 2008)	-0.13	-0.87	-0.31	-0.03	-0.14	-0.13
Emissions Increase (lbs/day)	-260	-1,740	-620	-60	-280	-260
1.5% Emissions Increase from Control Measures (lbs/day)	31	303	92	10	36	36
Total Emissions Increase (lbs/day)	-229	-1,437	-528	-50	-244	-224

TABLE 4.2-6 (CONCLUDED)

Annual Average Operational Emissions for Electric Generation in the District (tons/day)

Source Category	VOC	CO	NOx	SOx	PM10	PM2.5
2023 Emissions Inventory						
Electric Utilities	0.86	8.5	2.3	0.28	1.0	1.0
Cogeneration	0.05	0.41	0.43	0.03	0.05	0.05
2023 Total	0.91	8.9	2.7	0.31	1.1	1.1
Emission Increase (emissions in 2023 – emission in 2008)	-0.15	-1.07	-0.40	-0.05	-0.17	-0.16
Emissions Increase (lbs/day)	-300	-2,140	-800	-100	-340	-320
1.5 % Emissions Increase from Control Measures (lbs/day)	31	303	92	10	36	35
Total Emissions Increase (lbs/day)	-269	-1,837	-708	-90	-304	-284

Source: SCAQMD, 2012
Note: Negative numbers represent emissions reductions.

The inventory prepared for the 2102 AQMP includes estimates for electric utilities and cogeneration facilities in key years 2014 and 2023. It is assumed that the emissions associated with electrical generation that are part of the 2012 AQMP control measures would contribute to the emission changes identified in the emission inventories. The inventory also accounts for growth in population. It has been estimated that implementation of all the control measures is expected to result in an overall increase in electricity in 2023 of approximately 1.5 percent, relative to the projected peak electricity demand in 2008. As shown in Table 4.2-6, the estimated VOC, CO, NOx, SOx, PM10, and PM2.5 emissions are expected to decline between 2014 and 2023.

Table 4.2-7 shows total emissions from 2012 AQMP. As shown in Table 4.2-7, overall, emissions from 2012 AQMP control measures are not expected to exceed the SCAQMD's daily regional significance thresholds and, ultimately, would provide an emission reduction benefit.

TABLE 4.2-7

Total Annual Average Operational Emissions from Implementation
of the 2012 AQMP in the District
(tons/day)

Source Category	VOC	CO	NOx	SOx	PM10	PM2.5
2008 Emission Inventory						
2008 Total	593	2,881	757	54	167	80
2014 Emission Inventory						
2014 Total	451	2095	502	19	155	70
Emissions Increase from Implementation of the 2012 AQMP	-142	-786	-256	-36	-12	-10
Emissions Increase from Implementation of the 2012 AQMP (lbs/day)	-283,260	-1,572,020	-511,180	-71,460	-23,780	-19,880
SCAQMD Significance Thresholds (lbs/day)	55	550	55	150	150	55
Significant?	NO	NO	NO	NO	NO	NO
2023 Emissions Inventory						
2023 Total	406	1,583	~~322~~ 328	18	164	71
Emissions Increase from Implementation of the 2012 AQMP	-187	-1,297	-~~435~~ 429	-36	-2.9	-9.1
Emissions Increase from Implementation of the 2012 AQMP (lbs/day)	-373,820	-2,594,860	-~~870,520~~ 850,000	-72,020	-5,780	-18,280
SCAQMD Significance Thresholds (lbs/day)	55	550	55	150	150	55
Significant?	NO	NO	NO	NO	NO	NO

Source: SCAQMD, 2012
Note: Negative numbers represent emissions reductions.

The SCAQMD does not regulate electricity generating facilities outside of the district so the rules and regulations discussed above do not apply to electricity generating facilities outside of the district. In 2010, about 71 percent of the electricity used in California was generated in-state and about 29 percent was imported (see Section 3.2.3). While these electricity generating facilities would not be subject to SCAQMD rules and regulations, they would be subject to the rules and regulations of the local air pollution control district and the U.S. EPA. These agencies also have established New Source Review regulations for new and modified facilities that generally require compliance with BACT or lowest achievable emission reduction technology. Most in-state electricity generating plants use natural gas, which provides a relatively clean source of fuel (as compared to coal- or diesel-fueled plants). The emissions from these power plants would also be controlled by local, state, and federal rules and regulations, minimizing overall air emissions. These rules and regulations may differ from the SCAQMD rules and regulations because the ambient air quality and emission.

Power plants in California provided approximately 71 percent of the total in-state electricity demand in 2010 of which 15 percent came from renewable sources such as biomass, geothermal, small hydro, solar, and wind, which are clean sources of energy. These sources of electricity generate little, if any, air emissions. Increased use of these and other clean technologies will continue to minimize emissions from the generation of electricity. State law requires increasing the use of renewable energy to 20 percent by 2017 (modified from 2010 as presented in the 2007 AQMP) and to 33 percent by 2020. Further, adopted state laws will prohibit using electricity produced by coal-fired plants.

PROJECT-SPECIFIC MITIGATION: To the extent that electricity demand from 2012 AQMP control measures, no significant secondary air quality impacts from increased electricity demand were identified so mitigation measures are not required.

REMAINING SECONDARY AIR QUALITY IMPACTS: The air quality analysis concluded that potential secondary air quality impacts from increased electricity demand would be less than significant, no mitigation measures were required, so secondary air quality impacts remain less than significant.

4.2.6.2.2 Secondary Impacts from Control of Stationary Sources

PROJECT-SPECIFIC IMPACTS: Emission reductions from the control of emissions at several stationary sources could result in secondary emissions.

Control Measure CMB-01 includes further NOx reduction such as reducing the NOx allocation for some NOx RECLAIM facilities. Under the RECLAIM regulations, operators of affected facilities are currently able to choose how to reduce NOx emissions. Options to further reduce NOx emissions could include addition of control equipment (e.g., SCR, low-NOx Burners, NOx reducing catalysts, oxy-fuel furnaces, and selective non-catalytic reduction) by focusing on periodic best available retrofit control technology (BARCT) evaluation.

While some control measures may cause small increases in NOx emissions, the 2012 AQMP would achieve enough NOx reductions overall to continue making expeditious progress in attaining the federal one-hour and eight-hour ambient air quality standards for ozone. Selective catalytic reduction (SCR) has been used to control NOx emissions from stationary sources for many years. Like an oxidation catalyst, SCR promotes chemical reactions in the presence of a catalyst. However, unlike oxidation catalysts, a reductant (e.g., ammonia) is added to the exhaust stream in order to convert NOx to elemental nitrogen and oxygen in an oxidizing environment. As exhaust gases along with the reductant pass over the catalyst, 75 to 90 percent of NOx emissions, 50 to 90 percent of the VOC emissions, and 30 to 50 percent of the PM10 emissions are reduced.

There is the potential for secondary particulate formation from ammonia slip in sources that use SCR for control. Anticipating that SCR units would become widespread to comply with the NOx control rules under development over 20 years ago, the CEQA documents prepared by the SCAQMD for these new NOx control rules evaluated the potential for secondary PM10 formation from SCR systems. As part of analyses prepared for the EIRs for the NOx control rules, the SCAQMD conducted an extensive literature review and contacted a number of SCR manufacturers and vendors. The results of this data collection effort indicated that ammonia slip depends on a variety of factors including space velocity, ammonia to NOx molar ratio, temperature, and NOx inlet concentration.

The analysis also indicated that, SCRs in use at that time typically had an ammonia slip level ranging from approximately ten to 20 ppm. Ammonia slip levels in this range were the result of the following factors. First, to ensure maximum NOx reduction efficiency, SCR operators at that time typically injected excess ammonia (e.g., a higher ammonia to NOx molar ratio, into the flue gas to ensure achieving the appropriate NOx reduction reaction). The excess ammonia that does not react with the NOx passes or "slips" through the reactor vessel and is released into the atmosphere. With a decline in catalyst activity, to achieve the same NOx reductions, it often became necessary to increase the amount of ammonia injected into the flue gas, which in turn increases ammonia slip. Similarly, the analysis found that one of the main operational problems that contributed to ammonia slip was the uneven distribution of NOx in the duct ahead of the catalyst, creating a non-uniform mixture of ammonia and NOx over the entire cross-section of the duct and resulting in high levels of ammonia slip. Finally, the early NOx control EIRs prepared by the SCAQMD indicated that formation of ammonium nitrate (NH_4NO_3) could be a problem if temperatures were less than 169 ^{o}C.

The SCAQMD's early NOx control EIRs concluded that ammonium nitrate (NH_4NO_3) formation would not be a significant adverse air quality impact if ammonia slip is reduced to ten ppm or less by maintaining uniform ammonia injection. Ensuring adequate mixing of ammonia in the flue gas can alleviate this problem. Ammonia slip can also be reduced by maintaining the proper ammonia to NOx molar ratio, decreasing the exhaust gas flow rate, maintaining consistent exhaust velocity, and maintaining an optimal temperature regime.

