Appx VII

Air Quality Management Plan

1-Hour Ozone Attainment Demonstration

December 2012

South Coast Air Quality Management District
Cleaning the air that we breathe...
AQMD

FINAL 2012 AQMP
APPENDIX VII

2012 1-HOUR OZONE
ATTAINMENT DEMONSTRATION

DECEMBER 2012

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Table of Contents

SECTION 1 – INTRODUCTION

Purpose and Scope……... VII-1
Background ……. VII-1
New Ozone Standard …….. VII-1
EPA Action on 2003 1-Hour Ozone SIP Revision ……. VII-2
Litigation Over EPA's 2009 Action ……... VII-2
EPA Proposed SIP Call …….. VII-2

SECTION 2 – OZONE AIR QUALITY IN THE BASIN

Introduction …… VII-4
Ozone Health Effects ……. VII-4
Ozone Episodes……... VII-4
1-Hour Ozone Levels in the South Coast Air Basin …….. VII-5
Ambient Air Quality Standards …….. VII-6
Federal Ozone Standards …….. VII-6
Design Values and NAAQS Attainment Status ……... VII-7
Air Quality Compared to Other U.S. Metropolitan Areas……. VII-8

SECTION 3 – BASE YEAR AND FUTURE YEAR EMISSIONS

Introduction …… VII-11
Base Year and Future Year Emissions ……... VII-11

SECTION 4 – 1-HOUR OZONE SIP CONTROL STRATEGY

Introduction …… VII-17
2007 SIP Control Measures Carried Forward for the 1-Hour Ozone Attainment Demonstration …… VII-17
Final 2012 AQMP Proposed 8-Hour Ozone Control Measures for the 1-Hour Ozone Attainment Demonstration……. VII-18
SCAG's Regional Transportation Strategy and Transportation Control Measures ….. VII-20
Section I. Linking Regional Transportation Planning to Air Quality Planning ... VII-21
Section II. Regional Transportation Strategy and Transportation control Measures ……... VII-21
Section III. Reasonably Available Control Measure (RACM) Analysis …….. VII-22
Proposed Ozone Control Measures ..…….. VII-23
Proposed Ozone Stationary Source Measures …….. VII-28
Coating and Solvents ……. VII-30
Combustion Sources …….. VII-32
Petroleum Operations and Fugitive VOC Emissions …… VII-32

Multiple Component Sources …… VII-33
Incentive Programs ……..... VII-35
Educational Programs .……..... VII-35
Proposed Ozone Mobile Source Measures …….... VII-36
On-Road Mobile Source Measures ……..... VII-39
Off-Road Mobile Source Measures ……..... VII-40
Actions to Deploy Advanced Control Technologies VII-41
Overall Emission Reductions ..……..... VII-45

SECTION 5 – 1-HOUR OZONE ATTAINMENT DEMONSTRATION

Introduction…….... VII-47
Background.……..... VII-47
Attainment Demonstration Structure: Deterministic vs. Tiered Relative
Response Factor (RRF)…..... VII-48
Modeling Protocol..……..... VII-49
Modeling Emissions Inventory...……..... VII-51
Episode Selection and Design Values…….... VII-51
Base-Year Ozone Model Performance Evaluation…..... VII-54
Attainment Demonstration…….... VII-63
Weight of Evidence……..……..... VII-74
Summary and Conclusions……..... VII-82

SECTION 6 – ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS

California Environmental Quality Act (CEQA) ……. VII-84
Socioeconomic analysis …….. VII-86

SECTION 1

INTRODUCTION

PURPOSE AND SCOPE

The purpose of the 2012 1-hour ozone SIP revision is to provide an attainment demonstration to respond to the U.S. EPA's published "SIP call" proposal on September 19, 2012, finding the existing approved 1-hour ozone SIP substantially inadequate to provide for attainment of the revoked 1-hour ozone standard by the applicable attainment date of November 15, 2010. EPA's proposed SIP call was in turn a response to the decision of the Ninth Circuit Court of Appeals in *Association of Irritated Residents, et al, v. United States Environmental Protection Agency, et al.,* 686 F. 2d 668 (Amended January 12, 2012).

The only new information presented in this Appendix is the 1-hour ozone attainment demonstration described in Section 5. The other sections of this appendix are largely summaries or replications of information presented in the main volume or other appendices of the Final 2012 AQMP. This information is repeated here to provide context and completeness in support of the 1-hour ozone attainment demonstration.

BACKGROUND

In 1979, EPA established a primary health-based national ambient air quality standard (NAAQS) for ozone at 0.12 parts per million (ppm) averaged over a 1-hour period. See 44 Fed. Reg. 8220 (February 9, 1979). The Clean Air Act, as amended in 1990, classified areas that had not yet attained that standard, based on the severity of their ozone problem, ranging from Marginal to Extreme. Extreme Areas were provided the most time to attain the standard, until November 15, 2010. On November 6, 1991, EPA classified the South Coast Air Basin as "Extreme" nonattainment. As required under the 1990 amendments to the CAA, in 1994 the District and CARB submitted a 1-hour ozone "state implementation plan" (SIP) revision. In 1997, EPA approved the 1-hour ozone SIP for the South Coast. 62 Fed. Reg. 1150 (January 8, 1997). In 1997 and 1999, CARB submitted revisions to the 1994 South Coast 1-hour ozone SIP, which EPA approved in 2000. 65 Fed. Reg. 18903 (April 10, 2000).

In 2004, CARB submitted the 2003 revisions to the 1-hour ozone SIP which included updated emissions inventories showing higher mobile source emissions than had previously been projected and a lower "carrying capacity" than previously predicted, along with new commitments to achieve specified amounts of VOC and NOx reductions needed to attain by the applicable date. 73 Fed. Reg. 63408, 63410, 63416 (October 24, 2008).

NEW OZONE STANDARD

In the meantime, in 1997 EPA promulgated a new 8-hour ozone standard of 0.08 ppm to replace the 1-hour standard**.** 62 Fed. Reg. 38856 (July 18, 1997). EPA promulgated rules to implement that standard. The "Phase 1" rule, promulgated on

April 30, 2004 (69 Fed. Reg. 23951) established anti-backsliding requirements that would continue to remain in effect even though the existing 1-hour standard was revoked effective June 2005. See 40 CFR §51.905(a)(1) and §51.900(f). An Extreme area was required to have a fully-approved attainment demonstration in effect. (Id.).

EPA ACTION ON 2003 1-HOUR OZONE SIP REVISION

In 2008, the California Air Resources Board (CARB) withdrew key components of its emission reduction commitments in the 2003 South Coast 1-hour ozone SIP. See 73 Fed. Reg. at 63410-12. In 2009, EPA approved certain elements of the 2003 South Coast 1-Hour Ozone SIP but disapproved the attainment demonstration, largely because CARB's 2008 withdrawal of emission reduction commitments rendered the plan insufficient to demonstrate attainment. 74 Fed. Reg. 10176, 10181 (March 10, 2009). EPA also concluded that this disapproval did not trigger a sanctions clock or a FIP (federal implementation plan) because the approved SIP already contained an approved 1-hour attainment demonstration meeting CAA requirements, which was all that was necessary regarding the revoked 1-hour standard. 74 Fed. Reg. at 10177, 10181.

LITIGATION OVER EPA'S 2009 ACTION

Several environmental and community groups petitioned for review of EPA's action in the Ninth Circuit Court of Appeals. On February 2, 2011, the Ninth Circuit ruled in favor of petitioners. As pertinent here, the Court held that EPA must promulgate a FIP or issue a SIP call where EPA disapproves a new attainment demonstration unless the Agency determines that the SIP as approved remains adequate to demonstrate attainment of the relevant NAAQS. On May 5, 2011, EPA petitioned for panel rehearing, and amicus briefs were filed in support of EPA by the District, CARB, and SCAG. On January 27, 2012, the Ninth Circuit denied the petition for rehearing but modified its opinion to delete references to sanctions. The court remanded the case to EPA, stating that "EPA should have ordered California to submit a revised attainment plan for the South Coast after it disapproved the 2003 Attainment Plan". *Association of Irritated Residents v. EPA*, 632 F. 3d. 668, 681 (9th Cir., reprinted as amended January 27, 2012, further amended February 13, 2012.) The Court also issued a ruling regarding transportation control measures for ozone under CAA §182(d)(1)(A), which is discussed in Appendix VIII of the Final 2012 AQMP.

EPA PROPOSED SIP CALL

On September 19, 2012, EPA published a proposed SIP call under Section 110(k)(5) of the CAA, based on a determination that the applicable implementation plan (here, the 1997/99 plan approved April 10, 2000) "is substantially inadequate to attain or maintain the relevant NAAQS…" The proposed SIP call is based on evidence

submitted in the form of the 2003 South Coast 1-hour Ozone Plan that the 1997/1999 plan was substantially inadequate to provide for attainment. That plan noted that "this revision points to the urgent need for additional emission reductions (beyond those incorporated in the 1997-99 Plan) to offset increased emissions estimates from mobile sources…" (See 2003 Air Quality Management Plan, pages ES-1 and ES-2.) However, many of those additional emission reduction commitments were withdrawn by CARB in 2008. EPA also notes that on December 30, 2011, EPA determined that the South Coast Air Basin had failed to attain the 1-hour ozone standard by the applicable date of November 15, 2010, thus triggering a fee program or equivalent under CAA §185. 76 Fed. Reg. 82133 (December 30, 2011). This determination provides further support for the present SIP call because it establishes that the approved SIP did not in fact lead to attainment for the 1-hour ozone NAAQS by the applicable date.

As a result, the state must submit an attainment demonstration for the South Coast for the 1-hour ozone standard showing attainment as expeditiously as practicable but no later than five years from the effective date of the final SIP call, unless the State can demonstrate a need for a later date, not to exceed 10 years beyond the effective date of the SIP call, considering the severity of the remaining nonattainment problem and the availability and feasibility of pollution control measures. CAA §172(a)(2).

EPA's proposed SIP call would give the State up to one year after the effective date of the SIP call to submit the revised attainment demonstration. The District intends to demonstrate that a period of the full 10 years allowed by law is needed to attain the 1-hour standard. The District plans to submit the updated 1-hour ozone attainment demonstration as part of the 2012 AQMP.

SECTION 2

OZONE AIR QUALITY IN THE BASIN

INTRODUCTION

The U.S EPA has designated the Basin as extreme nonattainment for the revoked federal 1-hour ozone standard of 0.12 ppm. The Basin had the highest number of days exceeding the federal 1-hour ozone standard of any urban area nationwide in 2011. The following information on 1-hour ozone air quality is taken from Chapter 2 and Appendix II of the Final 2012 AQMP, and is repeated here for completeness. The 1-hour ozone air quality data is used to support the 1-hour ozone attainment demonstration.

OZONE HEALTH EFFECTS

The adverse effects of ozone air pollution exposure on health have been studied for many years, as is documented by a significant body of peer-reviewed scientific research, including studies conducted in southern California which shows that even relatively low concentrations of ozone can significantly reduce lung function in normal healthy people.

Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered the most susceptible sub-groups to ozone effects. Short-term exposures to ozone at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. Elevated ozone levels are associated with increased school absences and daily hospital admission rates. An increased risk for asthma has been found in children who participate in multiple sports and live in high ozone communities.

Ozone exposure under exercising conditions is known to increase the severity of the above-mentioned observed responses. Animal studies suggest that exposures to a combination of pollutants which include ozone may be more toxic than exposure to ozone alone. Although lung volume and resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.

OZONE EPISODES

While the 1-hour ozone episode levels and the related health warnings still exist, they have been largely superseded by the more protective health warnings associated with the current 8-hour ozone NAAQS. The 1-hour O_3 episode warning levels include the state Health Advisory (0.15 ppm), Stage 1 (0.20 ppm), Stage 2 (0.35 ppm) and Stage 3 (0.50 ppm). Only the lowest of these 1-hour episode thresholds, the state Health Advisory, was exceeded in 2011. The last 1-hour O_3 Stage 1 episode occurred in

2003. The last Stage 2 episode occurred in 1988, and the last Stage 3 episode occurred in 1974.

1-HOUR OZONE LEVELS IN THE SOUTH COAST AIR BASIN

In 2011, the District regularly monitored ozone concentrations at 29 locations in the Basin and the Coachella Valley portion of the SSAB. All areas monitored measured 1-hour average ozone levels well below the Stage 1 episode level, but the maximum concentrations measured in the Basin exceeded the health advisory level in San Bernardino County. The maximum ozone concentrations in the Los Angeles, Riverside and San Bernardino Counties all exceeded the former 1-hour federal standard in 2011; Orange County and the Coachella Valley did not exceed that standard. Maximum ozone concentrations in the SSAB areas monitored by the District were lower than in the Basin and were below the health advisory level. Table VII-2-1 shows maximum 1-hour ozone concentrations by air basin and county.

TABLE VII-2-1

2011 Maximum 1-Hour Average Ozone Concentrations by Basin and County

BASIN/COUNTY	MAXIMUM 1-HR AVERAGE (PPM)	PERCENT OF FEDERAL STANDARD (0.12 PPM)	AREA
South Coast Air Basin			
Los Angeles	0.144	115	Santa Clarita Valley
Orange	0.095	76	North Orange County
Riverside	0.133	106	Lake Elsinore
San Bernardino	0.160	128	Central San Bernardino Mountains
Salton Sea Air Basin			
Riverside	0.124	99	Coachella Valley

The number of days exceeding the former federal 1-hour ozone standard in the Basin varies widely by area (Figure VII-2-1). The former 1-hour federal standard was not exceeded in areas along or near the coast in the Counties of Los Angeles and Orange, due in large part to the prevailing sea breeze which transports emissions inland before high ozone concentrations are reached. The standard was exceeded most frequently in the Central San Bernardino Mountains. Ozone exceedances also extended through San Bernardino and Riverside County valleys in the eastern Basin, as well as the northeast and northwest portions of Los Angeles County in the foothill

and valley areas. The Central San Bernardino Mountains area recorded the greatest number of exceedances of the former 1-hour federal standard (8 days). The Coachella Valley did not exceed the former 1-hour ozone standard in 2011.

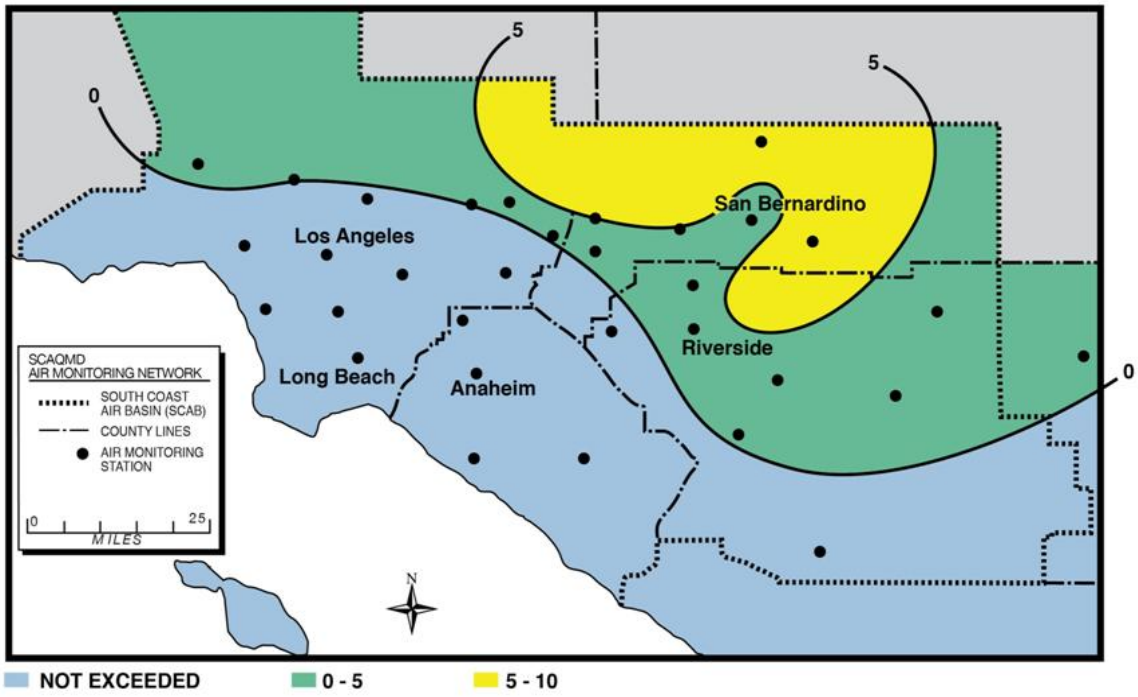


FIGURE VII-2-1

Number of Days in 2011 Exceeding the 1979 1-Hour Federal Ozone Standard
(1-hour average O_3 > 0.12 ppm)

AMBIENT AIR QUALITY STANDARDS

Federal Ozone Standards

The federal government has adopted ambient air quality standards, which define the concentration below which long-term or short-term exposure to a pollutant is not expected to cause adverse effects to public health and welfare. The current and revoked federal ozone ambient air quality standards and the effect of ozone on health are summarized in Table VII-2-2. As noted above, the federal 1-hour ozone standard was revoked in favor of the 8-hour ozone standard in 1997.

TABLE VII-2-2

Federal Ozone Ambient Air Quality Standards and Health Effects

Federal Standard (NAAQS) Concentration, Averaging Time	Relevant Health and Welfare Effects[#]
0.075 ppm, 8-Hour (2008) 0.08 ppm 8-Hour (1997) 0.12 ppm, 1-hour (1979, revoked in 1997)	(a) Pulmonary function decrements and localized lung edema in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (e) Vegetation damage; (f) Property damage

ppm – parts per million by volume
Federal standards follow the design value form of the NAAQS
[#] More detailed health effect information can be found in the 2012 AQMP Appendix I or the U.S. EPA NAAQS documentation at http://www.epa.gov/ttn/naaqs/

Design Values and NAAQS Attainment Status

In 2011, 1- hour ozone levels exceeded federal standard concentration levels at one or more of the routine monitoring stations in the Basin. As shown in Table VII-2-1, maximum 1-hour ozone concentrations of 0.160 ppm recorded in the Central San Bernardino Mountains area were 128 percent of the former 1-hour federal standard. However, an exceedance of the concentration level does not necessarily mean a violation of the NAAQS, given that the form of the standard must be considered. Air quality statistics can be presented in terms of maximum concentrations measured at monitoring stations or in air basins, as well as the number of days exceeding state or federal standards.

Attainment of the NAAQS is measured with three-year design values that take into account the form of the federal standards and multi-year averages. For 1-hour O_3, the form of the standard is the 4th highest measured 1-hour average concentration at each station over a three-year period. The overall design value for an air basin is the highest design value of all the stations in that basin. Figure VII-2-2 shows the trends in the 1-hour ozone design values and the annual Basin days exceeding the former 1-hour ozone NAAQS over the past two decades.

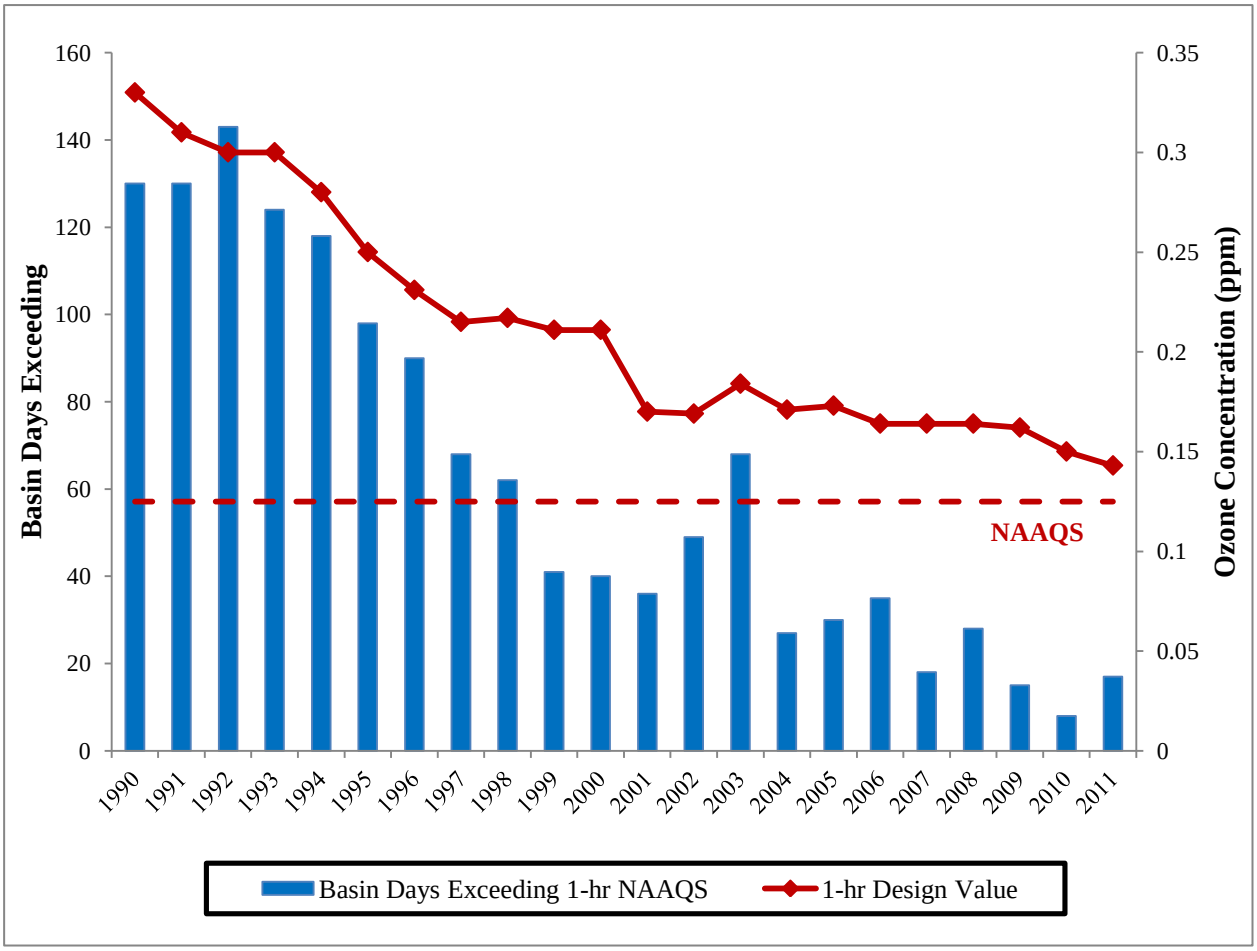


FIGURE VII-2-2

South Coast Air Basin Trends in Ozone Design Value and Annual Basin Days Exceeding the Former 1-hour NAAQS

Air Quality Compared to Other U.S. Metropolitan Areas

Despite significant improvement, the Basin still has some of the worst air quality in the nation in terms of the number of days per year exceeding the revoked federal 1-hour ozone standard. Figures VII-2-3 and VII-2-4 show maximum 1-hour ozone concentrations in 2011 for the Basin compared to other urban areas in the U.S. and California, respectively. It is important to note that maximum pollutant concentrations do not necessarily indicate potential NAAQS violations and subsequent nonattainment designations, as the design values that are used for attainment status are based on the form of the standard.

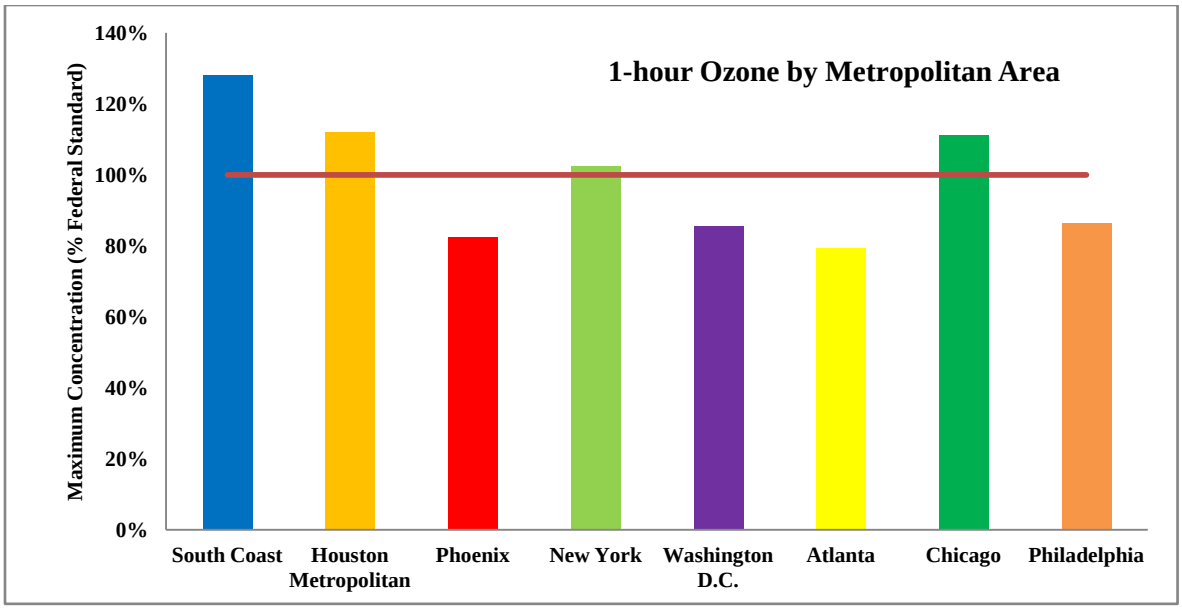


FIGURE VII-2-3

2011 South Coast Air Basin 1-hour Ozone Air Quality Compared to Other U.S. Metropolitan Areas (Maximum Pollutant Concentrations as Percentage of the Federal Standard)

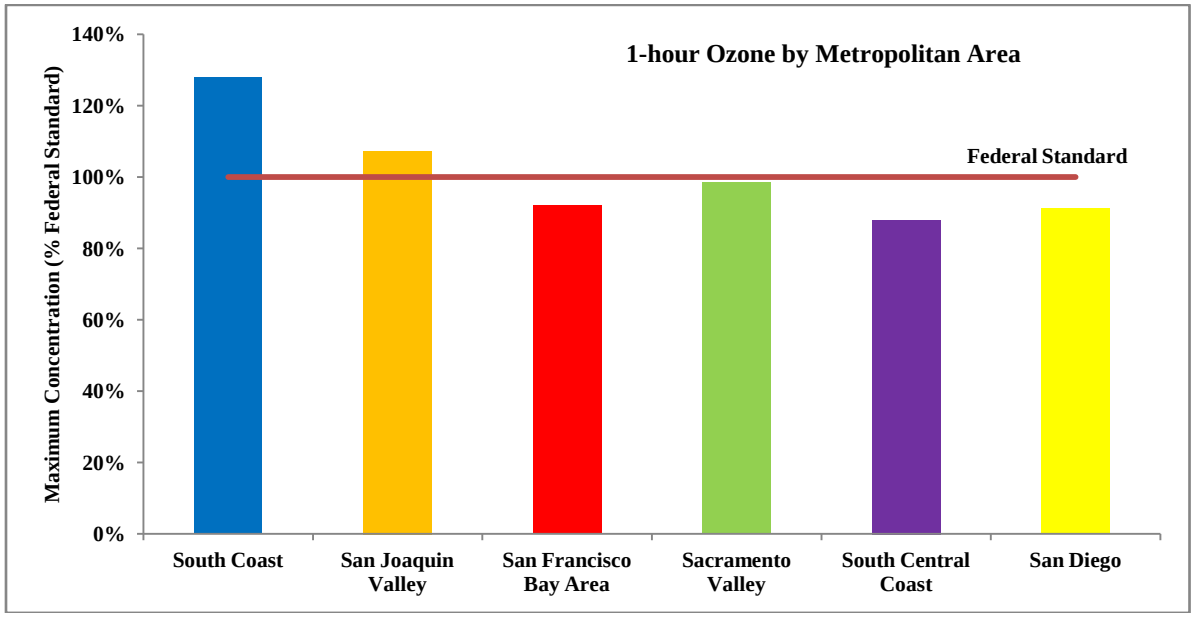


FIGURE VII-2-4

2011 South Coast Air Basin 1-hour Ozone Air Quality Compared to Other California Metropolitan Areas (Maximum Pollutant Concentrations as Percentage of the Federal Standard)

SECTION 3

BASE YEAR AND FUTURE YEAR EMISSIONS

INTRODUCTION

The 1-hour ozone attainment demonstration is based on the latest emissions inventories for the base year (2008) and projected future years developed as part of the Final 2012 AQMP. For specific details and descriptions of inventory development methodology, please refer to Chapter 3 and Appendix III of the Final 2012 AQMP.

BASE YEAR AND FUTURE YEAR EMISSIONS

Summaries of the summer planning inventory (ozone precursors) emissions that occurred in the Basin in the 2008 base year and that are projected for the 2022 attainment year are provided in the Tables VII-3-1 and VII-3-2. Note that the 2008 Base year inventory is identical to that in the Final 2012 AQMP (Chapter 3, Appendix III). Table VII-3-3 provides the complete 2022 summer planning emissions inventory by major source category in the South Coast Air Basin.

TABLE VII-3-1

Summary of Emissions By Major Source Category: **2008** Base Year
Summer Planning Inventory (tpd[1]) *

SOURCE CATEGORY	SUMMER OZONE PRECURSORS	
	VOC	**NOx**
STATIONARY SOURCES		
Fuel Combustion	14	41
Waste Disposal	12	2
Cleaning and Surface Coatings	43	0
Petroleum Production and Marketing	41	0
Industrial Processes	19	0
Solvent Evaporation		
Consumer Products	99	0
Architectural Coatings	25	0
Others	2	0
Misc. Processes	9	20
RECLAIM Sources	0	24
Total Stationary Sources	**264**	**87**
MOBILE SOURCES		
On-Road Vehicles	213	426
Off-Road Vehicles	162	208
Total Mobile Sources	**375**	**634**
TOTAL	**639**	**721**

[1] Values are rounded to nearest integer.

[*] Values represent inventory developed for Final 2012 AQMP.

TABLE VII-3-2

Summary of Emissions By Major Source Category: **2022** Baseline
Summer Planning Inventory (tpd[1])

SOURCE CATEGORY	SUMMER OZONE PRECURSORS	
	VOC	**NOx**
STATIONARY SOURCES		
Fuel Combustion	14	27
Waste Disposal	14	2
Cleaning and Surface Coatings	55	0
Petroleum Production and Marketing	36	0
Industrial Processes	17	0
Solvent Evaporation		
Consumer Products	90	0
Architectural Coatings	19	0
Others	2	0
Misc. Processes	9	13
RECLAIM Sources	0	27
Total Stationary Sources	**258**	**70**
MOBILE SOURCES		
On-Road Vehicles	73	135
Off-Road Vehicles	109	136
Total Mobile Sources	**182**	**271**
TOTAL	**440**	**341**

[1] Values are rounded to nearest integer.

TABLE VII-3-3

2022 Baseline Summer Planning Emissions by Source Category
in the South Coast Air Basin (tpd)

CODE	SOURCE CATEGORY	VOC	NOx	CO
10	Electric Utilities	0.88	0.23	8.51
20	Cogeneration	0.05	0.01	0.41
30	Oil and Gas Production (Combustion)	0.12	0.81	0.64
40	Petroleum Refining (Combustion)	1.28	0.00	5.06
50	Manufacturing and Industrial	6.80	13.91	21.21
52	Food and Agricultural Processing	0.07	0.08	1.28
60	Service and Commercial	4.45	9.25	17.37
99	Other (Fuel Combustion)	0.31	3.09	2.90
Total Fuel Combustion		**13.96**	**27.38**	**57.37**
Waste Disposal				
110	Sewage Treatment	0.05	0.01	0.02
120	Landfills	9.72	0.66	0.62
130	Incinerators	0.09	1.05	0.47
140	Soil Remediation	0.01	0.01	0.00
199	Other (Waste Disposal)	3.97	0.00	0.01
Total Waste Disposal		**13.84**	**1.73**	**1.12**
Cleaning and Surface Coatings				
210	Laundering	0.17	0.00	0.00
220	Degreasing	14.94	0.00	0.00
230	Coatings and Related Process Solvents	31.91	0.01	0.02
240	Printing	2.23	0.00	0.00
250	Sealants & Adhesives	5.24	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.74	0.03	0.04
Total Cleaning and Surface Coatings		**55.23**	**0.04**	**0.06**
Petroleum Production and Marketing				
310	Oil and Gas Production	1.57	0.10	0.08
320	Petroleum Refining	4.11	0.19	4.98
330	Petroleum Marketing	30.68	0.01	0.00
399	Other (Petroleum Production and Marketing)	0.02	0.01	0.00
Total Petroleum Production and Marketing		**36.38**	**0.31**	**5.06**
Industrial Processes				
410	Chemical	9.80	0.00	0.21
420	Food and Agriculture	1.69	0.00	0.00
430	Mineral Processes	0.47	0.03	1.05
440	Metal Processes	0.18	0.04	0.25
450	Wood and Paper	0.19	0.00	0.00
460	Glass and Related Products	0.02	0.00	0.00
470	Electronics	0.00	0.00	0.00
499	Other (Industrial Processes)	5.07	0.04	0.30
Total Industrial Processes		**17.42**	**0.11**	**1.81**
Solvent Evaporation				
510	Consumer Products	90.32	0.00	0.00
520	Architectural Coatings and Related Solvents	19.39	0.00	0.00
530	Pesticides/Fertilizers	1.00	0.00	0.00
540	Asphalt Paving/Roofing	1.49	0.00	0.00
Total Solvent Evaporation		**112.20**	**0.00**	**0.00**

TABLE VII-3-3 (Continued)

2022 Baseline Summer Planning Emissions by Source Category
in the South Coast Air Basin (tpd)

CODE	SOURCE CATEGORY	VOC	NOx	CO
Miscellaneous Processes				
610	Residential Fuel Combustion	2.29	11.55	15.00
620	Farming Operations	2.19	0.00	0.00
630	Construction and Demolition	0.00	0.00	0.00
640	Paved Road Dust	0.00	0.00	0.00
645	Unpaved Road and Travel Dust	0.00	0.00	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00
660	Fires	0.24	0.08	3.02
670	Waste Burning and Disposal	2.64	1.24	41.28
690	Cooking	1.98	0.00	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00
	RECLAIM		27.23	
Total Miscellaneous Processes		**9.34**	**40.10**	**59.30**
On-Road Motor Vehicles				
710	Light Duty Passenger	19.63	13.36	199.00
722	Light Duty Trucks 1 (T1)	8.21	4.68	60.43
723	Light Duty Trucks 2 (T2)	11.27	8.33	100.70
724	Medium Duty Trucks (T3)	15.31	12.83	128.76
732	Light Heavy Duty Gas Trucks 1 (T4)	4.90	11.36	34.30
733	Light Heavy Duty Gas Trucks 2 (T5)	0.41	1.03	2.39
734	Medium Heavy Duty Gas Trucks (T6)	0.63	1.28	7.37
736	Heavy Heavy Duty Gas Trucks (HHD)	0.10	0.88	7.15
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.40	10.47	3.28
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.14	3.43	1.36
744	Medium Heavy Duty Diesel Trucks (T6)	0.49	6.55	2.33
746	Heavy Heavy Duty Diesel Trucks (HHD)	3.42	43.03	19.80
750	Motorcycles (MCY)	6.59	2.04	49.47
760	Heavy Duty Diesel Urban Buses	0.43	10.48	2.08
762	Heavy Duty Gas Urban Buses	0.30	0.62	3.05
771	School Buses - Gas	0.05	0.09	0.75
772	School Buses - Diesel	0.03	1.77	0.13
777	Other Buses - Gas	0.29	0.53	2.82
779	All Other Buses - Diesel	0.10	1.06	0.52
780	Motor Homes	0.07	1.00	1.07
Total On-Road Motor Vehicles		**72.77**	**134.82**	**626.73**
Other Mobile Sources				
810	Aircraft	4.41	15.44	41.75
820	Trains	1.32	22.60	8.40
833	Ocean Going Vessels	3.09	32.93	5.48
835	Commercial Harbor Craft	1.05	9.30	7.31
840	Recreational Boats	35.18	8.22	159.73
850	Off-Road Recreational Vehicles	9.04	0.17	8.58
860	Commercial/Industrial Mobile Equipment	46.80	44.64	668.44
870	Farm Equipment	0.56	2.80	8.07
890	Fuel Storage and Handling	7.35	0.00	0.00
Total Other Mobile Sources		**108.80**	**136.10**	**907.76**

TABLE VII-3-3 (Concluded)

2022 Baseline Summer Planning Emissions by Source Category
in South Coast Air Basin (tpd)

CODE	SOURCE CATEGORY	VOC	NOx	CO
Total Stationary and Area Sources		258.34	63.78	209.89
Total On-Road Vehicles		72.77	134.82	622.73
Total Other Mobile		108.80	136.10	707.37
Total		**439.97**	**340.57**	**1659.23**

[CO inventory changed from the previous annual average emissions inventory to the appropriate summer planning emissions inventory]

SECTION 4

1-HOUR OZONE SIP CONTROL STRATEGY

INTRODUCTION

This section sets forth the proposed control strategy and implementation schedule to demonstrate attainment with the former 1-hour ozone NAAQS by 2022. Given the approximate alignment of the attainment dates, the control strategy for the 1-hour ozone standard is identical to the control strategy for the 1997 federal 8-hour ozone standard. The control strategy for the 8-hour ozone standard is described in the 2007 AQMP with updates proposed in the Final 2012 AQMP. The following sections discuss the proposed control measures for attainment of the 1-hour ozone national ambient air quality standards (NAAQS) that include:

- 2007 8-hour ozone SIP control measures carried forward for the 1-hour ozone attainment demonstration; and
- Proposed 8-hour ozone control measures from the Final 2012 AQMP (taken from Chapter 4 of the Final 2012 AQMP and repeated in this Section for completeness.)

2007 SIP CONTROL MEASURES CARRIED FORWARD FOR THE 1-HOUR OZONE ATTAINMENT DEMONSTRATION

As provided in Table 1-3 of the Final 2012 AQMP, the emission reduction commitments provided in the 2007 SIP have been met with the implementation of the majority of control measures identified in the 2007 SIP. For the 1-hour ozone attainment demonstration, the proposed control strategy is the continued implementation of the 2007 SIP control strategy for the 8-hour ozone attainment demonstration. As such, seven mobile source control measures (four on-road mobile source measures and three off-road measures) are proposed to be carried forward. The seven mobile source control measures are listed in Table VII-4-1 along with the specific reference pages from the 2007 SIP. The emission reductions associated with each measure are also provided in Table VII-4-1. These are not new measures and the emissions reductions commitments for these measures have already been approved in U.S. EPA's approval of the 2007 8-hour ozone SIP.

TABLE VII-4-1

List of 2007 SIP Mobile Source Control Measures Proposed to be Included in the 1-Hour Ozone Attainment Demonstration

2007 SIP Mobile Source Control Measures		
Title	**2007 SIP Reference (released April 26, 2007)**	**Reduction (tpd) by 2022**
Smog Check Improvements (BAR) - Annual Inspection of Older Vehicles	Pgs. 90 & 94	1.6 [VOC] 3.9 [NOx]
Smog Check Improvements (BAR) - Annual Inspection of High Mileage Vehicles	Pgs. 90 & 94	0.3 [VOC] 0.8 [NOx]
Smog Check for Motorcycles	Pgs. 91 & 95	1.2 [VOC] 0.4 [NOx]
Expanded Passenger Vehicle Retirement Program	Pgs. 91 & 100-101	0.4 [VOC] 0.3 [NOx]
Cleaner Main Ship Engines and Fuel - Main Engines	Pgs. 91 & 107-110	6.2 [NOx]
Accelerated Intro. of Cleaner Line-Haul Locomotives	Pgs. 92 & 113-114	12.1 [NOx]
Off-Road Recreational Vehicle Expanded Emission Standards	Pgs. 92 & 123-124	3.6 [VOC]
Total		**7.1 [VOC] 23.7 [NOx]**

FINAL 2012 AQMP PROPOSED 8-HOUR OZONE CONTROL MEASURES FOR THE 1-HOUR OZONE ATTAINMENT DEMONSTRATION

As stated above, the control strategy for attainment of the 1997 federal 8-hour ozone standard is identical to the control strategy being proposed for attainment of the former 1-hour ozone standard. The proposed 8-hour ozone control measures identified in the Final 2012 AQMP are repeated below for completeness, and are taken directly from Chapter 4 of the Final 2012 AQMP. A more detailed description of each control measure is provided in Appendices IV-A and IV-B.

The Final 2012 AQMP is proposing a control strategy that includes emission reductions from both stationary and mobile sources. The proposed stationary source control measures in the Final 2012 AQMP are based on implementation of all feasible control measures through the application of available cleaner technologies,

best management practices, incentive programs, as well as development and implementation of zero- and near-zero technologies and control methods. The stationary source control measures presented in the Plan are proposed to further reduce emissions from both point sources (permitted facilities) and area sources (generally small and non-permitted in addition to smaller permitted sources with emissions less than the reporting threshold in the District's Annual Emissions Reporting Program). The basic principles followed in developing the District's stationary source control measures call for initiating programs or rule making activities for VOC and further NOx control strategies aiming at maximum reductions by the applicable timeframe to further implement the federal ozone standards.

The mobile source strategy includes actions seeking further emission reductions from both on-road and off-road mobile sources, such as accelerated penetration of zero- and near-zero emission vehicles and early retirement of older vehicles. In addition, the mobile source strategy includes research and development of advanced control technologies from various mobile sources. Some of the proposed actions need to be implemented by several agencies that currently have the statutory authority to implement such measures.

For each control measure, the District will seek to achieve the maximum reduction potential that is technically feasible and cost-effective. Significant challenges remain in meeting the federal ozone standards. Ozone reduction strategies and programs need to be continued and accelerated to ensure that the air basin will meet the 1-hour ozone standards by 2022. Proposed measures to reduce ozone include emission reductions from coatings, consumer products, and RECLAIM facilities as well as early transitions to cleaner technologies.

To ultimately achieve the ozone ambient air quality standards, significant additional emissions reductions will be necessary from a variety of sources, including those primarily under the jurisdiction of CARB (e.g., on-road motor vehicles, off-road equipment, and consumer products) and U.S. EPA (e.g., aircraft, ships, trains, and pre-empted off-road equipment). Without an adequate and fair-share level of reductions from all sources, the emission reduction burden would unfairly be shifted to sources that have already been doing their part for clean air. Moreover, the District will continue to use its available regulatory authority to further control mobile source emissions where federal or State actions do not meet regional needs.