The SCR technology has progressed such that ammonia slip can now be limited to five ppm. For example, SCR vendors have developed better injection systems that result in a more even distribution of NOx ahead of the catalyst so that the potential for ammonia slip has been reduced. Similarly, ammonia injection rates are more precisely controlled by model control logic units that are a combination of feed-back control and feed forward control using a proportional/integral controller that sets flow rates by predicting SCR outlet ammonia concentrations and calibrating them to a set reference value.

Subsequent to the preparation of the early EIRs for the SCAQMD's NOx control rules, catalyst research has focused on reducing SO_2 oxidation. Even over 20 years ago, SCR vendors reported that SO_2 oxidation of their catalyst was less than one to four percent (SCAQMD, 1990). SO_2 to SO_3 conversion has been reduced by decreasing the amount of active ingredient (typically vanadium pentoxide), adding an active element as a promoter and improving the dispersion of active elements. SCR vendors have indicated that problems with ammonium particulates tend to be minimal if the amount of ammonia slip in the flue gas averages less than five to ten ppm. Particulate problems with ammonium bisulfate (NH_4HSO_4), and ammonium sulfate ($(NH_4)_2SO_4$), can be alleviated by reducing ammonia slip (SCAQMD, 1990).

In summary, in the early EIRs for the SCAQMD's NOx control rules (e.g., the EIR for Rule 1135), SCAQMD staff determined that the impacts related to secondary PM10 formation would be less than significant if ammonia slip were limited to five to ten ppm because ammonia would then be a limiting factor in producing secondary particulates. Based on substantial improvements in the SCR control technology, as well as improvements in ammonia monitoring equipment, minimizing ammonia slip to five ppm or less is feasible and is now a standard design parameter for SCR and catalyst manufacturers and secondary particulate emissions from SCR units has ceased to be a potentially significant adverse air quality impact with the standard imposition of ammonia limits less than ten ppm.

The SCAQMD has permitted numerous SCR systems within the district since the early 1990's and, therefore, has a longstanding practice of imposing permit conditions limiting ammonia slip. The current SCAQMD limit for ammonia slip for new, modified, or relocated equipment is five ppm, thus, minimizing the potential formation of secondary particulates, ammonium nitrate, in particular.

Based on the above, no new or substantially more severe significant air quality impacts related to ammonia emissions and secondary PM10 formation from the increased use of SCR systems is expected. The five ppm ammonia limit would be included as an enforceable permit condition on the SCAQMD permit to construct/operate. Operators would be required to monitor ammonia slip by conducting an annual source test and maintain a continuous monitoring system to accurately indicate the ammonia-to-emitted-NOx mole ratio at the inlet of the SCR.

Control Measure FUG-01 may result in an increase in natural gas used to combust VOC emissions from vacuum trucks used to remove materials from storage tanks, vessels, sumps, boxes and pipelines. VOC emissions may be controlled by using carbon adsorption systems, internal combustion engines, thermal oxidizers, refrigerated condensers, liquid scrubbers and positive displacement (PD) pumps. SCAQMD staff estimates that 27 million cubic feet per year of natural gas (thermal oxidizers) and 2,100 gallons of gasoline (internal combustion engines)may be used per year to combust fugitive VOCs from storage tanks, vessels, sumps, boxes and pipelines pulled by a vacuum truck. Criteria emissions from FUG -01 are included in Table 4.2-7.

Control Measure FUG-02 would require emission reductions from fugitive emissions associated with the transfer and dispensing of liquefied petroleum gas (LPG). FUG-02 would be implemented in two phases: Phase I, which was implemented with the adoption of Rule 1177 on June 1, 2012 and required the use of low emission fixed liquid level gauges (FLLGs) and low emission connectors for transfer and dispensing; and Phase II, which would expand the applicability of Rule 1177 to include LPG transfer and dispensing at other facilities, including currently exempted facilities. Implementation of Phase I of Rule 1177 is expected to result in a reduction of VOC emissions of 6.1 tons per day with an additional one to two tons per day with the implementation of Phase II. No significant secondary air quality impacts associated with VOC reductions from Control Measure FUG-02 are expected.

Control Measure BCM-03 would reduce PM2.5 emissions from under-fired charbroilers. Under-fired charbroilers are comprised of three main components: a heating source, a high temperature radiant surface, and a slotted grill. The grill holds the meat or other food while exposing it to the radiant heat. PM and VOC emissions occur when grease from the meat falls onto the high temperature radiant surface. Most under-fired charbroilers burn natural gas; however, solid fuels, such as charcoal or wood with or without the addition of ceramic stones, are sometimes used. This category includes: broilers, grill charbroilers, flamebroilers, and direct-fired barbecues. Potential control technologies that could generate secondary air quality impacts include the following.

- HEPA filters trap small particles by one of three mechanisms: interception (particles come within one radius of a fiber and adhere to it); impaction (particles are forced to embed in one of the fibers), or diffusion (an enhancing mechanism resulting from gas molecules collision with small particles which slows their flow). Diffusion is the predominate mechanism below the 0.1 (micrometer) µm diameter particle size. Impaction and interception predominate above 0.4 µm. In the 0.3 µm range, diffusion and interception predominate. Currently, there are no HEPAs with SCAQMD permits to control emissions from charbroilers in the Basin.

- Wet scrubbers rely on a finely atomized stream of liquid to capture particulate and gaseous pollutants from an exhaust stream, such as from a restaurant charbroiler. Heat and mass transfer are accomplished by direct contact of the exhaust gas with finely atomized droplets of the scrubbing liquid. The gas stream is cooled and moistened as the scrubbing liquid evaporates. PM removal efficiencies of 90 percent or higher have been achieved in service depending on particle size, load, flows and pressure drop. Presently, there are nine wet scrubbers permitted at restaurants located in the Basin.

- ESPs rely on imparting a 220-volt AC power supply transformed to high voltage direct current (DC) charge to the particulate materials while simultaneously ionizing the carrier gas, producing an electric corona. The particles, either negatively or positively charged, are attracted to the ESP electrode of the opposite charge and finally removed from the electrodes by rapping or washing the electrodes. An after filter is sometimes used to provide back pressure and ensure good gas distribution in the ESP. Collection efficiencies exceeding 90 percent are common in many applications. At present, there are 27 ESPs permitted and operating at restaurants located in the Basin.

- Regenerative thermal oxidizers (RTOs) consist of a combustion chamber located adjacent to several energy recovery chambers. The VOC-laden air enters an inlet header and is directed to one of the energy recovery chambers through the inlet control valve. The air passes through the heat exchange media, adsorbing heat from the media. It then enters the combustion chamber at a temperature close to the oxidation temperature. The oxidation process is completed in the combustion chamber. At least one chamber is always on inlet mode and another on outlet mode to allow the RTO to continuously process a VOC-laden air stream.

Based on the above information, installation of various types of control devices to comply with the requirements of 2012 AQMP control measure. HEPA filter and ESP technologies may result in increased demand for electricity, resulting in secondary emissions from electricity production. RTOs could increase demand for natural gas, producing secondary combustion emissions.

Control Measure MCS-01 would require the SCAQMD to adopt and implement new retrofit technology control standards (BARCT) as new BARCT standards become available. Although it is currently unknown what the new BARCT standards would be, to the extent that they require installation of control technologies, potential secondary air quality impacts could be generated. For example, potential construction air quality impacts from construction activities to install future BARCT equipment, from on-road vehicles (e.g., worker commute trips, haul truck delivery trips, etc.) and off-road construction equipment could be generated. Similarly, to the extent that BARCT technologies operate using electricity to run the equipment or natural gas combustion as part of the control process, secondary emissions from electricity generation or natural gas combustion could be generated. Although SCR is BARCT for controlling NOx emissions from a variety of combustion sources, if it is determined to be BARCT for other types of combustion sources ammonia slip emissions could be generated. However, since the source of emissions and the BARCT is unknown at this time, SCAQMD staff is unable to estimate secondary emission from Control Measure MCS-01.

Control Measure INC-01 may result in the replacement of existing combustion equipment with more efficient or zero emission technologies. INC-01 may also result in the installation of control technologies or the use of alternative fuels. Zero emission technologies are likely to be powered by electricity. Control technology may include diesel particulate filters and NOx reduction catalysts. However, since the source of emissions, control technology and energy requirements are unknown at this time; SCAQMD staff is unable to estimate secondary emission from Control Measure INC-01.

PROJECT-SPECIFIC MITIGATION: Based on the above information, potential secondary air quality impacts from control technologies associated with stationary sources were concluded to be less than significant so no mitigation measures are required.