Overall, the Final 2012 AQMP includes 16 stationary and 17 mobile source measures for ozone. The following two sections discuss the control measures as outlined below:

- SCAG's Regional Transportation Strategy and Transportation Control Measures (see Appendix IV-C for detailed descriptions of the regional transportation strategy and control measures)

- Proposed Ozone measures (see Appendix IV-A for detailed descriptions of the District's stationary source control measures and Appendix IV-B for detailed descriptions of the District's mobile source measures)

For District's SIP emission reduction commitments, overall emission reductions and implementation, please refer to Chapter 4 of the Final 2012 AQMP.

SCAG's REGIONAL TRANSPORTATION STRATEGY AND TRANSPORTATION CONTROL MEASURES

The Southern California Association of Governments (SCAG), the Metropolitan Planning Organization (MPO) for Southern California, is mandated to comply with federal and state transportation and air quality regulations. Federal transportation law authorizes federal funding for highway, highway safety, transit, and other surface transportation programs. The federal CAA establishes air quality standards and planning requirements for various criteria air pollutants.

Transportation conformity is required under CAA Section 176(c) to ensure that federally supported highway and transit project activities "conform to" the purpose of the SIP. Conformity currently applies to areas that are designated non-attainment, and those re-designated to attainment after 1990 ("maintenance areas" with plans developed under CAA Section 175[A]) for the specific transportation-related criteria pollutants. Conformity to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. The transportation conformity regulation is found in 40 CFR Part 93.

Pursuant to California Health and Safety Code section 40460, SCAG has the responsibility of preparing and approving the portions of the AQMP relating to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. The District combines its portion of the Plan with those prepared by SCAG.

The transportation strategy and transportation control measures (TCMs), included as part of the Final 2012 AQMP and SIP for the South Coast Air Basin, are based on SCAG's adopted 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and 2011 Federal Transportation Improvement Program (FTIP). This was developed in consultation with federal, state and local transportation and air quality planning agencies and other stakeholders.

The Regional Transportation Strategy and Transportation Control Measures portion of the 2012 AQMP/SIP consists of the following three related sections.

Section I. Linking Regional Transportation Planning to Air Quality Planning

As required by federal and state laws, SCAG is responsible for ensuring that the regional transportation plan, program, and projects are supportive of the goals and objectives of AQMPs/SIPs. SCAG is also required to develop demographic projections and a regional transportation strategy and control measures for the AQMPs/SIPs.

The RTP/SCS, updated every four years, is a long-range regional transportation plan that provides a vision for transportation investments throughout the SCAG Region. The 2012-2035 RTP/SCS also integrates land use and transportation planning to achieve regional greenhouse gas (GHG) reduction targets set by ARB pursuant to SB375.

SCAG also develops the biennial FTIP. The FTIP is a multimodal program of capital improvement projects to be implemented over a six year period. The FTIP implements the programs and projects in the RTP/SCS.

Section II. Regional Transportation Strategy and Transportation Control Measures

The SCAG Region faces daunting mobility, air quality, and transportation funding challenges. Under the guidance of the goals and objectives adopted by SCAG's Regional Council, the 2012-2035 RTP/SCS was developed to provide a blueprint to integrate land use and transportation strategies to help achieve a coordinated and balanced regional transportation system. The 2012-2035 RTP/SCS represents the culmination of more than two years of work involving dozens of public agencies, 191 cities, hundreds of local, county, regional and state officials, the business community, environmental groups, as well as various nonprofit organizations. The 2012-2035 RTP/SCS was formally adopted by the SCAG Regional Council on April 4, 2012.
The 2012-2035 RTP/SCS contains a host of improvements to every component of the regional multimodal transportation system including:

- Active transportation (non-motorized transportation, such as biking and walking)
- Transportation demand management (TDM)
- Transportation system management (TSM)
- Transit
- Passenger and high-speed rail
- Goods movement
- Aviation and airport ground access
- Highways
- Arterials

- Operations and maintenance

Included within these transportation system improvements are TCM projects that reduce vehicle use or change traffic flow or congestion conditions. TCMs include the following three main categories of transportation improvement projects and programs:

- High occupancy vehicle (HOV) measures,
- Transit and systems management measures, and
- Information-based transportation strategies.

New to this cycle of the RTP is the inclusion of the SCS as required by SB 375. The primary goal of the SCS is to provide a vision for future growth in Southern California that will decrease per capita GHG emissions from passenger vehicles. However, the strategies contained in the 2012-2035 RTP/SCS will produce benefits for the region far beyond simply reducing GHG emissions. The SCS integrates the transportation network and related strategies with an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands. The regional vision of the SCS maximizes current voluntary local efforts that support the goals of SB 375. The SCS focuses the majority of new housing and job growth in high-quality transit areas and other opportunity areas on existing main streets, in downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development. In addition, SCAG is a strategic partner in a regional effort to accelerate fleet conversion to near-zero and zero-emission transportation technologies, including planning for the expansion of alternative-fuel infrastructure to accommodate the anticipated increase in alternative fueled vehicles.

Section III. Reasonably Available Control Measure (RACM) Analysis for Transportation Control Measures

As required by the CAA, a RACM analysis must be included as part of the overall control strategy in the AQMP/SIP to ensure that all potential control measures are evaluated for implementation and that justification is provided for those measures that are not implemented. Appendix IV-C contains the RACM TCM component for the Final 2012 AQMP control strategy. In accordance with U.S. EPA procedures, this analysis considers TCMs in the 2012-2035 RTP/SCS, measures identified by the CAA, and relevant measures adopted in other non-attainment areas of the country. Based on this comprehensive review, it is determined that the TCMs being implemented in the Basin are inclusive of all TCM RACM. None of the candidate measures reviewed and determined to be infeasible meets the criteria for RACM implementation.

The emission benefits associated with the RTP/SCS are reflected in the 2012 AQMP projected emissions. For a detailed discussion of the regional transportation strategy, refer to Appendix IV-C: Regional Transportation Strategy and Control Measures.

PROPOSED OZONE CONTROL MEASURES

The 2007 State Implementation Plan for the 8-hour ozone NAAQS contains commitments for emission reductions that rely on advancement of technologies, as authorized under Section 182(e)(5) of the federal Clean Air Act. These measures, which have come to be known as the "black box," account for a substantial portion of the NOx emission reductions needed to attain the federal ozone standards – over 200 tons/day. Attaining these standards will require substantial reductions in emissions of NOx well beyond reductions resulting from current rules, programs, and commercially available technologies. The 8-hour ozone measures included in the Final 2012 AQMP as an implementation update for the 8-hour ozone plan are also being submitted as the control strategy for the 1-hour ozone attainment demonstration.

Mobile sources emit over 80 percent of regional NOx and therefore must be the largest part of the solution. On-road truck categories are projected to comprise the single largest contributor to regional NOx. Other equipment involved in goods movement, such as marine vessels, locomotives and aircraft, are also substantial NOx sources.

Since NOx emissions from most significant sources are already controlled by over 90%, attainment of the ozone standards will require broad deployment of zero and near zero[1] emission technologies. On-land transportation sources such as trucks, locomotives and cargo handling equipment have technological potential to achieve zero- and near-zero emission levels. Current and potential technologies include hybrid-electric, hybrid with all electric range, battery-electric, and hydrogen fuel cell on-road vehicle technologies. New types of hybrids could also serve long-term needs while providing additional fuel diversity. These could include, for example, natural gas-electric hybrid technologies for on-road and other applications, particularly if coupled with improved after-treatment technologies. Equipment powered solely by alternative fuels such as natural gas may also play a long-term role in some applications, if those applications are found to pose technological barriers to

[1] The term "near zero emissions" refers to emissions approaching zero and will be delineated for individual source categories through the process of developing and implementing the Air Quality Management Plan/State Implementation Plan. Based on current analyses, on-land transportation sources will need to achieve zero emissions where possible, and otherwise will need to be substantially below adopted emission standards — including standards with future effective dates. Near zero emissions technologies can help meet this need, particularly if they support a path toward zero emissions (e.g. electric/fossil fuel hybrids with all- electric range).

achieving zero or near-zero emissions. Even in such applications, however, substantial additional emission reductions will be needed through development of new, advanced after-treatment technologies. In addition, alternative fuels will likely play a transitional near-term role. Alternative fuels such as natural gas have historically helped the region make progress toward attaining air quality standards, and -- while not achieving zero or near-zero NOx emission levels -- they are generally cleaner than conventional fuels. Given the region's need to attain air quality standards in a few short years, alternative fueled engines will continue to play a role. Finally, we emphasize that air quality regulatory agencies have traditionally set policies and requirements that are performance based and technology and fuel neutral -- a policy that the District intends to continue. In short, all technologies and fuels should be able to compete on an equal footing to meet environmental needs.

While there has been much progress in developing and deploying transportation technologies with zero- and near-zero emissions (particularly for light-duty vehicles and passenger transit), additional technology development, demonstration and commercialization will be required prior to broad deployment in freight and other applications. This section describes a path to evaluate, develop, demonstrate, fund and deploy such technologies for land-based transportation sources. It also proposes near-term measures to accelerate fleet turnover to the lowest emission units, and require deployment of zero-emission technologies where most feasible.

The District staff believes that a combination of regulatory actions and public funding is the most effective means of achieving these emission reductions. Voluntary incentive programs such as the Carl Moyer Program can help to accelerate turnover to the cleanest commercially available equipment. A majority of the on-road and off-road measures proposed are based on existing funding programs implemented by the District or the California Air Resources Board. However, several of the existing funding programs will sunset in the 2014 – 2015 timeframe. Continued funding beyond 2015 will be needed to reduce the emissions associated with the black box. Developing, demonstrating and deploying new technologies will require public/private partnerships and, in some cases, regulatory actions.

The measures described in this section are a relatively small down payment on the total emission reductions needed to attain the 8-hour and 1-hour NAAQS for ozone. The measures proposed in this section and further discussed in Appendix IV-A and IV-B are feasible steps that must commence in the near-term to establish a path toward a broader transition to the technologies that will be needed to attain federal air quality standards. Between now and 2015, the additional measures needed to attain the ozone NAAQS will be fleshed out in greater detail as required under the federal Clean Air Act as part of the next AQMP revision. Given the magnitude of needed emission reductions, and the time remaining until attainment deadlines, it is

important that progress and momentum to identify, develop, and deploy needed technologies be sustained and accelerated.

The District staff recognizes these are very difficult policy choices the Basin is facing. Transitioning over the next 10 to 20 years to cleaner transportation technologies will involve major costs and effects on the economy. However, adopting sufficient plan measures to attain the ozone air quality standards by the applicable dates is required by federal law and therefore, failing to do so is not an acceptable public policy. Such failure would also risk adverse health consequences highlighted in recent health studies, not to mention the potential adverse economic impacts on the region due to potential federal sanctions. The following sections summarize the ozone measures. More detailed discussions are provided in Appendix IV-A and IV-B.

Clean Air Act Section 182(e)(5)

The District's 1-hour ozone SIP submittal relies in part on the ability to use advanced technology measures as authorized under Clean Air Act § 182(e)(5). EPA has already approved the reliance on § 182(e)(5) in the South Coast 8-hour ozone plan. 77 Fed. Reg. 12674, 12693 (Mar. 1, 2012). The present 1-hour ozone SIP submittal includes a number of ozone measures which reduce reliance on § 182(e)(5). Under the plain language of the Clean Air Act, the District may rely on § 182(e)(5) measures, as long as the reductions to be obtained from them are not needed for the first ten years after November 15, 1990. 42 U.S.C. § 7511a(e)(5)(B). The District's initial 1-hour ozone plan complied with this requirement, and EPA approved the § 182(e)(5) measures in 1995. 62 Fed. Reg. 1150, 1178 (Jan. 8, 1997), citing 60 Fed. Reg. 43379 (Aug. 21, 1995).

Since the present 1-hour SIP submission does not rely on § 182(e)(5) for emission reductions prior to November 15, 2000, it complies with § 182(e)(5). There is no textual or policy basis for concluding that § 182(e)(5) is not available. Because the present SIP submission addresses 1-hour ozone, there is no textual basis for deviation from the plain language of the Clean Air Act: Section 182(e)(5) is available for reductions needed after November 15, 2000. Nor is there any policy basis to do so. The Clean Air Act clearly authorizes EPA to grant up to 10 years to attain the standard. Therefore, under § 182(e)(5), contingency measures would need to be in place which attain the needed reductions by three years before the attainment deadline. This provides adequate assurance that the § 182(e)(5) measure, or the contingency measures, will be implemented in time to attain the 1-hour ozone standard.

The fact that EPA has interpreted § 182(e)(5) somewhat differently in the context of the 8-hour ozone standard is irrelevant here. EPA was required to deviate from the literal language of the Clean Air Act in the case of the 8-hour ozone standard because

it did not literally apply. However, the U.S. Supreme Court held that EPA may not simply ignore Subpart 2 (relative to 1-hour ozone) as to do so produced unreasonable results (e.g., Los Angeles needing to attain the more stringent 8-hour standard *at least as quickly as* it attained the less stringent 1-hour standard.) *Whitman v. American Trucking*. 531 U.S. 457, 486 (2001). As a result, EPA was required to "interpret" Subpart 2. In contrast, when considering the 1-hour ozone standard, the plain language of § 182(e)(5) applies, leaving no room for interpretation. Certainly nothing in § 179(d), dealing with plan submittals on failure to attain, remotely suggests that the plain language of § 182(e)(5) is no longer applicable. That being the case, EPA is not authorized to "interpret away" the provisions of § 182(e)(5). Even if the language were ambiguous, there is no policy reason to interpret it to prohibit reliance on § 182(e)(5).

As noted above, EPA has already approved the District's reliance on § 182(e)(5) for the 8-hour standard. It would make no sense to prohibit reliance on § 182(e)(5) for a standard *that has been revoked*. The District has already established in the 2007 AQMP and the 2012 1-hour ozone submittal that it is impossible to attain the standards without § 182(e)(5) measures, and all reasonable or feasibly available measures have been identified and scheduled for adoption. To say the District must attain a *revoked* standard, which EPA repeatedly described as not necessary to protect public health, (69 Fed. Reg. 23951, 23971, 23976 (April 30, 2004)), without reliance on measures undisputedly available for the existing, *more* health protective 8-hour standard, produces absurd results. Any such conclusion must be rejected. See e.g., *Logan v. United States, 522 U.S. 23, 26 (2007); United States v. X-Citement Video, Inc.*, 513 U.S. 64, 69 (1994).

Finally, EPA must consider the fact that for 8 years, all parties believed an attainment demonstration for the 1-hour standard *was not required*.

EPA stated in revoking the standard: "attainment of the 1-hour NAAQS would no longer be a goal…." 69 Fed. Reg. 23951 23970 (Apr. 30, 2004). EPA explained that it is not appropriate to "mandate states to perform an attainment demonstration for a NAAQS that is not needed to protect public health." 69 Fed. Reg. 23951, 23976. In disapproving the AQMD's 2003 attainment demonstration because it relied on withdrawn CARB measures, EPA explained that states no longer needed to attain the 1-hour standard. Responding to a comment that EPA must assure a viable path to attainment, EPA said: "…EPA's responsibility at the present time is to ensure that states adopt viable paths toward attainment of the 8-hour NAAQS, rather than the revoked 1-hour ozone NAAQS…." 74 Fed. Reg. 10176, 10179 (Mar. 10, 2009).

Only when the AIR case became final was this position rejected. (Jan. 27, 2012.) *Ass'n of Irritated Residents v. EPA*, 686 F.3d 668 (9th Cir. 2012). That being the case, it would be unreasonable to say the District must now attain that standard without relying on future technology advancements, as authorized by § 182(e)(5).

Had it been clear when EPA revoked the standard that the District would still have to attain it, CARB may not have withdrawn the 2003 AQMP measures. The region may have been closer to attainment of the 1-hour standard by now. Absent the ability to rely on § 182(e)(5), District would have no choice but to seek to amend the Clean Air Act to eliminate such obligations relative to revoked standards.

Contingency Measures

CAA section 182(e)(5) authorizes EPA to "approve provisions of an implementation plan for an Extreme Area which anticipate development of new control techniques or improvement of existing control techniques, and an attainment demonstration based on such provisions," if the State meets certain criteria. Such plan provisions may include enforceable commitments to submit, at a later date, contingency measures for failure to attain under CAA section 172(c)(9), in addition to the contingency measures to be implemented if the anticipated technologies approved under section 182(e)(5) do not achieve planned reductions. These contingency measures must be submitted no later than three years before proposed implementation of the plan provisions and approved or disapproved by EPA in accordance with CAA section 110.

CARB and the District have satisfied the criteria in section 182(e)(5) for reliance on the new technology provision as part of the attainment demonstration in the South Coast 8-Hour ozone SIP and in this 1-hour ozone SIP. Based on the State's anticipated development of these new technologies, CARB has submitted an enforceable commitment to submit, no later than 2020, additional contingency measures under CAA section 182(e)(5) that meet the requirements for attainment contingency measures in CAA section 172(c)(9), in addition to contingency measures to be implemented if the anticipated long-term measures approved pursuant to section 182(e)(5) do not achieve planned reductions. CARB Resolution 11–22, July 2011 and see letter dated November 18, 2011 from James Goldstene, CARB, to Jared Blumenfeld, EPA. Similarly, when submitting this 1-hour ozone demonstration to EPA, CARB is expected to submit enforceable commitments no later than 2019 (no later than three years prior to the attainment year of 2022), additional contingency measures under CAA section 182(e)(5) that meet the requirements for attainment contingency measures in CAA section 172(c)(9), in addition to contingency measures to be implemented if the anticipated long-term measures approved pursuant to section 182(e)(5) do not achieve planned reductions need for attainment of the 1-hour ozone standard.

RACT/RACM

The CAA, Section 172(c)(1), sets the overall framework for the Reasonably Available Control Measures (RACM) analysis. The CAA requires the nonattainment air districts to:

> *"provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology (RACT)) and shall provide for attainment of the national primary ambient air quality standards."*

The U.S. EPA recommends that nonattainment air districts first identify the emission reduction programs that have already been implemented at the federal level, and by other states and local air districts. Next, the U.S. EPA recommends the air districts to examine additional RACM/RACTs adopted for other nonattainment areas to attain the ambient air quality standards as expeditiously as practicable. The RACT/RACM analysis for the 1-hour ozone attainment demonstration can be found in Attachment 4 of this Appendix.

Proposed Ozone Stationary Source Measures

The proposed stationary source implementation measures are designed to assist in the attainment of the 8-hour ozone standard. These measures will also assist in attaining the 1-hour standard. The measures target a number of source categories including Coatings and Solvents (CTS), Combustion Sources (CMB), Petroleum Operations and Fugitive VOC Emissions (FUG), Multiple Component Sources (MCS), Incentive Programs (INC) and Educational Programs (EDU). There are 16 stationary source measures with the majority anticipated to be adopted in the next 2 – 3 years and implemented after 2015. These measures include two incentive programs and one educational measure.

There are two measures that were continued from the 2007 AQMP. The remaining 14 control measures are new ideas or revised previous measures (e.g., further reductions from an existing rule).

Table VII-4-2 provides a list of the District's ozone measures for stationary sources along with the anticipated adoption date, implementation date and emission reduction.

TABLE VII-4-2

List of the District's Adoption/Implementation Dates and Estimated Emission Reductions from Ozone Measures for Stationary Sources

NUMBER	TITLE	ADOPTION	IMPLEMENTATION PERIOD	REDUCTION (TPD)
CTS-01	Further VOC Reductions from Architectural Coatings (R1113) [VOC]	2015 - 2016	2018 – 2020	2-4
CTS-02	Further Emission Reduction from Miscellaneous Coatings, Adhesives, Solvents and Lubricants [VOC]	2013 - 2016		1-2
CTS-03	Further VOC Reductions from Mold Release Products [VOC]	2014	2016	0.8 – 2
~~CTS-04~~	~~Further VOC Reductions from Consumer Products [VOC]~~	~~2013 - 2015~~	~~2018~~	~~N/A~~[a]
CMB-01	Further NOx Reductions from RECLAIM [NOx]	2015	2017 – 2020	3-5[b]
CMB-02	NOx Reductions from Biogas Flares [NOx]	2015	Beginning 2017	Pending[c]
CMB-03	Reductions from Commercial Space Heating [NOx]	Phase I – 2014 (Tech Assessment) Phase II - 2016	Beginning 2018	0.18 by 2023 0.6 (total)
FUG-01	VOC Reductions from Vacuum Trucks [VOC]	2014	2016	1d
FUG-02	Emission Reduction from LPG Transfer and Dispensing [VOC] – Phase II	2015	2017	1-2
FUG-03	Further Reductions from Fugitive VOC Emissions [VOC]	2015 -2016	2017-2018	1-2
MCS-01	Application of All Feasible Measures Assessment [All Pollutants]	Ongoing	Ongoing	TBD[e]
MCS-02	Further Emission Reductions from Greenwaste Processing (Chipping and Grinding Operations not associated with composting) [VOC]	2015	2016	1[d]
MCS-03 (formerly MCS-06)	Improved Start-up, Shutdown and Turnaround Procedures [All Pollutants]	Phase I – 2012 (Tech Assessment) Phase II - TBD	Phase I – 2013 (Tech Assessment) Phase II – TBD	TBD[e]

TABLE VII-4-2 (concluded)

List of the District's Adoption/Implementation Dates and Estimated Emission Reductions from Ozone Measures for Stationary Sources

NUMBER	TITLE	ADOPTION	IMPLEMENTATION PERIOD	REDUCTION (TPD)
INC-01	Economic Incentive Programs to Adopt Zero and Near-Zero Technologies [NOx]	2014	Within 12 months after funding availability	TBD[e]
INC-02	Expedited Permitting and CEQA Preparation Facilitating the Manufacturing of Zero and Near-Zero Technologies [All Pollutants]	2014-2015	Beginning 2015	N/A[a]
EDU-01 (*formerly MCS-02, MCS-03*)	Further Criteria Pollutant Reductions from Education, Outreach and Incentives [All Pollutants]	Ongoing	Ongoing	N/A[a]

a. N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach, incentive programs) or if the measure is designed to ensure reductions that have been assumed to occur will in fact occur.
b. CMB-01 will target a cumulative 3-5 TPD of NOx emission reductions, including any CMB-01 PM2.5 contingency measure emission reductions.
c. Pending because emission reductions will be provided prior to the Final.
d. Reductions submitted in SIP once emission inventories are included in the SIP.
e. TBD are reductions to be determined once the inventory and control approach are identified.

The following text provides a brief description of the proposed ozone stationary source control measures and is taken directly from Chapter 4 of the Final 2012 AQMP.

Coatings and Solvents

The category of coatings and solvents is primarily targeted at reducing VOC emissions from these VOC-containing products. This category includes four proposed control measures that are based on additional emission reductions from architectural coatings; miscellaneous coatings, solvents, adhesives and lubricants; mold release products; and consumer products with low vapor pressure used by commercial and institutional facilities regulated by CARB.

CTS-01 – FURTHER VOC REDUCTIONS FROM ARCHITECTURAL COATINGS: The District adopted Rule 1113 – Architectural Coatings, in 1977 and it has since undergone numerous amendments. This proposed control measure seeks to reduce the VOC emissions from large volume coating categories such as flat, non-flat and primer, sealer, undercoaters (PSU) and from phasing out the currently exempt use of high-VOC architectural coatings sold in one liter containers or smaller. Additional emission reductions could be achieved from the application of

architectural coatings by use of application techniques with greater transfer efficiency. Such transfer efficiency improvements could be achieved through the use of a laser paint targeting system, which has been shown to improve transfer efficiency on average by 30% over equipment not using a targeting system, depending on the size, shape and configuration of the substrate. The proposal is anticipated to be accomplished with a multi-phase adoption and implementation schedule.

CTS-02 – FURTHER VOC REDUCTIONS FROM MISCELLANEOUS COATINGS, ADHESIVES, SOLVENTS, AND LUBRICANTS: This control measure seeks VOC emission reductions by focusing on select coating, adhesive, solvent and lubricant categories by further limiting the allowable VOC content in formulations. Examples of the categories to be considered include but are not limited to, coatings used in certain aerospace applications; adhesives used in a variety of sealing applications; solvents for graffiti abatement activities; and lubricants used as metalworking fluids to reduce heat and friction to prolong life of the tool, improve product quality and carry away debris. Reductions would be achieved by lowering the VOC content of the coatings, adhesives and lubricants. For solvents, reductions could be achieved with the use of alternative low-VOC products or non-VOC product/equipment at industrial facilities. The proposal is anticipated to be accomplished with a multi-phase adoption and implementation schedule.

CTS-03 – FURTHER VOC REDUCTION FROM MOLD RELEASE PRODUCTS: Metal, fiberglass, composite and plastic products are often manufactured using molds which form the product into a particular configuration. Mold release agents are used to ensure that the parts, as they are made, can be released easily and quickly from the molds. These agents often contain VOC solvent carriers and may also contain toxic components like toluene and xylene. Mold release products are also used for concrete stamping operations to keep the mold from adhering to the fresh concrete. Residential and commercial concrete stamping is a rapidly growing industry, and overall VOC emissions are estimated to be significant. This control measure seeks to reduce emissions from mold release products on metal, fiberglass, composite and plastic products, as well as concrete stamping operations, by requiring the use of low-VOC mold release products.

~~**CTS-04 – FURTHER VOC REDUCTION FROM CONSUMER PRODUCTS:** This measure seeks to revise the exemption for low vapor pressure solvents in CARB's consumer products regulation, which exempts low vapor pressure volatile organic compounds (LVP-VOC) from counting towards the compliance obligation for consumer product VOC limits. Recent testing conducted by the District on institutional cleaners found that traditionally formulated consumer products may contain significant amounts of LVP-VOC solvents. In some cases, such as certain multipurpose solvents, the products were 100 percent LVP-VOC solvents. Further~~

~~testing indicated that many of the LVP-VOC solvents evaporate nearly as quickly as the traditional solvents they were meant to replace and have Maximum Incremental Reactivity (MIR) values well above the threshold considered to be non-reactive, currently based on ethane. Therefore, an evaluation of the continued need for use of LVP-VOC solvents in certain categories is warranted.~~

Combustion Sources

This category includes three proposed measures for stationary combustion equipment. There is one control measure that further reduces NOx emissions from RECLAIM facilities. A second proposed measure seeks a reduction from biogas flares, and a third proposed control measure seeks to reduce NOx emissions from commercial space heaters.

CMB-01 – FURTHER NOX REDUCTIONS FROM RECLAIM: This proposed control measure will seek cumulative reductions of 3-5 tpd of NOx allocations by the year 2020, via implementation of periodic BARCT evaluation as required under the state law. If triggered, the PM2.5 contingency measure provision of CMB-01 would achieve 2-3 tpd of NOx allocation reductions in 2015, with the remaining 1-2 tpd implemented in the 2017-2020 timeframe. If the contingency measure is not triggered, then the entire 3-5 tpd of NOx reductions will be implemented in 2017-2020 timeframe. The control measure has the ability to produce co-benefits in the reduction of PM2.5 and ozone.

CMB-02 – NOX REDUCTIONS FROM BIOGAS FLARES: There are no source-specific rules regulating NOx emissions from biogas flares. Flare NOx emissions are regulated through new source review and BACT. This control measure proposes that, consistent with the all feasible measures measure, older biogas flares be gradually replaced with flares that meet current BACT. Strategies that minimize flaring and associated emissions can also be considered as alternative control options.

CMB-03 – REDUCTIONS FROM COMMERCIAL SPACE HEATING: This control measure applies to natural gas-fired commercial space heaters used for comfort heating. District Rule 1111 - NOx Emissions from Natural Gas-Fired Fan Type Central Furnaces, regulates space heaters with input rates less than 175,000 Btu/hr. This measure proposes to establish a NOx emission limit for new space heaters for commercial applications, which can be achieved through the use of low-NOx burners or other technologies.

Petroleum Operations and Fugitive VOC Emissions

This category pertains primarily to operations and materials associated with the petroleum, chemical, and other industries. Within this category, there is one proposed control measure targeting fugitive VOC emissions with improved leak

detection and repair. Other proposed measures include reductions from vacuum truck venting, and propane transfer and dispensing.

FUG-01 – VOC REDUCTIONS FROM VACUUM TRUCKS: This control measure seeks to reduce emissions from the venting of vacuum trucks. Emissions from such operations can be further reduced through the utilization of control technologies, including but not limited to, carbon adsorption systems, internal combustion engines, thermal oxidizers, refrigerated condensers and liquid scrubbers. Additionally, implementation of a leak detection and repair (LDAR) program may further reduce fugitive emissions.

FUG-02 - EMISSION REDUCTION FROM LPG TRANSFER AND DISPENSING: The District recently adopted Rule 1177 - Liquefied Petroleum Gas (LPG) Transfer and Dispensing (June 2012). The rule requires use of low-emission fixed liquid level gauges or equivalent alternatives during filling of LPG-containing tanks and cylinders, use of low-emission connectors, routine leak checks and repairs of LPG transfer and dispensing equipment. The purpose of this control measure is to reduce fugitive VOC emissions associated with the transfer and dispensing of LPG by expanding rule applicability to include LPG transfer and dispensing at currently exempted facilities such as refineries, marine terminals, natural gas processing plants and pipeline transfer stations, as well as facilities that conduct fill-by-weight techniques.

FUG-03 – FURTHER REDUCTIONS FROM FUGITIVE VOC EMISSIONS: This control measure seeks to broaden the applicability of improved leak detection and repair (LDAR) programs to remove additional fugitive VOC emissions. Areas for further study may include, but are not limited to, Rule 1142 - Marine Vessel Tank Operations, and wastewater separators. This control measure would explore the opportunity of incorporating a recently developed advanced optical gas imaging technology to detect leaks (Smart LDAR) to more easily identify and repair leaks in a manner that is less time consuming and labor intensive. Additionally, vapor recovery systems are currently required to be 95% control efficient. In an effort to further reduce emissions from these operations, this control measure would explore opportunities and the feasibility of further improving the collection/control efficiency of existing control systems resulting in additional VOC reductions.

Multiple Component Sources

There are a total of three stationary source measures proposed in this category. The first measure seeks reductions of all feasible measures after such an assessment is made. Another measure seeks further emission reductions from greenwaste processing, which is chipping and grinding not associated with composting. The third measure seeks to minimize emissions during equipment startup and shutdown

and to reduce emissions by applying the state requirement of all feasible control measures.

MCS-01 – APPLICATION OF ALL FEASIBLE MEASURES ASSESSMENT: This control measure is to address the state law requirement for all feasible measures for ozone. Existing rules and regulations for pollutants such as VOC, NOx, SOx and PM reflect current best available retrofit control technology (BARCT). However, BARCT continually evolves as new technology becomes available that is feasible and cost-effective. Through this proposed control measure, the District would commit to the adoption and implementation of the new retrofit control technology standards. Finally, staff will review actions taken by other air districts for applicability in our region.

MCS-02 - FURTHER EMISSION REDUCTIONS FROM GREENWASTE PROCESSING (CHIPPING AND GRINDING NOT ASSOCIATED WITH COMPOSTING): Chipped or ground greenwaste and/or wood waste has a potential to emit VOCs when being stockpiled or land-applied for various purposes. Chipping and grinding is a process to mechanically reduce the size of greenwaste and wood waste. The District rules currently establish best management practices (BMPs) for greenwaste composting and related operations under Rule 1133.1 – Chipping and Grinding Activities, and Rule 1133.3 – Greenwaste Composting Operations. During rule development, stakeholders raised the need to develop a holistic approach to identifying and accounting for emissions from all greenwaste streams and reducing potential emissions from greenwaste material handling operations at chipping and grinding facilities and other related facilities, and not just the ones associated with composting operations. This control measure would seek to establish additional Best Management Practices (BMPs) for handling processed or unprocessed greenwaste material by greenwaste processors, haulers, and operators who inappropriately stockpile material or directly apply the material to land. The implementation of the control measure would be in two phases. First, the existing database would be reviewed to refine the greenwaste material inventory, and second, staff would potentially develop a rule to incorporate technically feasible and cost-effective BMPs or controls.

MCS-03 - IMPROVED START-UP, SHUTDOWN AND TURNAROUND PROCEDURES: This proposed control measure seeks to reduce emissions during equipment startup, shutdown, and turnaround. Opportunities for further reducing emissions from start-up, shut-down and turnaround activities potentially may exist at refineries as well as other industries. Examples of possible areas for improvement may include best management practices, better engineering and equipment design, diverting or eliminating process streams that are vented to flares, and installation of redundant equipment to increase operational reliability. This measure will be

implemented through a two-phase effort to first collect/refine emissions and related data and then, based on the data collected, assess viable controls, if appropriate.

Incentive Programs

There are two proposed incentive programs within this category. The first program seeks to provide incentives for new and existing facilities to install and operate clean, more-efficient combustion equipment beyond what is currently required. The second program provides expedited permitting processing and development of applicable CEQA documentation if a company manufactures zero or near-zero emission technology.

INC-01: ECONOMIC INCENTIVE PROGRAMS TO ADOPT ZERO AND NEAR-ZERO TECHNOLOGIES: The primary objective of this measure is to develop programs that promote and encourage adoption and installation of cleaner, more-efficient combustion equipment with a focus on zero and near-zero technologies, such as boilers, water heaters and commercial space heating, through economic incentive programs, subject to the availability of public funding. Incentives may include grants for new purchases of equipment as well as loan programs in areas where long-term cost savings from increased efficiency are achieved.

INC-02: EXPEDITED PERMITTING AND CEQA PREPARATION FACILITATING THE MANUFACTURING OF ZERO AND NEAR-ZERO TECHNOLOGIES: This proposed measure is aimed at providing incentives for companies to manufacture zero and near-zero emission technologies locally, thus populating the market, potentially lowering the purchase cost, and increasing demand. With availability and usage of such technologies, air quality benefits will be achieved. This proposed measure focuses on two elements: 1) process the required air permit(s) in an expedited procedure; and 2) prioritize the preparation, circulation and certification of the applicable CEQA document. A stakeholder process will be initiated to design the program and collaborate with other existing District or local programs.

Educational Programs

There is one proposed educational program within this category.

EDU-01: FURTHER CRITERIA POLLUTANT REDUCTIONS FROM EDUCATION, OUTREACH AND INCENTIVES: This proposed control measure seeks to provide educational outreach and incentives for consumers to contribute to clean air efforts. Examples include the usage of energy efficient products, new lighting technology, "super compliant" coatings, tree planting, and the use of lighter colored roofing and paving materials which reduce energy usage by lowering the

ambient temperature. In addition, this proposed measure intends to increase the effectiveness of energy conservation programs through public education and awareness as to the environmental effects and benefits from conservation. Finally, educational and incentive tools to be used include comparison of energy usage and efficiency, social media, public/private partnerships.

Proposed Ozone Mobile Source Measures

Depending on the mobile source sector and the proposed control approach, District staff analyzed the need to accelerate the penetration of cleaner engine technologies. The proposed ozone measures are based upon a variety of control technologies that are commercially available and/or technologically feasible to implement in the next several years. The focus of these measures includes accelerated retrofits or replacement of existing vehicles or equipment, acceleration of vehicle turnover through voluntary vehicle retirement programs, and greater use of cleaner fuels in the near-term. In the longer-term, in order to attain the federal ozone ambient air quality standard, there is a need to increase the penetration and deployment of near-zero and zero-emission vehicles such as plug-in hybrids, battery-electric, and fuel cells, even further use of cleaner fuels (either alternative fuels or new formulations of gasoline and diesel fuels), and additional emission reductions from locomotive and aircraft engines.

Ten measures are proposed as actions to reduce mobile source emissions and seven additional measures are proposed to accelerate the development and deployment of near-zero and zero-emission technologies for goods movement related sources and off-road equipment. The measures call for greater emission reductions through accelerated turnover of older vehicles to the cleanest vehicles currently available and increased penetration of commercially-available near-zero and zero-emission technologies through existing incentives programs.

Drawing upon the recent draft "Vision for Clean Air: A Framework for Air Quality and Climate Planning" (or Vision), a document produced jointly between the District staff, the California Air Resources Board, and the San Joaquin Valley Air Pollution Control District, seven measures are proposed to further the development of zero- and near-zero emission technologies for on-road and off-road mobile sources. The draft Vision document discusses the need to accelerate deployment of the cleanest combustion technologies and zero- and near-zero emission technologies earlier to meet federal ambient air quality standards and long-term climate goals. The document provides actions for several key transportation sectors and off-road equipment.

Partial-zero and zero-emission technologies are rapidly being introduced into the on-road light- and medium-duty vehicle categories in large part due to the CARB Low Emission Vehicle (LEV) and the Zero-Emission Vehicle (ZEV) Regulations. In

addition, next-generation electric hybrid trucks are being commercialized for light-heavy and medium-heavy heavy-duty on-road vehicles. However, additional research and demonstration are needed to commercialize zero- and near-zero emission technologies for the heavier heavy-duty vehicles (with gross vehicle weight ratings greater than 26,000 lbs.).

For many of the off-road mobile sources such as locomotives, cargo handling equipment, commercial harbor craft, and off-road equipment, some form of "all zero-emission range" is feasible to demonstrate and implement beginning in the latter part of this decade. For other sectors such as marine vessels and aircraft, the development of cleaner combustion technologies beyond existing emission standards will be needed. The Vision document provides a broad discussion of the potential zero- and near-zero technologies or cleaner combustion technologies that could be demonstrated in the near-term. The potential technologies are discussed further in each of the "ADV" measures. A summary of the 17 measures is provided in Table VII-4-4.

TABLE VII-4-4

List of Adoption/Implementation Dates and Estimated Emission Reductions from Ozone Measures for Mobile Sources

ON-ROAD MOBILE SOURCES					
Number	**Title**	**Adoption**	**Implementation Period**	**Implementing Agency**	**Reduction (tpd) by 2023**
ONRD-01	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, PM]	N/A	Ongoing	CARB, SCAQMD	TBD [a]
ONRD-02	Accelerated Retirement of Older Light- and Medium-Duty Vehicles [VOC, NOx, PM]	N/A	Ongoing	CARB, Bureau of Automotive Repair, SCAQMD	TBD [a]
ONRD-03	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	N/A	Ongoing	CARB, SCAQMD	TBD a
ONRD-04	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	2014	2015-2023	CARB, SCAQMD	TBD [a,b]
ONRD-05	Further Emission Reductions from Heavy-Duty Vehicles Serving Near-Dock Railyards [NOx, PM]	2014	2015-2020	CARB	0.75 [NOx] 0.025 [PM2.5]

TABLE VII-4-4 (continued)
List of Adoption/Implementation Dates and Estimated Emission Reductions
from Ozone Measures for Mobile Sources

OFF-ROAD MOBILE SOURCES					
OFFRD-01	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	N/A	Ongoing	SCAQMD	7.5
OFFRD-02	Further Emission Reductions from Freight Locomotives [NOx, PM]	Ongoing	2015 – 2023	CARB, U.S. EPA, San Pedro Bay Ports	12.7 [NOx][c] 0.32 [PM2.5] [c]
OFFRD-03	Further Emission Reductions from Passenger Locomotives [NOx, PM]	Ongoing	Beginning 2014-2023	SoCal Regional Rail Authority	3.0 [NOx] [d] 0.06 [PM2.5] [d]
OFFRD-04	Further Emission Reductions from Ocean-Going Marine Vessels While at Berth [NOx, SOx, PM]	2014	Ongoing	San Pedro Bay Ports, CARB, SCAQMD	TBD [a]
OFFRD-05	Emission Reductions from Ocean-Going Marine Vessels [NOx]	N/A	Ongoing	San Pedro Bay Ports, CARB, U.S. EPA	TBD [a]

TABLE VII-4-4 (concluded)

List of Adoption/Implementation Dates and Estimated Emission Reductions from Ozone Measures for Mobile Sources

ADVANCED CONTROL TECHNOLOGIES					
Number	**Title**	**Adoption**	**Implementation Period**	**Implementing Agency**	**Reduction (tpd) by 2023**
ADV-01	Actions for the Deployment of Zero- and Near-Zero Emission On-Road Heavy-Duty Vehicles [NOx]	N/A	2012 and on	SCAQMD, San Pedro Bay Ports, CARB, U.S. EPA	TBD [e]
ADV-02	Actions for the Deployment of Zero- and Near-Zero Emission Locomotives [NOx]	N/A	2012 and on	SCAQMD, San Pedro Bay Ports, CARB, U.S. EPA	TBD [e]
ADV-03	Actions for the Deployment of Zero- and Near-Zero Emission Cargo Handling Equipment [NOx]	N/A	2012 and on	SCAQMD, San Pedro Bay Ports, CARB, U.S. EPA	TBD [e]
ADV-04	Actions for the Deployment of Cleaner Commercial Harborcraft [NOx]	N/A	2012 and on	SCAQMD, San Pedro Bay Ports, CARB, U.S. EPA	TBD [e]
ADV-05	Actions for the Deployment of Cleaner Ocean-Going Marine Vessels [NOx]	N/A	2012 and on	SCAQMD, San Pedro Bay Ports, CARB, U.S. EPA	TBD [e]
ADV-06	Actions for the Deployment of Cleaner Off-Road Equipment [NOx]	N/A	2012 and on	SCAQMD, CARB, U.S. EPA	TBD [e]
ADV-07	Actions for the Deployment of Cleaner Aircraft Engines [NOx]	N/A	2012 and on	SCAQMD, CARB, FAA, U.S. EPA	TBD [e]

a. Emission reductions will be determined after projects are identified and implemented.
b. Reductions achieved locally in Mira Loma region.
c. Emission reductions provided are updated from the 2007 SIP values reflecting a revised future year base emission levels. The reductions are not included in the 2012 AQMP SIP submittal
d. Submitted into the SIP once technically feasible and cost effective options are confirmed.
e. Emission reduction will be quantified after projects are demonstrated.