REMAINING SECONDARY AIR QUALITY IMPACTS: The air quality analysis concluded that potential secondary air quality impacts from control technologies associated with stationary sources would be less than significant, no mitigation measures were required, so secondary air quality impacts remain less than significant.

4.2.6.2.3 Secondary Impacts from Change in Use of Lower VOC Materials

PROJECT-SPECIFIC IMPACTS: Several control measures are aimed at reducing VOC emissions by reformulating certain products including architectural coatings (CTS-01); miscellaneous coating adhesives, solvents, and lubricants (CTS-02); and, mold release products (CTS-03). An additional control measure, CTS-04, would further reduce VOC emissions by revising or eliminating the exemption for low vapor pressure solvents in consumer products. Consumer products include, but are not limited to: detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products such as antiperspirants and hairsprays; home, lawn, and garden products; disinfectants; sanitizers; automotive specialty products; and, aerosol paints.

The analysis of secondary emissions from changes in use of lower VOC materials is focused on emissions from reducing the VOC from reformulated coatings (such as flat, non-flat, and primer sealer undercoaters (PSU)). To obtain further VOC emission reductions from these products it is expected the products would be reformulated with water-based or exempt compound formulations. The following subsections identify potential secondary air quality impacts from lowering the VOC content limit further. Although the following discussion focused primarily on coatings, some of its topics (e.g., substitution, more reactivity, and low vapor pressure), could apply to other types of consumer products.

Control Measure CTS-01 is expected to lower the VOC content from 50 grams per liter to 25 grams per liter. It is expected that this reduction would not substantially change the primary components of the coatings. As a result, the issues discussed below may no longer be applicable. Control Measures CTS-02 and CTS-03 are expected to lower the VOC content in miscellaneous coatings, adhesives, solvents, and lubricants as well as mold release products by requiring the lowering the VOC-content of the products. Control Measure CTRS-04 is expected to reduce VOC emissions from consumer products by revising the exemptions for the use of low vapor pressure VOC solvents. The following issues have raised with regard to reformulated coatings in both the 2003 and 2007 AQMPs.

The potential secondary air quality impacts associated with reformulation of coatings has been extensively evaluated in both the 2003 and 2007 AQMPs, as well as in a number of amendments to existing coatings rules. At the time, reformulations were shifting coatings from primarily solvent-based to water-based and exempt-solvent formulations. Secondary air quality impacts discussed previously in the 2007 AQMP were relative to more thickness of the coating, illegal thinning to reduce the viscosity of the reformulated coatings, more priming, more topcoats, more touch-ups and repair work, more frequent recoating, substitution, more reactivity, and synergistic effects of the eight issues. Each issue is summarized in the following bullet points along with the associated conclusions reached in the 2007 AQMP for each issue:

- **More thickness -** reformulated compliant water- and solvent-borne coatings are very viscous (e.g., are formulated using a high-solids content) and, therefore, are difficult to handle during application, tending to produce a thick film when applied directly from the can. A thicker film indicates that a smaller surface area is covered with a given amount of material, thereby increasing VOC emissions per unit of area covered.

  Response - Compliant low-VOC coatings are not necessarily formulated with higher solids content than conventional coatings. A low-VOC coating is expected to cover the same or larger surface area than a high-VOC coating. Further, there is no evidence that there is an inverse correlation between solids content and coverage area (SCAQMD, 2007).

- **Illegal thinning -** thinning occurs in the field in excess of what is allowed by the SCAQMD rule limits. It is asserted that, because reformulated compliant water- and solvent-borne coatings are more viscous (e.g., high-solids content), painters have to adjust the properties of the coatings to make them easier to handle and apply. In particular for solvent-borne coatings this adjustment consists of thinning the coating as supplied by the manufacturer by adding solvent to reduce its viscosity. The added solvent increases VOC emissions back to or sometimes above the level of older formulations.

Response - SCAQMD staff conducted extensive research prior to 1998 to determine whether or not thinning of materials beyond the allowable levels occurred in the field. SCAQMD staff conducted unannounced site visits to evaluate contractor practices, collected samples as applied and supplied from contractors, analyzed paint samples from retail outlets. No thinning beyond SCAQMD rule limits was identified. In addition, the CARB 2005 Architectural Coating Survey provided results of compliance with the CARB Suggested Control Measure for Architectural Coatings. In most cases the percent of complying market share from the 2005 survey improved or was approximately the same as the 2001 CARB survey. Therefore, the 2007 Final Program EIR concluded that widespread thinning does not happen often; when it does occur, it is unlikely to occur at a level that would lead to a substantial emissions increase when compared to emissions from higher VOC coatings (SCAQMD, 2007).

Currently, the majority of the architectural coatings currently available in the marketplace are waterborne. Thinning is not an issue for waterborne coatings as thinning with water would not increase the VOC content of those coatings. Of the total coatings sold in 2008, only seven percent of were solvent-based which equates to approximately three million gallons. Architectural Coatings sold in small containers with a VOC content greater than the VOC limits for those categories represented 15 percent of the total volume or slightly more than 0.4 million gallons. The proposed elimination of the small container exemption would therefore result in more waterborne coatings, further lessening the potential adverse impact of thinning with solvent. In addition, large containers would already comply with applicable VOC content limits so there would be no widespread thinning of small container coatings to meet small container needs. For the years between 2009 and 2011, the overall volume of solvent-based coatings was reduced by an additional 22 percent, and the potential for thinning was reduced by an equivalent amount. Further, adoption and implementation of Rule 1143 – Consumer Paint Thinner and Multi-Purpose Solvents, requires the use of paint thinners that have a VOC content of less than or equal to 25 grams per liter, resulting in paint thinners that are based on exempt solvents, further reducing the impacts from thinning of solvent-based architectural coatings.

- **More priming -** reformulated compliant low-VOC water- and solvent-borne topcoats do not adhere as well as higher-VOC solvent-based topcoats to unprimed substrates. Therefore, the substrates must be primed with typical solvent-based primers to enhance the adherence quality. Industry representatives have testified that the use of water-borne compliant topcoats could require more priming to promote adhesion. Additionally, it has been asserted that water-borne sealers do not penetrate and seal porous substrates like wood, as well as traditional solvent-borne sealers. This allegedly results in three or four coats of the sealer per application compared to one coat for a solvent-based sealer would be necessary, resulting in an overall increase in VOC emissions for the coating system.

Response - SCAQMD staff evaluated surface preparation in coating product data sheets and recent studies on the topic. It was determined that low-VOC coatings do not require substantial different surface preparation than conventional coatings. Both low-VOC and conventional coatings for both architectural and industrial maintenance applications were demonstrated to have the ability to adhere to a variety of surfaces. Based on the coating sheets, the material needed and the tie necessary to prepare a surface for coating was approximately equivalent for low-VOC and conventional coatings (SCAQMD, 2007).

In addition, a recent trend for coating manufacturers is to produce ultra low-VOC coatings that are primer and topcoat in one, hence eliminating an entire step in the coating process. Most major coatings manufacturers now offer such products, some of which are as low as 5.0 grams per liter. Therefore, any impacts from priming have been significantly reduced.

- **More topcoats -** reformulated compliant water- and low-VOC solvent-borne topcoats may not cover, build, or flow-and-level as well as the solvent-borne formulations. Therefore, more coats are necessary to achieve equivalent cover and coating build-up.

  Response - Based on information in product data sheets, SCAQMD staff found that the average drying time for lower-VOC coatings did increase compared to conventional coatings; however, with the development of non-volatile, reactive diluents combined with hypersurfactants, performance of the lower-VOC coatings equaled or outperformed traditional, solvent containing coatings. Resistance to chemicals, corrosion, chalk, impact and abrasion, adhesion and the ability to retain gloss and color was found to be similar in lower-VOC and conventional coatings. Coating manufacturer data indicated that low-VOC and conventional coatings for both architectural and industrial maintenance applications are durable and long lasting. More frequent recoating was not found for low-VOC coatings when compared to conventional coatings (SCAQMD, 2007).

- **More touch-ups and repair work -** reformulated compliant water- and low-VOC solvent-borne formulations dry slowly, and are susceptible to damage such as sagging, wrinkling, alligatoring, or becoming scraped and scratched. Claims have been made that the high-solids solvent-borne alkyd enamels tend to yellow in dark areas, and that water-borne coatings tend to blister or peel, and also result in severe blocking problems. All of these problems were reported to require additional coatings for repair and touch-up.

  Based on SCAQMD staff's evaluation of the durability characteristics information contained in the coating product data sheets, low-VOC coatings and conventional coatings have comparable durability characteristics. These conclusions are supported by the UMR, NTS and other coating studies. As a result, it is not anticipated that more touch up and repair work will need to be conducted with usage of low-VOC coatings.

- **More frequent recoating -** the durability of the reformulated compliant water- and low-VOC solvent-based coatings is inferior to the durability of the traditional solvent-borne coatings. Durability problems include cracking, peeling, excessive chalking, and color fading, which all typically result in more frequent recoating. As a result, they claim more frequent recoating would be necessary resulting in greater total emissions than would be the case for conventional coatings.