On-Road Mobile Source Measures

Five on-road mobile source control measures are proposed. The first two measures focus on on-road light- and medium-duty vehicles operating in the South Coast Air

Basin. By 2023, it is estimated that about 12 million vehicles will be operating in the Basin. The first measure would implement programs to accelerate the penetration and deployment of partial zero-emission and zero-emission vehicles in the light- and medium-duty vehicles categories. The second control measure would seek to accelerate retirement of older gasoline and diesel powered vehicles up to 8,500 gross vehicle weight (GVW). These vehicles include passenger cars, sports utility vehicles, vans, and light duty pick-up trucks.

The remaining three measures focus on heavy-duty vehicles. The first of these measures seeks additional emission reductions from the early deployment of partial zero-emission and zero-emission light- and medium-heavy-duty vehicles with gross vehicle weights between 8,501 pounds to 26,000 pounds. The second control measure for heavy-duty vehicles seeks additional emissions reductions from older, pre-2010 heavy-duty vehicles beyond the emission reductions targeted in CARB's Truck and Bus Regulation. Additional emission reductions could be achieved if an additional percentage of the oldest, pre-2010 heavy duty vehicles not subject to the Truck and Bus Regulation are targeted. The fifth on-road measure seeks emission reductions at near-dock railyards through the deployment of zero-emission heavy-duty vehicles. District staff is recommending a minimum funding level of $85 million per year for incentives to implement on-road mobile source measures.

Off-Road Mobile Source Measures

Five control measures that seek further emission reductions from off-road mobile sources and industrial equipment are proposed. Transportation sources such as aircraft, locomotives, and marine vessels are associated with anticipated economic growth not only in the Basin, but also nationwide. These sources are principally regulated by federal and state agencies. In addition, certain local actions can result in emission reductions beyond the emissions standard setting authority of the state and U.S. EPA. The first measure calls for the continuation of the Surplus Off-Road Opt-In for NOx (SOON) provision of the statewide In-Use Off-Road Diesel Fleet Regulation beyond 2014. The SOON provision implemented to-date has realized additional NOx reductions beyond the statewide regulation. The second and third measures call for additional emission reductions from freight and passenger locomotives. The fourth measure seeks additional emission reductions from ocean-going vessels while at berth. The fifth measure recognizes the efforts that the Ports of Los Angeles and Long Beach are implementing to incentivize Tier 2 and Tier 3 ocean-going vessels to call at the ports. District staff is recommending a minimum funding level of $30 million per year for incentives to implement off-road mobile source measures.

Actions to Deploy Advanced Control Technologies

Seven additional measures are proposed to deploy the cleanest control technologies as early as possible and to foster the development and deployment of near-zero and zero-emission technologies. Many of these actions have already begun. However, additional research and development will be needed that will lead to commercial deployment of control technologies that achieve emission levels below current adopted emission standards. Other near-zero and zero-emission technologies that are commercially available will require infrastructure development to facilitate their deployment.

The term "near-zero" technology is not defined in these actions. The term's specific meaning could depend on the source category and feasible technologies. The actions needed to deploy zero-emission technologies, "near-zero" emission technologies, and the next generation of cleaner combustion engines will be discussed in the development of the proposed measures and future AQMPs. To initiate the development of cleaner engines (either through in-cylinder or after-treatment controls or in combination with hybrid systems that lead to further criteria pollutant emission reductions), District staff is proposing that optional NOx standards be adopted. Having such optional standards will facilitate the early development of cleaner technologies and assist to deploy these technologies as soon as possible. They would be set by the level of emission reductions commercially achievable in the near-term. Several of the technologies to achieve emission levels lower than current standards, or zero-emission levels, are currently available and are potentially transferrable to various vehicle vocations and in-use applications. However, further research and demonstration are needed for many of these technologies to evaluate their performance prior to commercialization. Each measure contains a timeline for actions to bring about the zero-emission or cleaner technologies.

The District staff, U.S. Department of Energy, U.S. Environmental Protection Agency, Federal Aviation Administration, California Air Resources Board, California Energy Commission, engine manufacturers, advanced engine control developers, and electric hybrid systems developers have been discussing potential technologies to further reduce engine exhaust emissions or eliminate exhaust emissions entirely. Public forums such as technology symposiums will be used to solicit public input on technology development as part of the proposed actions.

The following text provides a brief description of the District staff's proposed mobile source measures:

ONRD-01 – ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO EMISSION VEHICLES: This measure proposes to continue incentives for the purchase of zero-emission vehicles and hybrid vehicles with a portion of their operation in an "all electric range" mode. The state Clean

Vehicle Rebate Pilot (CVRP) program is proposed to continue from 2015 to 2023 with a proposed funding for up to $5,000 per vehicle. The proposed measure seeks to provide funding assistance for up to 1,000 zero-emission or partial-zero emission vehicles per year.

ONRD-02 – ACCELERATED RETIREMENT OF OLDER LIGHT- AND MEDIUM-DUTY VEHICLES: This proposed measure calls for promoting the permanent retirement of older eligible vehicles through financial incentives currently offered through local funding incentive programs and the AB 118 Enhanced Fleet Modernization Program (EFMP). The proposed measure seeks to retire up to 2,000 older light- and medium-duty vehicles (up to 8,500 lbs gross vehicle weight) per year. Funding incentives of up to $2,500 per vehicle are proposed for the scrapping of the vehicle, which may include a replacement voucher for a newer or new vehicle.

ONRD-03 – ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO-EMISSION LIGHT-HEAVY- AND MEDIUM-HEAVY-DUTY VEHICLES: The objective of the proposed action is to accelerate the introduction of advanced hybrid and zero-emission technologies for Class 4 through 6 heavy-duty vehicles. The state is currently implementing a Hybrid Vehicle Incentives Project (HVIP) program to promote zero-emission and hybrid heavy-duty vehicles. The proposed measure seeks to continue the program from 2015 to 2023 to deploy up to 1,000 zero- and partial-zero emission vehicles per year with up to $25,000 funding assistance per vehicle. Zero-emission vehicles and hybrid vehicles with a portion of their operation in an "all electric range" mode would be given the highest priority.

ONRD-04 – ACCELERATED RETIREMENT OF OLDER ON-ROAD HEAVY-DUTY VEHICLES: This proposed measure seeks to replace up to 1,000 heavy-duty vehicles per year with newer or new vehicles that at a minimum, meet the 2010 on-road heavy-duty NOx exhaust emissions standard of 0.2 g/bhp-hr. Given that exceedances of the 24-hour PM2.5 air quality standard occur in the Mira Loma region, priority will be placed on replacing older diesel trucks that operate primarily at the warehouse and distribution centers located in the Mira Loma area. Funding assistance of up to $35,000 per vehicle is proposed and the level of funding will depend upon the NOx emissions certification level of the replacement vehicle. In addition, a provision similar to the Surplus Off-Road Option for NOx (SOON) provision of the statewide In-Use Off-Road Fleet Vehicle Regulation will be sought to ensure that additional NOx emission reduction benefits are achieved.

ONRD-05 – FURTHER EMISSION REDUCTIONS FROM HEAVY-DUTY VEHICLES SERVING NEAR-DOCK RAILYARDS: This proposed control measure calls for a requirement that any cargo container moved between the Ports of Los Angeles and Long Beach to the nearby railyards (the Intermodal Container Transfer Facility and the proposed Southern California International Gateway) be

with zero-emission technologies. The measure would be fully implemented by 2020 through the deployment of zero-emission trucks or any alternative zero-emission container movement system such as a fixed guideway system. The measure calls for CARB to either adopt a new regulation or amend an existing regulation to require such deployment by 2020. To the extent the measure can feasibly be extended beyond near-dock railyards, this would be considered for adoption by CARB.

OFFRD-01 – EXTENSION OF THE SOON PROVISION FOR CONSTRUCTION/INDUSTRIAL EQUIPMENT: This measure seeks to continue the Surplus Off-Road Option for NOx (SOON) provision of the statewide In-Use Off-Road Fleet Vehicle Regulation beyond 2014 through the 2023 timeframe. In order to implement the SOON program in this timeframe, funding of up to $30 million per year would be sought to help fund the repower or replacement of older Tier 0 and Tier 1 equipment, with reductions that are considered surplus to the statewide regulation with Tier 4 or cleaner engines.

OFFRD-02 – FURTHER EMISSION REDUCTIONS FROM FREIGHT LOCOMOTIVES: The proposed control measure is to meet the commitment in the 2007 SIP for the accelerated use of Tier 4 locomotives in the South Coast Air Basin. The measure calls for CARB to seek further emission reductions from freight locomotives through enforceable mechanisms within its authority to achieve 95 percent or greater introduction of Tier 4 locomotives by 2023.

OFFRD-03 – FURTHER EMISSION REDUCTIONS FROM PASSENGER LOCOMOTIVES: This measure recognizes the recent actions by the Southern California Regional Rail Authority (SCRRA or Metrolink) to consider replacement of their existing Tier 0 passenger locomotives with Tier 4 locomotives. The SCRRA adopted a plan that contains a schedule to replace their older existing passenger locomotives with Tier 4 locomotives by 2017. More recently, SCRRA released a Request for Quotes on the cost of new or newly manufactured passenger locomotives with locomotive engines that meet Tier 4 emission levels.

OFFRD-04 – FURTHER EMISSION REDUCTIONS FROM OCEAN-GOING MARINE VESSELS WHILE AT BERTH: This measure seeks additional emission reductions from ocean-going marine vessels while at berth. The actions would affect ocean-going vessels that are not subject to the statewide Shorepower Regulation or vessel calls that are considered surplus to the statewide regulation. The measure seeks at a minimum to have an additional 25 percent of vessel calls beyond the statewide regulation to deploy shorepower technologies or alternative forms of emissions reduction as early as possible. Such actions could be implemented through additional incentives programs or through the San Pedro Bay Ports as part of the implementation of the Ports Clean Air Action Plan.

OFFRD-05 – EMISSION REDUCTIONS FROM OCEAN-GOING MARINE VESSELS: This measure recognizes the recent actions at the Ports of Los Angeles and Long Beach to initiate an incentives program for cleaner ocean-going vessels to call at the ports. The program has been initiated as part of the San Pedro Bay Ports Clean Air Action Plan. The program will provide financial incentives for cleaner Tier 2 and Tier 3 ocean-going vessels to call at the ports. This measure also recognizes the need to monitor progress under such programs and augment them as necessary to ensure sufficient results. The program will be monitored on annual basis and, if necessary, any adjustments to the program will be made.

ADV-01 –ACTIONS FOR THE DEPLOYMENT OF ZERO- AND NEAR-ZERO EMISSION ON-ROAD HEAVY-DUTY VEHICLES: This measure would continue the efforts underway to develop zero-emission and near-zero emission technologies for on-road heavy-duty vehicle applications. Such technologies include, but not limited to, fuel cell, battery-electric, hybrid-electric with all electric range, and overhead catenary systems. Hybrid-electric systems incorporate an engine powered by conventional fuels or alternative fuels such as natural gas. The actions provided in the proposed measure are based on the SCAG 2012 Regional Transportation Plan.

ADV-02 –ACTIONS FOR THE DEPLOYMENT OF ZERO- AND NEAR-ZERO EMISSION LOCOMOTIVES: This measure calls for the development and deployment of zero-emission and near-zero emission technologies for locomotives. Such technologies include overhead catenary systems, hybrid locomotives that have some portion of their operation in an "all electric range" mode, and alternative forms of external power such as a battery tender car. The actions provided in the proposed measure are based on the SCAG 2012 Regional Transportation Plan. The zero-emission technologies could apply to freight and passenger locomotives.

ADV-03 –ACTIONS FOR THE DEPLOYMENT OF ZERO- AND NEAR-ZERO EMISSION CARGO HANDLING EQUIPMENT: This measure recognizes the actions underway to develop and deploy zero- and near-zero emission technologies for various cargo handling equipment. The San Pedro Bay Ports are currently demonstrating battery-electric yard tractors. In addition, battery-electric, fuel cell, and hybridized systems could be deployed on smaller cargo handling equipment. In addition, the use of alternative fuels for conventional combustion engines could potentially result in greater emissions benefits.

ADV-04 –ACTIONS FOR THE DEPLOYMENT OF CLEANER EMISSION COMMERCIAL HARBORCRAFT: Several commercial harbor craft operators have begun deployment of hybrid systems in their harbor craft to further reduce criteria pollutant emissions and improve fuel efficiency. Other cleaner technologies include the use of alternative fuels, retrofit of existing older marine engines with selective catalytic converters, and diesel particulate filters. This measure recognizes

several efforts between the District and the Ports of Los Angeles and Long Beach to further demonstrate control technologies that could be deployed on commercial harbor craft that could go beyond the statewide Harbor Craft Regulation.

ADV-05 –ACTIONS FOR THE DEPLOYMENT OF CLEANER OCEAN-GOING MARINE VESSELS: The Ports of Los Angeles and Long Beach, CARB, and the District have sponsored research and demonstration of various control technologies to further reduce emissions from ocean-going vessels. In addition, the San Pedro Bay Ports Clean Air Action Plan contains a measure to further demonstrate such technologies on ocean-going vessels. This measure recognizes many of these efforts and the need to further demonstrate retrofit technologies on existing ocean-going vessels.

ADV-06 –ACTIONS FOR THE DEPLOYMENT OF CLEANER OFF-ROAD EQUIPMENT: The District, Mobile Source Air Pollution Reduction Review Committee (MSRC), and CARB have been conducting an off-road "showcase" program for retrofit technologies to further reduce emissions from older off-road equipment. In addition, several major off-road engine manufacturers are investigating the potential use of hybrid systems to further reduce criteria pollutant and greenhouse gas emissions. Potential advanced technologies include hybrid systems that utilize batteries, fuel cells, or plug-in capabilities, which could result in lower emissions compared to Tier 4 emission levels when combined with future Tier 4 compliant engines. The measure is implemented by the District, CARB and U.S. EPA.

ADV-07 –ACTIONS FOR THE DEPLOYMENT OF CLEANER AIRCRAFT ENGINES: This measure recognizes the efforts of the Federal Aviation Administration's Continuous Lower Energy, Emissions and Noise (CLEEN) Program. The goal of the CLEEN Program is the development of new aircraft engines that potentially can be up to 60 percent cleaner in NOx emissions than current aircraft engines. The actions under this measure are to continue the development of cleaner aircraft engines and work with the airlines and local airport authorities to develop mechanisms to route the cleanest aircraft to serve the South Coast Air Basin.

OVERALL EMISSION REDUCTIONS

A summary of emission reductions for the proposed 1-hour ozone control measures for the year 2022, based on the summer planning inventory for VOC and NOx, is provided in Table VII-4-5. These reductions reflect the emission reductions associated with implementation of control measures under local, State, and federal jurisdiction. Emission reductions represent the difference between the projected baseline and the remaining emissions. Note the inclusion in Table VII-4-5 of long term ("black box") measures under CAA Section 182(e)(5) provisions.

TABLE VII-4-5
Emission Reductions for 2022 Based on
Summer Planning Inventory (Tons per Day)

SOURCES	VOC	NOx
Year 2022 Baseline [1]	440	335
Emission Reductions:		
Stationary Sources (2012 Proposed Measures)	6	3
Mobile Sources (2012 Proposed Measures)	---	8
Mobile Sources (2007 SIP Carried Forward) [2]	7	24
Long Term Measures [3]	17	150
Total 1-hour Ozone SIP Reductions	30	185
2022 Remaining Emissions	**410**	**150**

[1] Emission assumptions from SCAG's 2012 regional transportation plan are already reflected in the AQMP baseline, including TCMs.

[2] Emissions reductions already committed in the 2007 8-hour ozone SIP

[3] CAA Section 182(e)(5) long-term emission reduction measures. Note that the U.S. EPA approved 2007 8-hour ozone SIP included 40 tpd VOC and 241 tpd NOx emissions reductions (based on the emissions inventories from the 2007 SIP) as long term measures under CAA Section 182(e)(5). See 77 Fed. Reg. 12674 (March 1, 2012). Thus, the 1-hour ozone long term emissions reductions are not new emissions reductions as they are a subset of the previous 2007 SIP emissions reductions from long-term measures.

SECTION 5

1-hour Ozone Attainment Demonstration

INTRODUCTION

On September 19, 2012, in response to a California Ninth Circuit Court of Appeals remand, U.S. EPA published a proposed rule to require California to provide a new 1-hour ozone attainment demonstration for the South Coast Air Basin and the San Joaquin Valley non-attainment areas. The proposed rule made a finding of substantial inadequacy of the State Implementation Plan for the two areas. The proposed rule is anticipated to be approved early in 2013 and will allow five years, with a total of up to ten years for attainment of the now revoked 1-hour standard, if the state shows that ten years are needed. That will require a demonstration of attainment of the 0.12 ppm standard by 2023, with emissions reductions in place by the end of 2022. Background discussion on the reasoning for the required revision to the 1-hour ozone SIP as well as a description of the control strategy approach is provided in earlier sections of this Appendix. This section provides the details of the 2012 1-hour ozone modeling attainment demonstration.

BACKGROUND

For a full background discussion regarding the 1-hour ozone attainment demonstration, see the Introduction to this Appendix. The most recently approved SIP for the 1-hour ozone standard is the 1997/99 Plan, approved by EPA in April 2000. There have been changes to the motor vehicle emissions inventories and model since that time. EPA disapproved the attainment demonstration in the 2003 SIP revision because it relied in large part on control measures that had been withdrawn by CARB following revocation of the 1-hour standard. This disapproval led to the litigation which resulted in the SIP call proposed by EPA on September 19, 2012. In that proposal EPA calls for a revised and updated 1-hour ozone attainment demonstration.

Modeling platforms, meteorological models and chemistry packages have also undergone significant enhancements since the 1997 AQMP attainment demonstration when the Urban Airshed Model (UAM) with CB-IV chemistry was the primary tool for projecting air quality. During the development of the 2003 AQMP, the District convened a panel of seven experts to independently review the regional air quality modeling for ozone. The consensus of the panel was for the District to move to more current state-of-the-art dispersion platforms and chemistry modules. At that time, the model selected for the 2007 AQMP ozone attainment demonstrations was the Comprehensive Air Quality Model with Extensions (CAMx) [Environ, 2002], using SAPRC99 chemistry. The Final 2012 AQMP has continued to move forward to incorporate current state-of-the-art modeling platforms to conduct regional modeling analyses. The Final 2012 AQMP PM2.5 attainment demonstration and ozone implementation update has been developed using the U.S. EPA supported Community Multiscale Air Quality (CMAQ) (version 4.7) air quality modeling

platform with SAPRC99 chemistry, and the Weather Research and Forecasting Model (WRF) (version 3.3) meteorological fields. Appendix V of the 2012 Final AQMP provides an expanded discussion of the current modeling platform.

ATTAINMENT DEMONSTRATION STRUCTURE: DETERMINISTIC VS. TIERED RELATIVE RESPONSE FACTOR (RRF)

The 1997 AQMP and 2003 AQMP 1-hour ozone attainment demonstrations relied on direct output from model simulations to project future year air quality and design values. This "deterministic" approach was based on the premise that future year projected baseline inventories were accurate and the impacts of implementing the control program were well simulated. In addition, the form of the 1-hour ozone standard was directed at the fourth highest concentration in a three year period for a given air monitoring station. In essence, the analysis looked at the 2nd highest concentration in a given year, typically occurring during the worst-case meteorological scenario. The 2007 AQMP and 2012 AQMP have relied on the use of relative response factors (RRF) determined from the ratio of future to base year simulation projections to estimate attainment. Since shifting to the 8-hour ozone standard, the RRF estimated from multiple meteorological episodes has been the primary methodology to project future year station specific design values calculated as the three year averages of the 4th highest 8-hour concentration. Both approaches, (deterministic or RRF), have their limitations: the deterministic method relies on accurate modeling and the proper selection of a meteorological episode while the RRF approach tends to place less reliance on individual day model performance since the factor is based on an average of several events having similar meteorological profiles. However, basing the RRF on multiple days may mask the meteorological profile characteristics of an extreme event such as an annual second maximum concentration. Table VII-5-1 summarizes a comparison of the two approaches to demonstrate attainment of the standard.

No specific modeling guidance applies to this current analysis since the 1-hour standard has been revoked. As discussed above, the previous 1-hour ozone attainment demonstrations utilized the deterministic approach to demonstrate attainment of the standard. As modeling platforms (both dispersion and meteorological) and emissions inventories have greatly improved over the past two decades, ozone simulations have demonstrated an increasingly higher level of accuracy in recreating observed base year concentrations. The improved simulation performance has mitigated several of the concerns regarding using the deterministic approach to directly predict future year concentrations. As a result of the improved base year performance, this Basin 1-hour ozone attainment demonstration will be based on the deterministic modeling approach. As part of the weight of evidence discussion, the RRF approach will applied using a stratified or tiered approach to develop station specific projections of 2022 1-hr ozone concentrations.

TABLE VII-5-1

Comparison of Attainment Demonstration Methodologies

RRF	Deterministic
Targets 98th percentile – multiple year average standard	Targets annual 2nd maximum concentration
Designed to compensate for base year performance	Requires performance within established criteria thresholds
Projects future design values based on the base year design value applied to ratio of future to base year simulated ozone	Assumes accurate future year emissions inventory and directly predicts expected concentrations
Station specific evaluation	Day specific analysis requiring candidate episode meeting the "worst case" profile
Requires concentration threshold for inclusion in analysis and minimum number of valid simulation days	

MODELING PROTOCOL

Table VII-5-2 provides the Final 2012 AQMP 1-hour ozone modeling protocol. As previously discussed, the CMAQ/WRF/SAPRC99 modeling structure used for the 8-hour ozone update in the Final 2012 AQMP was used for the 1-hour ozone attainment demonstration. A comprehensive discussion of the 8-hour ozone modeling analysis is provided in Appendix V of the Final 2012 AQMP.

TABLE VII-5-2

Summary of Final 2012 AQMP 1-hour Ozone Model Selection and Modeling Protocol

Final 2012 AQMP 1-Hour Ozone Modeling Protocol
Ozone Dispersion Platform: CMAQ Chemistry: SAPRC99
Domain/ Coordinates Expanded SCOS97 Meteorology, Emissions and Model application: Lambert Conformal Grid: 4 Km X 4 Km Ozone: 18 layers

Emissions Inventories
• 2008 Base year
• Day-Specific Emissions
• Shipping emissions split into 2layers
• EMFAC2011
  o 3- modules
  o Modified DTIM
• Adjustments to fugitive PM2.5 Paved road EPA with CA modifications
• Day-Specific Biogenic emissions
• Revised Mexican emissions profile

Meteorology • WRF initialized with NCEP data with FDDA
Air Quality Model Performance • Assess model performance based on both 1-hour statistics: Normalized gross bias Normalized gross error Peak prediction accuracy • 60 ppb threshold (both indices) • 49 Cell averaging
2008 Base Year Simulations June – August 2008 92 days of simulations evaluated Peak Episode 6/18-6/21
Future Year Projections—Deterministic Approach /Tiered RRF Approach • 2022

MODELING EMISSIONS INVENTORY

Table VII-5-3 provides the baseline and controlled modeling emissions inventories used in the attainment demonstration. The CMAQ simulations were based on the summer planning inventory, with adjustments made for weekly and daily temperature variations. A brief characterization of the emissions used for the modeling analysis is presented in Section 3 of this Appendix and Chapter 3 of the Final 2012 AQMP. An extensive discussion of the overall emissions inventory is provided in the Final 2012 AQMP Appendix III.

TABLE VII-5-3
Summer Planning Emissions Inventory (tons/day)

Year	VOC	NOX	CO
(a) Baseline			
2008	593	754	2880
2022	440	335	1540
(b) Controlled			
2022	410	150	1540

EPISODE SELECTION AND DESIGN VALUES

Past ozone attainment demonstrations evaluated a set of days characterized by restrictive meteorology or episodes occurring during concurrent intensive field monitoring programs. Of great importance, these episode periods needed to be rated in terms of how representative they were relative to the ozone standard being evaluated. For the now revoked 1-hour ozone standard, the attainment demonstration focused on a limited number of days closely matching the annual design value. Typically, the analysis addressed fewer than 5 days of simulations. The 2003 1-hour ozone episode focused on the August 4-7, 1997 ozone meteorological episode that occurred during the Southern California Ozone Study and was the subject of an extensive field monitoring campaign.

This update to the future year ozone projection focuses on 92 days of ozone air quality observed during June through August of the base year 2008. Overall, the 92 day period provides a robust description of the 2008 ozone meteorological season. Table VII-5-4 lists the number of days each Basin station exceeded the revoked 1-hour ozone standard during the June through August 2008 period. Also listed in Table VII-5-4 are the 2008, 5-year weighted design values (also used in the RRF future year ozone projections). Figure VII-5-1 depicts the time series of the daily Basin maximum and the Crestline (the Basin design station) daily maximum 1-hour ozone concentrations during the three month period in 2008. During this period,

seven well defined multi-day ozone episodes occurred in the Basin with 30 total days having daily Basin-wide 1-hour maximum ozone concentrations of 120 ppb or higher. More importantly, when assessed for a normalized meteorological ozone episode potential using a regression based weighting covering 30-years of data (1998-2010), the June 18 - 22, 2008 period was ranked in the 99th percentile. This episode contained the top four daily Basin ozone maximum concentrations for 2008 and has been selected as the focus of the attainment demonstration.

Table VII-5-5 summarizes the June 18 - 22 ozone meteorological episode. Three monitoring stations shared the distinction as having the daily maximum concentration including Crestline, Glendora and on the final day, Glendora and Santa Clarita. As indicated in Table VII-5-4, Crestline is the design site for the Basin with a 1-hour average design value of 158 ppb. Several locations in the San Bernardino and Riverside Valleys exhibit similar daily transport patterns as Crestline. Glendora, which exhibited the second highest design value (151 ppb) is located approximately 30 km downwind of Central Los Angeles along the same wind transport route. The peak Basin 2008 1-hour average ozone concentration observed at Santa Clarita was on August 2nd with a value of 150 ppb along a distinctly different transport route. As illustrated in Table VII-5-5, the observed Basin maximum ozone concentration for the episode closely matches the station design value for the station observing the maximum concentration. The exceptions occur on June 20th where the observed 1-hr maximum ozone concentration reached 176 PPB at Crestline, approximately 111 percent of the Crestline (and Basin) design value. Similarly, on Sunday June 22nd the observed maximum concentration was approximately 82and 87 percent of the Glendora and Santa Clarita design values, respectively.

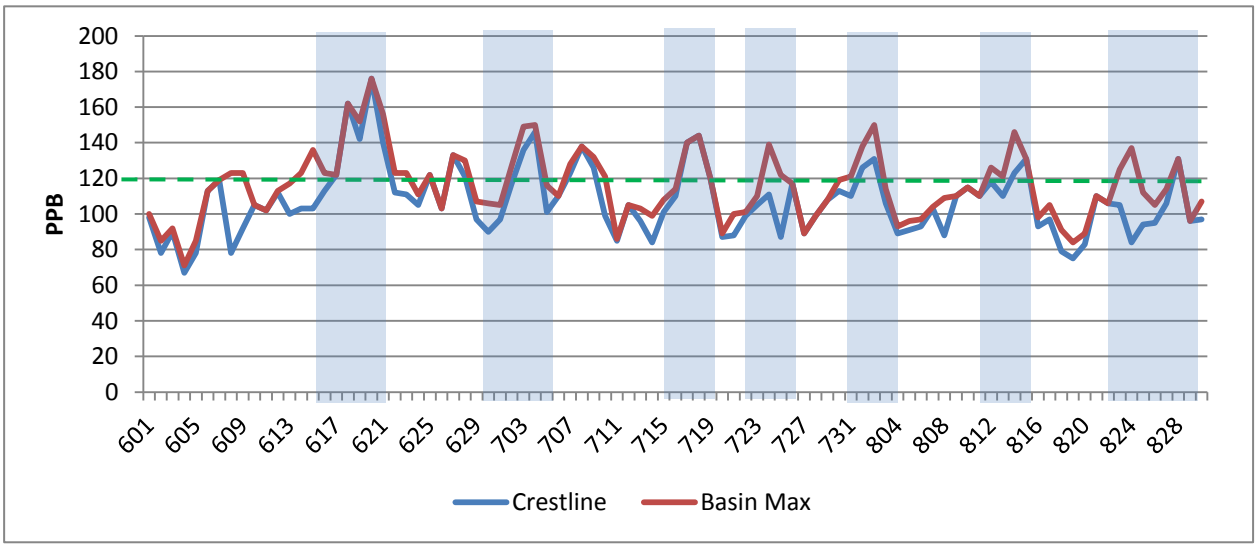


FIGURE VII-5-1

Observed Basin and Crestline Daily Maximum 1-Hr Ozone Concentrations: June 1 through August 31, 2008. (Shaded areas indicate multiple day regional ozone episodes).

TABLE VII-5-4

2008 Basin Weighted Design Values and Number of Days Daily 1-Hour Ozone Maximum Concentrations Exceeded 120 ppb*

Station	2008 5-Year Weighted Design (ppb)	Number of Days in 2008 with Observed 1-Hr Maximum Ozone > 120 ppb
Azusa	137	7
Burbank	127	0
Reseda	125	0
Pomona	138	5
Pasadena	130	1
Santa Clarita	141	8
Glendora	151	12
Rubidoux	137	8
Perris	134	4
Mira Loma	129	4
Lake Elsinore	133	6
Banning Airport	138	10
Upland	147	9
Crestline	158	16
Fontana	148	8
San Bernardino	150	11
Redlands	149	12

*Only Stations having design values greater than 120 ppb are listed

TABLE VII-5-5
Profile of the June 18-22, 2008 Meteorological-Ozone Episode

Date	Day of Week	Maximum Observed 1-Hr Ozone (PPB)	Design Value at Maximum Station (PPB)	Maximum Location
18-Jun-08	Wed	162	158	Crestline
19-Jun-08	Thu	152	151	Glendora
20-Jun-08	Fri	176	158	Crestline
21-Jun-08	Sat	156	151	Glendora
22-Jun-08	Sun	123	151	Glendora
			141	Santa Clarita

BASE-YEAR OZONE MODEL PERFORMANCE EVALUATION

For the CMAQ performance evaluation, the modeling domain is separated into nine sub-regions or zones. Figure VII-5-2 depicts the sub-regional zones used for base-year simulation performance. The different zones present unique air quality profiles. In previous ozone modeling attainment demonstrations using a smaller modeling domain, the number and size of the zones were different. Seven zones represented the Basin and portions of Ventura County, the Mojave Desert and the Coachella Valley.

For the current analysis the Basin is represented by three of the zones: Zone 3 – the San Fernando Valley, Zone 4 – the Eastern San Gabriel, Riverside and San Bernardino Valleys, and Zone 5 – the Los Angeles and Orange County emissions source areas. Of the three areas, Zone 4 represents the Basin maximum ozone concentrations and the primary downwind impact zone. As such, the priority in evaluating model performance is focused on Zone 4.

The statistics used to evaluate 1-hour average CMAQ ozone performance do not change from previous AQMPs and include the following:

Statistic for O_3	Criteria (%)	Comparison Basis
Normalized Gross Bias	≤ ±15	Paired in space and time
Normalized Gross Error	≤ 35	Paired in space (+2 grid cells) and time
Peak Prediction Accuracy	≤ ± 20	Unpaired in space and time

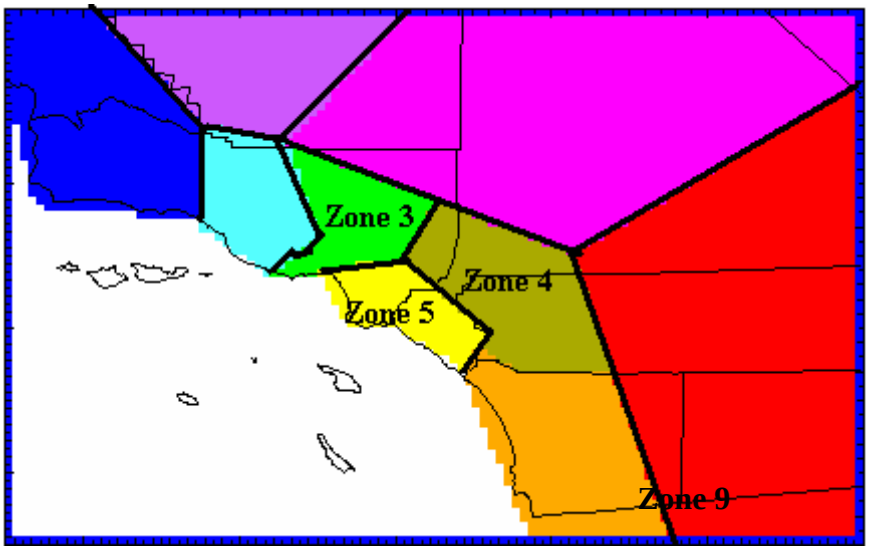


FIGURE VII-5-2

Performance Evaluation Zones

The base year average regional model performance for the June 2008 episode for Zones 3, 4, and 5 is presented in Table VII-5-6. Performance statistics are presented for observed concentrations of 60 ppb or greater.

The CMAQ ozone simulations generally meet the 1-hour average unpaired peak on four of the five episode days in Zones 3 and 5 and on three of the days in Zone 4. The 2008 highest observed 1-hour ozone concentrations occurred on June 18th and June 20th in Zone 4. The ozone simulations were only able to recreate 76 and 73 percent of the observed concentrations on each of those days. Normalized bias tended to be negative in Zones 3 and 4. Zone-5 showed a tendency for over prediction on June 19th and 22nd. The normalized model error performance goal was consistently met in the three zones on June 19-21.

Figures VII-5-3 through VII-5-12 present the diurnal profiles of observed and CMAQ simulated 1-hour ozone and spatial plots of daily 1-hour maximum predicted ozone for the June 2008 episode. The diurnal trends depict station profiles grouped

by evaluation zone with Zone 3 presented at the left side of the chart. The CMAQ predicted trend is highlighted by a dashed red line. The trend diagrams support the statistical analysis with June 19th and 21st depicting a close match with observations, particularly in Zone 4. The trend of predicted and observed diurnal ozone is also closely matched in Zones 3 and 5 for all days except June 22nd when the daily peak ozone concentrations were over predicted.

The corresponding spatial plots of daily ozone maximum demonstrate the extent and concentration ranges of CMAQ predicted ozone. The peak predicted concentrations occur in Zone 4 on June 21st followed by June 19th, with both days meeting the unpaired prediction criteria. On June 22nd, the same pattern persists but with an extension of higher predicted ozone concentrations occurring in Zone 5 as well. While June 18th and 20th are under predicted (unpaired peak ratio of 0. 76 and 0.73), the location of the projected daily 1-hour ozone maximum concentrations is correctly depicted in the spatial presentation.

Additional statistical characterizations of model performance and individual station diurnal trends of observed and predicted 1-hour ozone concentrations are presented as Attachments 1 and 2 to this Appendix.

TABLE VII-5-6

June 18-22, 2008 Base Year 1-Hour Average Ozone Performance
(Bold type indicates meeting statistical performance criteria).

Date	Zone 3				
	Observed (ppb)	**Predicted (ppb)**	**Unpaired Peak Ratio**	**Normalized Bias* (ppb)**	**Normalized Error* (ppb)**
618	87	93	1.07	-17	**25**
619	95	109	1.15	**4**	**18**
620	111	99	0.89	**-10**	**19**
621	122	107	0.87	-19	**20**
622	123	92	0.75	-29	**29**
Date	Zone 4				
	Observed (ppb)	**Predicted (ppb)**	**Unpaired Peak Ratio**	**Normalized Bias* (ppb)**	**Normalized Error* (ppb)**
618	162	123	0.76	-17	**20**
619	152	136	0.90	**-1**	**18**
620	176	129	0.73	**-12**	**16**
621	156	150	0.96	**-1**	**18**
622	123	134	1.09	**10**	**21**
Date	**Zone 5**				
	Observed (ppb)	**Predicted (ppb)**	**Unpaired Peak Ratio**	**Normalized Bias* (ppb)**	**Normalized Error* (ppb)**
618	118	107	0.91	**0**	**22**
619	110	111	1.01	**11**	**15**
620	114	106	0.93	**0**	**13**
621	107	115	1.07	**4**	**12**
622	107	121	1.13	**13**	**19**

*Normalized bias and normalized error calculated for hours where observations > 60 ppb

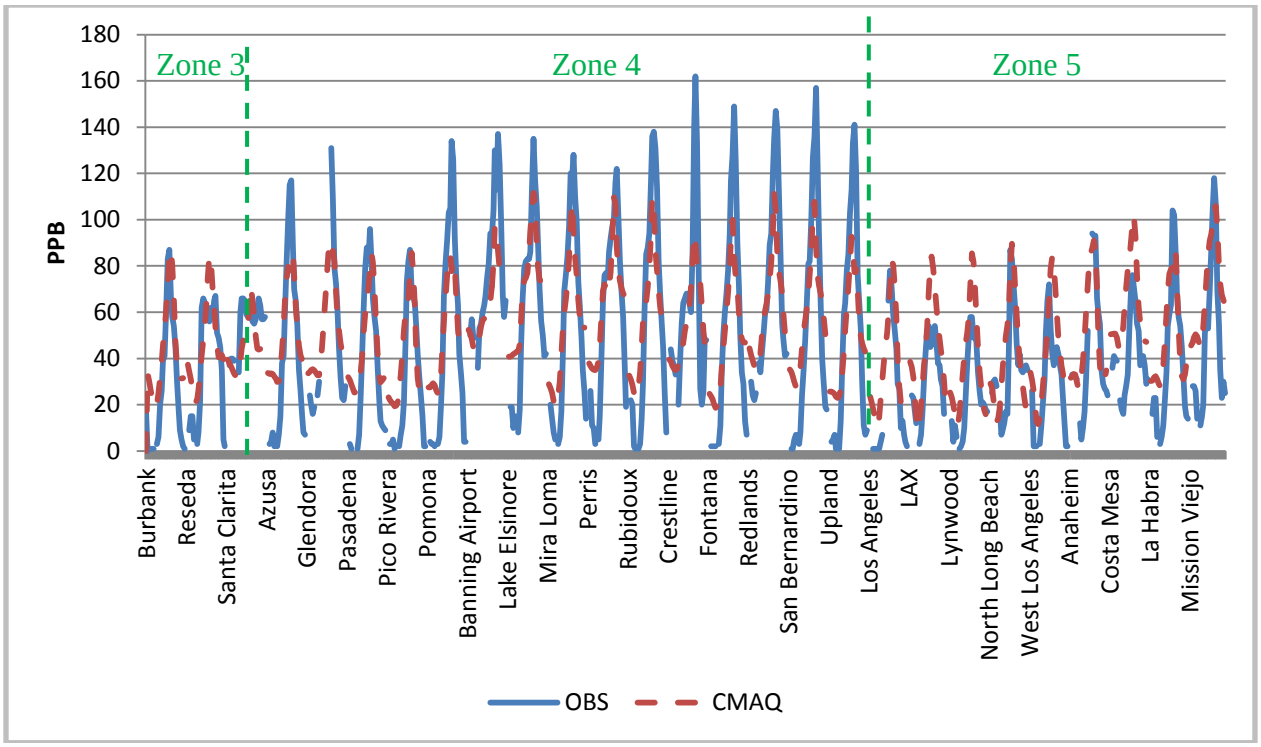


FIGURE VII-5-3
CMAQ predicted and observed diurnal trends of 1-hour ozone for June 18, 2008

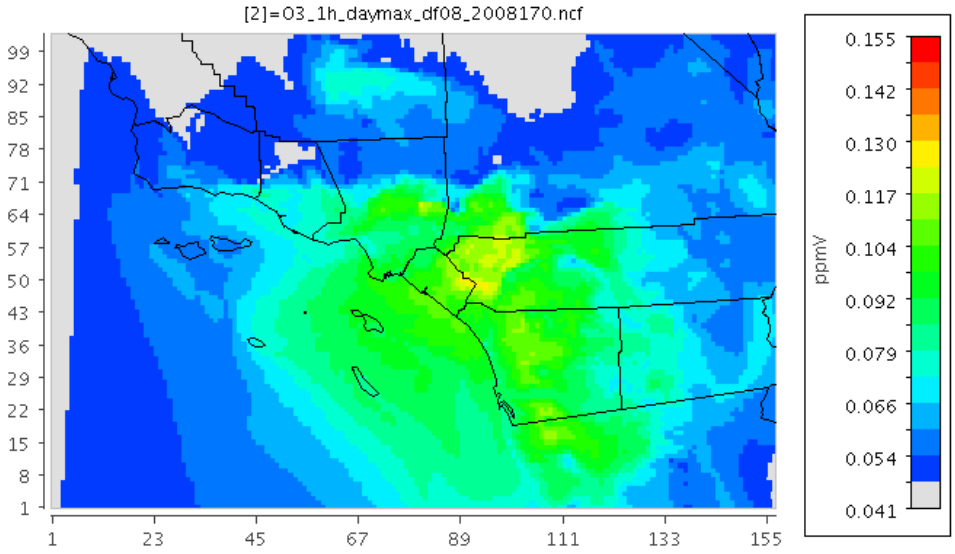


FIGURE VII-5-4
CMAQ predicted maximum 1-hour ozone (PPB) for June 18, 2008

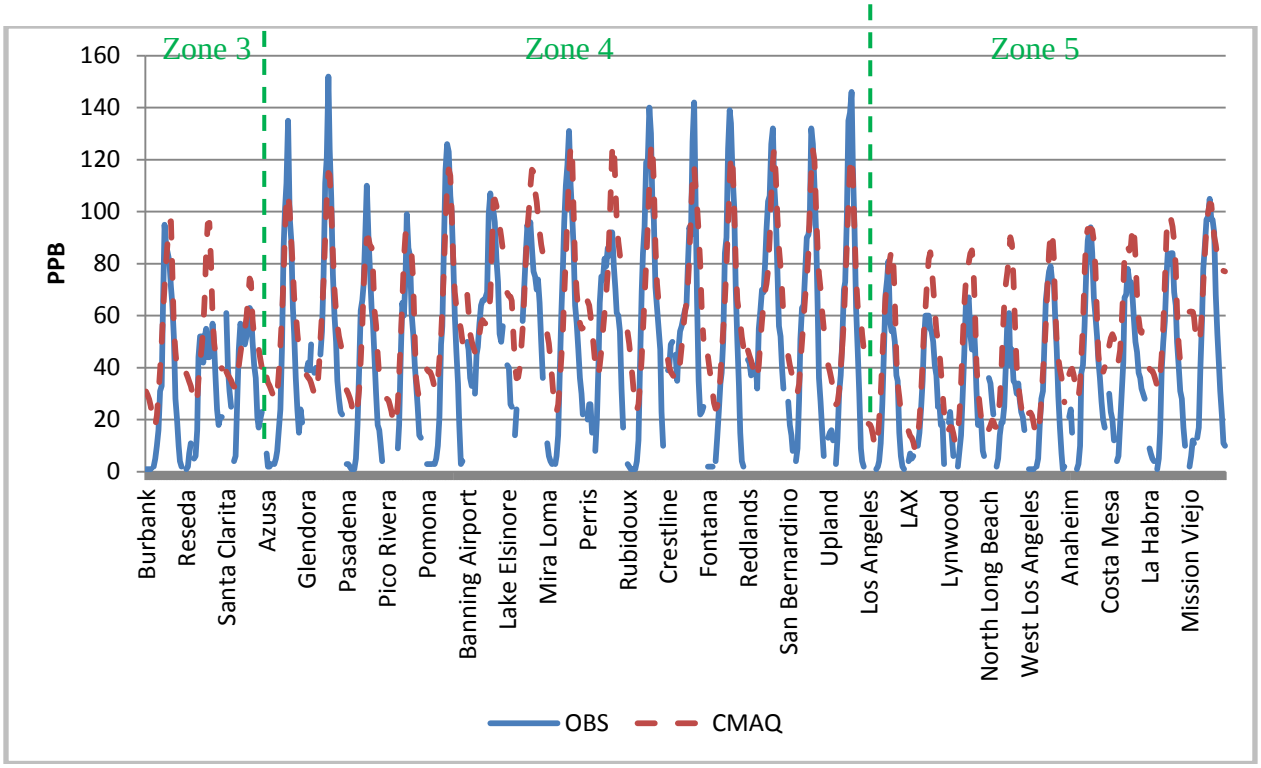


FIGURE VII-5-5
CMAQ predicted and observed diurnal trends of 1-hour ozone for June 19, 2008

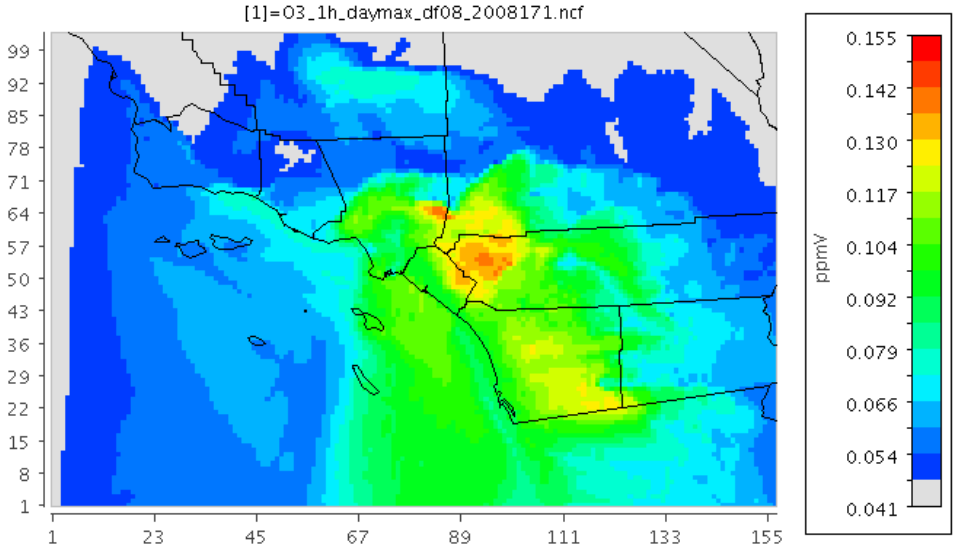


FIGURE VII-5-6
CMAQ predicted maximum 1-hour ozone (PPB) for June 19, 2008

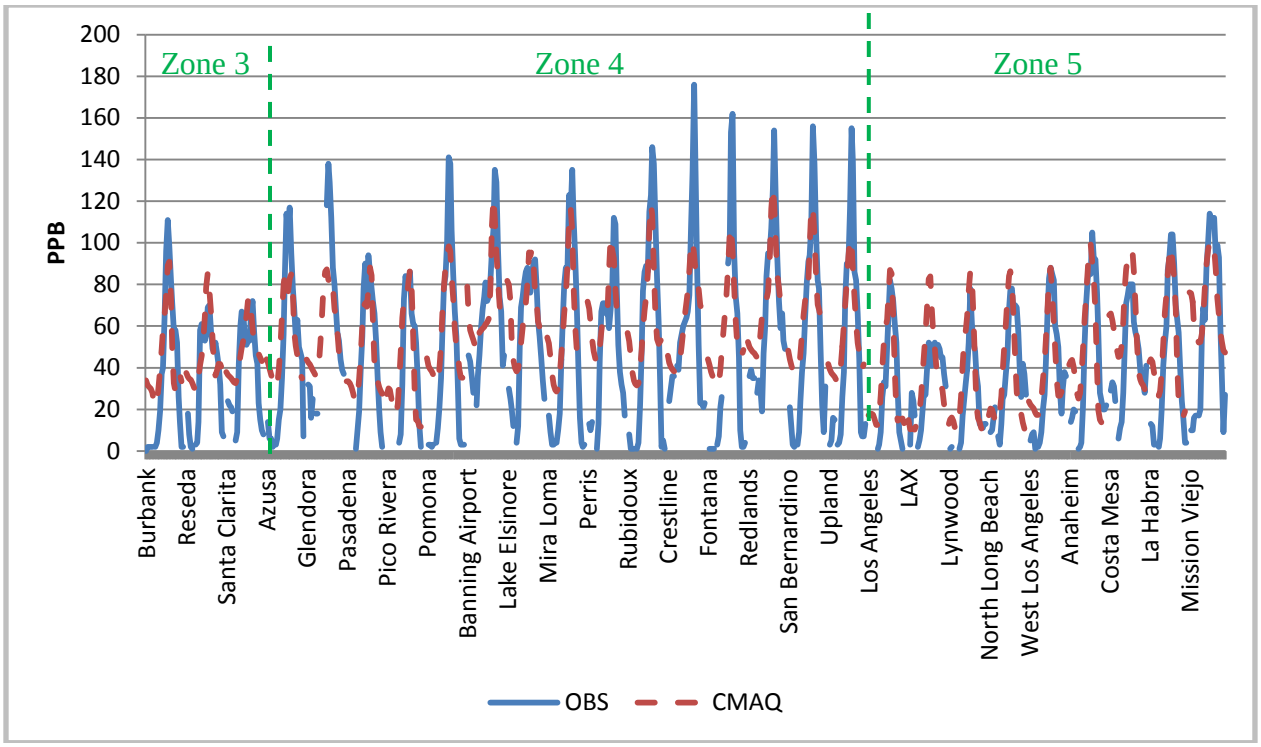


FIGURE VII-5-7
CMAQ predicted and observed diurnal trends of 1-hour ozone for June 20, 2008

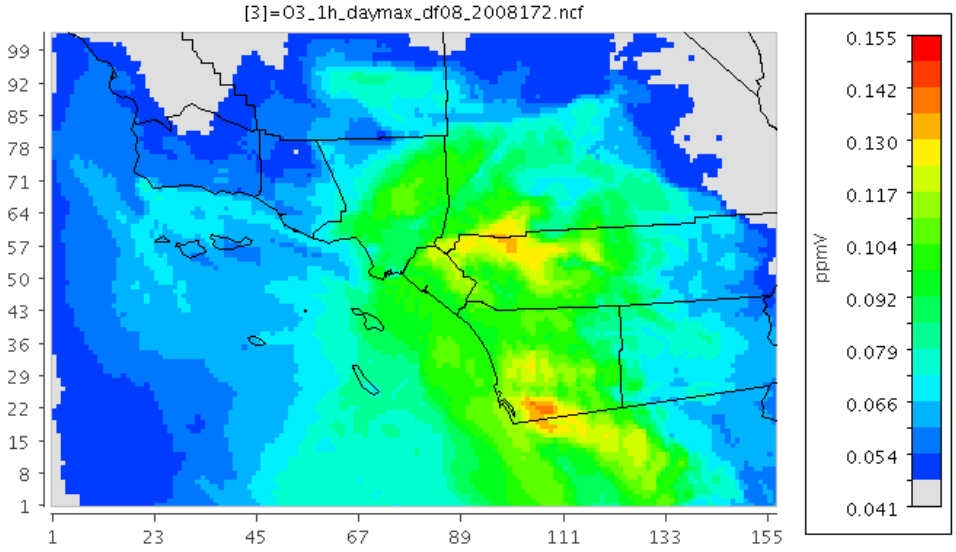


FIGURE VII-5-8
CMAQ predicted maximum 1-hour ozone (PPB) for for June 20, 2008

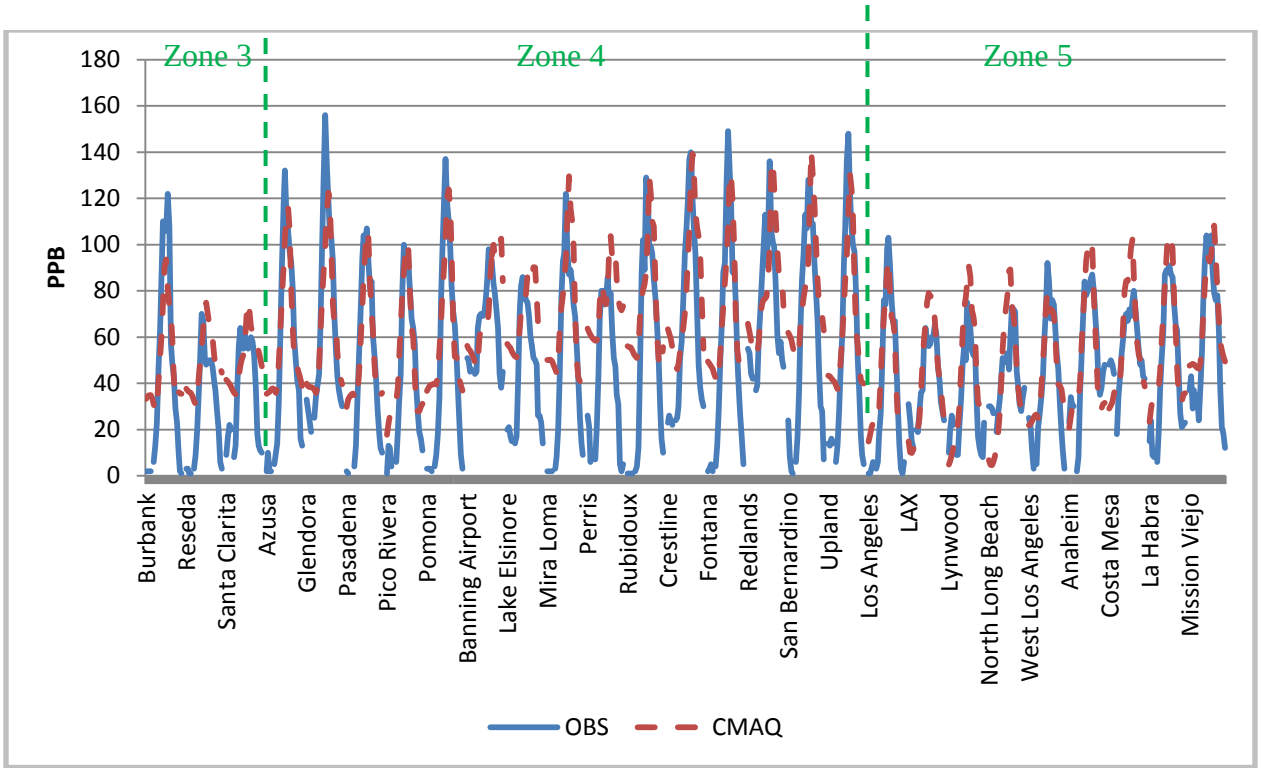


FIGURE VII-5-9
CMAQ predicted and observed diurnal trends of 1-hour ozone for June 21, 2008

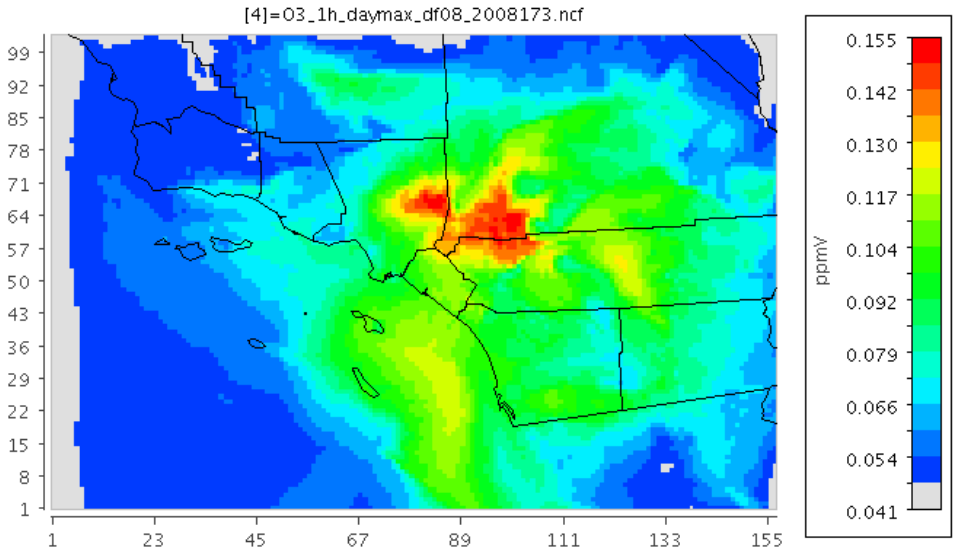


FIGURE VII-5-10
CMAQ predicted maximum 1-hour ozone (PPB) for June 21, 2008

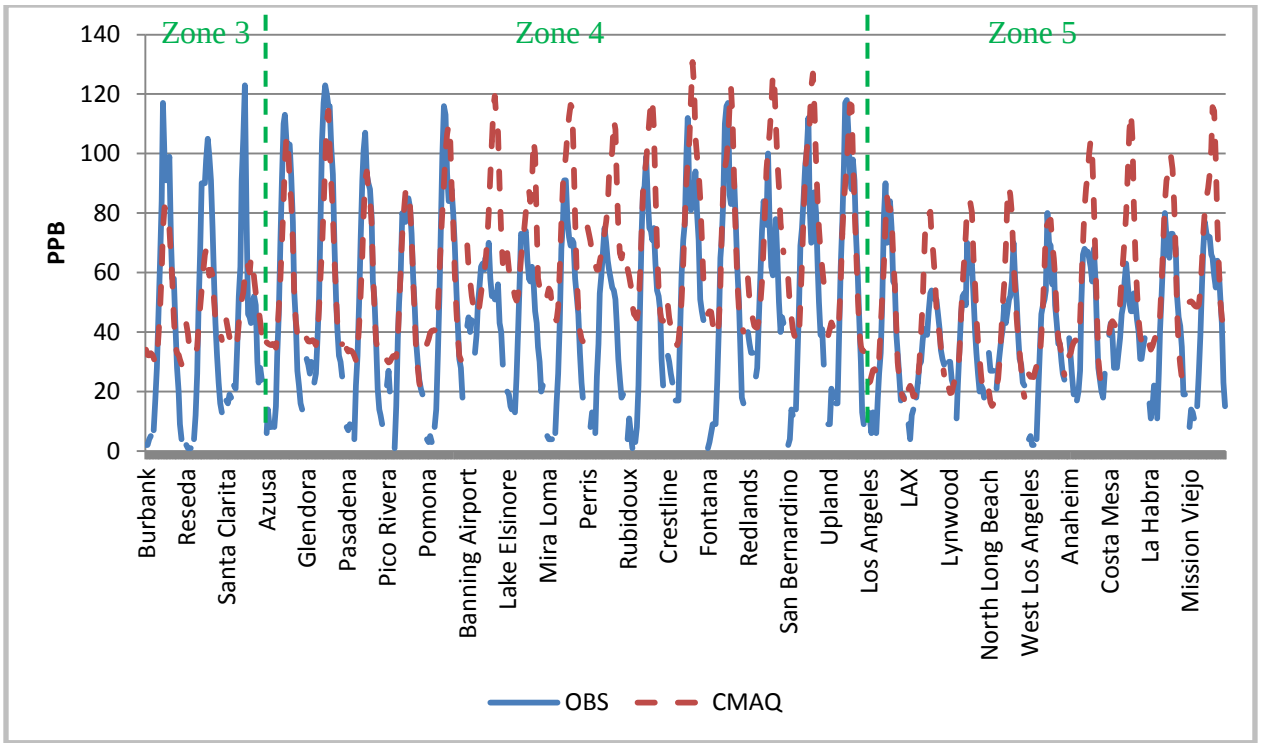


FIGURE VII-5-11
CMAQ predicted and observed diurnal trends of 1-hour ozone for June 22, 2008

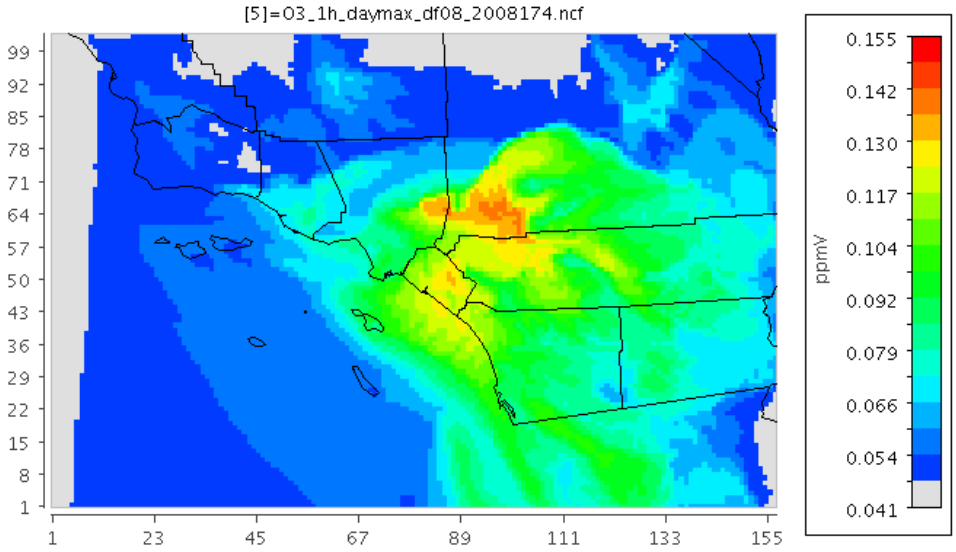


FIGURE VII-5-12
CMAQ predicted maximum 1-hour ozone (PPB) for June 22, 2008

ATTAINMENT DEMONSTRATION

Table VII-5-7 provides the summary of the 1-hour ozone attainment demonstration using the CMAQ modeling platform and the 2022 controlled emissions inventory (410 TPD VOC, 150 TPD NOx). The Controlled Emissions Projection Algorithm (CEPA) summary is provided as Attachment 3 to this document. The maximum predicted 1-hour ozone concentration on 125.6 ppb occurs on June 19th at Pasadena. All other predicted concentrations during the five day episode are projected to be below the attainment demonstration concentration threshold of 124.4 ppb. (Note: both June 18th and June 20th failed to meet all of the model acceptance criteria, more specifically the unpaired peak analysis. As a result, the attainment demonstration is focusing on the June 19th and 21st, days with observed peak concentrations that closely matched the design values).

The final two columns in Table VII-5-7 provide the maximum of the 2022 predicted daily maximum 1-hour ozone concentrations for all 92 days simulated with the controlled emissions as well as the number of occurrences the daily maximum was predicted to exceed 124.4 ppb. The analysis demonstrated that throughout the June through August smog season, only Pasadena on June 19th has a 2022 predicted 1-hour daily maximum ozone concentrations that would exceed the attainment threshold. All other predicted maximum 1-hour average concentrations during the 92 day summer ozone season are projected to be at least 10 percent below the attainment threshold. This is illustrated by the time series of predicted daily maximum 1-hour ozone concentrations in Figure VII-5-13. Regional temperatures during the June episode were extremely warm, giving rise to extensive evaporative and biogenic emissions. Midday temperatures in the San Gabriel Valley exceeded 100 degrees Fahrenheit on each day during the episode. Table VII-5-8 lists a summary of 4 model simulations for June 19th which include the 2022 predicted maximum 1-hour ozone for that day, the maximum predicted 1-hour ozone over all 92 simulated days, and the number of days the standard was projected to be violated at each station. The simulations included 2022 baseline emissions, and model analyses with reaming emissions of 410 TPD VOC and 180, 160 and 150 TPD NOx.

The analysis shows that when NOx emissions are reduced from the 2022 baseline values to 180 TPD, only 4 sites have one day exceeding the standard throughout the season. Three violations are projected to occur on June 19th while the violation at Upland is projected to occur on June 20th. When simulated with 160 TPD NOx, only Burbank and Pasadena are projected to exceed the standard on June 19th, and with 150 TPD NOx, only Pasadena is projected to exceed the standard on one day. The high biogenic emissions during this episode may have contributed to an increasing VOC/NOx ratio in this area which is directly downwind of the metropolitan Los Angeles emissions sources. As biogenic emissions remain constant, NOx emissions are lowered leading to the increased reactivity and ozone forming potential. By the

150 TPD NOx emissions level, the impact appears to be isolated only to Pasadena which remained above the 124.4 ppb level. It is important to note that variations in the local wind field and deeper atmospheric mixing responding to the surface heating on June 18th and June 20th may have ameliorated the impact to the San Gabriel Valley on those days.

The form of the 1-hour standard allows for a single exceedance at a station annually. Given the form of the standard, the 410 TPD VOC and 150 TPD NOx emissions carrying capacity satisfies the Basin 1-hour ozone attainment demonstration. The 410 TPD VOC and 150 TPD NOx level emissions carrying capacity translates to a 30 TPD (7 percent) reduction in VOC emissions beyond the 2022 baseline and a 185 TPD (55 percent) reduction in NOx emissions beyond 2022 baseline. The 150 TPD NOx level represents a conservative estimate of the carrying capacity. Since the form of the standard allows for one exceedance per station per year, it may be possible to meet the standard at NOx levels as high as 180 TPD as demonstrated in Table VII-5-8.

Figures VII-5-14 through VII-5-23 provide the gridded daily 1-hour maximum ozone simulated for the 2022 baseline (440 TPD VOC and 335 TPD NOx) and controlled emissions (410 TPD VOC and 150 TPD NOx).

TABLE VII-5-7

Predicted Maximum 1-Hour Ozone (PPB) for the June 18-22 Episode for the 2022 Controlled Summer Planning Day Emissions

	June 18 Wed	June 19 Thu	June 20 Fri	June 21 Sat	June 22 Sun	92 Days Simulated Maximum PPB	Number of Days > 124.4 PPB
Azusa	112.7	116.1	112.8	119.5	93.4	119.5	0
Burbank	107.5	121.9	97.6	91.3	78.6	121.9	0
Glendora	115.6	113.0	113.7	115.6	91.4	115.6	0
Pasadena	112.4	125.6	109.3	108.6	89.7	125.6	1
Pomona	122.1	89.5	101.3	112.2	99.0	122.1	0
Reseda	66.0	97.6	79.9	58.9	54.8	97.6	0
Santa Clarita	55.3	61.8	58.4	58.2	56.2	93.8	0
Banning Airport	104.7	83.0	103.2	93.8	104.9	104.9	0
Lake Elsinore	83.5	81.2	69.4	62.3	72.9	98.0	0
Mira Loma	111.9	90.9	106.7	100.2	105.1	111.9	0
Perris	97.6	90.9	77.8	92.3	101.1	101.1	0
Rubidoux	110.8	90.5	106.8	104.8	109.9	110.8	0
Crestline	99.5	83.4	106.7	116.4	96.1	116.4	0
Fontana	120.1	89.0	102.0	116.1	103.4	120.1	0
Redlands	115.1	94.5	109.1	104.1	107.6	115.1	0
San Bernardino	117.8	95.1	107.4	99.7	108.2	117.8	0
Upland	122.0	89.8	104.1	112.6	94.7	122.0	0

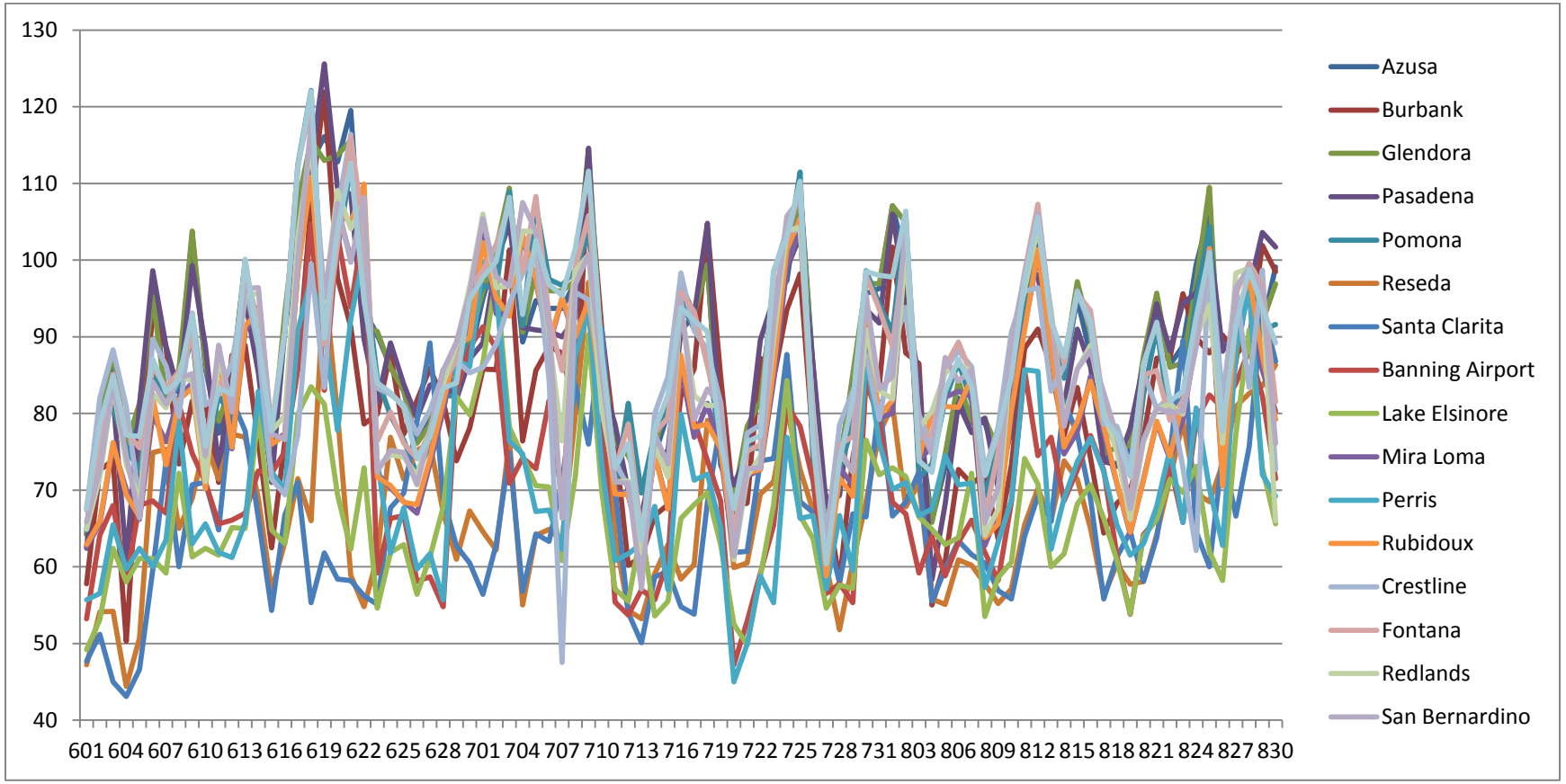


FIGURE VII-5-13

CMAQ Simulated Daily 1-Hour Maximum Ozone for June through August 2022 with the 2022 Controlled Summer Emissions. (The green dashed line depicts the 124.4 PPB threshold for the attainment demonstration).

TABLE VII-5-8

Predicted Maximum 1-Hour Ozone (PPB) for the June 19th Episode for the 2022 Baseline and Selected Controlled Summer Planning Day Emissions

Station	Baseline Emissions June 19 Max (PPB)	92 Day Max (PPB)	Days > 124.4 PPB	NOx 180 TPD June 19 Max (PPB)	92 Day Max (PPB)	Days > 124.4 PPB	NOx 160 TPD June 19 Max (PPB)	92 Day Max (PPB)	Days > 124.4 PPB	NOx 150 TPD June 19 Max (PPB)	92 Day Max (PPB)	Days > 124.4 PPB
Azusa	113.5	133.1	1	120.1	124.8	1	119.1	121.9	0	116.1	119.5	0
Burbank	129.3	129.3	1	127.0	127.0	1	124.5	124.5	1	121.9	121.9	0
Glendora	112.9	132.4	1	117.0	121.3	0	115.8	118.4	0	113.0	115.6	0
Pasadena	122.4	122.4	0	128.4	128.4	1	127.2	127.2	1	125.6	125.6	1
Pomona	104.8	126.1	1	92.4	123.7	0	92.5	123.0	0	89.5	122.1	0
Reseda	111.4	111.4	0	101.8	101.8	0	99.6	99.7	0	97.6	97.6	0
Santa Clarita	67.7	108.2	0	63.2	105.1	0	62.3	104.4	0	61.8	93.8	0
Banning Airport	96.4	124.5	1	86.8	111.6	0	85.2	109.7	0	83.0	104.9	0
Lake Elsinore	98.8	107.7	0	85.2	102.3	0	82.8	100.7	0	81.2	98.0	0
Mira Loma	110.6	126.4	2	94.3	116.7	0	91.4	114.8	0	90.9	111.9	0
Perris	110.6	115.6	0	94.4	107.8	0	91.6	106.9	0	90.9	101.1	0
Rubidoux	109.8	127.1	2	93.8	116.6	0	90.8	115	0	90.5	110.8	0
Crestline	102.9	136.7	2	86.9	123.9	0	84.1	121.1	0	83.4	116.4	0
Fontana	106.0	131.7	1	92.5	123.6	0	89.9	121.6	0	89.0	120.1	0
Redlands	114.0	131.0	2	98.1	119.8	0	95	117.5	0	94.5	115.1	0
San Bernardino	113.5	127.8	4	98.4	121.9	0	95.3	120.4	0	95.1	117.8	0
Upland	107.4	127.0	1	93.3	124.5	1	90.6	123.4	0	89.8	122.0	0

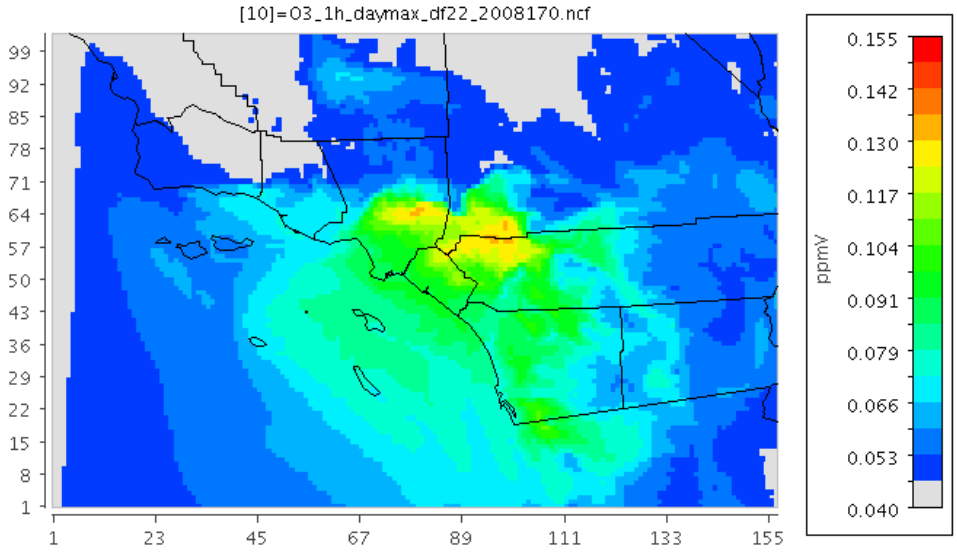


FIGURE VII-5-14
CMAQ predicted 2022 maximum 1-hour ozone (PPB) for June 18, 2008: Baseline Emissions

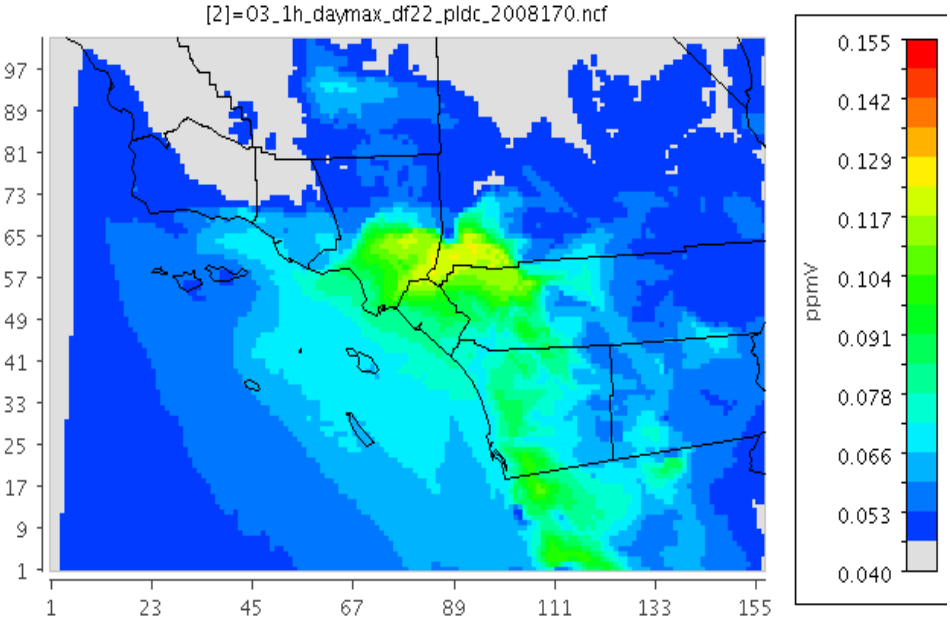


FIGURE VII-5-15
CMAQ predicted 2022 maximum 1-hour ozone (PPB) for June 18, 2008: Controlled Emissions

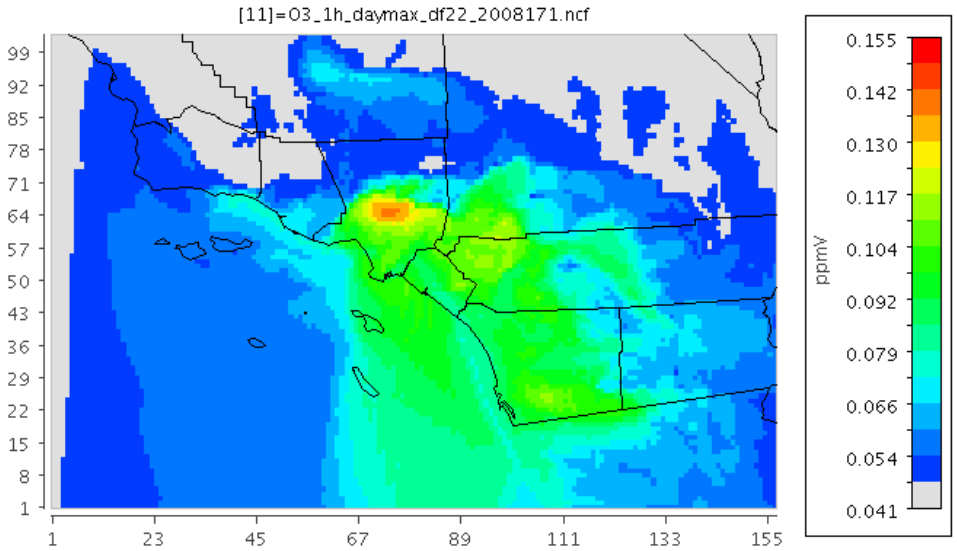


FIGURE VII-5-16
CMAQ predicted 2022 maximum 1-hour ozone (PPB) for June 19, 2008: Baseline Emissions

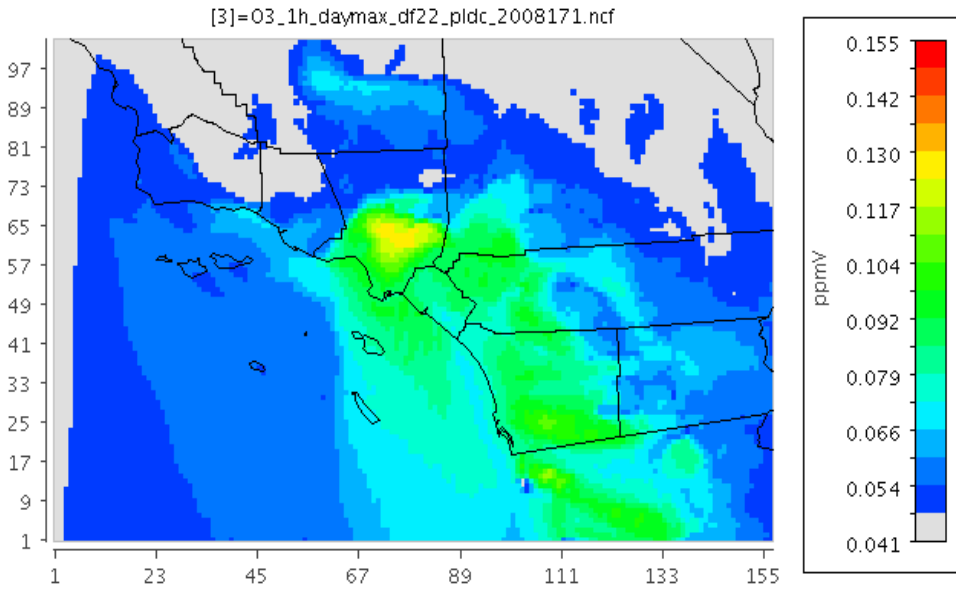


FIGURE VII-5-17
CMAQ predicted 2022 maximum 1-hour ozone (PPB) for June 19, 2008: Controlled Emissions

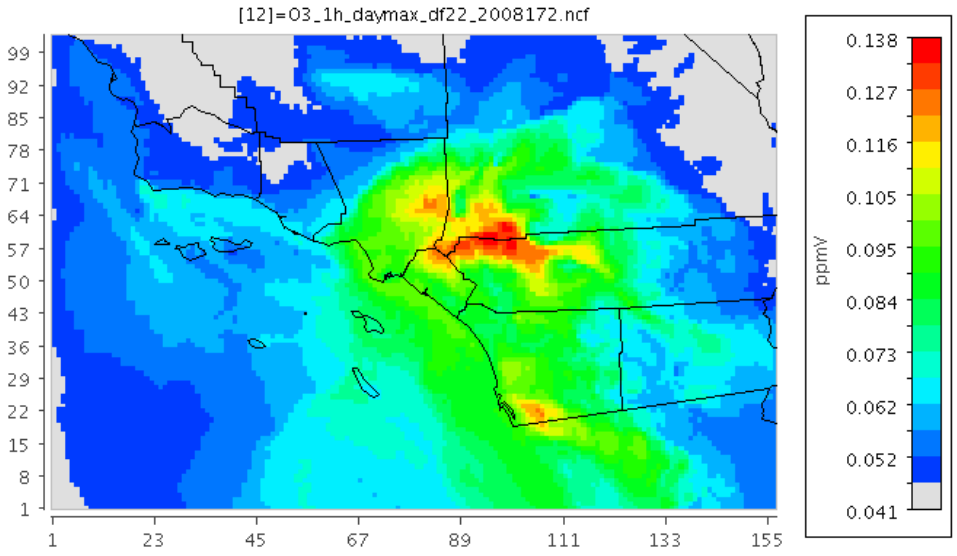


FIGURE VII-5-18
CMAQ predicted 2022 maximum 1-hour ozone (PPB) for June 20, 2008: Baseline Emissions

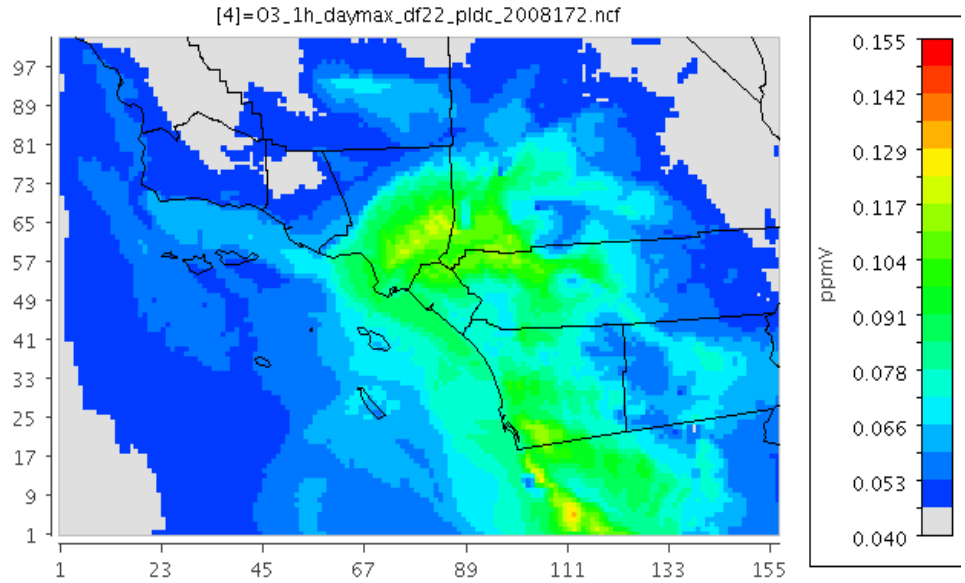


FIGURE VII-5-19
CMAQ predicted 2022 maximum 1-hour ozone (PPB) for June 20, 2008: Controlled Emissions