  Response - The latest data from coating manufacturers obtained by SCAQMD staff indicate that the new generation of waterborne coatings is performing as well if not better than their solvent-based counterparts. These commercialized products are formulated with better performing raw materials, including superior resin chemistry and higher performing pigments, resulting in better hiding and coverage and overall durability, therefore, a reduction in coating usage is expected.

- **Substitution -** reformulated compliant water- and low-VOC solvent-borne coatings are inferior in durability and are more difficult to apply, so consumers and contractors will substitute better performing high VOC coatings in other categories for use in categories with low compliance limits. An example of this substitution could be the use of a higher VOC product (e.g., clear wood coatings) currently sold under the small container exemption, which has a higher VOC content limit requirement, in place of a lower-VOC clear wood coatings.

  Response - SCAQMD staff determined that substitution would not occur because based on product data sheets and studies, there are, generally a substantial number of low-VOC coatings in a wide variety of coating categories that are currently available; and CARB and SCAQMD rules prohibit the application of certain coatings in specific settings.

  In the rare event that substitution does occur, it is expected that future coatings would still achieve overall VOC emission reductions. Substitution would only result in lesser emission reductions than expected, it would not increase emissions compared to the existing setting. Consequently, it is not expected that control measures requiring a lower overall VOC content of coatings will result in significant adverse air quality impacts from the substitution of low-VOC coatings with higher-VOC coatings (SCAQMD, 2007).

- **Reactivity -** reformulated compliant low-VOC water- and solvent-borne coatings contain solvents that are more reactive than the solvents used in conventional coating formulations. Water-borne coatings perform best under warm, dry weather conditions, and are typically recommended for use between May and October. Since ozone formation is also dependent on the meteorological conditions, use of waterborne coatings during this period increases the formation of ozone.

  Response - SCAQMD staff has continued to monitor all reactivity-related research since the 2007 AQMP. However, based on the latest research and analysis, as well as the recommendations of the research, staff supports the continuation of a mass-based ozone control strategy, with future consideration for a reactivity-based approach.

- **Synergetic Effects of the Eight Issues –** Individually each of the eight issues does not result in a significant adverse air quality impact; therefore, the synergistic effect of all eight issues were determined not to result in a significant air quality impact. The Final Program EIR for the 2007 AQMP~~D~~ stated that even if it is assumed that some of the alleged activities do occur, the net overall effect of reducing the VOC content of coatings and other consumer products is expected to be a reduction in VOC emissions.

Based on the preceding analysis of potential air quality impacts from implementing future coatings rules, it is concluded that the overall air quality effects would be a VOC emission reduction and beneficial to air quality in the district.

PROJECT-SPECIFIC MITIGATION: Potential secondary adverse air quality impacts from future coating or consumer product regulations were evaluated and it was concluded that impacts would be less than significant, so no mitigation measures are required.

REMAINING SECONDARY AIR QUALITY IMPACTS: The air quality analysis concluded that potential secondary air quality impacts from future reformulated coatings and solvent products would be less than significant, no mitigation measures were required, so secondary air quality impacts remain less than significant.

4.2.6.2.4 Secondary Impacts from Mobile Sources

PROJECT-SPECIFIC IMPACTS: Three control measures, ONRD-01, ONRD-02, and ONRD-03, are aimed at reducing emissions from mobile sources by accelerating the penetration of partial zero-emission and zero emission vehicles. These control measures do not directly generate secondary air quality impacts, but generate indirect air quality impacts from the generation of electricity required to operate the additional partial zero-emission and zero emission vehicles. The secondary air quality impacts associated with the increase in electrical demand have been discussed in the beginning of this subsection under "Secondary Impacts for Increased Electricity Demand".

Control Measure ONRD-04 accelerates the replacement of heavy duty diesel vehicles (26,001 pounds and greater gross vehicle weight) with newer, lower-emissions vehicles. The early replacement of these vehicles could potentially increase the number of vehicles being scrapped. Scrapping activities generate secondary air quality impacts from the shredding of the vehicle and the electricity to perform the scrapping. During the Rule 1610 rulemaking, emissions associated with vehicle scrapping were estimated to be 0.088 pound of PM10 emissions per vehicle scrapped (SCAQMD, 1992). The actual number of vehicles scrapped would depend on the actual number of vehicles participating in the program. Emissions impacts would also depend on the number of vehicles scrapped instead of relocated outside the district, the number of vehicles scrapped at facilities within the district, and the available capacity within the district to scrap the vehicle at the time it is retired. Based on the number of factors that affect the quantification of the secondary emissions, quantification of the secondary air quality impacts would be speculative. However, the quantity of PM10 generated per vehicle scrapped is approximately the same as a diesel truck driving 50 miles.

Control Measure ONRD-05 would accelerate the replacement of up to 1,000 older heavy-duty vehicles with zero-emission vehicles or zero-emissions container movement systems. This control measure does not directly generate secondary air quality impacts, but generates indirect air quality impacts from the generation of electricity required to operate the additional partial zero-emission and zero emission vehicles. The secondary air quality impacts associated with the increase in electrical demand have been discussed in the beginning of this subsection under "Secondary Impacts for Increased Electricity Demand." As with ONRD-04, retirement of the older heavy-duty vehicles could potentially increase the vehicle scrapping and the same uncertainties as to the disposition of the retired vehicle would occur. A conservative estimate of the emissions associated with retirement of 1,000 vehicles would be if all 1,000 were scrapped in a single day within the district (e.g., 0.088 pound of PM10 per vehicle x 1,000 vehicles = 88 pound of PM10, which is less than the PM10 significance threshold of 150 pounds per day). Using the CEIDARS profile 900 ratio of 0.6 pound of PM2.5 per pound of PM10, results in 52.8 pounds per day of PM2.5 emissions, which is below the PM2.5 significance threshold of 55 pounds per day. Therefore, secondary air quality impacts associated with the vehicle scrapping would be less than significant.

Control Measure OFFRD-01 would accelerate the replacement or retrofit of approximately 1,200 pieces of older construction equipment. As with ONRD-04, retirement of the older heavy-duty vehicles could potentially increase the vehicle scrapping and the same uncertainties as to the disposition of the retired vehicle would occur. However, construction equipment is typically refurbished and a new engine installed, so no scrapping of construction equipment is expected. Therefore, quantification of the secondary air quality impacts would be speculative. Retrofit methods could include add-on devices such as, particulate filters and SCRs.

Add-on devices, such as particulate filters have an increase in fuel use, typically estimated at less than one percent, associated with the decrease in fuel economy associated with the type of device. Therefore, there is a potential for an increase in emissions from the increase in fuel use. It is not known how much construction equipment will be retrofitted with particulate filters versus replaced. Therefore, quantification of the secondary air quality impacts would be speculative.

In the case of exhaust pollutants, Manufacturers of Emission Controls Association (MECA) reports that the use of oxidization catalysts to reduce PM10 emissions from diesel-fueled vehicles should not increase other exhaust pollutants. In fact, combining an oxidation catalyst with engine management techniques can be used to reduce NOx emissions from diesel engines. This is achieved by adjusting the engine for low NOx emissions, which is typically accompanied by increased CO, VOC, PM10, and PM2.5 emissions. An oxidation catalyst can be added to offset these increases, thereby lowering the exhaust levels for all of the pollutants. Often, the increases in CO, VOCs, and PM10 can be reduced to levels lower than otherwise could be achieved. In fact, a system which uses an oxidation catalyst combined with proprietary ceramic engine coatings and injection timing retard can achieve significant NOx reductions (e.g., greater than 40 percent) while maintaining low PM10 and PM2.5 emissions (MECA, 1999).

In the case of the use of SCRs, potential adverse air quality impacts associated with the use of SCRs in diesel-fueled vehicles could occur if this technology resulted in the increase of other exhaust pollutants at the expense of reducing PM10 and PM2.5 or a reduction in fuel economy. However, applying SCR to diesel-powered vehicles provides simultaneous reductions of NOx, PM10, PM2.5, and VOC emissions.

Like an oxidation catalyst, SCR promotes chemical reactions in the presence of a catalyst. However, unlike oxidation catalysts, a reductant is added to the exhaust stream in order to convert NOx to elemental nitrogen and oxygen in an oxidizing environment. The reductant can be ammonia but in mobile source applications, urea is normally preferred. As exhaust gases along with the reductant pass over the catalyst, 75 to 90 percent of NOx emissions, 50 to 90 percent of the VOC emissions, and 30 to 50 percent of the PM10 and PM2.5 emissions are reduced. SCR also reduces the characteristic odor produced by a diesel engine and the diesel smoke.