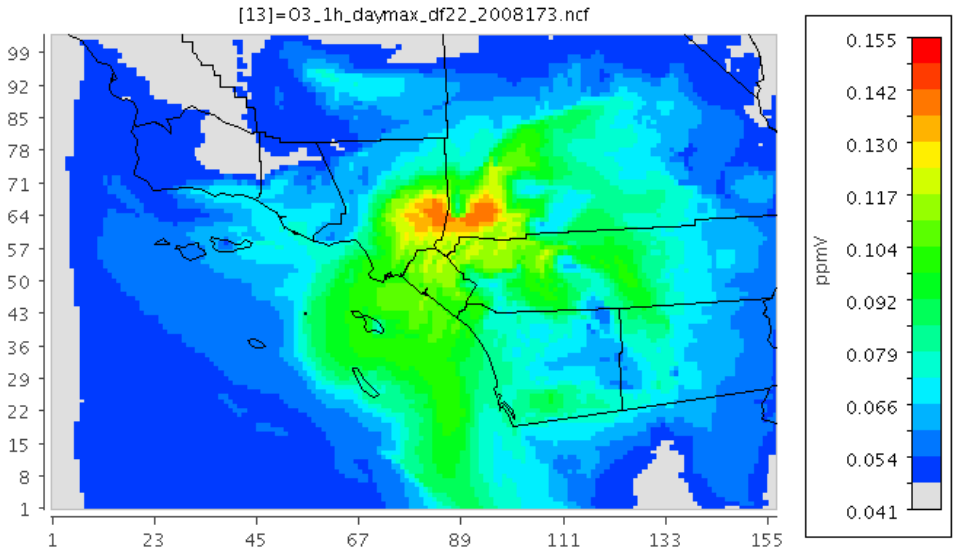


FIGURE VII-5-20
CMAQ predicted 2022 maximum 1-hour ozone (PPB) for June 21, 2008: Baseline Emissions

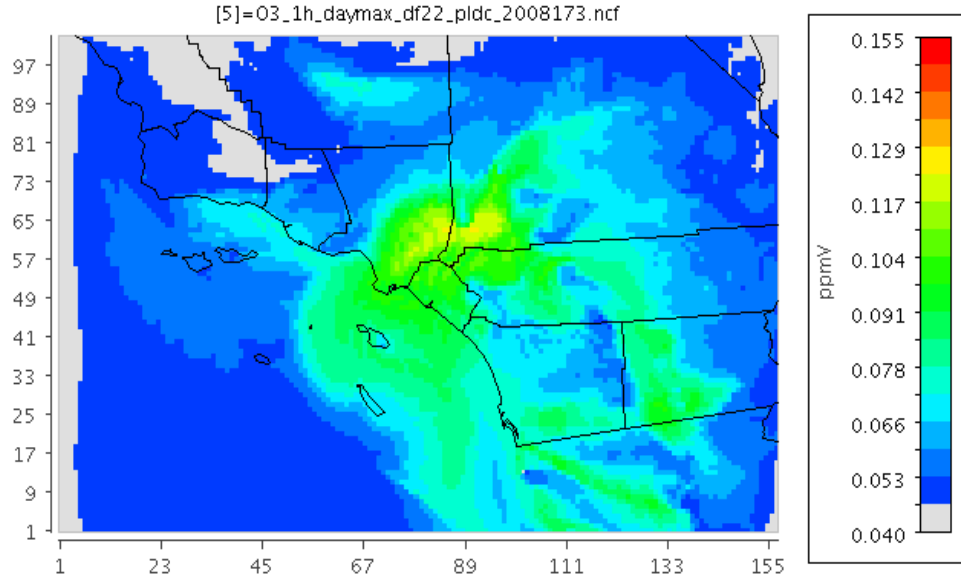


FIGURE VII-5-21
CMAQ predicted 2022 maximum 1-hour ozone (PPB) for June 21, 2008: Controlled Emissions

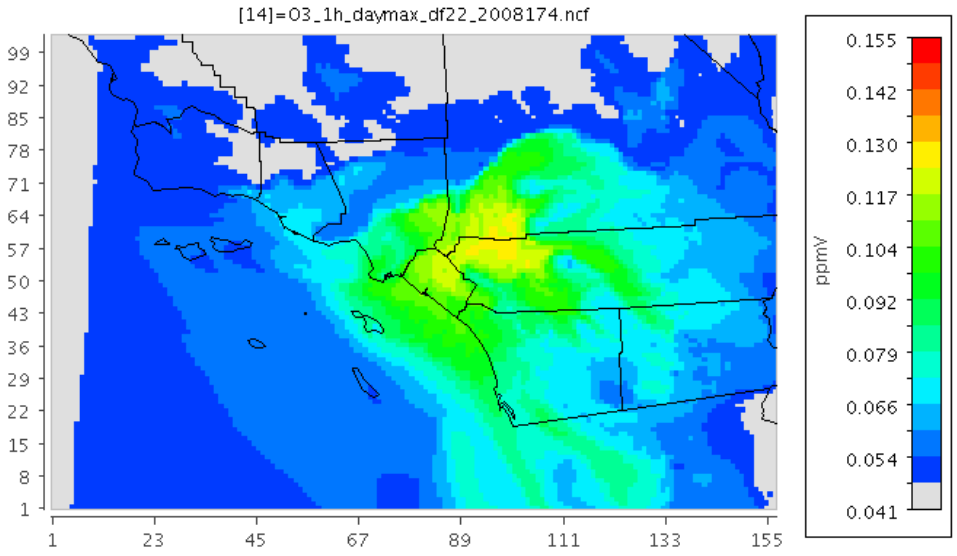


FIGURE VII-5-22
CMAQ predicted 2022 maximum 1-hour ozone (PPB) for June 22, 2008: Baseline Emissions

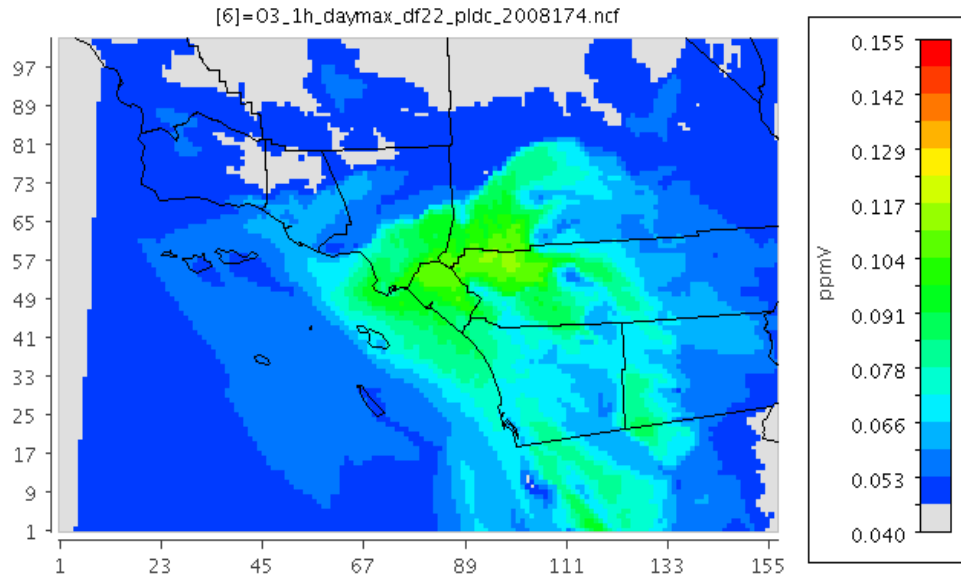


FIGURE VII-5-23
CMAQ predicted 2022 maximum 1-hour ozone (PPB) for June 22, 2008: Controlled Emissions

WEIGHT OF EVIDENCE

The U.S. EPA recommends that a weight of evidence discussion be incorporated with air quality attainment demonstrations, particularly if the future year simulated ozone concentrations are within a certain percent of the standard in question. For 8-hour ozone, U.S. EPA requires a weight of evidence discussion to provide aggregate supplemental analyses to support the modeled attainment test if the future projected concentration falls within 3 percent of the acceptance threshold. Applying this criterion for the 1-hour standard would require a weight of evidence discussion if the projected maximum concentration fell within 4 ppb of the 124.4 threshold. As such, the weight of evidence discussion presented in this section addresses two lines of reasoning why the proposed control strategy and associated emissions reductions will achieve attainment of the 1-hour ozone standard. The first analysis examines the trends of observed ozone and precursor emissions and then projecting those trends forward in time to determine when an empirically projected attainment date would take place and if the emissions trends continued. As previously stated, the second analysis employs a tiered RRF approach to determine if the emissions reductions using the simulation ratio and design value methodology provides further support for the demonstration of attainment.

Figures VII-5-24 and VII-5-25 present the trends of observed annual 1-hour maximum ozone concentrations and the projections of the trend through 2023. Figure VII-5-24(a) depicts the long term trend beginning with 1976 and including all years through 2011. The linear regression best fit line indicates that if the trend is projected forward in time, the Basin would be expected to meet the one hour standard as early as 2013. However, a close examination of the long term trend shows an inflection that occurred post 1996 California Phase II Reformulation creating a "hockey stick" appearance. Reexamining the blade of the hockey stick in Figure VII-5-24(b) from 2000 through 2011, the best fit projection suggests attainment would take until 2023 which is consistent with the attainment demonstration. Similarly, by 2022 the trends of Basin VOC and NOx emissions with full implementation of the 2007 AQMP will be very consistent with the targeted carrying capacity (410 TPD VOC and 150 TPD NOx) .

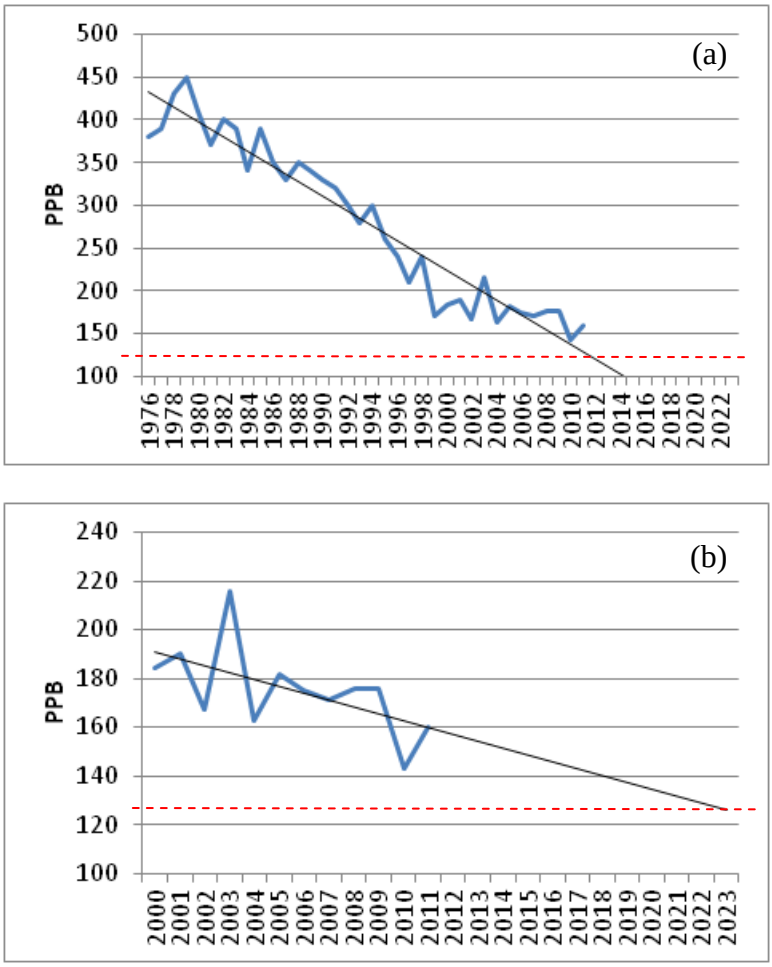


FIGURE VII-5-24

Trends of Annual Basin 1-Hour Maximum Ozone Concentrations with Projections to 2023: (a) 1976 – 2011, (b) Post Phase II Fuel Reformulation: 2000 – 2011. (The dashed red line depicts the attainment threshold 124 PPB).

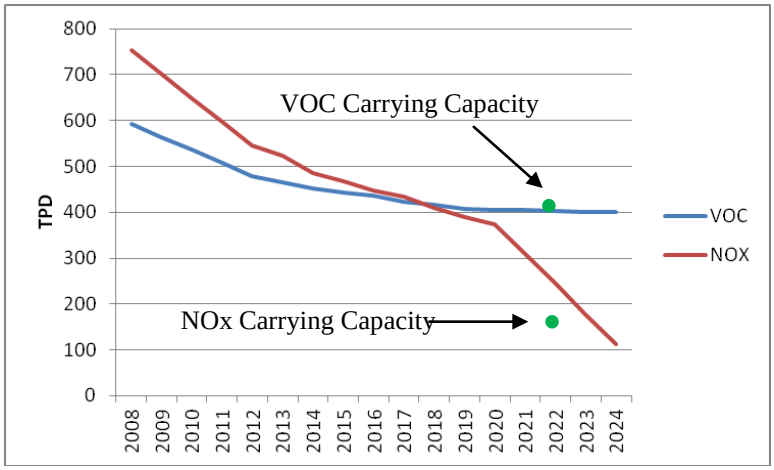


FIGURE VII-5-25

Trends of Annual Basin 1-Hour Maximum Ozone Concentrations with Projections to 2023: (a) 1976 – 2011, (b) Post Phase II Fuel Reformulation: 2000 – 2011. (The dashed red line depicts the attainment threshold 124 PPB).

The second element of the weight of evidence discussion utilizes the tiered RRF approach to determine station specific future year design concentrations based on base year 2008 emissions and 2022 controlled emissions. The proposed methodology tiers the concentration threshold for accepting a simulation station day based on three criteria for evaluation: (1) the base year daily maximum concentration absolute prediction error (calculated for a station per episode day) must be 20 percent or less; (2) the observed station concentration must be within 25 percent of the design value; and (3) a minimum of four station specific days simulated must meet the error at the set concentration threshold for the RRF to be calculated. The 20 percent error criteria is the same level used in the 8-hour ozone analysis and the four day minimum was iteratively determined to provide a measure of robustness to the RRF calculation. Basically, the four day criteria represented a balance between an analyses based on a higher error criteria with potentially more days included at a higher concentration threshold vs. a limited set of better simulated station days with lower prediction error. Table VII-5-9 lists the impacted stations and the threshold concentration used for the RRF calculation. Also listed in Table VII-5-9 are the base year average percentage prediction bias and error for those days included in the future year projection. Overall, the base year tendency is towards under prediction.

It is important to note that the analysis included both weekdays and weekend days. For example, the RRF calculation for the design site, Crestline, included 4 days with

observed concentrations above 140 ppb including one Thursday, two Fridays and one Saturday. In contrast, the RRF for Fontana met the four day criteria at the 120 ppb threshold with one Thursday, two Saturdays and two Sunday episodes respectively. For both Azusa and Glendora, one of the four days included in the analysis was a weekday.

TABLE VII-5-9

Ozone Episode Selection Criteria: Four Days Above Threshold With Daily Absolute Percentage Prediction Error < 20%

Station	Zone	Tier (PPB)	No. Days	Avg Bias (PPB)	Avg Error (PPB)
Burbank	3	100	4	-8.4	8.4
Reseda	3	100	5	-8.0	9.5
Santa Clarita	3	110	6	-12.0	12.0
Azusa	4	115	4	-11.6	11.6
Glendora	4	120	4	-11.3	11.3
Pomona	4	115	5	-2.3	3.1
Banning Airport	4	100	5	-5.6	10.6
Lake Elsinore	4	115	7	-9.9	9.9
Mira Loma	4	120	4	4.3	4.9
Perris	4	115	6	-13.7	13.7
Rubidoux	4	125	4	-1.8	7.4
Crestline	4	140	5	-8.6	10.5
Fontana	4	120	5	-1.2	6.1
Redlands	4	130	4	0.3	4.7
San Bernardino	4	125	5	0.0	11.2
Upland	4	115	6	-4.8	7.0
Pasadena	5	100	5	-5.9	7.1

Tables VII-5-10 and VII-5-11 provide the summaries of the RRF analyses for the June through August period for 2022 baseline (440 TPD VOC and 335 TPD NOx) and 2022 controlled emissions (410 TPD VOC and 150 TPD NOx). The analyses provide future year projected 1-hour ozone design values for two scenarios: with and without the June 19th simulation day included. The difference between the projected future year design values assessed from the 17 and 18 day analyses provides an assessment of the impact a single day can have on the RRF attainment calculation.

The 2022 baseline analysis (Table VII-5-10) indicates that roughly half of the stations with 2008 weighted design values exceeding 120 ppb will not meet the attainment threshold of 124.4 ppb. Future year design values for the eastern portion of the Basin are projected to approach the standard at several sites. However, Crestline and Upland will remain upwards of 11 ppb over the attainment level. The San Gabriel Valley stations of Azusa, Pasadena and Glendora are all projected to be at least 15 ppb above the standard in the baseline scenario. Removing June 19th from the baseline analysis only impacts Pasadena, whereby the projected future design value is lowered by more than 8 ppb. All other future year design values remain ± 1 ppb of the 18 station estimate.

When the controlled scenario is implemented in 2022 (TableVII-5-11), the predicted future year design values for the eastern portion of the Basin meet the attainment threshold. Only the San Gabriel Valley has projected design values exceeding the threshold. Removing June 19th from the analysis brings Pasadena into compliance and lowers the future design value at Azusa to within 3 ppb of the attainment goal. The removal of June 19th does not impact Glendora because that day was not included in the base year analysis. Of note, the removal of June 19th causes the Upland future year design value to nominally increase by 2 ppb. The RRF analysis demonstrates that the emissions reductions targeted through the implementation of the control program will cause future year air quality to meet the 1-hour standard at the majority of the areas in the Basin. Accounting for a particularly restrictive meteorological episode day, and excluding an episode such as June 19th, narrowed the gap between a projection of attainment and non-attainment. Overall, the 2022 17-day Tiered RRF analysis based on the controlled emissions closely mirrored the deterministic attainment demonstration.

While the tiered RRF analysis attainment projection can provide an approximation of the form of the 1-hour standard, the analysis does not provide an exact comparison. Day selection, the number of days included in the calculation, and the simulation performance for that day, all have critical impacts on the outcome of the future year projections.

The weight of evidence discussion provided in this section shows that the ongoing trends in air quality due to the implementation of the 2007 and 2012 control program and the control strategies already in place is expected to lower the future year 1-hour ozone design value such that the Basin will meet the standard by 2022. This is consistent with the Basin's projected attainment of the 8-hour ozone standard in 2023. Furthermore, while the tiered RRF analysis did not replicate the deterministic attainment projection, the analysis lends support to the level of emissions reduction need for attainment and the areas of the Basin expected to experience most air quality improvements from implementation of the control program.

TABLE VII-5-10

Summary of 2022 Tiered RRF Analysis for Baseline Emissions (440 TPD VOC and 335 TPD NOx)

Station	Days Included	Threshold to Enter Analysis	2008 Design Value	RRF 18- Days	Future Design 18-Days	RRF 17-Days*	Future Design 17-Days*
Azusa	4	115	137	1.021	139.9	1.024	140.3
Burbank	4	100	127	0.969	123	0.969	123
Glendora	4	120	151	0.949	143.3	0.949	143.3
Pasadena	5	100	130	1.089	141.6	1.026	133.4
Pomona	5	115	138	0.902	124.5	0.907	125.2
Reseda	5	100	125	0.899	112.4	0.899	112.4
Santa Clarita	6	110	141	0.849	119.7	0.849	119.7
Banning Airport	5	100	138	0.868	119.7	0.876	120.9
Lake Elsinore	7	115	133	0.818	108.8	0.818	108.8
Mira Loma	4	120	129	0.844	108.9	0.841	108.5
Perris	6	115	134	0.832	111.5	0.832	111.5
Rubidoux	4	125	137	0.853	116.9	0.850	116.4
Crestline	5	140	158	0.854	134.9	0.858	135.6
Fontana	5	120	148	0.867	128.3	0.865	128
Redlands	4	130	149	0.854	127.2	0.842	125.5
San Bernardino	5	125	150	0.851	127.7	0.829	124.4
Upland	6	115	147	0.924	135.9	0.929	136.6

*June 19th is removed from the analysis

TABLE VII-5-11

Summary of 2022 Tiered RRF Analysis for 2022 Controlled Emissions (VOC 410 TPD, NOx 150 TPD)

Station	Days Included	Threshold to Enter Analysis	2008 Design Value	RRF 18- Days	Future Design 18-Days	RRF 17-Days*	Future Design 17-Days*
Azusa	4	115	137	0.956	131.0	0.930	127.4
Burbank	4	100	127	0.879	111.6	0.879	111.6
Glendora	4	120	151	0.884	133.5	0.884	133.5
Pasadena	5	100	130	1.035	134.6	0.950	123.5
Pomona	5	115	138	0.788	108.8	0.797	110.0
Reseda	5	100	125	0.808	101.0	0.808	101.0
Santa Clarita	6	110	141	0.747	105.3	0.747	105.3
Banning Airport	5	100	138	0.743	102.5	0.751	103.6
Lake Elsinore	7	115	133	0.683	90.9	0.683	90.9
Mira Loma	4	120	129	0.746	96.2	0.760	98.0
Perris	6	115	134	0.705	94.5	0.705	94.5
Rubidoux	4	125	137	0.758	103.8	0.773	105.9
Crestline	5	140	158	0.737	116.4	0.751	118.7
Fontana	5	120	148	0.749	110.8	0.752	111.2
Redlands	4	130	149	0.735	109.6	0.734	109.4
San Bernardino	5	125	150	0.739	110.9	0.727	109.0
Upland	6	115	147	0.824	121.1	0.838	123.2

*June 19th is removed from the analysis

SUMMARY AND CONCLUSIONS

CMAQ regional air quality simulations, conducted for the severe June 18 - 22, 2008 meteorological episode, demonstrate that the Basin will be in attainment of the revoked 1-hour ozone standard with controlled emissions of 410 TPD VOC and 150 TPD NOx in 2022. The form of the 1-hour standard allows for one day at each station to exceed the threshold of 120 ppb (124.4 for the modeling attainment threshhold). When the deterministic modeling was expanded to include 92 days of simulations from June 1 through August 31, the projected number of violations of the standard totaled one station day at Pasadena. The attainment demonstration is supported by the air quality trend analysis and a companion attainment analysis based on a tiered RRF methodology.

The 1997 SIP's 1-hour ozone attainment demonstration defined a 2010 VOC and NOx emissions carrying capacity 413 and 530 TPD, respectively. The 2003 AQMP's updated attainment demonstration revised the projection to 313 TPD VOC and 541 TPD NOx. The contribution of the long term emissions reductions measures to the attainment demonstration were 46 percent in 1997 and 76 percent in 2003. The 2007 federally approved 8-hour ozone attainment demonstration defined a 2023 carrying capacity of 420 TPD VOC and 114 TPD NOx. As presented above, the 1-hour ozone attainment demonstration defines a 2022 carrying capacity of 410 TPD VOC and 150 TPD NOx. For both the current 8-hour and revoked 1-hour ozone standards, require a control strategy that significantly reduces NOx emissions and thus a continued reliance on long term measures (CAA Section 182(e)(5) "black box" measures). For the 1-hour ozone attainment demonstration, the "black box" control measures account for 43 percent of the total emissions reductions from the 2022 baseline needed for attainment.

This current 1-hour ozone attainment demonstration requires 7 percent VOC and 55 percent NOx emissions reductions from 2022 baseline emissions. The targeted emissions reductions to achieve 1-hour ozone attainment are consistent in both the amount of emissions reduction and timing of those reductions with the approved 2007 8-hour ozone SIP inventory. Table VII-5-12 summarizes the emissions reductions required for attainment of the 1-hour ozone standard.

TABLE-VII-5-12

1-hour Ozone Attainment Demonstration Emissions Summary

Scenario	VOC (TPD)	NOx (TPD)	CO (TPD)
2022 Baseline	440	335	1540
2022 Attainment	410	150	1540
Total Reduction	30	185	0
Percentage Reduction From Baseline	7	55	0

SECTION 6

Environmental and Socioeconomic Impacts

California Environmental Quality Act (CEQA)

In anticipation that U.S. EPA would likely request that the District prepare a one-hour ozone SIP, the Program Environmental Impact Report (EIR) for the 2012 AQMP included a total of 11 project objectives[2] including the following:

- Continue making expeditious progress towards attaining the federal eight-hour ozone standard and demonstrate attainment of the federal one-hour ozone standard (revoked) by 2022 – 2023;
- Reduce population exposure to ozone through continued progress towards attaining the federal one-hour (revoked) and eight-hour ozone standards by 2022 – 2023;

The 2012 AQMP reflects a multi-agency effort to identify 2012 AQMP control measures that specifically address the District's efforts to attain the federal 24-hour PM2.5 standard and the federal one-hour (revoked) and eight-hour ozone standards by 2022 – 2023, respectively. Consistent with CEQA requirements to analyze the whole of the actions from a project, the Program EIR prepared for the 2012 AQMP includes an environmental analysis of all PM2.5 control measures, as well as, all of the ozone-related control measures in the 2012 AQMP.

On September 19, 2012, U.S. EPA published in the Federal Register a proposed "SIP call" which, if finalized, would require the District to prepare a demonstration of attainment of the one-hour ozone standard, with attainment required by ten years from the date the SIP call is finalized. The same day, U.S. EPA published in the Federal Register a proposal to withdraw its approval of, and then to disapprove, the transportation control measure (TCM) demonstrations, also referred to as VMT emissions offset demonstrations, in the 2003 one-hour ozone plan and the 2007 eight-hour ozone plan. As explained by U.S. EPA, both of these actions were taken in response to a decision of the Ninth Circuit Court of Appeals in Association of Irritated Residents v EPA, January 27, 2012.

In response to U.S. EPA's "SIP call" and in anticipation that it will be finalized, District staff has prepared this 1-*hour Ozone Attainment Demonstration*, which demonstrates attainment of the federal one-hour (revoked) ozone standard by the year 2022. The federal one-hour ozone attainment demonstration in this document contains all of the same ozone control measures that are included in the 2012 AQMP,

[2] CEQA Guidelines §15124(b)

as well as the seven remaining mobile source control measures from the 2007 AQMP. No new measures are proposed beyond those in the 2012 AQMP.

Similarly, in connection with the proposed disapproval of the TCM demonstrations for the South Coast Air Basin, U.S. EPA prepared a guidance document[3] for Severe and Extreme ozone nonattainment areas on how to address Clean Air Act (CAA) §182(d)(1)(A) (VMT emissions offset demonstrations). District staff conducted a VMT emissions offset analysis pursuant to U.S. EPA guidance and concluded that actual emissions with controls and VMT growth were substantially less than emissions assuming no new measures and no VMT growth ("ceiling"). Based on this conclusion, no new TCMs are required for the one-hour ozone SIP. District staff has prepared the *VMT Offset Requirement Demonstration* (2012 AQMP Appendix VIII) to provide the results of the VMT emissions offset analysis to the public.

With regard to the seven mobile source control measures from the 2007 AQMP, potential environmental impacts from these control measures along with all other 2007 AQMP ozone and PM2.5 control measures were evaluated in the Final Program EIR for the 2007 AQMP (Sch. #2006111064), certified by the District Governing Board on June 1, 2007. These remaining measures would be implemented even without the 2012 AQMP. For this reason, the seven mobile source control measures, as well as four other remaining control measures from the 2007 AQMP, were also evaluated as Alternative 1, the No Project Alternative, in the 2012 AQMP Program EIR, which concluded that implementation of the remaining 2007 AQMP control measures would not generate any significant adverse environmental impacts. The inclusion of existing 2007 AQMP control measures in this 1-*hour Ozone Attainment Demonstration* does not require additional environmental review where no changes are being proposed to the 2007 measures.

Based on the above information, no additional control measures or TCMs to address progress in attaining the federal one-hour (revoked) and eight-hour ozone standards by 2022 – 2023 have been identified beyond those listed in the 2012 AQMP. This means that this 1-*hour Ozone Attainment Demonstration* includes all of the same ozone-related control measures that are currently in the 2012 AQMP. Further, the timing or implementation dates of the ozone control measures in this 1-*hour Ozone Attainment Demonstration* compared to timing and implementation dates in the 2012 AQMP would not change to meet the one-hour standard. Therefore, by analyzing the 2012 AQMP ozone-related control measures in the Program EIR, the Program

[3] U.S. EPA. Office of Transportation and Air Quality. 2012. *Implementing Clean Air Act Section 182(d)(1)(A): Transportation Control Measures and Transportation Control Strategies to Offset Growth in Emissions Due to Growth in Vehicle Miles Travelled*. EPA-420-B-12-053. August. http://www.epa.gov/otaq/stateresources/policy/general/420b12053.pdf.

EIR also serves as the CEQA document for this 1-*hour Ozone Attainment Demonstration* and the *VMT Offset Requirement Demonstration* (2012 AQMP Appendix VIII). Finally, potential impacts from the seven remaining mobile source ozone control measures from the 2007 AQMP have been disclosed to the public in the 2007 AQMP and as part of the alternatives analysis in the Program EIR for the 2012 AQMP. Since no changes are being proposed to those existing measures, no additional environmental analysis of the 2007 AQMP control measures is required.

Socioeconomic Analysis

The *1-hour ozone attainment demonstration* provided in this Appendix does not include any new measures beyond those proposed for the 8-hour ozone plan in the Final 2012 AQMP. The socioeconomic impacts of the included new measures are fully analyzed in the Socioeconomic Report for the Final 2012 AQMP. The impacts of the 2007 AQMP ozone attainment strategy and the benefits of ozone attainment were discussed in the Socioeconomic Report associated with the 2007 AQMP. Therefore, no additional socioeconomic impact analysis is necessary.

District staff assesses the socioeconomic impacts of proposed rule amendments or proposed rules pursuant to the Board resolutions and state legislative requirements. As additional information on control requirements becomes more well-defined during the rulemaking process, a detailed assessment of their socioeconomic and environmental impacts will be conducted.

Attachment-1

CMAQ Performance

Observed Vs. Predicted

Concentration, Bias & Error

June 18-22, 2008

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Azusa	3	33.76	7	36.29	14	44.03	2	35.37	6	36.56
1	Azusa	4	33.38	2	34.33	6	42.53	10	35.8	14	36.15
2	Azusa	8	33.54	2	33.07	6	39.65	2	36.21	8	35.86
3	Azusa	2	33.28	3	31.47	2	36.77	2	37.35	8	35.64
4	Azusa	-999	32.16	-999	29.74	-999	34.1	-999	37.84	-999	35.99
5	Azusa	2	31.2	3	28.29	3	32.05	5	37.31	8	35.57
6	Azusa	7	29.84	5	27.28	6	30.45	10	35.85	15	34.72
7	Azusa	15	30.17	8	29.7	15	31.63	14	38.2	32	38.25
8	Azusa	38	35.25	16	38.17	20	39.05	32	49.09	46	48.26
9	Azusa	41	43.26	24	48.35	35	50.1	62	63.12	70	57.94
10	Azusa	59	53.94	48	59.82	56	65.29	92	77.82	92	70.35
11	Azusa	80	64.54	86	74.93	85	80.05	117	90.07	110	84.17
12	Azusa	99	73.98	100	91.83	114	84.58	132	102.71	113	96.8
13	Azusa	115	79.66	111	103.84	105	81.06	113	113.45	104	105.87
14	Azusa	117	78.06	135	107.18	117	76.38	106	116.08	103	102.5
15	Azusa	89	81.24	98	100.46	95	82.84	97	106.64	103	90.69
16	Azusa	70	85.47	89	88.59	78	84.96	92	80.13	92	83.95
17	Azusa	65	76.13	63	78.16	69	75.58	80	62.45	77	70.7
18	Azusa	54	62.41	53	67.02	55	57.4	60	52.39	54	53.74
19	Azusa	35	53.55	36	61.67	63	50.33	50	50.39	44	43.91
20	Azusa	26	45.48	24	53.23	50	45.95	41	46.79	27	39.19
21	Azusa	15	41.27	15	46.97	47	40.19	37	44.09	22	36.93
22	Azusa	8	39.34	24	46.17	44	36.55	16	41.66	16	35.32
23	Azusa	7	37.77	19	45.08	7	34.8	13	38.46	14	33.73
	Max	117	85.47	135	107.18	117	84.96	132	116.08	113	105.87

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Burbank	1	33.61	1	30.93	2	33.99	2	33.26	2	34.06
1	Burbank	1	30.17	1	29.58	2	31.67	2	34.3	2	32.26
2	Burbank	1	26.02	1	27.78	2	30.75	2	34.94	4	32.15
3	Burbank	1	22.17	1	25.06	2	29.9	2	34.84	5	32.92
4	Burbank	-999	19.36	-999	20.56	-999	27.93	-999	33.35	-999	32.36
5	Burbank	3	18.91	2	17.67	2	24.17	6	31.01	7	31.34
6	Burbank	6	20.1	5	17.73	4	21.76	13	28.14	17	29.55
7	Burbank	20	25.04	10	21.67	10	23.1	23	30.13	28	31.09
8	Burbank	26	31.64	16	29.72	19	30.48	46	40.57	46	38.74
9	Burbank	39	38.62	31	39.06	37	39.06	63	51.14	64	47.92
10	Burbank	41	45.56	33	49.42	40	49.03	89	61.35	84	59.82
11	Burbank	61	52.41	63	60.32	64	58.44	110	74.38	117	74.6
12	Burbank	83	60.92	95	71.19	96	65.15	106	90.54	98	82
13	Burbank	87	72.17	87	80.71	111	75.47	106	93.55	91	79.9
14	Burbank	66	84.15	84	89.13	98	89.12	122	80.86	93	80.03
15	Burbank	58	86.99	81	95.9	82	90.98	108	73.2	99	75.1
16	Burbank	54	80.48	71	96.32	71	74.08	57	68.88	71	65.32
17	Burbank	45	66.3	65	78.56	58	49.67	49	60.13	58	57.9
18	Burbank	30	47.31	52	55.53	58	32.57	43	42.03	58	44.8
19	Burbank	18	36.97	28	46.16	52	28.58	29	33.41	42	35.49
20	Burbank	9	31.64	20	39.6	26	32	23	35.45	28	32.76
21	Burbank	5	31.29	10	37.44	14	35.99	10	36.2	20	32.37
22	Burbank	2	31.33	4	37.84	2	36.63	2	35.57	9	30.78
23	Burbank	1	31.46	2	36.8	2	33.52	1	35.38	4	29.12
	Max	87	86.99	95	96.32	111	90.98	122	93.55	117	82

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Glendora	24	33.63	39	37.12	32	44	33	39.84	31	37.86
1	Glendora	20	34.26	42	36.16	31	42.62	28	38.64	29	36.84
2	Glendora	16	35.02	39	35.41	16	41.68	23	38.29	26	36.77
3	Glendora	19	35.36	49	34.08	25	40.38	19	38.38	30	37.12
4	Glendora	-999	34.82	-999	32	-999	38.8	-999	38.1	-999	37.34
5	Glendora	24	33.92	38	29.95	18	37.42	25	37.19	23	36.68
6	Glendora	30	32.75	40	29.34	18	36	34	35.85	26	35.63
7	Glendora	-999	32.74	-999	32.63	-999	37.18	39	38.18	38	38.44
8	Glendora	-999	37.53	-999	41.24	-999	43.16	44	47.99	52	48.7
9	Glendora	-999	44.82	45	50.52	-999	51.89	64	60.71	75	58.07
10	Glendora	-999	54.66	54	60.81	-999	65.01	97	75.47	104	67.83
11	Glendora	87	64.9	76	73.58	-999	80.12	128	88.02	117	81.84
12	Glendora	-999	75.49	111	89.99	118	86.22	156	99.05	123	96.75
13	Glendora	-999	85.44	121	105.48	138	87.25	135	113.63	120	111.13
14	Glendora	131	87.15	152	114.89	129	82.22	119	122.46	116	114.48
15	Glendora	109	82.57	124	114.08	112	81.58	107	119.68	116	101.96
16	Glendora	79	86.62	105	101.05	88	83.52	103	99.69	102	90.33
17	Glendora	72	81.68	76	83.94	80	79.32	93	74.16	93	79.54
18	Glendora	62	68.44	60	69.98	67	68.37	68	65.88	69	64.64
19	Glendora	45	58.61	50	61.31	57	63.53	53	64.71	51	52.06
20	Glendora	32	52.27	35	56.48	53	57.24	43	53.42	41	42.64
21	Glendora	23	46.57	28	52.07	44	47.47	37	45.45	32	39.07
22	Glendora	22	42.71	23	49.24	39	42.53	33	42.03	30	37
23	Glendora	28	39.34	22	46.09	37	40.52	30	39.54	25	35.9
	Max	131	87.15	152	114.89	138	87.25	156	122.46	123	114.48

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Los Angeles	-999	23.56	-999	18.41	-999	17.17	1	14.82	13	22.88
1	Los Angeles	1	21.42	-999	18.07	-999	17.19	1	17.88	10	23.36
2	Los Angeles	1	18.44	-999	16.85	-999	17.92	3	20.79	6	25.2
3	Los Angeles	1	14.91	1	13.92	-999	17.48	6	22.83	13	27.17
4	Los Angeles	-999	10.85	-999	9.67	-999	15.12	-999	23.32	-999	27.49
5	Los Angeles	1	10.59	1	9.5	1	12.63	3	23.73	6	26.47
6	Los Angeles	4	14.24	2	12.74	3	12.48	6	23.16	18	25.45
7	Los Angeles	7	22.61	4	19.67	9	16.26	18	28.7	26	31.08
8	Los Angeles	-999	30.8	11	29.51	26	26.67	27	42.48	33	41.84
9	Los Angeles	-999	38.6	26	43.27	33	39.98	50	57.91	51	52.14
10	Los Angeles	-999	45.51	46	56.86	31	52.66	76	69.39	79	62.75
11	Los Angeles	65	51.03	68	66.63	50	59.48	74	77.53	90	76.68
12	Los Angeles	78	58.43	74	73.24	64	63.18	98	88.6	70	85.4
13	Los Angeles	71	70.5	81	77.64	82	73.99	103	93.26	80	81.12
14	Los Angeles	59	82.46	58	81.9	78	86.99	91	79.62	84	81.79
15	Los Angeles	52	80.47	54	85.64	72	85.32	76	68.66	75	78.88
16	Los Angeles	44	70.73	55	82.07	61	65.35	66	66.81	57	65.5
17	Los Angeles	29	57.76	50	66.04	52	38.21	67	60.18	56	55.68
18	Los Angeles	27	39.43	37	43.44	29	18.99	49	38.22	39	41.32
19	Los Angeles	10	27.93	35	33.83	9	14.53	32	25.03	33	29.78
20	Los Angeles	13	21.03	15	28.79	5	15.03	14	23.21	25	24.46
21	Los Angeles	7	17.32	6	22.92	1	15.28	3	23.73	17	20.4
22	Los Angeles	4	16.42	2	20.04	-999	15.63	1	23.18	19	18.42
23	Los Angeles	2	17.54	1	18.67	1	13.32	6	23.29	18	17.37
	Max	78	82.46	81	85.64	82	86.99	103	93.26	90	85.4

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	LAX	24	38.53	4	15.66	3	14.84	31	14.78	9	20.85
1	LAX	23	36.29	7	13.76	28	10.37	24	10.04	4	21.94
2	LAX	18	31.98	5	13.1	24	10.52	15	9.83	12	20.74
3	LAX	12	24.74	6	11.29	17	10.64	12	11.37	14	18.42
4	LAX	-999	14.45	-999	9	-999	10.22	-999	14.02	-999	18.42
5	LAX	3	9.14	10	10.05	2	12.35	20	17.61	18	20.8
6	LAX	7	12.4	10	13.46	5	15.08	19	19.79	23	23.69
7	LAX	18	19.48	15	19.71	10	18.82	28	24.75	29	29.94
8	LAX	30	28.52	24	29.35	20	25.96	36	36.47	30	39.67
9	LAX	42	36.97	35	42.42	28	37.29	37	49.83	37	49.7
10	LAX	52	43.25	50	53.89	27	45.97	56	58.12	41	62.81
11	LAX	54	53.31	60	63.03	40	56.48	64	65.74	41	77.13
12	LAX	45	68.56	60	73.28	52	69.79	58	75.15	39	79.57
13	LAX	46	81.31	60	81.7	51	82.73	56	79	47	79.46
14	LAX	52	84.11	55	84.4	41	83.82	57	77.51	53	80.48
15	LAX	54	78.91	54	79.63	44	70.01	60	77.98	54	72.22
16	LAX	47	71.29	50	70.95	52	56.66	60	75.79	53	66.8
17	LAX	38	62.61	41	62.39	49	49.38	65	67.74	51	59.05
18	LAX	37	53.9	37	54.3	51	40.03	61	55.89	51	48.6
19	LAX	31	48.53	25	50.16	49	35.71	47	47.2	46	42.33
20	LAX	28	43.76	25	45.42	45	34.41	41	41.66	41	39.24
21	LAX	16	38.52	18	39.01	45	31.9	32	37.68	34	34.83
22	LAX	-999	30.2	19	31.02	37	29.19	28	30.49	31	29.91
23	LAX	1	20.47	3	22.8	31	22.39	24	23.41	29	25.73
	Max	54	84.11	60	84.4	52	83.82	65	79	54	80.48