In the case of exhaust pollutants, the catalyst composition of SCR and its mode of operation are such that sulfates could form. However, with the use of ultra-low sulfur diesel fuel, which has been required for stationary and on-road applications since September 2006, sulfate formation is expected be negligible. In particular, even at temperatures in exceeding 500 degrees Centigrade, only five percent of the sulfur in the fuel would be converted to sulfate, which still allows for significant net PM10 and PM2.5 emission reductions. Applying SCR to diesel-powered vehicles also provides simultaneous reductions of NOx, PM10, PM2.5, and VOC emissions.

As to a reduction in fuel economy, because of the large NOx reductions afforded by SCR, it is possible that low NOx emissions can be achieved with an actual fuel economy benefit. Compared to internal engine NOx abatement strategies like exhaust gas recirculation and timing retard, SCR offers a fuel economy benefit in the range of three to 10 percent as a result of being able to optimize engine timing for fuel economy and relying on the SCR system to reduce NOx emissions. Therefore, no significant adverse air quality impacts were identified from the use of particulate filters or SCRs in conjunction with ultra-low sulfur diesel fuel to potentially comply with the applicable control measures.

Control Measures OFFRD-02 and OFFRD-03 would accelerate the replacement of 440 and 52 locomotive engines in freight and passenger service, respectively, or employ add-on devices to meet the lower emission standard, as such, the potential secondary air quality impacts from add-on devices. Therefore, the impacts of the replacement of locomotives and use of add-on devices are similar to those discussed for OFFRD-01. Similar to Control Measure OFFRD-01, locomotives are typically refurbished and a new engine installed so no scrapping of the locomotives are expected. Add-on devices, such as particulate filters have an increase in fuel use associated with the decrease in fuel economy associated with the type of add-on device, which is estimated to be less than one percent. Therefore, there is a potential for an increase in emissions from the increase in fuel use. However, the number of locomotives to be equipped with add-on devices versus replaced is not known. Therefore, quantification of the secondary air quality impacts would be speculative.

Control Measure OFFRD-04 would increase the amount of shorepower used for "cold ironing" by 25 percent. However, the demand for electricity varies based on the type of vessel. Therefore, the increase in electricity demand cannot be quantified. However, stationary power generating facilities can use alternative fuels such as natural gas, reducing emissions to low levels when compared to marine diesel. Therefore, the overall impact of using shorepower is expected to be a beneficial impact on air quality.

Control Measure ADV-07 would accelerate the replacement of aircraft engines with cleaner burning engines. Aircraft engines when retired from service are typically returned to the engine manufacturer for recycling. The early retirement and recycling of aircraft engines is not expected to generate secondary air quality impacts as no "shredding" like automobiles is necessary.

Control Measures OFFRD-02, OFFRD-03, ADV-04, ADV-05, ADV-06, and ADV-07 have the potential to use alternative fuels such as biodiesel, LNG, CNG, methanol, ethanol, and hydrogen. The availability of the producers of alternatives fuels to meet the increase in demand has the potential for an increase in air emissions associated with the increased production. Production of the alternative fuels such as LNG, CNG require little processing with less air emissions than the production of refined petroleum products such as gasoline, diesel, and jet fuel. While biodiesel, ethanol, and methanol production do require more processing than LNG and CNG, the production processes are less complicated than petroleum refining. Biodiesel and methanol are made from a catalytic chemical process similar to one or two processes in a typical refinery, which will have many units to produce refined products from crude oil. Ethanol is produced by fermentation. Biodiesel, methanol, and ethanol can be made from renewable sources such as vegetable oils, sugar cane, corn, and animal fats. Therefore, the production of alternative fuels typically produces less air emissions. The increase in air emissions from the increase in production of alternative fuels would be offset by the reduction in the production of petroleum fuels and the transport reduced of crude oil primarily from overseas, as diesel and gasoline demand decreases. Therefore, no increase air emissions associated with meeting the increase in demand for alternative fuels is expected and no significant secondary air quality impacts are expected.

Mobile source control measures are expected to result in changes in emissions related to mobile sources. The inventory prepared for the 2012 AQMP include emissions estimates associated with mobile sources discussed in this section, which are summarized in Table 4.2-7.

The inventory prepared for the 2012 AQMP includes estimates for on-road vehicles in 2008, 2014, and 2023. The inventory also accounts for growth in population that also includes growth in the number of mobile sources and an increase in the vehicle miles traveled. The estimated VOC, CO, NOx, SOx, PM10, and PM2.5 emissions associated with on-road mobile sources in the Basin are expected to be reduced between the 2008 and the 2014, and 2023 inventories. Therefore, the overall impact of mobile source control measures is expected to be a beneficial impact on air quality.

PROJECT-SPECIFIC MITIGATION: The overall impact of mobile source control measures is expected to be beneficial by providing large emission reductions from mobile sources. Therefore, air quality impacts associated with mobile source control measures are expected to be less than significant and no mitigation measures are required.

REMAINING SECONDARY AIR QUALITY IMPACTS: The air quality analysis concluded that potential secondary air quality impacts from mobile sources would be less than significant, no mitigation measures were required, so secondary air quality impacts remain less than significant.

Secondary Impacts from Miscellaneous Sources

PROJECT-SPECIFIC IMPACTS: Miscellaneous source control measures would regulate a variety of different types of emissions sources including both area and point sources. As a result, these control measures are expected to reduce VOC, criteria pollutant, and precursor emissions. The following control measures were identified to as having the potential to generate secondary air quality impacts.

TABLE 4.2-8

Annual Average Emissions for On-Road and Other Mobile Sources in the District (tons/day)

Source Category	VOC	CO	NOx	SOx	PM10	PM2.5
2008 Emission Inventory						
On-Road Motor Vehicles	209	1,966	462	2.1	32	19
Other Mobile Sources[a]	127	778	204	38	15	13
2008 Total	336	2,744	666	40	47	32
2014 Emission Inventory						
On-Road Motor Vehicles	117	1,165	272	2.1	25	12
Other Mobile Sources[a]	100	766	157	4.3	9.1	8.2
2014 Total	217	1,931	429	6.4	34	20
Emission Increase (emissions in 2014 – emission in 2008)	-119	-1,112	-236	-34.0	-12	-11
Emissions Increase (lbs/day)	-237,100	-2,224,060	-471,400	-67,980	-23,960	-22,880
Emission Increase from Control Measures Implementation	0	-4,000	0	0	0	0
Total Emissions Increase (lbs/day)	-237,100	-2,228,060	-471,400	-67,980	-23,960	-22,880
SCAQMD Significance Thresholds (lbs/day)	55	550	55	150	150	55
Significant?	NO	NO	NO	NO	NO	NO

TABLE 4.2-8 (CONCLUDED)

Annual Average Emissions for On-Road and Other Mobile Sources in the District (tons/day)

Source Category	VOC	CO	NOx	SOx	PM10	PM2.5
2023 Emissions Inventory						
On-Road Motor Vehicles	67	591	126	1.9	25	11
Other Mobile Sources[a]	85	826	130	5.8	7.4	6.6
2023 Total	153	1,417	255	7.7	32	18
Emission Increase (emissions in 2023 – emission in 2008)	-183	-1,326	-407	-33	-18	-15
Emissions Increase (lbs/day)	-366,260	-2,651,740	-814,360	-65,540	-35,600	-30,860
Emission Increase from Control Measures Implementation	-12,080	-52,620	0	0	0	0
Total Emissions Increase (lbs/day)	-378,340	-2,704,360	-814,360	-65,540	-35,600	-30,860
SCAQMD Significance Thresholds (lbs/day)	75	550	700	150	150	55
Significant?	NO	NO	NO	NO	NO	NO

Source: SCAQMD, 2012

Note: Negative numbers represent emissions reductions.

(a) Other Mobile Sources include aircraft, trains, ocean going vessels, commercial harbor crafts, recreational boats, off-road recreational vehicles, off-road equipment, farm equipment, and fuel storage and handling.

Control Measure MCS-02 would implement all feasible mitigation measures including: 1) requiring cover of chipped or ground greenwaste material as early as operationally possible; 2) requiring chipped or ground greenwaste material to remain covered until it is removed from the site within the required 48 hours pursuant to Rule 1133.1; 3) potential requiring season covering of chipped or ground greenwaste material during the summer months; and, 4) strengthening the reporting requirements in Rule 1133 Registration/Annual Update and Rule 1133.1 Recordkeeping. MCS-02 would be implemented in two phases: Phase 1 would be a re-evaluation of greenwaste material handling operations and inventory, and Phase 2 would be development of a rule to incorporate technically feasible and cost-effective best management practices (BMPs). MCS-02 is expected to reduce VOC emissions by 1.0 to 1.34 tons per day by 2014. However, to comply with covering requirements, early movement of the material may occur. While there is a potential for additional shipments to be made in lieu of covering, it is not expected to be a preferred, cost effective approach over covering of the material. Therefore, MCS-02 is expected not to generate additional vehicle trips that could create significant secondary air quality impacts.

Control Measure BCM-04 could require the application of sodium bisulfate (SBS), an acidifier, on livestock waste. SBS is being considered for use in animal housing areas where high concentrations of fresh manure are located. Research indicates best results with the use of SBS on “hot spots.” SBS can also be applied to manure stock piles and at fence lines, and upon scraping manure to reduce ammonia spiking from the leftover remnants of manure and urine. SBS application may be required seasonally or episodically during times when high ambient PM2.5 levels are of concern. Additional delivery truck trips would be required to deliver SBS and SBS may be applied by hand or by tractor.

Control Measure FUG-03 may require additional vehicle trips to detect, verify or repair equipment with fugitive emissions at oil and gas production facilities, petroleum and chemical products processing, storage and transfer facilities, marine terminals, and other sources. Most of these facilities already have utilize self-inspection program for Inspection/Maintenance or leak detection and repair (LDAR) that involve individual screening of all of their piping components. The control measure would explore the use of new technologies to detect and verify VOC fugitive emissions in order to supplement existing programs in achieving additional emission reductions. Work practices for Rule 462 – Organic Liquid Loading, Rule 1142 - Marine Vessel Tank Operations and Rule - 1148.1 Oil Well Enhanced Drilling would be upgraded to a self-inspection program that requires repairs and maintenance to be documented with records and, where appropriate, reported. LDAR elements may also be added to Rules 1142 and 1148.1. LDAR elements may also be added to Rule 463 - Storage of Organic Liquids and 1178 - Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities, Rule 1173 - Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum and Chemical Plants and Rule 1176 - Sumps and Wastewater Separators. Since control measure would enhance existing self-inspection programs, few additional vehicle trips associated with additional detection, verification and repairing of leaking are likely.

As indicated above, Control Measures MSC-02 and FUG-03 are not expected to generate a substantial number of new vehicle trips, if any, related to control requirements. Control Measure BCM-04 could require additional vehicle travel to deliver and apply acidifier. At this time, it is not known what controls may be applied, which facilities may require additional trips or how often these trips may be necessary. Therefore, no emission estimates could be prepared at this time. However, while these trips routine, they are not expected to be frequent; therefore, these emissions are not expected to be significant.

PROJECT-SPECIFIC MITIGATION: Overall, potential secondary air quality impacts from miscellaneous source control measures, in particular increased vehicle trips, are not expected to increase substantially. Therefore, potential secondary air quality impacts associated with miscellaneous source control measures are expected to would be less than significant and no mitigation measures are required.

REMAINING SECONDARY AIR QUALITY IMPACTS: The air quality analysis concluded that potential secondary air quality impacts from miscellaneous sources would be less than significant, no mitigation measures were required, so secondary air quality impacts remain less than significant.

4.2.6.3 Toxic Air Contaminants

PROJECT-SPECIFIC IMPACTS: A number of control measures that are proposed in the 2012 AQMP may result in the use of ammonia in SCRs. Ammonia slip from SCR units is restricted to five ppm or less, which has been shown through source-specific permit modeling to have no significant impact on surrounding communities. Therefore, the impact from the use of ammonia as proposed in the 2012 AQMP is expected to be less than significant.

In general, it is expected that the 2012 AQMP control measures would reduce emissions of TACs. The basis for this conclusion is that many TACs are also classified as VOCs. To the extent that control measures reduce VOC emissions, associated TAC emission reduction could occur as well. CTS-01, CTS-02, CTS-03 and CTS-04 are expected to reduce VOCs by reducing solvent content of coatings, mold release and consumer products.

As Subchapter 4.4, the toxicity of future coating formulations is generally less or no worse than conventional solvents overall but if a facility changes from using water-based products to using products that are reformulated with chemicals that may have new or different health hazards, significant adverse health hazard impacts could occur from using some low VOC reformulated products. However, as with the use of all chemicals, facilities and their workers would be required to continue to comply with existing health protective procedures when handling both flammable and toxic materials. Further, water-based coatings and products tend to contain less flammable and less toxic materials than solvent-based coatings and products. Consequently, future reformulated coatings and solvents are not expected to increase exposures to TAC emissions.

FUG-01, FUG-02 and FUG-03 would reduce VOCs from vacuum trucks; LPG transfer and dispensing; and equipment with fugitive emissions at oil and gas production facilities, petroleum and chemical products processing, storage and transfer facilities, marine terminals, and other sources MCS-01 would adopt additional retrofit technology, which depending on the source and control technology, would reduce criteria pollutants.

BCM-01, BCM-03, CMB-01, CMB-02, CMB-03, INC-01, IND-01, MSC-03 would reduce combustion emissions through the replacement of existing equipment with more efficient equipment, emission control technology or changes to processes at refineries. The reduction of combustion emission would reduce combustion TACs.

Some measures for motor vehicle and transportation source categories (ONRD-01, ONRD-02, ONRD-03, ONRD-04, ONRD-05, OFFRD-01, OFFRD-02, OFFRD-03, OFFRD-04, ADV-01, ADV-02, ADV-03, ADV-04, ADV-05, ADV-06 and ADV-07) would reduce emissions of diesel exhaust particulate, which is a known carcinogen, and toxic components of gasoline such as benzene, toluene, and xylene. These control measures would result in replacing existing vehicles or equipment with more efficient vehicle or equipment, zero emission electric vehicles or equipment, or alternative fueled vehicles or equipment. Combustion emissions of alternative fuels have trace amounts of methanol and aldehyde, but, generally, are considered to cleaner and less toxic than diesel or gasoline fueled vehicles. Emissions from power generating equipment may include trace amounts of benzene, aldehydes, metals, and polynuclear aromatic hydrocarbons. However, if the process being electrified was previously powered by direct combustion of fossil fuels, then electrification is expected to result in an overall decrease in toxic emissions.

The overall impacts associated with implementation of the 2012 AQMP are an overall reduction in TACs. Therefore, no significant impacts from TACs have been identified.

PROJECT-SPECIFIC MITIGATION: No significant secondary air quality impacts from TACs have been identified so no mitigation measures are required.

REMAINING SECONDARY AIR QUALITY IMPACTS: The air quality analysis concluded that potential secondary air quality impacts from TACs would be less than significant, no mitigation measures were required, so secondary air quality impacts from TACs remain less than significant.

4.2.6.4 Global Warming

The 2012 AQMP as a whole is expected to promote a net decrease in GHG emissions, in part, because most GHG emissions in the district are generated by combustion processes. To the extent that 2012 AQMP control measures reduce or eliminate combustion processes in favor of near zero or zero emission technologies, GHG emission reduction co-benefit would also be expected to occur. The control measures that have potential GHG emissions impacts are presented in Table 4.2-8. The relative impacts (e.g., either an increase (+) or decrease (-)) are presented along with the activities associated with the impact (e.g., construction necessary to implement the control measure).

TABLE 4.2-9

Potential Impacts on Climate Change and Global Warming
from Implementation of 2012 AQMP Control Measures

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[a]
SHORT-TERM PM2.5 CONTROL MEASURES			
BCM-03	Emission Reductions from Under-Fired Charbroilers	Add-On Control Equipment with Ventilation Hood Requirements (e.g., ESPs, HEPA filters, wet scrubbers, and thermal oxidizers).	+ (afterburners, construction, increased energy)
CMB-01	Further NOx Reductions from RECLAIM – *Phase I and Phase II*	Selective catalytic reduction, low NOx burners, NOx reducing catalysts, oxy-fuel furnaces, and selective non-catalytic reduction.	+ (increased energy, construction)
IND-01	Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities	Environmental lease conditions, port rules, tariffs, or incentives.	+ (afterburners, increased energy, reduced fuel economy associated with add-on pollution control equipment) - (conversion to alt fuels/reduction in conventional fuels)
MCS-01	Application of All Feasible Measures Assessment	District will adopt and implement new retrofit technology control standards as new BARCT standards become available.	+ (afterburners, increased energy)

TABLE 4.2-9 (CONTINUED)

Potential Impacts on Climate Change and Global Warming
from Implementation of 2012 AQMP Control Measures