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Lynwood	13	25.28	19	16.23	1	13.05	10	4.9	30	21.04
1	Lynwood	4	23.27	23	17.26	2	15.18	20	6.42	30	19.43
2	Lynwood	11	19.91	14	17.09	-999	16.18	26	8.93	24	19.63
3	Lynwood	6	15.74	6	14.67	-999	14.44	22	12.06	22	22.07
4	Lynwood	-999	11.17	-999	11.46	-999	11.05	-999	14.91	-999	24.17
5	Lynwood	1	11.06	-999	11.28	-999	10.03	9	18.51	11	24.95
6	Lynwood	2	15.89	2	14.38	1	11.51	9	21.95	22	25.66
7	Lynwood	4	24.66	8	22.3	4	15.9	22	30.04	34	33.25
8	Lynwood	10	32.74	14	33.7	17	26.15	33	45.23	46	45.12
9	Lynwood	25	40.62	29	49.09	25	41.09	48	61.71	52	56.2
10	Lynwood	37	47.12	45	63.78	33	53.72	56	72.86	53	64.44
11	Lynwood	49	50.68	64	73.1	39	58.16	50	77.22	49	73.01
12	Lynwood	58	57.36	65	77.02	52	64.69	75	83.41	70	83.07
13	Lynwood	58	71.75	67	80.38	78	77	71	90.89	60	83.78
14	Lynwood	49	85.41	53	83.96	61	86.47	64	86.33	62	83.42
15	Lynwood	50	81.74	47	85.17	52	83.96	54	71.69	63	80.26
16	Lynwood	47	69.63	59	77.35	48	63.59	52	68.7	52	64.75
17	Lynwood	34	58.04	47	60.29	37	40.64	54	62.63	40	55.66
18	Lynwood	26	44.97	32	42.11	31	22.28	35	43.88	33	45.49
19	Lynwood	20	34.61	18	31.91	13	15.76	17	31.97	26	36.62
20	Lynwood	21	27.52	23	25.94	12	14.01	12	30.07	20	31.29
21	Lynwood	20	22.1	19	20.47	11	11.06	9	28.63	22	24.97
22	Lynwood	18	17.91	8	17.01	13	9.77	8	24.92	21	20.17
23	Lynwood	17	15.82	6	13.8	13	7.13	23	22.94	18	16.92
	Max	58	85.41	67	85.17	78	86.47	75	90.89	70	83.78

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Long Beach	25	29.23	36	16.36	9	17.21	30	6.79	33	20.09
1	Long Beach	30	27.34	34	17.85	10	20.35	30	4.69	27	16.35
2	Long Beach	31	22.69	27	19.69	15	19.94	29	4.5	27	15.16
3	Long Beach	28	16.16	22	19.38	21	17.81	27	5.89	27	15.83
4	Long Beach	-999	12.67	-999	17.29	-999	14.7	-999	8.43	-999	18.67
5	Long Beach	19	13.98	2	17.08	7	13.21	19	13.26	21	21.69
6	Long Beach	7	18.98	5	19.99	3	14.55	27	18.44	28	24.29
7	Long Beach	9	27.25	14	27.31	13	18.42	33	27.18	33	31.32
8	Long Beach	12	35.74	19	38.03	25	26.42	43	40.91	38	40.08
9	Long Beach	17	43.32	19	51.67	27	37.82	51	54.61	41	48.72
10	Long Beach	16	49.63	25	64.24	37	50.06	49	65.63	49	56.36
11	Long Beach	48	54.49	41	72.18	46	60.95	50	72.08	43	68.38
12	Long Beach	87	62.54	59	77.02	68	73.74	53	78.26	47	84.96
13	Long Beach	83	78.79	61	83.5	77	84.1	46	88.78	51	88.98
14	Long Beach	72	89.63	41	90.21	78	86.39	59	89.3	52	85.9
15	Long Beach	62	84.44	47	87.65	67	80.97	73	74.17	57	79.63
16	Long Beach	46	70.84	35	73.62	70	64.56	72	69.31	70	63.6
17	Long Beach	37	58.66	34	55.32	69	45.32	71	61.93	58	54.6
18	Long Beach	42	47.48	30	40.43	57	28.34	45	46.67	50	44.4
19	Long Beach	35	39.42	34	33.5	41	20.67	38	37.47	38	37.28
20	Long Beach	34	33.45	28	29.27	26	20.86	31	32.54	31	33.38
21	Long Beach	36	28.08	23	24.8	42	17.83	28	28.92	29	27.77
22	Long Beach	37	22.83	21	22.28	37	13.73	34	26.43	23	20.87
23	Long Beach	35	17.93	16	18.19	27	10.76	38	24.27	22	18.12
	Max	87	89.63	61	90.21	78	86.39	73	89.3	70	88.98

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Pasadena	3	31.97	3	31.35	-999	33.44	2	29.82	8	34.36
1	Pasadena	1	30.65	3	30.05	-999	33.42	1	33.05	7	33.49
2	Pasadena	-999	28.75	2	28.32	-999	32.59	-999	34.29	9	33.88
3	Pasadena	-999	26.88	1	26.07	-999	30.64	2	35.22	8	33.7
4	Pasadena	-999	25.33	-999	22.65	-999	28.01	-999	35.59	-999	33.04
5	Pasadena	1	25.37	1	21.27	1	25.14	4	34.44	4	32.02
6	Pasadena	7	26.07	5	21.85	10	23.81	13	32.53	22	30.53
7	Pasadena	24	29.13	18	24.91	19	25.93	34	35.23	32	33.74
8	Pasadena	44	34.26	39	31.61	39	34.51	53	44.93	50	42.34
9	Pasadena	61	41.64	62	42.69	55	46.29	72	58.12	72	53.29
10	Pasadena	79	50.84	66	55.92	78	60.29	94	72.59	91	65.92
11	Pasadena	88	59.37	72	70.76	90	69.62	104	85.21	101	79
12	Pasadena	82	65.44	90	83.38	73	70.96	100	96.82	107	91.43
13	Pasadena	96	70.44	110	89.62	94	69.28	107	106.23	93	93.97
14	Pasadena	81	78.04	91	89.84	86	77.31	93	103.07	90	87.31
15	Pasadena	66	85.33	77	87.01	78	88.16	81	83.66	88	85.27
16	Pasadena	58	81.6	63	86.27	72	84.42	84	70.77	79	76.87
17	Pasadena	52	70.36	58	78.8	66	63.15	61	63.19	57	62.74
18	Pasadena	36	54.42	44	62.12	53	41.56	52	48.16	51	47.24
19	Pasadena	22	42.06	30	56.32	35	35.97	42	37.34	37	36.96
20	Pasadena	13	32.68	18	45.28	19	33.54	28	35.41	21	33.77
21	Pasadena	11	29.77	16	36.45	9	30.53	18	35.66	14	32.21
22	Pasadena	10	30.53	11	35.26	2	29.02	12	35.08	12	29.91
23	Pasadena	9	31.58	4	34.51	-999	27.56	10	35.79	9	28.43
	Max	96	85.33	110	89.84	94	88.16	107	106.23	107	93.97

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Pico Rivera	3	23.17	2	28.06	-999	27.37	1	17.67	22	30.57
1	Pico Rivera	3	22.17	-999	27.42	-999	30.13	13	22.74	27	29.8
2	Pico Rivera	5	21.19	-999	25.74	-999	29.51	12	25.85	20	29.99
3	Pico Rivera	1	20.5	-999	23.27	-999	25.15	4	28.85	-999	31.07
4	Pico Rivera	-999	19.39	-999	19.39	-999	20.76	-999	30.41	-999	31.92
5	Pico Rivera	-999	19.63	-999	18.12	-999	18.13	-999	31.59	1	31.83
6	Pico Rivera	2	21.24	-999	20.06	-999	17.98	6	32.43	15	31.62
7	Pico Rivera	7	26.59	9	26.55	4	22.6	19	38.26	38	37.65
8	Pico Rivera	11	32.88	18	37	8	33.24	32	50.53	50	48.37
9	Pico Rivera	21	41.54	44	50.25	32	47.45	44	64.62	60	61.34
10	Pico Rivera	47	52.08	65	65.69	73	64.12	80	78.74	80	73.19
11	Pico Rivera	73	59.44	60	81.88	84	72.07	100	88.89	78	80.58
12	Pico Rivera	82	62.35	75	91.39	79	72	88	95.97	77	87.11
13	Pico Rivera	87	65.69	99	90.84	80	72.58	96	100.82	83	88.26
14	Pico Rivera	70	76.72	86	87.39	86	81.12	92	97.95	85	84.52
15	Pico Rivera	67	85.75	83	85.39	66	87.08	80	78.75	82	82.39
16	Pico Rivera	64	77.53	61	83.75	61	79.08	68	64.38	73	72.57
17	Pico Rivera	55	63.03	53	73.15	60	54.69	64	59.56	58	57.3
18	Pico Rivera	42	45.22	41	50.78	52	26.39	57	43.62	48	44.64
19	Pico Rivera	32	31.7	34	36.01	35	15.11	40	30.29	37	34.16
20	Pico Rivera	24	26.24	25	31.28	13	14.59	28	27.78	30	28.36
21	Pico Rivera	15	23.75	14	27.78	2	11.99	19	27.84	24	23.03
22	Pico Rivera	2	24.47	13	27.3	-999	11.71	16	29.93	21	19.94
23	Pico Rivera	2	26.26	-999	26.58	-999	12.62	11	31.13	19	18.83
	Max	87	85.75	99	91.39	86	87.08	100	100.82	85	88.26

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Pomona	4	27.5	3	39.43	3	44.59	3	36.65	4	36.06
1	Pomona	3	27.45	3	38.5	3	40.66	3	38.01	3	37.49
2	Pomona	3	28.59	3	38.43	2	39.33	3	39.13	5	39.72
3	Pomona	2	29.36	3	36.76	3	38.18	2	39.35	3	40.42
4	Pomona	-999	28.52	-999	34.88	-999	36.91	-999	39.79	-999	40.53
5	Pomona	3	26.25	3	32.07	4	35.08	4	39.89	8	40.56
6	Pomona	6	24.92	5	31.19	11	32.7	9	39.48	14	41.47
7	Pomona	20	26.33	10	34.96	21	33.25	18	43.46	32	46.85
8	Pomona	33	33.17	21	43.27	35	39.77	34	54.62	52	59.58
9	Pomona	67	43.65	49	51.54	56	50.62	76	65.98	78	72.36
10	Pomona	81	56.11	56	62.67	79	65.59	96	78.17	99	80.25
11	Pomona	91	66.16	87	77.82	84	78.85	117	89.21	116	89.77
12	Pomona	103	75.63	116	95.22	101	88.45	137	102.7	113	100.46
13	Pomona	105	84.13	126	110.18	141	95.17	118	120.26	93	106.56
14	Pomona	134	84.71	123	116.32	138	98.33	110	123.92	84	109.91
15	Pomona	126	77.72	106	113.75	106	95.91	98	115.45	86	103.84
16	Pomona	92	82.38	100	100.82	85	83.96	82	97.05	88	89.21
17	Pomona	74	80.02	82	82.05	67	73.33	71	65.8	80	76.97
18	Pomona	63	64.93	60	69.05	55	58.61	65	51.52	69	59.74
19	Pomona	42	52.42	46	63.24	29	49.56	53	51.62	54	47.2
20	Pomona	34	47.04	34	58.79	6	46.47	37	48.21	41	37.98
21	Pomona	25	45.91	18	57.92	3	39.28	24	41.86	31	32.07
22	Pomona	4	44.8	3	54.85	3	35.37	9	39.22	28	30.66
23	Pomona	4	42.16	4	50.04	3	35.17	3	36.79	18	29.95
	Max	134	84.71	126	116.32	141	98.33	137	123.92	116	109.91

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Reseda	9	37.3	1	37.73	18	37.4	3	37.64	2	42.69
1	Reseda	15	34.36	2	36.13	8	35.58	3	36.68	1	39.43
2	Reseda	15	31.09	7	34.74	2	34.71	1	36.32	1	35.14
3	Reseda	5	26.7	11	33.02	1	34.23	1	35.8	1	33.21
4	Reseda	-999	21.97	-999	30.44	-999	32.61	-999	34.49	-999	33.92
5	Reseda	3	20.96	5	27.52	3	30.6	3	32.49	4	34.33
6	Reseda	8	22.39	6	26.26	4	29.11	9	30.85	12	33.21
7	Reseda	21	26.5	16	27.76	14	29.17	20	32.37	26	34.84
8	Reseda	62	34.04	44	35.35	58	35.57	33	41.31	47	41.76
9	Reseda	66	41.38	52	42.14	61	41.29	50	48.8	66	48.1
10	Reseda	64	48.02	52	47.73	59	45.58	70	54.82	90	54.24
11	Reseda	62	54.06	42	55.24	53	53.33	67	64.05	90	60.5
12	Reseda	60	62.12	52	68.61	56	64.89	51	72.73	90	65.92
13	Reseda	56	74.85	55	84.71	69	78.6	48	74.88	98	67.83
14	Reseda	62	84.43	44	95.35	70	85.61	49	70.14	105	64.68
15	Reseda	58	81.88	44	95.77	58	77.4	50	65.03	99	58.95
16	Reseda	65	70.62	46	81.17	49	67.02	50	61.39	91	60.94
17	Reseda	67	62.02	57	59.67	48	54.26	47	59.61	75	59.1
18	Reseda	51	53.49	48	49.5	52	39.77	41	51.98	56	50.11
19	Reseda	49	45.91	37	45.46	47	36.2	37	47.83	43	44.07
20	Reseda	45	40.51	24	44.85	41	38.67	28	49.92	32	43.06
21	Reseda	35	41.5	18	45.18	32	41.9	20	49.58	23	41.48
22	Reseda	5	41.45	21	42.92	9	41.83	6	46.77	16	40.07
23	Reseda	2	39.71	21	39.63	7	39.69	3	44.56	13	37.29
	Max	67	84.43	57	95.77	70	85.61	70	74.88	105	67.83

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Santa Clarita	37	39.55	61	38.5	24	37.96	9	41.53	17	43.98
1	Santa Clarita	40	37.63	40	37.2	22	36.57	17	40.66	16	40.96
2	Santa Clarita	40	36.5	31	36.16	21	35.79	22	39.71	19	38.28
3	Santa Clarita	39	35.21	25	35.01	19	35.08	20	38.48	18	36.52
4	Santa Clarita	-999	33.62	-999	33.73	-999	34.08	-999	37.22	-999	35.41
5	Santa Clarita	34	32.53	4	32.71	5	32.96	8	35.98	22	34.69
6	Santa Clarita	34	31.9	6	32.62	9	32.59	13	35.16	21	34.39
7	Santa Clarita	60	33.29	27	34.65	42	34.76	37	36.95	35	36.8
8	Santa Clarita	66	39.01	47	40.79	60	40.74	56	43.09	52	43.02
9	Santa Clarita	66	44.21	57	45.43	67	45.63	64	47.72	62	48
10	Santa Clarita	65	47.96	55	48.82	66	49.44	58	50.05	91	50.74
11	Santa Clarita	59	50.48	50	51.42	55	53.05	55	52.16	105	53.29
12	Santa Clarita	58	52.35	49	54.48	51	58.86	61	56.81	123	59.01
13	Santa Clarita	60	55.53	52	59.43	53	65	56	68.92	80	63.35
14	Santa Clarita	58	64.62	60	66.77	53	72.76	55	75.22	46	62.18
15	Santa Clarita	56	71.18	63	74.31	66	73.92	58	70.4	45	60.02
16	Santa Clarita	55	64.83	62	72.99	72	67.54	60	64.35	43	64.93
17	Santa Clarita	57	58.35	50	58.51	57	59.17	58	62.11	50	64.47
18	Santa Clarita	62	49.45	41	51.66	46	50.82	52	58.3	52	57.87
19	Santa Clarita	66	44.24	36	49.03	42	49.32	39	56.68	49	53.13
20	Santa Clarita	63	43.83	21	48.99	23	47.36	18	55.82	30	50.73
21	Santa Clarita	57	44.12	17	47.46	15	46.77	13	53.79	23	47.65
22	Santa Clarita	57	42.75	20	43.5	10	44.9	11	50.62	28	43.42
23	Santa Clarita	58	40.42	23	40.03	8	43.19	10	47.34	24	38.8
	Max	66	71.18	63	74.31	72	73.92	64	75.22	123	64.93

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	West LA	26	33.81	1	22.56	5	23.84	25	21.86	4	25.79
1	West LA	2	30.72	1	22.76	8	22.32	22	22.46	5	24.97
2	West LA	2	25.92	1	21.48	9	21.33	11	23.66	2	25.11
3	West LA	2	19.26	1	18.6	1	20.37	3	25.26	2	24.87
4	West LA	-999	12.54	-999	15.11	-999	18.44	-999	26.25	-999	27.07
5	West LA	3	11.58	2	13.88	2	17.36	5	26.43	4	28.59
6	West LA	11	14.35	5	15.27	4	17.27	21	24.92	19	28.39
7	West LA	21	20.46	18	19.72	9	18.7	27	27.32	33	30.82
8	West LA	31	28.49	28	28.1	20	25.05	34	38.07	46	39.3
9	West LA	51	36.33	31	38.01	27	34.36	43	49.49	49	49
10	West LA	65	43.09	51	47.51	42	42.2	61	59.41	51	62.14
11	West LA	72	52.26	66	57.01	65	53.15	71	72.7	54	74.96
12	West LA	53	65.12	72	70.98	83	67.85	92	79.55	80	76.25
13	West LA	42	78.82	77	84.48	88	84.04	84	74.06	70	77.32
14	West LA	37	83.88	79	91.73	85	87.97	68	70.75	69	77.75
15	West LA	41	80.19	73	92.59	82	75.28	76	71.49	56	69.73
16	West LA	45	71.7	73	82.45	60	61.46	74	69.63	63	64.74
17	West LA	42	60.69	60	64.5	56	49.62	65	62.54	49	58.36
18	West LA	37	49.39	47	50.31	50	34.04	53	47.81	43	45.98
19	West LA	33	43.38	29	43.72	29	26.55	46	39.38	36	37.94
20	West LA	24	36.78	17	39.37	18	26.58	31	38.94	36	35.77
21	West LA	13	33.88	7	36.27	30	28.41	19	37.44	30	32.13
22	West LA	2	28.95	1	31.57	38	29.35	11	33.24	26	28.68
23	West LA	2	23.17	2	26.7	36	24.86	3	28.31	24	25.6
	Max	72	83.88	79	92.59	88	87.97	92	79.55	80	77.75

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Anaheim	33	31.68	21	37.5	14	41.45	23	20.76	38	31.99
1	Anaheim	33	32.24	24	39.28	16	43.14	34	25.47	31	33
2	Anaheim	32	33.27	15	39.56	20	43.72	31	29.05	25	35.08
3	Anaheim	31	33.02	-999	37.31	19	40.36	30	31.12	19	36.57
4	Anaheim	-999	29.85	-999	32.95	-999	33.9	-999	31.19	-999	37.26
5	Anaheim	12	26.88	1	29.63	1	27.99	2	31.25	17	37.13
6	Anaheim	5	27.05	3	28.57	2	25.14	8	33.07	20	36.77
7	Anaheim	10	32.24	10	33.95	4	27.63	36	40.4	27	43.72
8	Anaheim	17	38.89	38	43.96	21	35.67	49	54.46	50	55.39
9	Anaheim	32	48.71	41	56.65	51	48.77	67	67.28	66	69.34
10	Anaheim	52	60.61	56	75.67	71	63.04	84	80.3	68	81.7
11	Anaheim	-999	71.79	76	90.34	83	75.14	78	93.01	67	88.74
12	Anaheim	-999	80.44	89	93.4	86	86.9	80	98.24	67	93.06
13	Anaheim	94	85.45	92	93.23	85	98.24	82	96.97	65	99.65
14	Anaheim	93	87.74	94	93.53	105	99.51	85	100.59	62	104.52
15	Anaheim	93	91.04	84	93.07	92	90.81	87	99.08	57	99.43
16	Anaheim	66	86.41	67	88.7	92	82.99	80	78.24	68	83.49
17	Anaheim	60	70.56	60	78.08	76	66.43	68	61.98	58	64.31
18	Anaheim	55	50.58	52	59.19	57	39.44	58	44.99	40	45.13
19	Anaheim	35	36.94	43	45.66	28	19.63	41	32.49	28	30.87
20	Anaheim	29	31.04	36	38.3	24	15.04	35	29.24	24	25.19
21	Anaheim	27	29.78	27	36.51	20	13.66	38	29.16	20	21.85
22	Anaheim	26	31.56	20	38.24	20	13.97	45	30.96	18	20.32
23	Anaheim	24	34.88	17	40.24	22	16.61	48	31.49	26	20.68
	Max	94	91.04	94	93.53	105	99.51	87	100.59	68	104.52

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Costa Mesa	36	50.48	30	48.45	29	65.3	48	29.03	39	39.67
1	Costa Mesa	41	50.59	23	51.37	33	66.05	50	30.3	43	42.57
2	Costa Mesa	40	50.69	20	52.86	31	62.63	48	32.02	39	43.62
3	Costa Mesa	39	50.8	12	51.43	24	57.7	44	35.38	28	42.91
4	Costa Mesa	-999	49.14	-999	47.54	-999	53.82	-999	37.88	-999	42.02
5	Costa Mesa	22	45.27	4	43.63	6	48.7	18	37.62	28	42.69
6	Costa Mesa	18	44.3	6	42.61	11	45.09	34	37.01	33	44.1
7	Costa Mesa	16	48.28	18	46.57	14	45.66	43	40.7	38	49.69
8	Costa Mesa	24	53.87	30	56.93	28	50.86	53	52.35	46	57.52
9	Costa Mesa	28	61.62	42	70.39	47	62.24	60	67.16	49	65.1
10	Costa Mesa	33	70.74	67	83.43	71	76.89	67	79.86	57	71.05
11	Costa Mesa	53	78.23	68	87.32	75	87.38	70	84.23	63	79.88
12	Costa Mesa	69	82.85	78	86.43	80	92.31	67	84.34	56	93.56
13	Costa Mesa	76	90.4	73	85.03	80	94.73	72	89.87	50	107.67
14	Costa Mesa	71	98.64	73	87.13	80	96.63	69	98.57	47	113.92
15	Costa Mesa	65	101.98	67	94.77	62	95.56	76	102.47	47	104.17
16	Costa Mesa	55	93.05	59	93.57	57	86.44	80	86.27	53	82.67
17	Costa Mesa	52	75.86	50	82.75	54	70.65	72	70.83	50	65.27
18	Costa Mesa	37	62.41	46	67.99	49	51.37	64	58.18	44	53.4
19	Costa Mesa	38	55.42	38	58.95	39	37.86	55	52.62	40	44.29
20	Costa Mesa	41	50.66	36	54	34	34.44	48	50.21	31	38.57
21	Costa Mesa	37	48.31	32	53.41	33	32.76	50	45.53	31	36.82
22	Costa Mesa	29	47.55	30	57.24	28	31.65	43	41.77	35	37.21
23	Costa Mesa	31	47.11	28	61.71	41	29.67	42	38.62	38	36.67
	Max	76	101.98	78	94.77	80	96.63	80	102.47	63	113.92

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	La Habra	16	30.24	9	39.62	13	42.88	15	23.27	16	35.64
1	La Habra	23	30.39	7	39.06	12	44.03	24	28.05	11	34.12
2	La Habra	23	31.85	5	38.73	3	42.78	9	32.63	14	35.15
3	La Habra	6	32.4	4	37.22	3	37.84	8	35.95	22	36.96
4	La Habra	-999	30.98	-999	35.14	-999	32.83	-999	37.09	-999	38.55
5	La Habra	3	29.03	1	33.02	2	28.69	6	37.49	11	39.14
6	La Habra	6	27.99	5	32.09	6	26.49	20	38.8	26	39.47
7	La Habra	11	30.9	15	36.08	20	28.76	37	44.98	41	45.68
8	La Habra	22	37.07	39	44.82	41	37.45	51	58.09	53	56.81
9	La Habra	34	47.29	50	55.85	52	51.7	62	70.68	66	70.54
10	La Habra	54	59.32	58	73.12	60	66.7	87	82.57	80	83.53
11	La Habra	59	69.17	75	90.97	87	75.3	89	94.54	72	91.04
12	La Habra	63	76.65	84	98.43	93	84.77	88	103.84	70	92.58
13	La Habra	104	78.51	80	98.53	104	93.89	91	103.57	65	95.71
14	La Habra	102	79.31	84	97.23	104	98.39	87	103.57	73	99.12
15	La Habra	85	86.78	84	94.3	90	90.67	86	98.11	73	94.8
16	La Habra	67	86.06	69	88.5	70	83.36	74	75.91	71	83.11
17	La Habra	58	71.81	64	78.7	64	68.03	65	61.66	68	65.77
18	La Habra	54	52.79	50	62.1	57	43.42	63	47.4	52	47.63
19	La Habra	45	38.43	41	49.39	39	24.16	45	35.16	45	34.61
20	La Habra	32	32.37	31	41.85	24	19.35	27	31.5	42	28.92
21	La Habra	19	30.96	28	40.19	15	17.05	21	32.16	35	24.56
22	La Habra	15	33.22	17	40.8	4	16.84	22	35.28	19	22.28
23	La Habra	14	37.49	10	41.72	4	19.01	23	35.74	19	21.9
	Max	104	86.78	84	98.53	104	98.39	91	103.84	80	99.12

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Mission Viejo	28	45.58	2	61.54	10	76.19	37	47.57	8	50.13
1	Mission Viejo	28	47.06	6	61.65	10	75.75	43	48.08	14	50.3
2	Mission Viejo	26	49.28	12	61.45	16	71.65	29	48.24	13	49.8
3	Mission Viejo	14	50.53	11	59.53	17	59.56	37	48.13	11	49.14
4	Mission Viejo	-999	49.47	-999	53.15	-999	56.37	-999	47.36	-999	48.56
5	Mission Viejo	11	47.13	13	49.92	17	54.25	35	46.58	15	48.54
6	Mission Viejo	15	45.19	17	49.59	20	52.13	24	46.35	26	49.1
7	Mission Viejo	20	46.61	40	52.72	58	52.35	38	48.75	39	54.01
8	Mission Viejo	51	53.81	58	61.78	69	56.69	54	58.26	56	63.47
9	Mission Viejo	57	63.67	78	72.14	63	65.36	75	70.14	68	73.11
10	Mission Viejo	53	74.85	87	83.77	88	78.89	93	82.79	77	81.04
11	Mission Viejo	69	84.73	97	93.9	100	89.48	104	93.21	73	85.16
12	Mission Viejo	87	90.83	98	99.64	114	96.61	94	94.66	72	88.28
13	Mission Viejo	103	93.79	105	103.05	111	100.31	100	92.57	72	93.04
14	Mission Viejo	118	98.27	97	102.87	111	100.56	104	95.23	66	101.6
15	Mission Viejo	107	104.05	97	97.76	112	100.69	89	103.05	65	115.62
16	Mission Viejo	69	105.95	92	90.59	94	97.5	79	108.25	59	114.31
17	Mission Viejo	55	96.42	68	87.22	99	87.06	76	95.12	55	98.18
18	Mission Viejo	35	80.11	53	82.57	93	73.3	78	80.51	64	76.94
19	Mission Viejo	23	72.33	41	81.2	62	65.16	62	67.5	60	61.45
20	Mission Viejo	30	67.42	31	79.19	36	57.56	38	57.89	52	50.85
21	Mission Viejo	25	65.33	22	77.9	9	52.57	21	54.22	43	44.71
22	Mission Viejo	16	62.84	11	77.31	27	48.2	18	51.44	23	41.75
23	Mission Viejo	7	61.14	10	76.98	39	47.35	12	49.37	15	39.91
	Max	118	105.95	105	103.05	114	100.69	104	108.25	77	115.62

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Banning	50	52.37	50	68.07	46	78.93	51	56.23	42	69.13
1	Banning	57	50.86	47	61.51	43	65.93	50	55.01	45	61.64
2	Banning	49	48.36	36	53.09	36	58.04	45	54.17	40	57.24
3	Banning	49	44.85	33	50.06	28	55.67	46	52.7	44	52.1
4	Banning	-999	43.07	-999	47.85	-999	53.34	-999	50.87	-999	48.73
5	Banning	36	43.33	30	46.06	22	50.63	44	49.08	33	47.33
6	Banning	53	45.3	45	45.65	36	48.84	45	46.75	39	46.08
7	Banning	55	49.69	48	47.66	46	50.23	64	49.01	49	45.51
8	Banning	60	53.72	57	52.89	59	56.92	69	60.01	55	48.91
9	Banning	63	56.5	64	57.09	68	57.88	70	63.44	62	52.98
10	Banning	67	57.27	66	58.33	74	58.77	69	63.99	63	57.27
11	Banning	75	57.05	66	57.33	81	59.65	70	64.71	61	59.71
12	Banning	81	58.31	67	56.93	72	60.87	75	64.21	65	63.68
13	Banning	94	61.09	69	58.22	74	61.82	84	64.16	62	70.38
14	Banning	93	64.9	99	60.39	81	63.49	98	70.96	70	80.08
15	Banning	104	71.16	107	67.36	96	77.15	95	86.37	58	92.61
16	Banning	130	81.34	99	85.76	107	108.23	92	95.27	52	104.26
17	Banning	113	97.04	100	104.29	135	121.79	83	99.89	53	116.26
18	Banning	137	96.22	96	104.75	129	111.84	79	94.98	51	119.4
19	Banning	124	86.42	82	102.36	97	95.61	72	96.8	51	111.68
20	Banning	98	78.85	73	98.48	74	81.75	64	99.79	56	107.26
21	Banning	67	74.6	53	94.56	67	70.03	44	101.32	43	88.94
22	Banning	58	73.06	50	90.27	41	62.97	38	102.56	40	73.16
23	Banning	65	72.02	56	85.5	46	59.33	45	84.18	29	63.18
	Max	137	97.04	107	104.75	135	121.79	98	102.56	70	119.4

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Lake Elsinore	19	40.73	41	68.77	30	81.68	20	57.09	20	66.54
1	Lake Elsinore	19	40.79	40	67.51	25	79.87	21	56.08	19	61.07
2	Lake Elsinore	10	41.14	26	67.27	20	71.72	17	55.29	15	58.19
3	Lake Elsinore	15	41.86	25	65.71	12	52.02	15	53.79	14	57.54
4	Lake Elsinore	-999	42.37	-999	53.16	-999	43.74	-999	52.59	-999	54.78
5	Lake Elsinore	8	42.83	14	40.97	4	39.89	14	51.64	13	51.8
6	Lake Elsinore	18	43.17	24	35.95	12	38.28	17	51.26	25	50.56
7	Lake Elsinore	45	45.99	-999	36.28	50	39.41	42	54.56	41	52.54
8	Lake Elsinore	66	56.61	-999	40.01	69	44.61	71	63.84	58	59.09
9	Lake Elsinore	79	68.51	-999	46.31	74	51.75	82	71.01	73	64.92
10	Lake Elsinore	82	73.69	58	55.04	81	59.11	86	73.54	72	70.32
11	Lake Elsinore	83	74.86	71	67.07	86	66.33	80	74.39	73	74.68
12	Lake Elsinore	83	76.97	84	81.35	88	71.16	76	78.39	74	80.31
13	Lake Elsinore	86	85.09	95	93.57	86	80.73	75	86.41	64	86.25
14	Lake Elsinore	113	95.09	89	101.12	76	95.42	69	88.02	58	87.55
15	Lake Elsinore	135	104	96	109.23	83	93.71	61	84.92	57	83.83
16	Lake Elsinore	117	111.58	86	116.19	91	96.84	56	87.1	62	89.42
17	Lake Elsinore	106	106.53	77	115.32	92	90.02	51	90.25	57	104.88
18	Lake Elsinore	90	90.6	75	107.87	78	75.51	50	90.16	47	99.71
19	Lake Elsinore	70	79.53	70	103.68	63	71.14	48	77.48	43	75.93
20	Lake Elsinore	56	73.84	74	98.13	55	62.26	26	66.5	35	58.04
21	Lake Elsinore	50	73.46	65	92.57	45	59.51	26	64.3	30	54.93
22	Lake Elsinore	41	73.69	50	87.34	34	60.53	23	65.65	20	54.82
23	Lake Elsinore	42	71.41	36	83.87	25	59.2	14	67.09	22	55.72
	Max	135	111.58	96	116.19	92	96.84	86	90.25	74	104.88

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Mira Loma	20	28.82	11	52.94	17	54.46	2	50.07	5	52.31
1	Mira Loma	14	27.2	6	49.31	9	51.72	2	49.97	4	54.66
2	Mira Loma	8	25.14	4	42.98	3	44.78	2	50.23	4	53.62
3	Mira Loma	5	21.62	3	35.99	3	36.96	2	49.52	4	48.06
4	Mira Loma	-999	19.15	-999	28.11	-999	31.74	-999	47.82	-999	44.93
5	Mira Loma	3	20.87	3	23.46	4	29.37	3	46.11	6	44.38
6	Mira Loma	6	23.98	6	22.96	10	28.49	8	44.61	16	43.87
7	Mira Loma	17	30.03	14	25.8	18	29.92	20	49.36	26	48.18
8	Mira Loma	43	41.89	38	34.21	44	37.05	44	63.52	43	61.03
9	Mira Loma	69	53.24	61	43.92	65	46.41	77	72.81	68	76.61
10	Mira Loma	76	59.69	79	54.79	80	56.79	93	78.31	77	89.76
11	Mira Loma	84	65.34	96	67.92	88	66.41	96	84.42	91	94
12	Mira Loma	97	72.47	110	82.6	87	74.55	122	93.14	91	99.37
13	Mira Loma	120	83.14	118	98.7	123	89.3	96	113.03	78	106.78
14	Mira Loma	119	98.38	131	115.06	114	109.48	87	129.56	72	112.4
15	Mira Loma	128	107.25	110	125.57	135	116.73	89	115.46	69	116.43
16	Mira Loma	110	94.54	98	120.91	113	105.52	83	110.05	71	115.27
17	Mira Loma	99	83.55	87	101.09	94	79.86	74	100.79	70	100.48
18	Mira Loma	73	75.78	64	80	71	60.43	69	70.39	58	78.41
19	Mira Loma	62	65.19	57	68.93	42	49.07	56	50.07	52	59.38
20	Mira Loma	49	57.4	47	62.02	16	45.18	42	42.43	46	47.36
21	Mira Loma	35	52.16	36	57.25	4	45.35	25	40.8	33	40.45
22	Mira Loma	26	51.46	30	55.04	2	46.26	14	42.51	23	37.59
23	Mira Loma	14	53.4	22	55.18	3	48.34	9	47.14	18	36.87
	Max	128	107.25	131	125.57	135	116.73	122	129.56	91	116.43

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Perris	26	37.9	20	65.54	13	71.72	26	63.7	4	75.22
1	Perris	11	36.71	26	63.98	10	68.33	21	62.01	-999	72.63
2	Perris	10	35.72	26	60.17	14	61.9	6	60.93	8	70.4
3	Perris	3	35.07	15	54.78	-999	53.77	10	59.79	13	66.48
4	Perris	-999	35.03	-999	48.14	-999	47.98	-999	58.95	-999	64.65
5	Perris	5	36.13	8	41.18	1	44.55	7	58.39	6	62.73
6	Perris	15	38.72	20	37.28	13	42.54	22	58.55	25	60.94
7	Perris	39	44.91	41	37.31	44	43.3	44	63.11	36	61.02
8	Perris	65	57.46	65	41.03	67	49.53	68	74.98	53	63.81
9	Perris	76	69.28	75	46.69	71	57.67	80	82.8	59	66.34
10	Perris	77	72	74	54.09	71	63.55	80	80.04	67	70.15
11	Perris	75	69.67	82	61.17	66	66.46	74	75.69	75	73.39
12	Perris	86	68.36	79	68.08	67	67.14	78	74.23	70	77.11
13	Perris	92	70.87	86	76.9	59	69.97	86	80.26	64	82.45
14	Perris	97	77.35	83	89.38	68	86.85	76	96.21	61	92.31
15	Perris	100	90.84	92	106.7	78	102.98	79	103.62	58	96.05
16	Perris	116	109.69	92	123.52	112	96.71	62	94.43	55	100.95
17	Perris	122	106.89	79	126.19	109	92.46	51	94.23	54	111.47
18	Perris	102	88.18	70	109.83	79	77.94	47	96.78	51	108.13
19	Perris	82	78.86	61	96.57	51	68.36	35	84.74	43	91.5
20	Perris	69	73.55	60	88.45	38	64.75	31	76.43	31	74.91
21	Perris	58	70.35	54	83.27	32	65.14	5	72.76	24	66.52
22	Perris	37	68.22	32	78.29	28	67.21	2	71.59	18	64.73
23	Perris	19	66.94	17	74.28	17	66.29	5	73.32	19	67.68
	Max	122	109.69	92	126.19	112	102.98	86	103.62	75	111.47

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Rubidoux	22	32.64	3	53.66	8	56.71	1	56.1	4	61.15
1	Rubidoux	20	30.97	2	49.18	1	52.65	1	55.69	11	58.67
2	Rubidoux	2	28.55	1	42.95	1	45.17	1	55.5	6	55.63
3	Rubidoux	1	25.17	1	36.69	1	37.73	1	54.15	1	49
4	Rubidoux	-999	23.12	-999	29.56	-999	33.74	-999	52.62	-999	46.02
5	Rubidoux	1	24.55	1	24.53	1	32.23	2	51.76	3	45.48
6	Rubidoux	3	27.7	4	23.69	4	31.47	4	51	8	44.57
7	Rubidoux	14	34.06	12	25.98	22	32.38	12	55.86	22	47.85
8	Rubidoux	29	45.49	42	33.95	48	39.11	48	69.25	49	59.41
9	Rubidoux	61	55.6	69	43.44	77	48.7	88	77.34	74	74.09
10	Rubidoux	85	60.39	84	54.2	86	58.7	102	80.09	87	86.62
11	Rubidoux	88	64.61	94	66.51	89	67.43	89	82.76	89	93.08
12	Rubidoux	94	71	119	79.98	86	74.03	129	87.97	99	97.16
13	Rubidoux	116	79.49	119	94.7	115	84.82	122	103.53	85	104.51
14	Rubidoux	136	93.37	140	110.57	123	106.88	98	129.16	75	111.18
15	Rubidoux	138	109.73	130	124.52	146	118.42	99	121.08	74	117.76
16	Rubidoux	131	103.36	106	126.49	138	113.21	96	109.98	71	118.69
17	Rubidoux	114	86.67	97	110.67	110	87.33	85	107.89	75	108.77
18	Rubidoux	82	77.91	71	86.85	83	65.32	77	83.14	63	88.05
19	Rubidoux	67	69.39	63	72.23	62	53.73	65	61.01	54	68.26
20	Rubidoux	57	61.93	55	65	31	51.39	51	50.16	52	54.53
21	Rubidoux	45	58.31	47	61.24	2	52.73	29	47.04	47	46.51
22	Rubidoux	25	59.37	23	59.82	5	53.81	16	49.43	31	44.02
23	Rubidoux	8	58.03	10	59.27	1	55.66	10	55.71	22	43.76
	Max	138	109.73	140	126.49	146	118.42	129	129.16	99	118.69

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Indio	49	52.14	68	57.78	61	59.12	62	47.34	51	63.88
1	Indio	52	50.85	61	55.69	55	58.77	54	48.73	49	54.15
2	Indio	48	46.23	55	52.98	54	56.09	50	49.61	46	50.91
3	Indio	35	40.58	54	52.1	47	52.15	49	49.03	45	49.69
4	Indio	-999	36.82	-999	49.73	-999	48.94	-999	47.42	-999	52.22
5	Indio	3	34.43	46	46.3	36	46.13	11	45.6	29	54.96
6	Indio	9	33.72	30	43	37	43.84	30	43.69	19	54.96
7	Indio	23	36.91	43	43.1	40	43.01	55	48.06	20	57.6
8	Indio	53	45.52	53	48.41	54	48.46	67	59.66	23	61.66
9	Indio	65	53.45	69	52.84	66	52.96	75	68.77	29	66.83
10	Indio	71	60.79	79	57.12	76	57.19	70	75.12	38	70.4
11	Indio	78	66.98	68	60.94	79	63.36	71	79.47	50	72.55
12	Indio	81	71.97	63	63.8	75	65.37	77	81.24	61	74.65
13	Indio	81	74.43	61	65.53	74	63.46	74	83.83	67	75.41
14	Indio	78	72.19	64	65.72	76	60.93	69	84.19	65	75.31
15	Indio	76	69.24	65	64.29	76	59.67	66	82.3	64	75.12
16	Indio	70	66.93	64	62.53	75	59.44	63	81.12	67	75.92
17	Indio	81	63.09	62	59.25	69	59	66	76.74	61	75.74
18	Indio	93	61.64	73	56.55	80	72.92	60	68.48	52	76.26
19	Indio	102	71.07	85	67.11	111	90.99	57	79.32	45	88.53
20	Indio	115	77.23	76	80.21	101	78.9	62	92.8	43	89.27
21	Indio	100	74.1	79	78.28	88	62.7	61	87.83	45	81.92
22	Indio	90	67.14	73	68.69	74	51.39	56	78.83	47	70.8
23	Indio	74	60.14	67	61.13	61	47.09	54	71.54	44	56.63
	Max	115	77.23	85	80.21	111	90.99	77	92.8	67	89.27

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Palm Springs	32	49.22	67	62.99	65	66.19	55	41.16	52	49.61
1	Palm Springs	32	47.96	65	63.43	52	57.69	50	41.83	51	47.31
2	Palm Springs	29	44.97	62	57.89	47	52.92	50	42.96	51	44.12
3	Palm Springs	27	40.75	60	52.78	48	49.68	41	44.25	48	41.89
4	Palm Springs	-999	37.6	-999	48.68	-999	47.83	-999	43.7	-999	40.44
5	Palm Springs	55	36.34	53	44.96	47	46.91	40	42.56	43	39.41
6	Palm Springs	57	36.98	49	42.53	51	46.07	47	41.25	36	40.85
7	Palm Springs	61	39.95	59	42.71	53	46.32	60	43.24	21	47.83
8	Palm Springs	62	45.3	61	48.12	52	51.66	63	52.07	28	54.31
9	Palm Springs	64	48.53	60	52.62	56	53.48	78	59.72	38	60.3
10	Palm Springs	66	50.87	60	54.07	63	55.55	81	67.49	54	65.05
11	Palm Springs	69	53.09	63	55.78	71	57.77	76	71.58	67	68.91
12	Palm Springs	70	55.65	61	57.88	73	59.12	71	73.92	69	71.75
13	Palm Springs	64	58.55	61	59.58	74	60.23	70	76.01	66	72.35
14	Palm Springs	73	61.03	65	60.61	75	61.18	69	76.72	69	73.79
15	Palm Springs	86	62.63	79	61.65	79	61.94	83	79.62	66	77.26
16	Palm Springs	90	65.18	105	63.23	89	69.47	76	79.84	61	85.56
17	Palm Springs	99	72.97	100	67.89	104	99.08	70	76.15	54	93.14
18	Palm Springs	93	80.83	95	77.4	109	100.73	50	79.93	50	91.66
19	Palm Springs	97	79.62	75	81.59	102	74.73	47	89.89	46	88.35
20	Palm Springs	103	74.4	72	76.7	92	60.49	43	92.86	45	82.89
21	Palm Springs	88	69.78	70	68.45	76	50.31	43	79.83	41	70.14
22	Palm Springs	79	67.3	73	70.6	67	44.24	45	68.82	39	49.96
23	Palm Springs	68	64.89	69	73.35	59	42.79	52	59.53	39	45.01
	Max	103	80.83	105	81.59	109	100.73	83	92.86	69	93.14