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[a]
OZONE CONTROL MEASURES			
CMB-02	NOx Reductions from Biogas Flares (NOx)	Replacement of existing biogas flares with more efficient biogas flares	+ (construction) (1) (more efficient flares)
CMB-03	Reductions from Commercial Space Heating (NOx)	This control measure seeks emission reductions from unregulated commercial fan-type central furnaces used for space heating.	+ (construction) (2) (more efficient commercial fan-type central furnaces)
MCS-02	Further Emission Reductions from Green Waste Processing (Chipping and Grinding Operations not associated with composting)	Require chipped or ground greenwaste material to be covered after chipping or grinding or removed from site, and seasonal covering of chipped or ground greenwaste material.	+ (construction)
MCS-03	Improved Start-up, Shutdown and Turnaround Procedures (All Pollutants)	Diverting or eliminating process streams that are vented to flares, and installing redundant equipment to increase operational reliability	+ (construction) - (potentially less flaring)
FUG-01	~~Further~~ VOC Reductions from Vacuum Trucks	VOC control devices such as carbon adsorption systems, internal combustion engines, thermal oxidizers, refrigerated condensers, liquid scrubbers and positive displacement (PD) pumps.	+ (construction, increased energy) + (afterburners, increased energy with add-on pollution control equipment)
FUG-02	Emission Reduction from LPG Transfer and Dispensing – Phase II	Expand applicability of rule to LPG transfer and dispensing at facilities other than those that offer LPG for sale to end users included currently exempted facilities.	+ (construction, increased energy, inspection vehicles)
ONRD-01	Accelerated Penetration of Partial Zero-Emission and Zero Emission Vehicles (NOx)	Incentives to replace older vehicles with electric or hybrid vehicles.	+ (scrapping) - (electrification, conversion to alt fuels/reduction in conventional fuels)
ONRD-02	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles (NOx)	Incentives to replace older light- and medium-duty vehicles with new or newer low-emitting vehicles.	- (scrapping) - (electrification, conversion to alt fuels/reduction in conventional fuels)
ONRD-03	Accelerated Penetration of Partial Zero-Emission and Zero Emission Medium Heavy-Duty Vehicles (NOx)	Incentives to replace older medium-duty vehicles with low-emitting vehicles. Highest priority would be given to zero-emission vehicles and hybrid vehicles with a portion of their operation in an “all electric range” mode.	- (electrification, conversion to alt fuels/reduction in conventional fuels)

TABLE 4.2-9 (CONTINUED)

Potential Impacts on Climate Change and Global Warming
from Implementation of 2012 AQMP Control Measures

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
ONRD-04	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles (NOx, PM)	Incentives replace heavy-duty vehicles with newer or new vehicles. Priority would be placed on replacing older diesel trucks in Mira Loma.	- (conversion to alt fuels/reduction in conventional fuels) - (replacement with more efficient engines,
ONRD-05	Further Emission Reductions from Heavy-Duty Vehicles Serving Near-Dock Railyards (NOx, PM)	Incentives to replace up to 1,000 heavy-duty vehicles with low-emitting vehicles or zero-emission container movement systems.	+ (construction) - (electrification, conversion to alt fuels/reduction in conventional fuels)
OFFRD-01	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Accelerate Tier 0 and Tier 1 equipment replacement with Tier 4 equipment, use of air pollution control technologies (e.g., advanced fuel injection, air induction, and after-treatment technologies).	+ (increased energy, reduced fuel economy associated with add-on control equipment) - (replacement with more efficient engines, conversion to alt fuels/reduction in conventional fuels)
OFFRD-02	Further Emission Reductions from Freight Locomotives (NOx, PM)	Replace existing engines (Tier 0 through Tier 3 engines) with Tier 4 engines with control equipment (e.g., SCRs, DPM filters, electric batteries, and alternative fuels).	+ (increased energy, alt fuels, reduced fuel economy associated with add-on control equipment) - (replacement with more efficient engines)
OFFRD-03	Further Emission Reductions from Passenger Locomotives (NOx)	Repower existing Tier 0 and Tier 2engines with Tier 4 engines with control equipment (e.g., SCRs, DPM filters, electric batteries, and alternative fuels).	+ (engine repower, increased energy, reduced fuel economy associated with add-on control equipment) - (replacement with more efficient engines,
OFFRD-04	Further Emission Reductions from Ocean-Going Marine Vessels at Berth	Shore power of vessels at berth, use of air pollution control technologies on exhaust gases from auxiliary engines and boilers (e.g., SCRs, DPM filters, electric batteries, and alternative fuels).	+ (construction, increased energy, reduced fuel economy associated with add-on control equipment) - (electrification)
ADV-01	Proposed Implementation Measures for the Deployment of Zero- and Near-Zero Emission On-Road Heavy-Duty Vehicles (NOx)	Construct "wayside" electric or magnetic infrastructure, construction battery charging and fueling infrastructure. Alternatively, if battery, fuel cell or other zero/near zero emission technologies progress sufficiently, the need for wayside power for rail or trucks may be diminished or eliminated.	+ (construction, increased energy) - (electrification ,conversion to alt fuels/reduction in conventional fuels)

TABLE 4.2-9 (CONCLUDED)

Potential Impacts on Climate Change and Global Warming from Implementation of 2012 AQMP Control Measures

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
ADV-02	Proposed Implementation Measures for the Deployment of Zero- and Near-Zero Emission Locomotives (NOx)	Construct "wayside" electric , magnetic, battery-hybrid system, or fuel cell infrastructure, construct battery charging or fueling infrastructure.	+ (construction, increased energy) - (electrification, conversion to alt fuels reduction in conventional fuels)
ADV-03	Proposed Implementation Measures for the Deployment of Zero- and Near-Zero Emission Cargo Handling Equipment (NOx)	Construct electric gantry cranes, construct battery charging or fueling infrastructure, and use of alternative fuels.	+ (construction, increased energy) - (electrification, conversion to alt fuels reduction in conventional fuels)
ADV-04	Actions for the Deployment of Cleaner Commercial Harborcraft (NOx)	Construct battery charging or fueling infrastructure, use of air pollution control equipment (e.g., SCR, use of alternative fuels).	+ (construction, increased energy, reduced fuel economy associated with add-on control equipment)
ADV-05	Proposed Implementation Measures for the Deployment of Cleaner Ocean-Going Marine Vessels (NOx)	Employ after treatment control technologies such as SCR and sea water scrubbers, and use of alternative fuels.	+ (construction, increased energy, reduced fuel economy associated with add-on control equipment)
ADV-06	Proposed Implementation Measures for the Deployment of Cleaner Off-Road Equipment (NOx)	Construct battery charging or fueling infrastructure, and increased use of alternative fuels	+ (construction, increased energy) - conversion to alt fuels/reduction in conventional fuels)
ADV-07	Proposed Implementation Measures for the Deployment of Cleaner Aircraft Engines (NOx)	Use alternative fuels, lean combustion burners, high rate turbo bypass, advanced turbo-compressor design, and engine weight reduction.	- (conversion to alt fuels/reduction in conventional fuels)

(a) + Control measure is expected to result in an increase in GHG emissions
- Control measure is expected to result in a decrease in GHG emissions

A number of mobile source control measures would reduce GHG emissions through accelerated penetration of partial zero-emission and zero emission vehicles and use of alternative fuels such as natural gas, the combustion of which generates less GHG emissions than diesel fuel. The 2012 AQMP reported a 2008 GHG inventory of 154.82 million metric tons, of which 11.66 million metric tons are associated with power generation. Implementation of the proposed control measures is expected to reduce GHG emissions consistent with the AB32 scoping plan. However, an increase in electricity demand to implement Control Measures ONRD-01, ONRD-02, ONRD-03, ADV-01, and ADV-02 is expected to be about 1,691.2 GWh in 2023 and produce approximately 0.171 million metric tons of greenhouse gas emissions or approximately 0.11 percent of the 2008 greenhouse gas inventory for the district.

The reduction in petroleum fuels demand from implementation of Control Measures ONRD-01, ONRD-02, ONRD-03, and ONRD-04 is expected to be 60,150,808 gallons in 2023 (see Table 4.3-6), of which it is assumed 27,608,834 gallons would be motor gasoline with a CO2 emission factor of 8.78 kg/gal and 40,087,519 gallons would be diesel fuel with a CO2 emission factor of 10.05 kg/gal. The greenhouse gas emissions would be reduced by slightly more than 0.648 metric tons in 2023 when adjusting for nitrous oxide and methane emissions. Therefore, overall reduction in GHG emissions from implementation of Control Measures ONRD-01, ONRD-02, ONRD-03, and ONRD-04 would be approximately 0.477 million metric tons and no significant impact to GHG emissions would be expected as shown in Table 4.2-9.

TABLE 4.2-10

Estimated GHG Emission Impacts from
Control Measures ONRD-01, ONRD-02, ONRD-03, and ADV-02

Description	CO_2 Emissions (million metric tons)	CO_2eq Emissions (million metric tons)
Increased Electricity	0.1712	0.1715
Change in Gasoline Use	-0.2424	-0.2447
Change in Diesel Use	-0.4029	-0.4033
Net Change in Emissions	-0.4741	-0.4765

(a) Source: 2012 AQMP Appendix III.
Negative numbers represent emission reductions.