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Crestline	44	39.57	39	43.01	24	45.72	23	63.41	32	48.85
1	Crestline	39	38.79	40	40.16	30	42.41	26	61.55	30	44.69
2	Crestline	37	36.79	49	38.44	36	40.41	24	59.23	26	41.71
3	Crestline	33	35.47	50	37.39	36	39.18	22	55.23	23	39.48
4	Crestline	-999	35.04	-999	36.46	-999	38.31	-999	50.87	-999	37.83
5	Crestline	20	35.71	45	35.52	41	38.04	24	47.58	17	36.62
6	Crestline	39	37.47	35	35.28	39	37.87	25	46.14	17	35.55
7	Crestline	55	39.75	47	37.27	52	39.39	30	48.33	17	36.89
8	Crestline	64	42.77	54	42.06	56	43.94	51	53.67	40	42.71
9	Crestline	66	46.89	56	48.25	60	50.52	58	58.89	60	51.26
10	Crestline	68	51.99	59	55.02	62	57.84	76	63.99	71	63.45
11	Crestline	68	55.14	62	60.84	64	65.31	96	70.21	77	78.37
12	Crestline	64	57.71	64	65.09	67	71.5	107	80.49	100	90.8
13	Crestline	60	62.23	78	70.71	75	76.64	118	92.33	112	97.82
14	Crestline	86	70.68	94	82.54	106	86.82	137	105.91	85	104.19
15	Crestline	140	82.57	91	99.42	134	99.46	140	129.67	81	118.48
16	Crestline	162	93.74	127	113.31	176	100.97	119	139.28	85	130.76
17	Crestline	133	90.28	142	117.78	138	94.22	105	128.45	88	122.05
18	Crestline	79	80.74	108	110.28	90	86.97	96	114.06	94	105.79
19	Crestline	27	76.05	66	102.26	51	81.68	72	107.53	80	98.91
20	Crestline	20	72.83	35	91.97	23	77.82	48	103.59	71	93.89
21	Crestline	26	62.87	22	79.59	23	70.06	38	95.73	51	84.9
22	Crestline	48	51.9	23	61.2	21	68.17	33	75.08	47	71.62
23	Crestline	48	46.88	25	51.1	23	66.69	30	54.91	44	57.17
	Max	162	93.74	142	117.78	176	100.97	140	139.28	112	130.76

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Fontana	2	24.69	2	44.38	1	44.04	2	49.41	1	46.15
1	Fontana	2	23.63	2	39.65	1	41.25	3	48.41	3	47.03
2	Fontana	2	22.18	2	35.06	1	37.94	5	47.4	6	46.73
3	Fontana	2	20.34	2	30.41	1	35.78	2	46.25	9	42.85
4	Fontana	-999	18.69	-999	26.47	-999	33.35	-999	44.35	-999	40.02
5	Fontana	3	19.55	4	24.28	3	32.08	4	42.35	9	39.04
6	Fontana	11	22.39	13	25.01	7	31.21	13	40.36	23	38.65
7	Fontana	33	27.03	23	28.5	21	32.31	29	42.72	41	42.77
8	Fontana	50	35.59	34	36.63	26	39.15	51	53.95	65	55.96
9	Fontana	60	44.27	38	45.29	-999	47.63	64	63.53	71	72.74
10	Fontana	68	51.79	51	54.75	59	56.49	88	72.82	84	88.25
11	Fontana	78	60.24	84	65.92	-999	65.81	92	83.42	110	95.14
12	Fontana	93	68.55	90	79.18	90	75.2	125	93.07	116	98.09
13	Fontana	117	79.22	124	95.35	97	88.21	149	107.86	117	104.75
14	Fontana	128	92.39	139	111.89	153	103.69	132	130.48	86	116.6
15	Fontana	149	99.97	134	122.08	162	107.73	120	130.76	83	122.38
16	Fontana	125	83.24	114	118.9	95	96.68	88	118.85	92	111.75
17	Fontana	90	75.15	102	101.97	74	78.62	92	99.79	91	90.1
18	Fontana	71	70.84	70	80.07	66	62.24	75	69.06	77	72.4
19	Fontana	50	59.54	50	65.78	45	50.38	51	54.2	61	57.01
20	Fontana	34	51.93	33	61.35	10	46.9	36	48.57	50	47.48
21	Fontana	29	48.53	15	57.69	2	45.94	26	47.51	36	43.46
22	Fontana	13	46.96	4	51.8	2	46.13	16	48.33	18	42.32
23	Fontana	7	46.93	2	47.88	4	48.47	5	45.86	16	40.09
	Max	149	99.97	139	122.08	162	107.73	149	130.76	117	122.38

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Redlands	30	44.34	43	46.66	36	52.45	55	65.78	40	58.05
1	Redlands	24	41.52	42	44.59	39	49.97	53	62.1	36	50.79
2	Redlands	22	39.16	37	42.69	35	48.63	44	58.29	33	49.05
3	Redlands	25	36.72	40	40.31	35	47.6	42	54.82	33	44.61
4	Redlands	-999	35.07	-999	37.63	-999	46.94	-999	52.91	-999	42.09
5	Redlands	38	35.08	41	35.44	28	45.71	37	52.01	25	41.46
6	Redlands	34	37.04	32	35.86	34	44.69	39	52.59	28	41.51
7	Redlands	43	42.1	55	40.92	30	46.9	59	57.97	44	43.97
8	Redlands	51	50.3	62	50.26	19	56.18	72	69.17	59	49.59
9	Redlands	60	56.85	70	57.95	47	64.73	86	74.01	74	56.86
10	Redlands	61	60.77	69	64.76	60	69.47	99	76.25	84	69.07
11	Redlands	73	63.56	81	69.6	84	71.39	113	76.63	80	83.13
12	Redlands	89	67.9	93	72.21	95	72.77	91	77.53	76	94.67
13	Redlands	94	74.46	104	77.46	95	76.62	104	83.75	100	101.2
14	Redlands	120	81.69	106	89.73	107	91.52	136	99.38	75	107.19
15	Redlands	135	94.74	126	106.45	126	116.34	106	131.29	62	115.56
16	Redlands	147	111.36	132	119.13	154	126.82	101	136.19	59	126.93
17	Redlands	139	103.72	111	124.3	121	119.04	99	124.94	63	125.07
18	Redlands	111	84.36	100	114.19	92	100.36	82	111.25	78	111.19
19	Redlands	84	77.56	78	98.39	72	84.34	61	98.01	65	97.75
20	Redlands	55	73.39	56	86.04	59	78.38	53	87.08	50	88.75
21	Redlands	48	67.98	52	78.62	66	70.48	58	86.54	40	76.71
22	Redlands	41	59.17	39	69.4	53	66.69	50	85.01	45	71.51
23	Redlands	42	50.7	32	59.72	49	67.04	47	73.43	43	66.84
	Max	147	111.36	132	124.3	154	126.82	136	136.19	100	126.93

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	San Bernardino	1	35.23	27	44.48	21	48.28	24	61.82	2	57.91
1	San Bernardino	1	34.1	18	40.95	11	44.07	8	60.53	4	48.87
2	San Bernardino	5	32.34	14	38.3	3	41.02	2	58.69	14	45.04
3	San Bernardino	7	29.91	8	35.54	2	38.86	1	55.93	12	41.33
4	San Bernardino	-999	27.8	-999	32.67	-999	37.93	-999	53.13	-999	38.9
5	San Bernardino	3	28.01	4	30.38	3	38.19	6	51.41	14	37.81
6	San Bernardino	8	30.96	9	30.47	9	38.06	17	51.19	32	36.73
7	San Bernardino	24	36.12	28	33.7	24	39.41	37	55.25	50	39.55
8	San Bernardino	35	44.31	51	41.62	38	46.74	63	64.89	69	49.7
9	San Bernardino	48	51.3	63	49.77	47	56.21	85	71.39	75	63.41
10	San Bernardino	64	56.61	64	58.61	65	65.41	96	76.97	85	79.38
11	San Bernardino	81	61.56	77	67.38	81	72.58	113	81.38	96	93.99
12	San Bernardino	82	67.91	90	73.95	91	75.88	107	85.63	101	101.37
13	San Bernardino	100	76.08	91	84.16	94	81.56	128	92.72	112	104.84
14	San Bernardino	127	86.5	95	100.35	109	98.64	127	116.53	82	110.48
15	San Bernardino	136	102.46	132	115.03	156	116.59	109	140.8	70	122.32
16	San Bernardino	157	107.73	126	123.63	138	117.5	109	129.29	71	126.98
17	San Bernardino	122	87.97	110	119.6	104	103.65	92	117.55	87	114.85
18	San Bernardino	94	75.6	92	100.99	82	83.72	79	99.31	80	97.21
19	San Bernardino	66	71.56	63	84.86	78	70.39	66	83.64	62	83.71
20	San Bernardino	40	68.37	36	76.05	49	68	47	74.95	50	74.73
21	San Bernardino	29	64.3	27	70.27	22	64.36	30	73.25	39	67.14
22	San Bernardino	19	57.58	16	61.58	9	61.85	28	69.21	41	61.84
23	San Bernardino	18	50.43	6	55.1	31	62.37	7	62.82	29	56.33
	Max	157	107.73	132	123.63	156	117.5	128	140.8	112	126.98

Hour	Station	18		19		20		21		22	
		OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ	OBS	CMAQ
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Upland	4	25.73	13	40.98	3	41.82	14	43.26	9	38.98
1	Upland	5	25.69	15	38.56	5	39.19	13	43.06	9	41.08
2	Upland	7	25.31	16	35.59	16	37.48	16	42.07	21	43.27
3	Upland	1	24.63	12	31.76	15	36.55	14	41.21	18	41.77
4	Upland	-999	23.54	-999	28.45	-999	35.58	-999	40.61	-999	40.17
5	Upland	1	22.91	3	25.83	3	34.46	6	39.18	16	39.68
6	Upland	13	23.53	13	26.41	4	32.92	13	37.55	16	40.09
7	Upland	38	26.71	30	31.06	8	33.9	28	40.47	39	44.39
8	Upland	59	34.03	37	39.6	26	40.39	47	50.35	62	57.01
9	Upland	64	43.01	51	48.31	38	50.27	61	60.72	77	72.98
10	Upland	78	52.34	70	58.66	73	60.76	92	72.77	96	84.22
11	Upland	85	61.76	73	71.17	90	70.25	107	84.6	117	89.53
12	Upland	103	71.13	97	86.32	90	81.43	136	94.96	118	96.51
13	Upland	113	82	135	103.15	116	93.24	148	113.58	107	106.87
14	Upland	133	92.63	138	116.85	155	102.07	122	130.21	93	116.65
15	Upland	141	87.57	146	121.15	139	99.55	107	123.95	88	116.17
16	Upland	121	77.34	117	112.9	86	87.08	100	113.67	98	99.58
17	Upland	76	78.77	94	92.84	82	73.86	97	84.38	91	82.45
18	Upland	64	69.71	63	74.83	66	61.39	79	63.17	72	68.35
19	Upland	52	55.2	47	63.69	44	51.91	51	56.55	60	53.13
20	Upland	30	49.23	30	60.89	9	47.14	36	47.98	44	40.72
21	Upland	11	46.55	9	58.89	7	41.02	17	41.42	30	35.24
22	Upland	7	44.33	4	52.78	7	39.42	9	40.31	13	33.85
23	Upland	9	42.74	2	46.94	13	41.63	5	39.8	9	33.5
	Max	141	92.63	146	121.15	155	102.07	148	130.21	118	116.65

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Azusa	-999	-999	-999	-999	-999	-999	1.12	1.12	-12.06	12.06
10	Azusa	-999	-999	-999	-999	-999	-999	-14.18	14.18	-21.65	21.65
11	Azusa	-15.46	15.46	-11.07	11.07	-4.95	4.95	-26.93	26.93	-25.83	25.83
12	Azusa	-25.02	25.02	-8.17	8.17	-29.42	29.42	-29.29	29.29	-16.2	16.2
13	Azusa	-35.34	35.34	-7.16	7.16	-23.94	23.94	0.45	0.45	1.87	1.87
14	Azusa	-38.94	38.94	-27.82	27.82	-40.62	40.62	10.08	10.08	-0.5	0.5
15	Azusa	-7.76	7.76	2.46	2.46	-12.16	12.16	9.64	9.64	-12.31	12.31
16	Azusa	15.47	15.47	-0.41	0.41	6.96	6.96	-11.87	11.87	-8.05	8.05
17	Azusa	11.13	11.13	15.16	15.16	6.58	6.58	-17.55	17.55	-6.3	6.3
18	Azusa	-999	-999	-999	-999	-999	-999	-7.61	7.61	-999	-999
19	Azusa	-999	-999	-999	-999	-12.67	12.67	-999	-999	-999	-999
20	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Azusa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-13.702857	21.302857	-5.2871429	10.321429	-13.7775	17.1625	-8.614	12.872	-11.225556	11.641111

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Burbank	-999	-999	-999	-999	-999	-999	-11.86	11.86	-16.08	16.08
10	Burbank	-999	-999	-999	-999	-999	-999	-27.65	27.65	-24.18	24.18
11	Burbank	-8.59	8.59	-2.68	2.68	-5.56	5.56	-35.62	35.62	-42.4	42.4
12	Burbank	-22.08	22.08	-23.81	23.81	-30.85	30.85	-15.46	15.46	-16	16
13	Burbank	-14.83	14.83	-6.29	6.29	-35.53	35.53	-12.45	12.45	-11.1	11.1
14	Burbank	18.15	18.15	5.13	5.13	-8.88	8.88	-41.14	41.14	-12.97	12.97
15	Burbank	-999	-999	14.9	14.9	8.98	8.98	-34.8	34.8	-23.9	23.9
16	Burbank	-999	-999	25.32	25.32	3.08	3.08	-999	-999	-5.68	5.68
17	Burbank	-999	-999	13.56	13.56	-999	-999	-999	-999	-999	-999
18	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
19	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Burbank	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-6.8375	15.9125	3.7328571	13.098571	-11.46	15.48	-25.568571	25.568571	-19.03875	19.03875

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Glendora	-999	-999	-999	-999	-999	-999	-3.29	3.29	-16.93	16.93
10	Glendora	-999	-999	-999	-999	-999	-999	-21.53	21.53	-36.17	36.17
11	Glendora	-22.1	22.1	-2.42	2.42	-999	-999	-39.98	39.98	-35.16	35.16
12	Glendora	-999	-999	-21.01	21.01	-31.78	31.78	-56.95	56.95	-26.25	26.25
13	Glendora	-999	-999	-15.52	15.52	-50.75	50.75	-21.37	21.37	-8.87	8.87
14	Glendora	-43.85	43.85	-37.11	37.11	-46.78	46.78	3.46	3.46	-1.52	1.52
15	Glendora	-26.43	26.43	-9.92	9.92	-30.42	30.42	12.68	12.68	-14.04	14.04
16	Glendora	7.62	7.62	-3.95	3.95	-4.48	4.48	-3.31	3.31	-11.67	11.67
17	Glendora	9.68	9.68	7.94	7.94	-0.68	0.68	-18.84	18.84	-13.46	13.46
18	Glendora	6.44	6.44	9.98	9.98	1.37	1.37	-2.12	2.12	-4.36	4.36
19	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Glendora	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-11.44	19.353333	-9.00125	13.48125	-23.36	23.751429	-15.125	18.353	-16.843	16.843

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
10	Los Angeles	-999	-999	-999	-999	-999	-999	-6.61	6.61	-16.25	16.25
11	Los Angeles	-13.97	13.97	-1.37	1.37	-999	-999	3.53	3.53	-13.32	13.32
12	Los Angeles	-19.57	19.57	-0.76	0.76	-0.82	0.82	-9.4	9.4	15.4	15.4
13	Los Angeles	-0.5	0.5	-3.36	3.36	-8.01	8.01	-9.74	9.74	1.12	1.12
14	Los Angeles	-999	-999	-999	-999	8.99	8.99	-11.38	11.38	-2.21	2.21
15	Los Angeles	-999	-999	-999	-999	13.32	13.32	-7.34	7.34	3.88	3.88
16	Los Angeles	-999	-999	-999	-999	4.35	4.35	0.81	0.81	-999	-999
17	Los Angeles	-999	-999	-999	-999	-999	-999	-6.82	6.82	-999	-999
18	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
19	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Los Angeles	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-11.346667	11.346667	-1.83	1.83	3.566	7.098	-5.86875	6.95375	-1.8966667	8.6966667

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
10	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
11	LAX	-999	-999	3.03	3.03	-999	-999	1.74	1.74	-999	-999
12	LAX	-999	-999	13.28	13.28	-999	-999	-999	-999	-999	-999
13	LAX	-999	-999	21.7	21.7	-999	-999	-999	-999	-999	-999
14	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
15	LAX	-999	-999	-999	-999	-999	-999	17.98	17.98	-999	-999
16	LAX	-999	-999	-999	-999	-999	-999	15.79	15.79	-999	-999
17	LAX	-999	-999	-999	-999	-999	-999	2.74	2.74	-999	-999
18	LAX	-999	-999	-999	-999	-999	-999	-5.11	5.11	-999	-999
19	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	LAX	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	N/A	N/A	12.67	12.67	N/A	N/A	6.628	8.672	N/A	N/A

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
10	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
11	Lynwood	-999	-999	9.1	9.1	-999	-999	-999	-999	-999	-999
12	Lynwood	-999	-999	12.02	12.02	-999	-999	8.41	8.41	13.07	13.07
13	Lynwood	-999	-999	13.38	13.38	-1	1	19.89	19.89	23.78	23.78
14	Lynwood	-999	-999	-999	-999	25.47	25.47	22.33	22.33	21.42	21.42
15	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	17.26	17.26
16	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
17	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
18	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
19	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Lynwood	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	N/A	N/A	11.5	11.5	12.235	13.235	16.876667	16.876667	18.8825	18.8825

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
10	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
11	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
12	North Long Beach	-24.46	24.46	-999	-999	5.74	5.74	-999	-999	-999	-999
13	North Long Beach	-4.21	4.21	22.5	22.5	7.1	7.1	-999	-999	-999	-999
14	North Long Beach	17.63	17.63	-999	-999	8.39	8.39	-999	-999	-999	-999
15	North Long Beach	22.44	22.44	-999	-999	13.97	13.97	1.17	1.17	-999	-999
16	North Long Beach	-999	-999	-999	-999	-5.44	5.44	-2.69	2.69	-6.4	6.4
17	North Long Beach	-999	-999	-999	-999	-23.68	23.68	-9.07	9.07	-999	-999
18	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
19	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	North Long Beach	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	2.85	17.185	22.5	22.5	1.0133333	10.72	-3.53	4.31	-6.4	6.4

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Pasadena	-19.36	19.36	-19.31	19.31	-999	-999	-13.88	13.88	-18.71	18.71
10	Pasadena	-28.16	28.16	-10.08	10.08	-17.71	17.71	-21.41	21.41	-25.08	25.08
11	Pasadena	-28.63	28.63	-1.24	1.24	-20.38	20.38	-18.79	18.79	-22	22
12	Pasadena	-16.56	16.56	-6.62	6.62	-2.04	2.04	-3.18	3.18	-15.57	15.57
13	Pasadena	-25.56	25.56	-20.38	20.38	-24.72	24.72	-0.77	0.77	0.97	0.97
14	Pasadena	-2.96	2.96	-1.16	1.16	-8.69	8.69	10.07	10.07	-2.69	2.69
15	Pasadena	19.33	19.33	10.01	10.01	10.16	10.16	2.66	2.66	-2.73	2.73
16	Pasadena	-999	-999	23.27	23.27	12.42	12.42	-13.23	13.23	-2.13	2.13
17	Pasadena	-999	-999	-999	-999	-2.85	2.85	2.19	2.19	-999	-999
18	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
19	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Pasadena	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-14.557143	20.08	-3.18875	11.50875	-6.72625	12.37125	-6.26	9.5755556	-10.9925	11.235

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	1.34	1.34
10	Pico Rivera	-999	-999	0.69	0.69	-8.88	8.88	-1.26	1.26	-6.81	6.81
11	Pico Rivera	-13.56	13.56	21.88	21.88	-11.93	11.93	-11.11	11.11	2.58	2.58
12	Pico Rivera	-19.65	19.65	16.39	16.39	-7	7	7.97	7.97	10.11	10.11
13	Pico Rivera	-21.31	21.31	-8.16	8.16	-7.42	7.42	4.82	4.82	5.26	5.26
14	Pico Rivera	6.72	6.72	1.39	1.39	-4.88	4.88	5.95	5.95	-0.48	0.48
15	Pico Rivera	18.75	18.75	2.39	2.39	21.08	21.08	-1.25	1.25	0.39	0.39
16	Pico Rivera	13.53	13.53	22.75	22.75	18.08	18.08	-3.62	3.62	-0.43	0.43
17	Pico Rivera	-999	-999	-999	-999	-5.31	5.31	-4.44	4.44	-999	-999
18	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
19	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Pico Rivera	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-2.5866667	15.586667	8.19	10.521429	-0.7825	10.5725	-0.3675	5.0525	1.495	3.425

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Pomona	-23.35	23.35	-999	-999	-999	-999	-10.02	10.02	-5.64	5.64
10	Pomona	-24.89	24.89	-999	-999	-13.41	13.41	-17.83	17.83	-18.75	18.75
11	Pomona	-24.84	24.84	-9.18	9.18	-5.15	5.15	-27.79	27.79	-26.23	26.23
12	Pomona	-27.37	27.37	-20.78	20.78	-12.55	12.55	-34.3	34.3	-12.54	12.54
13	Pomona	-20.87	20.87	-15.82	15.82	-45.83	45.83	2.26	2.26	13.56	13.56
14	Pomona	-49.29	49.29	-6.68	6.68	-39.67	39.67	13.92	13.92	25.91	25.91
15	Pomona	-48.28	48.28	7.75	7.75	-10.09	10.09	17.45	17.45	17.84	17.84
16	Pomona	-9.62	9.62	0.82	0.82	-1.04	1.04	15.05	15.05	1.21	1.21
17	Pomona	6.02	6.02	0.05	0.05	6.33	6.33	-5.2	5.2	-3.03	3.03
18	Pomona	1.93	1.93	9.05	9.05	-999	-999	-13.48	13.48	-9.26	9.26
19	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Pomona	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-22.056	23.646	-4.34875	8.76625	-15.17625	16.75875	-5.994	15.73	-1.693	13.397

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Reseda	-27.96	27.96	-999	-999	-999	-999	-999	-999	-999	-999
9	Reseda	-24.62	24.62	-999	-999	-19.71	19.71	-999	-999	-17.9	17.9
10	Reseda	-15.98	15.98	-999	-999	-999	-999	-15.18	15.18	-35.76	35.76
11	Reseda	-7.94	7.94	-999	-999	-999	-999	-2.95	2.95	-29.5	29.5
12	Reseda	2.12	2.12	-999	-999	-999	-999	-999	-999	-24.08	24.08
13	Reseda	-999	-999	-999	-999	9.6	9.6	-999	-999	-30.17	30.17
14	Reseda	22.43	22.43	-999	-999	15.61	15.61	-999	-999	-40.32	40.32
15	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-40.05	40.05
16	Reseda	5.62	5.62	-999	-999	-999	-999	-999	-999	-30.06	30.06
17	Reseda	-4.98	4.98	-999	-999	-999	-999	-999	-999	-15.9	15.9
18	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
19	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Reseda	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-6.41375	13.95625	N/A	N/A	1.8333333	14.973333	-9.065	9.065	-29.304444	29.304444

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Santa Clarita	-999	-999	-22.5	22.5	-999	-999	-999	-999	-999	-999
1	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Santa Clarita	-26.71	26.71	-999	-999	-999	-999	-999	-999	-999	-999
8	Santa Clarita	-26.99	26.99	-999	-999	-19.26	19.26	-999	-999	-999	-999
9	Santa Clarita	-21.79	21.79	-999	-999	-21.37	21.37	-16.28	16.28	-14	14
10	Santa Clarita	-17.04	17.04	-999	-999	-16.56	16.56	-999	-999	-40.26	40.26
11	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-51.71	51.71
12	Santa Clarita	-999	-999	-999	-999	-999	-999	-4.19	4.19	-63.99	63.99
13	Santa Clarita	-4.47	4.47	-999	-999	-999	-999	-999	-999	-16.65	16.65
14	Santa Clarita	-999	-999	6.77	6.77	-999	-999	-999	-999	-999	-999
15	Santa Clarita	-999	-999	11.31	11.31	7.92	7.92	-999	-999	-999	-999
16	Santa Clarita	-999	-999	10.99	10.99	-4.46	4.46	4.35	4.35	-999	-999
17	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
18	Santa Clarita	-12.55	12.55	-999	-999	-999	-999	-999	-999	-999	-999
19	Santa Clarita	-21.76	21.76	-999	-999	-999	-999	-999	-999	-999	-999
20	Santa Clarita	-19.17	19.17	-999	-999	-999	-999	-999	-999	-999	-999
21	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Santa Clarita	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-18.81	18.81	1.6425	12.8925	-10.746	13.914	-5.3733333	8.2733333	-37.322	37.322

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
10	West LA	-21.91	21.91	-999	-999	-999	-999	-1.59	1.59	-999	-999
11	West LA	-19.74	19.74	-8.99	8.99	-11.85	11.85	1.7	1.7	-999	-999
12	West LA	-999	-999	-1.02	1.02	-15.15	15.15	-12.45	12.45	-3.75	3.75
13	West LA	-999	-999	7.48	7.48	-3.96	3.96	-9.94	9.94	7.32	7.32
14	West LA	-999	-999	12.73	12.73	2.97	2.97	2.75	2.75	8.75	8.75
15	West LA	-999	-999	19.59	19.59	-6.72	6.72	-4.51	4.51	-999	-999
16	West LA	-999	-999	9.45	9.45	1.46	1.46	-4.37	4.37	1.74	1.74
17	West LA	-999	-999	4.5	4.5	-999	-999	-2.46	2.46	-999	-999
18	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
19	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	West LA	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-20.825	20.825	6.2485714	9.1085714	-5.5416667	7.0183333	-3.85875	4.97125	3.515	5.39

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Anaheim	-999	-999	-999	-999	-999	-999	0.28	0.28	3.34	3.34
10	Anaheim	-999	-999	-999	-999	-7.96	7.96	-3.7	3.7	13.7	13.7
11	Anaheim	-999	-999	14.34	14.34	-7.86	7.86	15.01	15.01	21.74	21.74
12	Anaheim	-999	-999	4.4	4.4	0.9	0.9	18.24	18.24	26.06	26.06
13	Anaheim	-8.55	8.55	1.23	1.23	13.24	13.24	14.97	14.97	34.65	34.65
14	Anaheim	-5.26	5.26	-0.47	0.47	-5.49	5.49	15.59	15.59	42.52	42.52
15	Anaheim	-1.96	1.96	9.07	9.07	-1.19	1.19	12.08	12.08	-999	-999
16	Anaheim	20.41	20.41	21.7	21.7	-9.01	9.01	-1.76	1.76	15.49	15.49
17	Anaheim	10.56	10.56	18.08	18.08	-9.57	9.57	-6.02	6.02	-999	-999
18	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
19	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Anaheim	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	3.04	9.348	9.7642857	9.8985714	-3.3675	6.9025	7.1877778	9.7388889	22.5	22.5

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Costa Mesa	-999	-999	-999	-999	-999	-999	7.16	7.16	-999	-999
10	Costa Mesa	-999	-999	16.43	16.43	5.89	5.89	12.86	12.86	-999	-999
11	Costa Mesa	-999	-999	19.32	19.32	12.38	12.38	14.23	14.23	16.88	16.88
12	Costa Mesa	13.85	13.85	8.43	8.43	12.31	12.31	17.34	17.34	-999	-999
13	Costa Mesa	14.4	14.4	12.03	12.03	14.73	14.73	17.87	17.87	-999	-999
14	Costa Mesa	27.64	27.64	14.13	14.13	16.63	16.63	29.57	29.57	-999	-999
15	Costa Mesa	36.98	36.98	27.77	27.77	33.56	33.56	26.47	26.47	-999	-999
16	Costa Mesa	-999	-999	-999	-999	-999	-999	6.27	6.27	-999	-999
17	Costa Mesa	-999	-999	-999	-999	-999	-999	-1.17	1.17	-999	-999
18	Costa Mesa	-999	-999	-999	-999	-999	-999	-5.82	5.82	-999	-999
19	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Costa Mesa	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	23.2175	23.2175	16.351667	16.351667	15.916667	15.916667	12.478	13.876	16.88	16.88

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	La Habra	-999	-999	-999	-999	-999	-999	8.68	8.68	4.54	4.54
10	La Habra	-999	-999	-999	-999	6.7	6.7	-4.43	4.43	3.53	3.53
11	La Habra	-999	-999	15.97	15.97	-11.7	11.7	5.54	5.54	19.04	19.04
12	La Habra	13.65	13.65	14.43	14.43	-8.23	8.23	15.84	15.84	22.58	22.58
13	La Habra	-25.49	25.49	18.53	18.53	-10.11	10.11	12.57	12.57	30.71	30.71
14	La Habra	-22.69	22.69	13.23	13.23	-5.61	5.61	16.57	16.57	26.12	26.12
15	La Habra	1.78	1.78	10.3	10.3	0.67	0.67	12.11	12.11	21.8	21.8
16	La Habra	19.06	19.06	19.5	19.5	13.36	13.36	1.91	1.91	12.11	12.11
17	La Habra	-999	-999	14.7	14.7	4.03	4.03	-3.34	3.34	-2.23	2.23
18	La Habra	-999	-999	-999	-999	-999	-999	-15.6	15.6	-999	-999
19	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
20	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	La Habra	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-2.738	16.534	15.237143	15.237143	-1.36125	7.55125	4.985	9.659	15.355556	15.851111

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Mission Viejo	-999	-999	-999	-999	-12.31	12.31	-999	-999	-999	-999
9	Mission Viejo	-999	-999	-5.86	5.86	2.36	2.36	-4.86	4.86	5.11	5.11
10	Mission Viejo	-999	-999	-3.23	3.23	-9.11	9.11	-10.21	10.21	4.04	4.04
11	Mission Viejo	15.73	15.73	-3.1	3.1	-10.52	10.52	-10.79	10.79	12.16	12.16
12	Mission Viejo	3.83	3.83	1.64	1.64	-17.39	17.39	0.66	0.66	16.28	16.28
13	Mission Viejo	-9.21	9.21	-1.95	1.95	-10.69	10.69	-7.43	7.43	21.04	21.04
14	Mission Viejo	-19.73	19.73	5.87	5.87	-10.44	10.44	-8.77	8.77	35.6	35.6
15	Mission Viejo	-2.95	2.95	0.76	0.76	-11.31	11.31	14.05	14.05	50.62	50.62
16	Mission Viejo	36.95	36.95	-1.41	1.41	3.5	3.5	29.25	29.25	-999	-999
17	Mission Viejo	-999	-999	19.22	19.22	-11.94	11.94	19.12	19.12	-999	-999
18	Mission Viejo	-999	-999	-999	-999	-19.7	19.7	2.51	2.51	12.94	12.94
19	Mission Viejo	-999	-999	-999	-999	3.16	3.16	5.5	5.5	1.45	1.45
20	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Mission Viejo	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	4.1033333	14.733333	1.3266667	4.7822222	-8.6991667	10.2025	2.6390909	10.286364	17.693333	17.693333

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Banning Airport	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Banning Airport	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Banning Airport	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Banning Airport	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Banning Airport	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Banning Airport	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Banning Airport	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Banning Airport	-999	-999	-999	-999	-999	-999	-14.99	14.99	-999	-999
8	Banning Airport	-6.28	6.28	-999	-999	-999	-999	-8.99	8.99	-999	-999
9	Banning Airport	-6.5	6.5	-6.91	6.91	-10.12	10.12	-6.56	6.56	-9.02	9.02
10	Banning Airport	-9.73	9.73	-7.67	7.67	-15.23	15.23	-5.01	5.01	-5.73	5.73
11	Banning Airport	-17.95	17.95	-8.67	8.67	-21.35	21.35	-5.29	5.29	-1.29	1.29
12	Banning Airport	-22.69	22.69	-10.07	10.07	-11.13	11.13	-10.79	10.79	-1.32	1.32
13	Banning Airport	-32.91	32.91	-10.78	10.78	-12.18	12.18	-19.84	19.84	8.38	8.38
14	Banning Airport	-28.1	28.1	-38.61	38.61	-17.51	17.51	-27.04	27.04	10.08	10.08
15	Banning Airport	-32.84	32.84	-39.64	39.64	-18.85	18.85	-8.63	8.63	-999	-999
16	Banning Airport	-48.66	48.66	-13.24	13.24	1.23	1.23	3.27	3.27	-999	-999
17	Banning Airport	-15.96	15.96	4.29	4.29	-13.21	13.21	16.89	16.89	-999	-999
18	Banning Airport	-40.78	40.78	8.75	8.75	-17.16	17.16	15.98	15.98	-999	-999
19	Banning Airport	-37.58	37.58	20.36	20.36	-1.39	1.39	24.8	24.8	-999	-999
20	Banning Airport	-19.15	19.15	25.48	25.48	7.75	7.75	35.79	35.79	-999	-999
21	Banning Airport	7.6	7.6	-999	-999	3.03	3.03	-999	-999	-999	-999
22	Banning Airport	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Banning Airport	7.02	7.02	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-20.300667	22.25	-6.3925	16.205833	-9.7015385	11.549231	-0.7435714	14.562143	0.1833333	5.97

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Lake Elsinore	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Lake Elsinore	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Lake Elsinore	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Lake Elsinore	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Lake Elsinore	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Lake Elsinore	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Lake Elsinore	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Lake Elsinore	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Lake Elsinore	-9.39	9.39	-999	-999	-24.39	24.39	-7.16	7.16	-999	-999
9	Lake Elsinore	-10.49	10.49	-999	-999	-22.25	22.25	-10.99	10.99	-8.08	8.08
10	Lake Elsinore	-8.31	8.31	-999	-999	-21.89	21.89	-12.46	12.46	-1.68	1.68
11	Lake Elsinore	-8.14	8.14	-3.93	3.93	-19.67	19.67	-5.61	5.61	1.68	1.68
12	Lake Elsinore	-6.03	6.03	-2.65	2.65	-16.84	16.84	2.39	2.39	6.31	6.31
13	Lake Elsinore	-0.91	0.91	-1.43	1.43	-5.27	5.27	11.41	11.41	22.25	22.25
14	Lake Elsinore	-17.91	17.91	12.12	12.12	19.42	19.42	19.02	19.02	-999	-999
15	Lake Elsinore	-31	31	13.23	13.23	10.71	10.71	23.92	23.92	-999	-999
16	Lake Elsinore	-5.42	5.42	30.19	30.19	5.84	5.84	-999	-999	27.42	27.42
17	Lake Elsinore	0.53	0.53	38.32	38.32	-1.98	1.98	-999	-999	-999	-999
18	Lake Elsinore	0.6	0.6	32.87	32.87	-2.49	2.49	-999	-999	-999	-999
19	Lake Elsinore	9.53	9.53	33.68	33.68	8.14	8.14	-999	-999	-999	-999
20	Lake Elsinore	-999	-999	24.13	24.13	-999	-999	-999	-999	-999	-999
21	Lake Elsinore	-999	-999	27.57	27.57	-999	-999	-999	-999	-999	-999
22	Lake Elsinore	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Lake Elsinore	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-7.245	9.0216667	18.554545	20.010909	-5.8891667	13.240833	2.565	11.62	7.9833333	11.236667

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Mira Loma	-15.76	15.76	-17.08	17.08	-18.59	18.59	-4.19	4.19	8.61	8.61
10	Mira Loma	-16.31	16.31	-24.21	24.21	-23.21	23.21	-14.69	14.69	12.76	12.76
11	Mira Loma	-18.66	18.66	-28.08	28.08	-21.59	21.59	-11.58	11.58	3	3
12	Mira Loma	-24.53	24.53	-27.4	27.4	-12.45	12.45	-28.86	28.86	8.37	8.37
13	Mira Loma	-36.86	36.86	-19.3	19.3	-33.7	33.7	17.03	17.03	28.78	28.78
14	Mira Loma	-20.62	20.62	-15.94	15.94	-4.52	4.52	42.56	42.56	40.4	40.4
15	Mira Loma	-20.75	20.75	15.57	15.57	-18.27	18.27	26.46	26.46	47.43	47.43
16	Mira Loma	-15.46	15.46	22.91	22.91	-7.48	7.48	27.05	27.05	44.27	44.27
17	Mira Loma	-15.45	15.45	14.09	14.09	-14.14	14.14	26.79	26.79	30.48	30.48
18	Mira Loma	2.78	2.78	16	16	-10.57	10.57	1.39	1.39	-999	-999
19	Mira Loma	3.19	3.19	-999	-999	-999	-999	-999	-999	-999	-999
20	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Mira Loma	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-16.220909	17.306364	-6.344	20.058	-16.452	16.452	8.196	20.06	24.9	24.9

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Perris	-7.54	7.54	-23.97	23.97	-17.47	17.47	6.98	6.98	-999	-999
9	Perris	-6.72	6.72	-28.31	28.31	-13.33	13.33	2.8	2.8	-999	-999
10	Perris	-5	5	-19.91	19.91	-7.45	7.45	0.04	0.04	3.15	3.15
11	Perris	-5.33	5.33	-20.83	20.83	0.46	0.46	1.69	1.69	-1.61	1.61
12	Perris	-17.64	17.64	-10.92	10.92	0.14	0.14	-3.77	3.77	7.11	7.11
13	Perris	-21.13	21.13	-9.1	9.1	-999	-999	-5.74	5.74	18.45	18.45
14	Perris	-19.65	19.65	6.38	6.38	18.85	18.85	20.21	20.21	31.31	31.31
15	Perris	-9.16	9.16	14.7	14.7	24.98	24.98	24.62	24.62	-999	-999
16	Perris	-6.31	6.31	31.52	31.52	-15.29	15.29	32.43	32.43	-999	-999
17	Perris	-15.11	15.11	47.19	47.19	-16.54	16.54	-999	-999	-999	-999
18	Perris	-13.82	13.82	39.83	39.83	-1.06	1.06	-999	-999	-999	-999
19	Perris	-3.14	3.14	35.57	35.57	-999	-999	-999	-999	-999	-999
20	Perris	4.55	4.55	28.45	28.45	-999	-999	-999	-999	-999	-999
21	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Perris	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-9.6923077	10.392308	6.9692308	24.36	-2.671	11.557	8.8066667	10.92	11.682	12.326

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
9	Rubidoux	-5.4	5.4	-25.56	25.56	-28.3	28.3	-10.66	10.66	0.09	0.09
10	Rubidoux	-24.61	24.61	-29.8	29.8	-27.3	27.3	-21.91	21.91	-0.38	0.38
11	Rubidoux	-23.39	23.39	-27.49	27.49	-21.57	21.57	-6.24	6.24	4.08	4.08
12	Rubidoux	-23	23	-39.02	39.02	-11.97	11.97	-41.03	41.03	-1.84	1.84
13	Rubidoux	-36.51	36.51	-24.3	24.3	-30.18	30.18	-18.47	18.47	19.51	19.51
14	Rubidoux	-42.63	42.63	-29.43	29.43	-16.12	16.12	31.16	31.16	36.18	36.18
15	Rubidoux	-28.27	28.27	-5.48	5.48	-27.58	27.58	22.08	22.08	43.76	43.76
16	Rubidoux	-27.64	27.64	20.49	20.49	-24.79	24.79	13.98	13.98	47.69	47.69
17	Rubidoux	-27.33	27.33	13.67	13.67	-22.67	22.67	22.89	22.89	33.77	33.77
18	Rubidoux	-4.09	4.09	15.85	15.85	-17.68	17.68	6.14	6.14	25.05	25.05
19	Rubidoux	2.39	2.39	9.23	9.23	-8.27	8.27	-3.99	3.99	-999	-999
20	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Rubidoux	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-21.861818	22.296364	-11.076364	21.847273	-21.493636	21.493636	-0.55	18.05	20.791	21.235

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Indio	-999	-999	-10.22	10.22	-1.88	1.88	-14.66	14.66	-999	-999
1	Indio	-999	-999	-5.31	5.31	-999	-999	-999	-999	-999	-999
2	Indio	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Indio	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Indio	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Indio	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Indio	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Indio	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Indio	-999	-999	-999	-999	-999	-999	-7.34	7.34	-999	-999
9	Indio	-11.55	11.55	-16.16	16.16	-13.04	13.04	-6.23	6.23	-999	-999
10	Indio	-10.21	10.21	-21.88	21.88	-18.81	18.81	5.12	5.12	-999	-999
11	Indio	-11.02	11.02	-7.06	7.06	-15.64	15.64	8.47	8.47	-999	-999
12	Indio	-9.03	9.03	0.8	0.8	-9.63	9.63	4.24	4.24	13.65	13.65
13	Indio	-6.57	6.57	4.53	4.53	-10.54	10.54	9.83	9.83	8.41	8.41
14	Indio	-5.81	5.81	1.72	1.72	-15.07	15.07	15.19	15.19	10.31	10.31
15	Indio	-6.76	6.76	-0.71	0.71	-16.33	16.33	16.3	16.3	11.12	11.12
16	Indio	-3.07	3.07	-1.47	1.47	-15.56	15.56	18.12	18.12	8.92	8.92
17	Indio	-17.91	17.91	-2.75	2.75	-10	10	10.74	10.74	14.74	14.74
18	Indio	-31.36	31.36	-16.45	16.45	-7.08	7.08	8.48	8.48	-999	-999
19	Indio	-30.93	30.93	-17.89	17.89	-20.01	20.01	-999	-999	-999	-999
20	Indio	-37.77	37.77	4.21	4.21	-22.1	22.1	30.8	30.8	-999	-999
21	Indio	-25.9	25.9	-0.72	0.72	-25.3	25.3	26.83	26.83	-999	-999
22	Indio	-22.86	22.86	-4.31	4.31	-22.61	22.61	-999	-999	-999	-999
23	Indio	-13.86	13.86	-5.87	5.87	-13.91	13.91	-999	-999	-999	-999
	Average	-16.307333	16.307333	-5.8552941	7.18	-14.844375	14.844375	8.9921429	13.025	11.191667	11.191667