Control Measures BCM-03, CMB-01, CMB-02, CMB-03, IND-01, MCS-01, MCS-02, MCS-03, INC-01, FUG-01, FUG-02, FUG-03, OFFRD-01, OFFRD-04, OFFRD-05, ADV-01, ADV-02, ADV-03, ADV-04, ADV-05, and ADV-06 are expected to have GHG emissions associated with construction. Construction emissions impacts are amortized over a 30-year timeframe. As such, individual projects typically do not generate significant GHG impacts during the construction phase.

Control Measures BCM-03, CMB-01, IND-01, MCS-01, FUG-01, FUG-02, INC-01, OFFRD-01, OFFRD-02, OFFRD-03, OFFRD-04, ADV-01, ADV-02, ADV-03, ADV-04, ADV-05, and ADV-05 have the potential to increase energy demand by implementing control measures that would use electricity to power add-on control devices or power catenary systems for fixed-route mobile sources. Projects involving catenary systems would reduce diesel combustion emissions. As with the on-road control measures discussed previously, converting from diesel-fired sources to electricity generated by primarily natural gas, GHG emissions are expected to decrease. Projects to install catenary systems are expected to require project-specific CEQA review where global climate change and ozone depletion would be analyzed. Add-on control devices are sized for the specific source that is being controlled, as such the additional energy demand is highly variable from source to source. The energy to power these control measures is expected to be provided by public utility companies. As discussed in Subchapter 4.3 of this Final Program EIR, additional power generating facilities are expected due to general growth, but no new power generating facilities are expected as a result of implementing the 2012 AQMP. Power generating facilities are subject to AB-32 and will be required to reduce GHG emissions by 2020. Therefore, the additional energy necessary to implement add-on control devices and catenary systems are not expected to have significant GHG emissions.

Control Measures IND-01, ONRD-01, ONRD-02, ONRD-03, ONRD-04, ONRD-05, OFFRD-01, OFFRD-02, OFFRD-O4, ADV-01, ADV-02, ADV-03, ADV-06, and ADV-07 have the potential to require the use of alternative fuels. Both the use and production of alternative fuels is expected to decrease emissions as discussed previously in the Potential Impacts from Mobile Sources. Alternative fuels generate less GHG emissions when combusted compared to gasoline and diesel and generate less GHG emissions from production when compared to petroleum products. Therefore, no increase in GHG emissions is expected from the use of alternative fuels and no significant impacts are expected.

Based on the analysis presented above, global climate change and ozone depletion impacts are expected to be less than significant.

PROJECT-SPECIFIC MITIGATION: No significant air quality impacts from GHG emissions have been identified so no mitigation is required.

REMAINING AIR QUALITY IMPACTS: The air quality analysis concluded that potential secondary air quality impacts from GHG emissions would be less than significant, no mitigation measures were required, so secondary air quality impacts from GHG emissions remain less than significant.

4.2.6.5 Stratospheric Ozone Depletion

PROJECT-SPECIFIC IMPACTS: None of the control measures are expected to require the use of stratospheric ozone depleting substances. None of the control measures are expected to require additional control of stratospheric ozone depleting substances. Therefore, no adverse stratospheric ozone depleting impacts are expected from the proposed project.

PROJECT-SPECIFIC MITIGATION: No significant air quality impacts from stratospheric ozone depletion have been identified so no mitigation is required.

REMAINING AIR QUALITY IMPACTS: The air quality analysis concluded that potential secondary air quality impacts from stratospheric ozone depletion would be less than significant, no mitigation measures were required, so secondary air quality impacts from stratospheric ozone depletion remain less than significant.

4.2.7 Summary of Air Quality Impacts

The following is the summary of the conclusions of the analysis of secondary air quality impacts associated with implementation of the 2012 AQMP.

- Construction Activities: The emissions associated with construction activities due to the implementation of the control measures in the 2012 AQMP were considered to be significant for CO and PM10 emissions.

- Secondary Emissions from Increased Electricity Demand: While there may be an increase in electricity, the existing air quality rules and regulations are expected to minimize emissions associated with increased generation of electricity. The impacts associated with secondary emissions from increased electricity demand are expected to be less than significant.

- Secondary Emissions from the Control of Stationary Sources: No significant secondary air quality impacts from control of stationary sources were identified associated with implementation of the 2012 AQMP.

- Secondary Emissions from Change in Use of Lower VOC Materials: The secondary air quality impacts associated with reformulated products are expected to be less than significant.

- Secondary Emissions from Mobile Sources: The overall impact of mobile sources due implementation of the control measures has been considered less than significant for all pollutants.

- Secondary Emissions from Increased Use of Fuels due to Reduction in Fuel Economy: The reduction in fuel economy is expected to be about one percent for the affected sources so a potential increase in fuel use could occur. However, the overall focus of the 2012 AQMP is to reduce PM2.5 and ozone emissions, which is primarily driven by increasing use of cleaner fuels. Therefore, the impact of fuel economy is expected to be less than significant.

- Secondary Emissions from Miscellaneous Sources: The impacts of the control measures on secondary emissions from miscellaneous sources were determined to be less than significant.

- Non-Criteria Pollutants: Electrification may cause greater emissions of benzene, aldehydes, metals, and polycyclic aromatic hydrocarbons from fuel-based power generating facilities. However, if the process being electrified was previously powered by direct combustion of fossil fuels, then electrification may result in an overall decrease in toxic emissions. No significant secondary air quality impacts were identified from non-criteria pollutants, so no mitigation measures are required.

- Global Warming and Ozone Depletion: The 2012 AQMP is expected to have a net effect of reducing emissions of compounds that contribute to global warming and ozone depletion so that no significant adverse impacts are expected.

- Ambient Air Quality: The 2012 AQMP is expected to: 1) attain the 24-hour federal PM2.5 by 2014 (see Figure 4.2-3); 2) implement specific measures to implement Clean Air Action §182 (e)(5) to assist in attaining the eight-hour ozone standard by 2023; 3) maintain compliance with state and federal NO_2 standards (even considering the increase in population growth); 4) maintain compliance with state and federal SO_2 standards (even considering the increase in population growth); and, 5) maintain compliance with the federal 24-hour average PM10 standard.

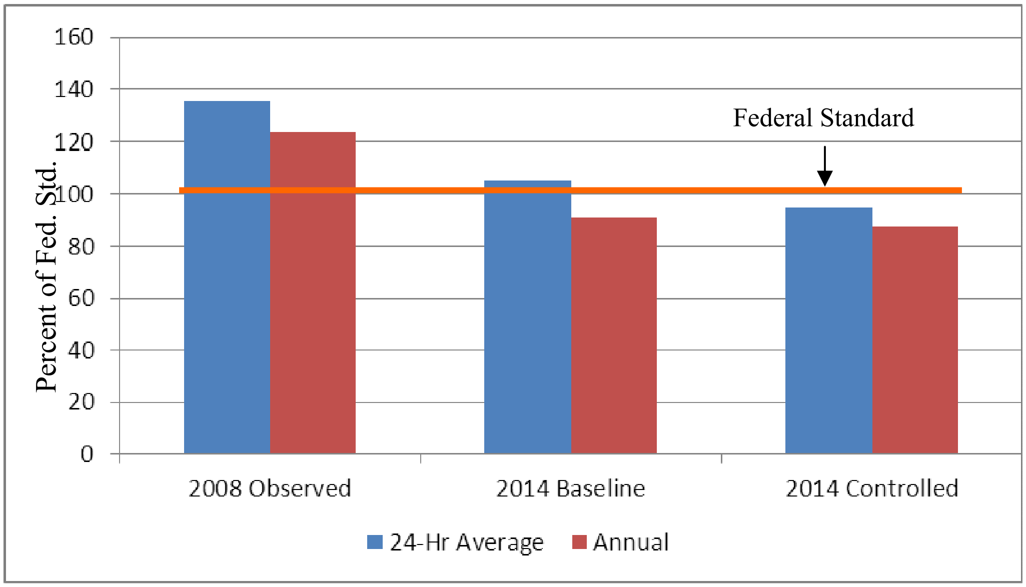

FIGURE 4.2-3

Projection of Future Air Quality in the Basin in Comparison with the Federal Standards.

Summary of PM2.5 Control Measure Impacts: The air quality impacts associated with PM2.5 Control Measures (BCM-03, CMB-01, IND-01, and MCS-01) were evaluated and determined to be significant for construction activities and less than significant for secondary emissions from increased electricity demand, control of stationary sources, change in us of lower VOC materials, mobile sources, increase us of fuels due to reduction in fuel economy, miscellaneous sources, non-criteria pollutants, and global warming and ozone depletion.

Summary of Ozone Control Measure Impacts: The air quality impacts associated with the 23 Ozone Control Measures (see Table 4.2-1) were evaluated and determined to be significant for construction activities and less than significant for secondary emissions from increased electricity demand, control of stationary sources, change in us of lower VOC materials, mobile sources, increase us of fuels due to reduction in fuel economy, miscellaneous sources, non-criteria pollutants, and global warming and ozone depletion.