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Palm Springs	-999	-999	-4.01	4.01	1.19	1.19	-999	-999	-999	-999
1	Palm Springs	-999	-999	-1.57	1.57	-999	-999	-999	-999	-999	-999
2	Palm Springs	-999	-999	-4.11	4.11	-999	-999	-999	-999	-999	-999
3	Palm Springs	-999	-999	-7.22	7.22	-999	-999	-999	-999	-999	-999
4	Palm Springs	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Palm Springs	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Palm Springs	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Palm Springs	-21.05	21.05	-999	-999	-999	-999	-16.76	16.76	-999	-999
8	Palm Springs	-16.7	16.7	-12.88	12.88	-999	-999	-10.93	10.93	-999	-999
9	Palm Springs	-15.47	15.47	-7.38	7.38	-999	-999	-18.28	18.28	-999	-999
10	Palm Springs	-15.13	15.13	-5.93	5.93	-7.45	7.45	-13.51	13.51	-999	-999
11	Palm Springs	-15.91	15.91	-7.22	7.22	-13.23	13.23	-4.42	4.42	1.91	1.91
12	Palm Springs	-14.35	14.35	-3.12	3.12	-13.88	13.88	2.92	2.92	2.75	2.75
13	Palm Springs	-5.45	5.45	-1.42	1.42	-13.77	13.77	6.01	6.01	6.35	6.35
14	Palm Springs	-11.97	11.97	-4.39	4.39	-13.82	13.82	7.72	7.72	4.79	4.79
15	Palm Springs	-23.37	23.37	-17.35	17.35	-17.06	17.06	-3.38	3.38	11.26	11.26
16	Palm Springs	-24.82	24.82	-41.77	41.77	-19.53	19.53	3.84	3.84	24.56	24.56
17	Palm Springs	-26.03	26.03	-32.11	32.11	-4.92	4.92	6.15	6.15	-999	-999
18	Palm Springs	-12.17	12.17	-17.6	17.6	-8.27	8.27	-999	-999	-999	-999
19	Palm Springs	-17.38	17.38	6.59	6.59	-27.27	27.27	-999	-999	-999	-999
20	Palm Springs	-28.6	28.6	4.7	4.7	-31.51	31.51	-999	-999	-999	-999
21	Palm Springs	-18.22	18.22	-1.55	1.55	-25.69	25.69	-999	-999	-999	-999
22	Palm Springs	-11.7	11.7	-2.4	2.4	-22.76	22.76	-999	-999	-999	-999
23	Palm Springs	-3.11	3.11	4.35	4.35	-999	-999	-999	-999	-999	-999
	Average	-16.554706	16.554706	-7.8195	9.3835	-15.569286	15.739286	-3.6945455	8.5381818	8.6033333	8.6033333

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Crestline	-21.23	21.23	-999	-999	-999	-999	-999	-999	-999	-999
9	Crestline	-19.11	19.11	-999	-999	-9.48	9.48	-999	-999	-8.74	8.74
10	Crestline	-16.01	16.01	-999	-999	-4.16	4.16	-12.01	12.01	-7.55	7.55
11	Crestline	-12.86	12.86	-1.16	1.16	1.31	1.31	-25.79	25.79	1.37	1.37
12	Crestline	-6.29	6.29	1.09	1.09	4.5	4.5	-26.51	26.51	-9.2	9.2
13	Crestline	2.23	2.23	-7.29	7.29	1.64	1.64	-25.67	25.67	-14.18	14.18
14	Crestline	-15.32	15.32	-11.46	11.46	-19.18	19.18	-31.09	31.09	19.19	19.19
15	Crestline	-57.43	57.43	8.42	8.42	-34.54	34.54	-10.33	10.33	37.48	37.48
16	Crestline	-68.26	68.26	-13.69	13.69	-75.03	75.03	20.28	20.28	45.76	45.76
17	Crestline	-42.72	42.72	-24.22	24.22	-43.78	43.78	23.45	23.45	34.05	34.05
18	Crestline	1.74	1.74	2.28	2.28	-3.03	3.03	18.06	18.06	11.79	11.79
19	Crestline	-999	-999	36.26	36.26	-999	-999	35.53	35.53	18.91	18.91
20	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	22.89	22.89
21	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Crestline	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-23.205455	23.927273	-1.0855556	11.763333	-18.175	19.665	-3.408	22.872	12.6475	19.259167

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-9.04	9.04
9	Fontana	-15.73	15.73	-999	-999	-999	-999	-0.47	0.47	1.74	1.74
10	Fontana	-16.21	16.21	-999	-999	-999	-999	-15.18	15.18	4.25	4.25
11	Fontana	-17.76	17.76	-18.08	18.08	-999	-999	-8.58	8.58	-14.86	14.86
12	Fontana	-24.45	24.45	-10.82	10.82	-14.8	14.8	-31.93	31.93	-17.91	17.91
13	Fontana	-37.78	37.78	-28.65	28.65	-8.79	8.79	-41.14	41.14	-12.25	12.25
14	Fontana	-35.61	35.61	-27.11	27.11	-49.31	49.31	-1.52	1.52	30.6	30.6
15	Fontana	-49.03	49.03	-11.92	11.92	-54.27	54.27	10.76	10.76	39.38	39.38
16	Fontana	-41.76	41.76	4.9	4.9	1.68	1.68	30.85	30.85	19.75	19.75
17	Fontana	-14.85	14.85	-0.03	0.03	4.62	4.62	7.79	7.79	-0.9	0.9
18	Fontana	-0.16	0.16	10.07	10.07	-3.76	3.76	-5.94	5.94	-4.6	4.6
19	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-3.99	3.99
20	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Fontana	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-25.334	25.334	-10.205	13.9475	-17.804286	19.604286	-5.536	15.416	2.6808333	13.2725

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Redlands	-999	-999	-11.74	11.74	-999	-999	-2.83	2.83	-999	-999
9	Redlands	-3.15	3.15	-12.05	12.05	-999	-999	-11.99	11.99	-17.14	17.14
10	Redlands	-0.23	0.23	-4.24	4.24	9.47	9.47	-22.75	22.75	-14.93	14.93
11	Redlands	-9.44	9.44	-11.4	11.4	-12.61	12.61	-36.37	36.37	3.13	3.13
12	Redlands	-21.1	21.1	-20.79	20.79	-22.23	22.23	-13.47	13.47	18.67	18.67
13	Redlands	-19.54	19.54	-26.54	26.54	-18.38	18.38	-20.25	20.25	1.2	1.2
14	Redlands	-38.31	38.31	-16.27	16.27	-15.48	15.48	-36.62	36.62	32.19	32.19
15	Redlands	-40.26	40.26	-19.55	19.55	-9.66	9.66	25.29	25.29	53.56	53.56
16	Redlands	-35.64	35.64	-12.87	12.87	-27.18	27.18	35.19	35.19	-999	-999
17	Redlands	-35.28	35.28	13.3	13.3	-1.96	1.96	25.94	25.94	62.07	62.07
18	Redlands	-26.64	26.64	14.19	14.19	8.36	8.36	29.25	29.25	33.19	33.19
19	Redlands	-6.44	6.44	20.39	20.39	12.34	12.34	37.01	37.01	32.75	32.75
20	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Redlands	-999	-999	-999	-999	4.48	4.48	-999	-999	-999	-999
22	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Redlands	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-21.457273	21.457273	-7.2975	15.2775	-6.6227273	12.922727	0.7	24.746667	20.469	26.883

Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	San Bernardino	-999	-999	-999	-999	-999	-999	1.89	1.89	-19.3	19.3
9	San Bernardino	-999	-999	-13.23	13.23	-999	-999	-13.61	13.61	-11.59	11.59
10	San Bernardino	-7.39	7.39	-5.39	5.39	0.41	0.41	-19.03	19.03	-5.62	5.62
11	San Bernardino	-19.44	19.44	-9.62	9.62	-8.42	8.42	-31.62	31.62	-2.01	2.01
12	San Bernardino	-14.09	14.09	-16.05	16.05	-15.12	15.12	-21.37	21.37	0.37	0.37
13	San Bernardino	-23.92	23.92	-6.84	6.84	-12.44	12.44	-35.28	35.28	-7.16	7.16
14	San Bernardino	-40.5	40.5	5.35	5.35	-10.36	10.36	-10.47	10.47	28.48	28.48
15	San Bernardino	-33.54	33.54	-16.97	16.97	-39.41	39.41	31.8	31.8	52.32	52.32
16	San Bernardino	-49.27	49.27	-2.37	2.37	-20.5	20.5	20.29	20.29	55.98	55.98
17	San Bernardino	-34.03	34.03	9.6	9.6	-0.35	0.35	25.55	25.55	27.85	27.85
18	San Bernardino	-18.4	18.4	8.99	8.99	1.72	1.72	20.31	20.31	17.21	17.21
19	San Bernardino	5.56	5.56	21.86	21.86	-7.61	7.61	17.64	17.64	21.71	21.71
20	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	San Bernardino	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-23.502	24.614	-2.2427273	10.57	-11.208	11.634	-1.1583333	20.738333	13.186667	20.8

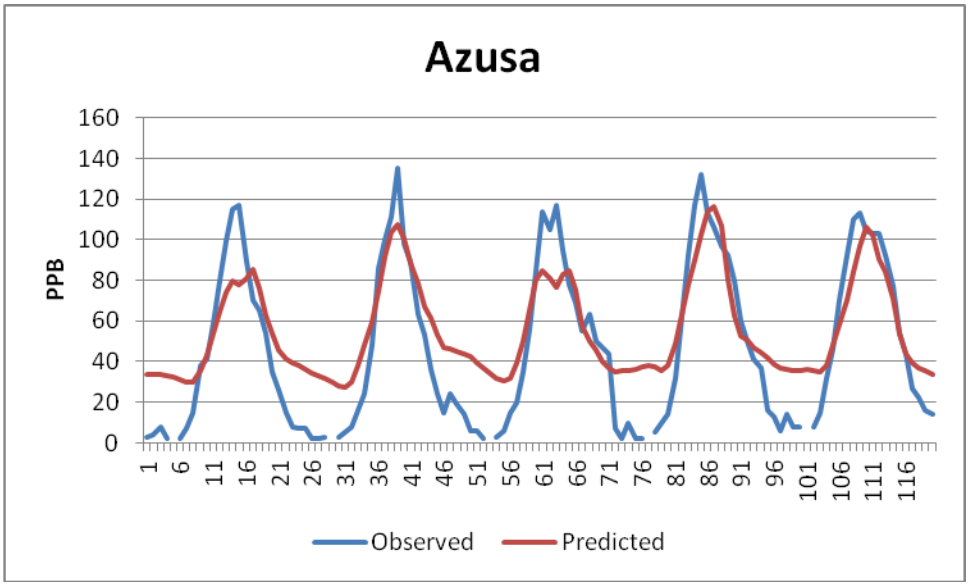
Hour	Station	18		19		20		21		22	
		Bias	Error	Bias	Error	Bias	Error	Bias	Error	Bias	Error
		PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
0	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
1	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
3	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
4	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
5	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
6	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
7	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
8	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-4.99	4.99
9	Upland	-20.99	20.99	-999	-999	-999	-999	-0.28	0.28	-4.02	4.02
10	Upland	-25.66	25.66	-11.34	11.34	-12.24	12.24	-19.23	19.23	-11.78	11.78
11	Upland	-23.24	23.24	-1.83	1.83	-19.75	19.75	-22.4	22.4	-27.47	27.47
12	Upland	-31.87	31.87	-10.68	10.68	-8.57	8.57	-41.04	41.04	-21.49	21.49
13	Upland	-31	31	-31.85	31.85	-22.76	22.76	-34.42	34.42	-0.13	0.13
14	Upland	-40.37	40.37	-21.15	21.15	-52.93	52.93	8.21	8.21	23.65	23.65
15	Upland	-53.43	53.43	-24.85	24.85	-39.45	39.45	16.95	16.95	28.17	28.17
16	Upland	-43.66	43.66	-4.1	4.1	1.08	1.08	13.67	13.67	1.58	1.58
17	Upland	2.77	2.77	-1.16	1.16	-8.14	8.14	-12.62	12.62	-8.55	8.55
18	Upland	5.71	5.71	11.83	11.83	-4.61	4.61	-15.83	15.83	-3.65	3.65
19	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-6.87	6.87
20	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
21	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
22	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
23	Upland	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
	Average	-26.174	27.87	-10.57	13.198889	-18.596667	18.836667	-10.699	18.465	-2.9625	11.8625

Attachment-2

Diurnal Trends:

Observed Vs. Predicted

June 18-22, 2008


Azusa
PPB
160
140
120
100
80
60
40
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16
21
26
31
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61
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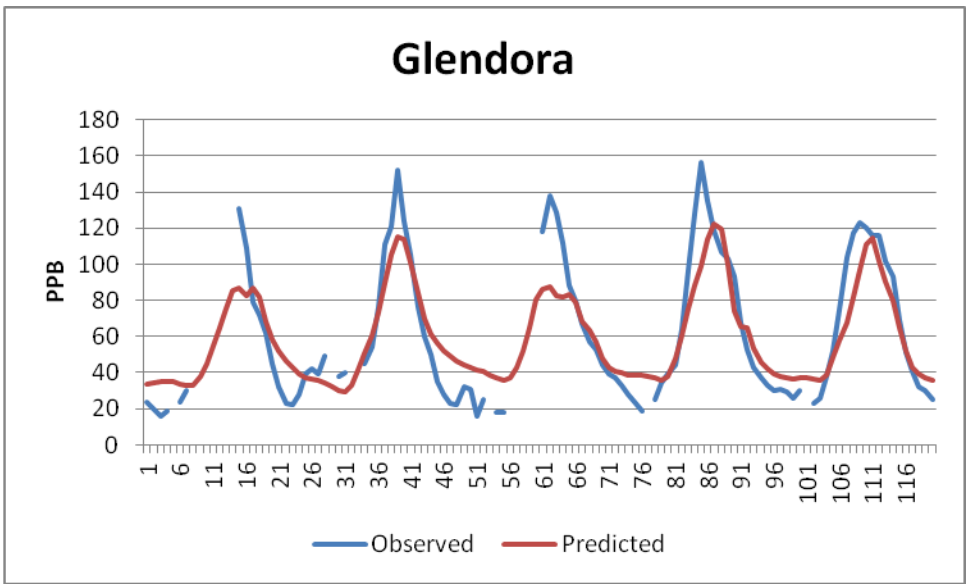
71
76
81
86
91
96
101
106
111
116
Observed
Predicted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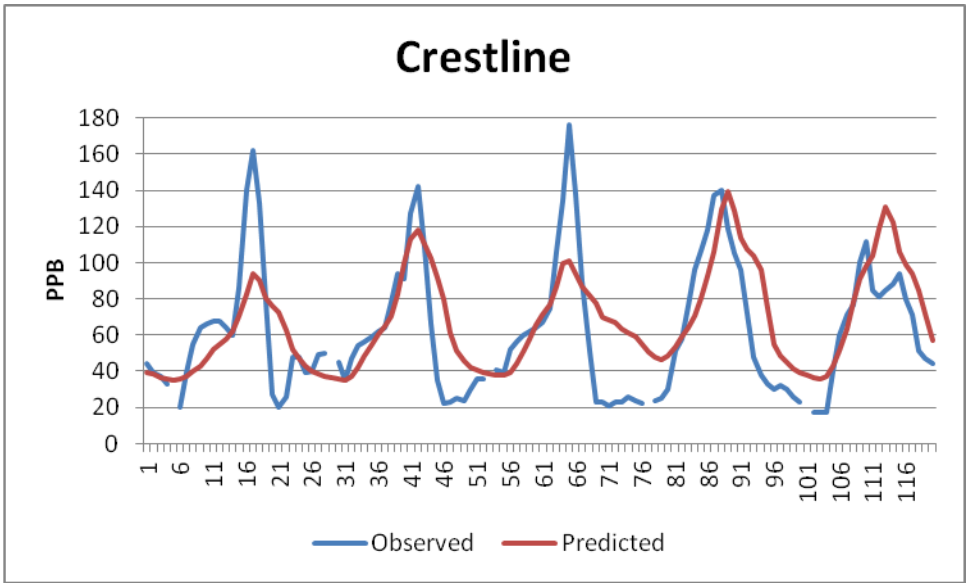
Observed
Predicted


Crestline
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11
16
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101
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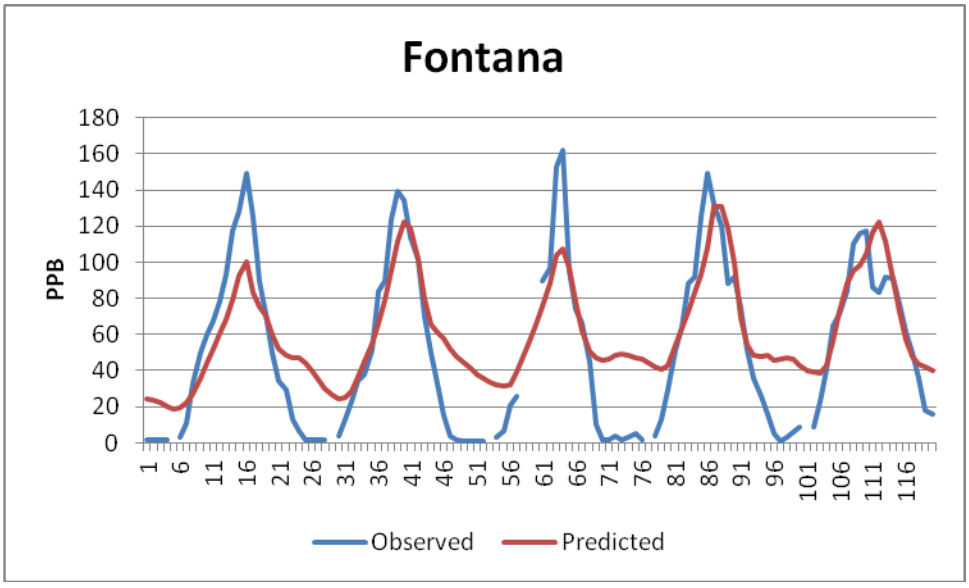
111
116
Observed
Predicted


Fontana
PPB
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160
140
120
100
80
60
40
20
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1
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11
16
21
26
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71
76
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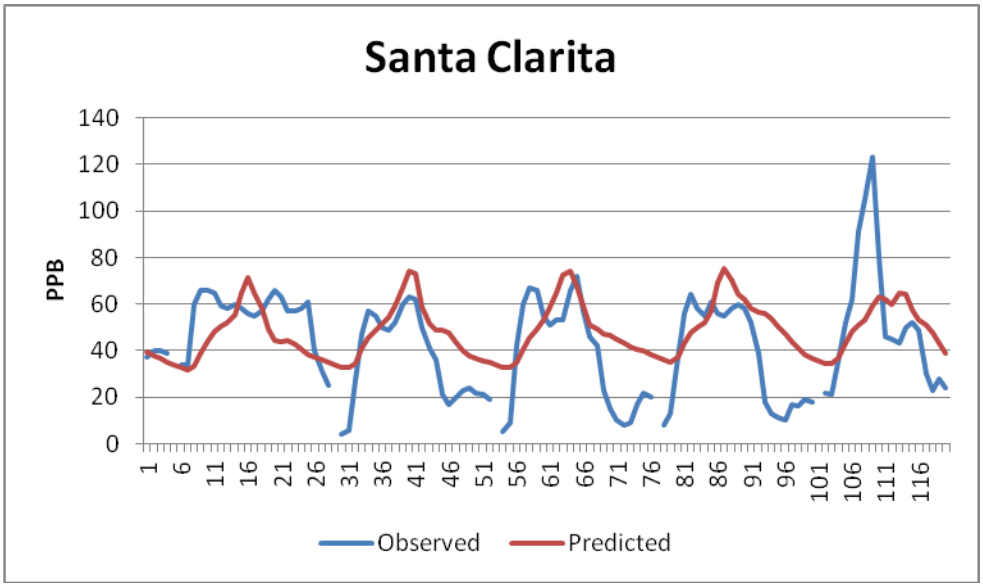
86
91
96
101
106
111
116
Observed
Predicted


Santa Clarita
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26
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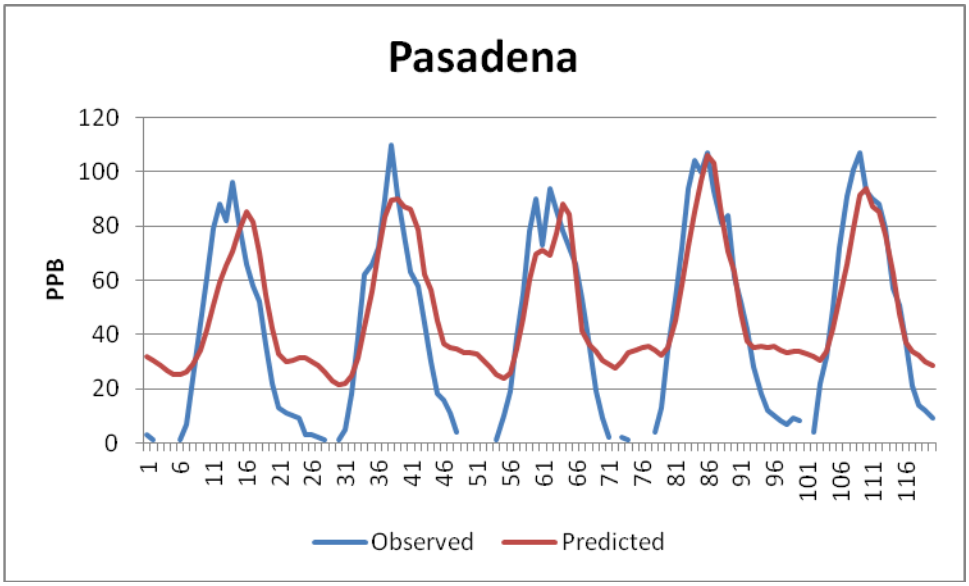
96
101
106
111
116
Observed
Predicted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61
66
71
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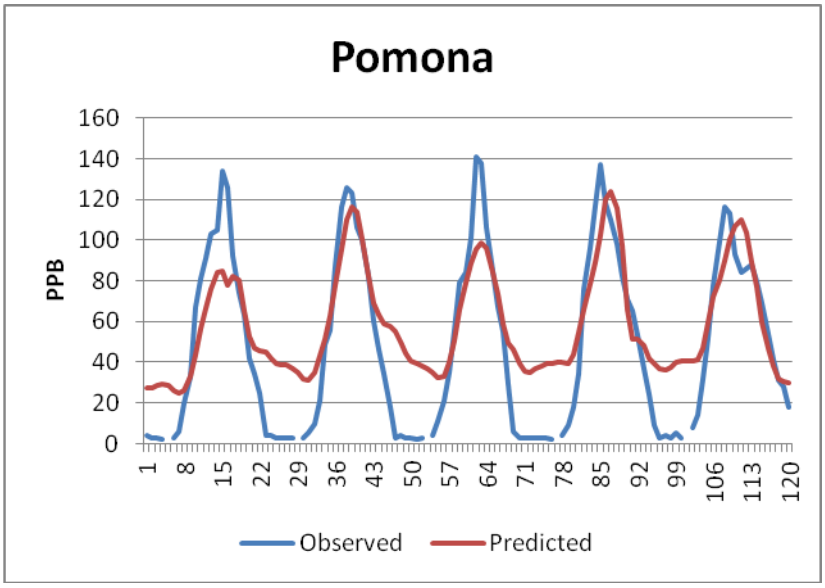
96
101
106
111
116
Observed
Predicted


Pomona
PPB
160
140
120
100
80
60
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20
0
1
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85
92
99
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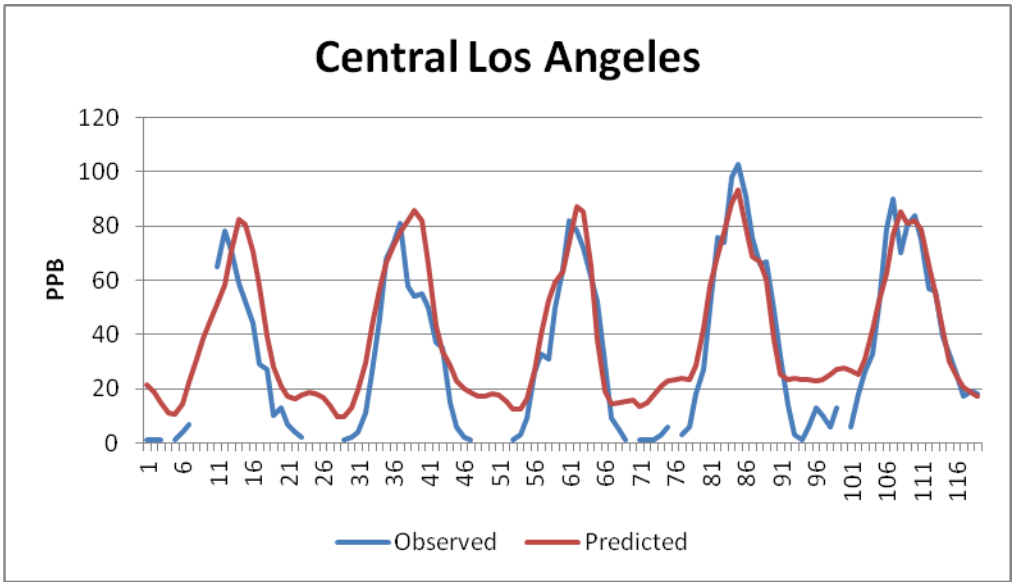
113
120
Observed
Predicted


Central Los Angeles
PPB
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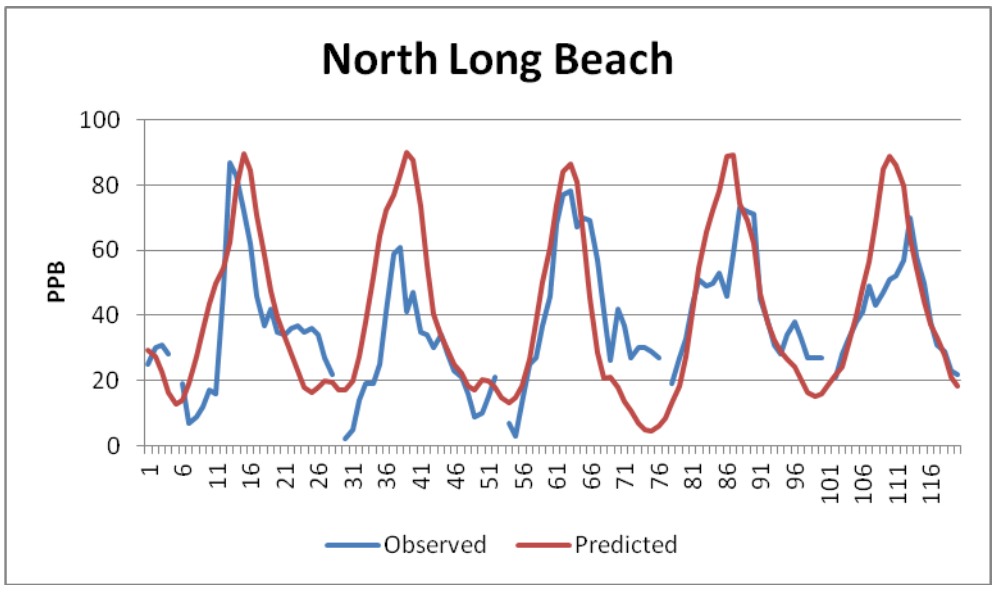
Observed
Predicted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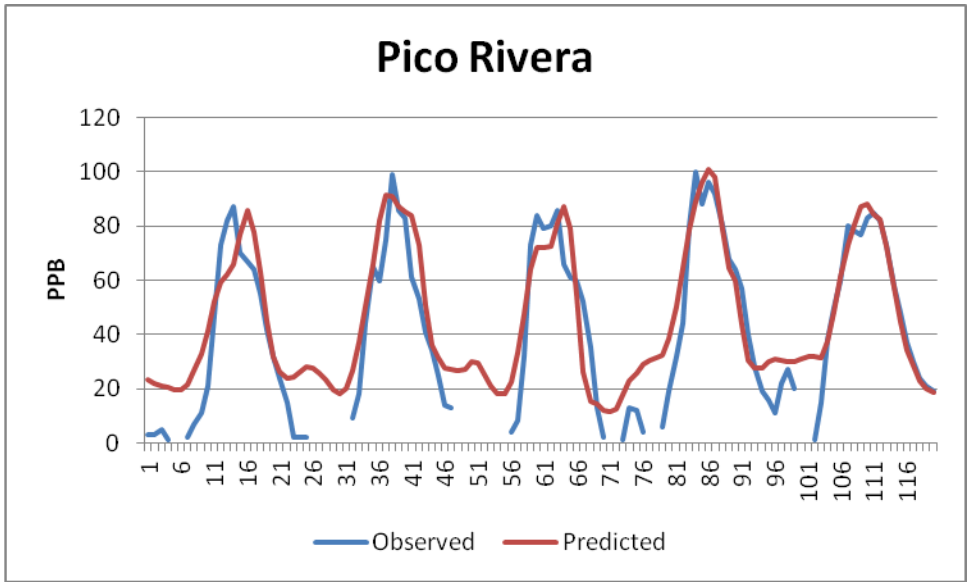
Observed
Predicted


Pico Rivera
PPB
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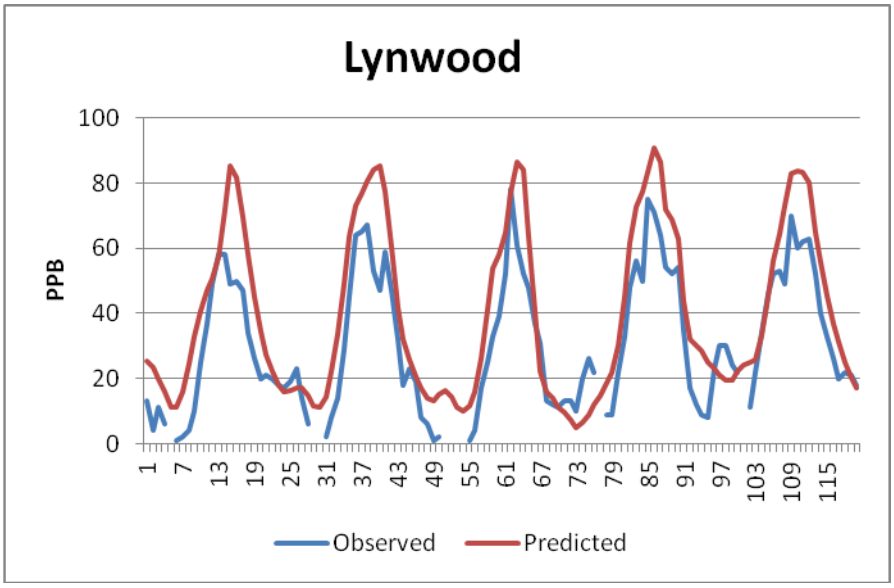
Observed
Predicted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PPB
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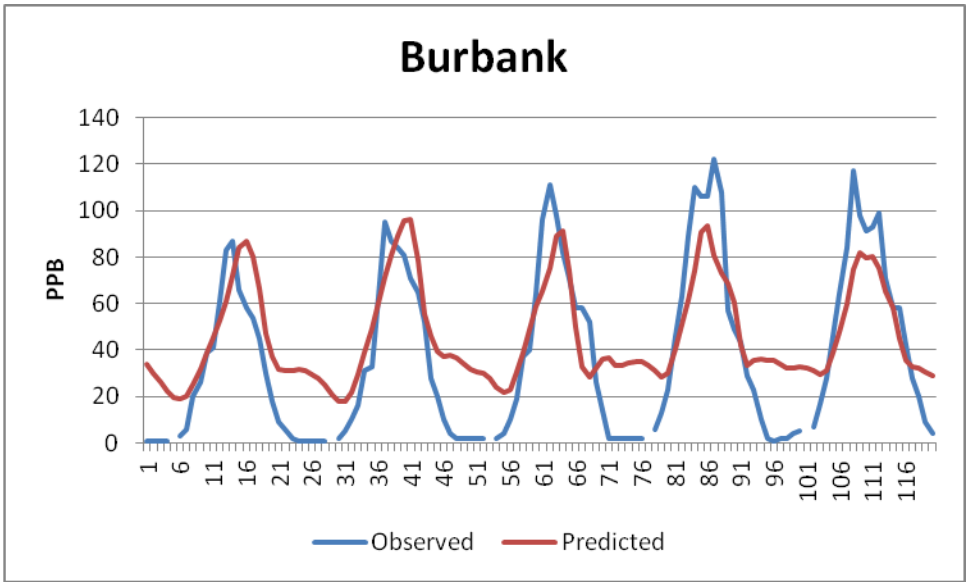
Observed
Predicted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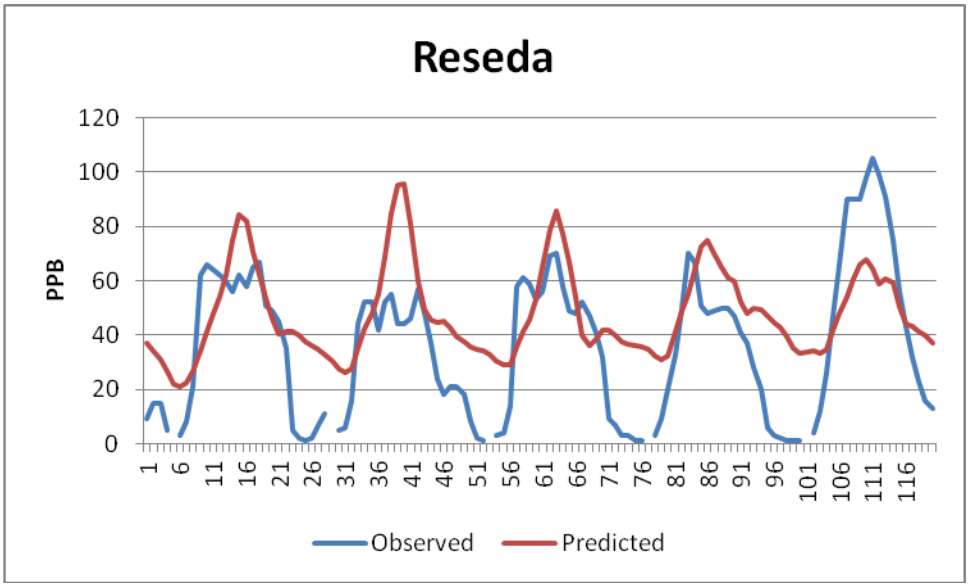
Predicted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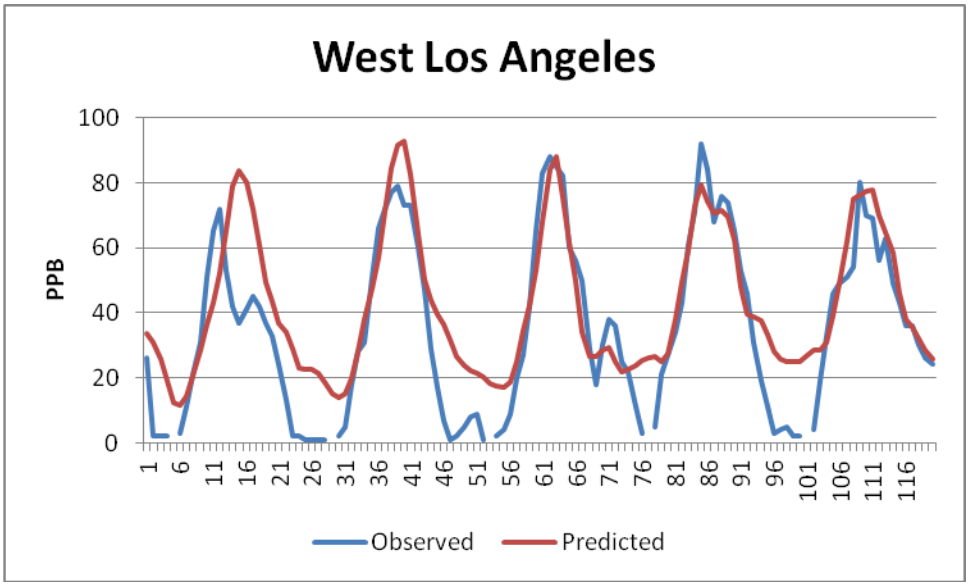
Observed
Predicted


West Los Angeles
PPB
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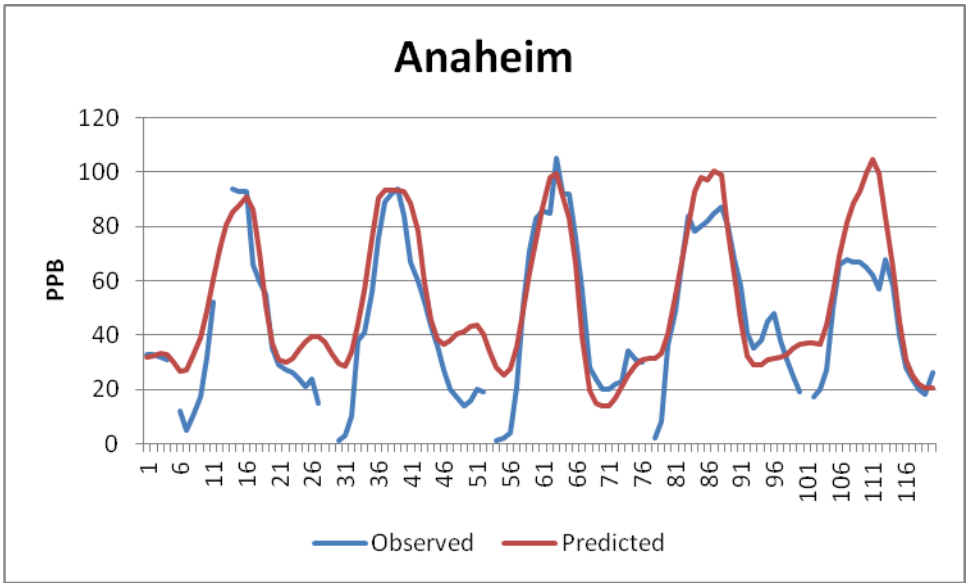
Observed
Predicted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PPB
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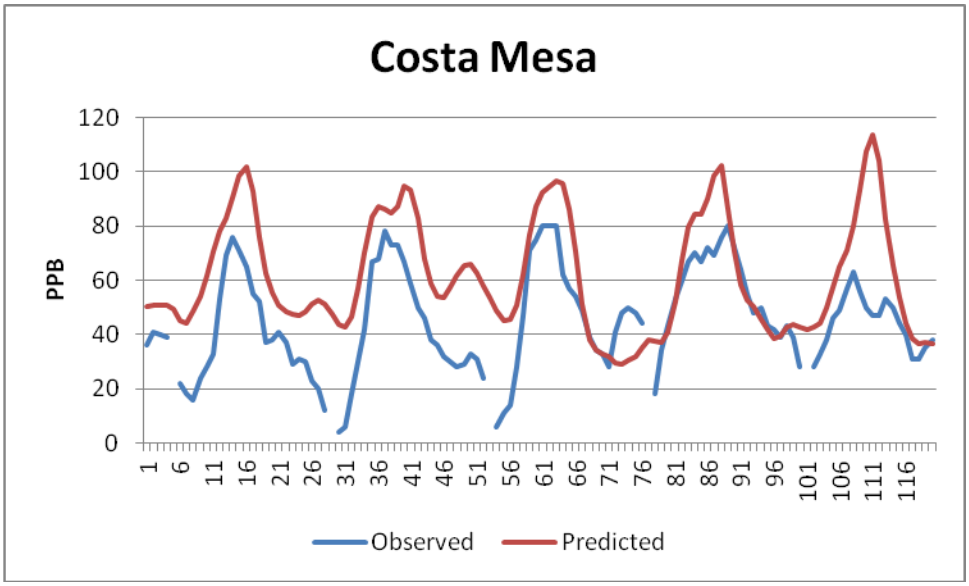
Observed
Predicted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PPB
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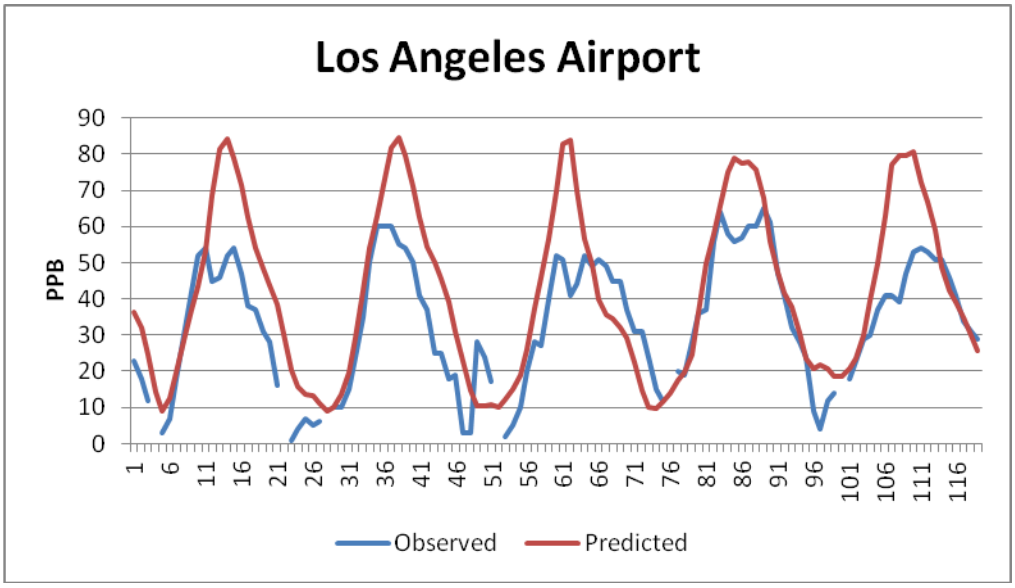
Observed
Predicted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PPB
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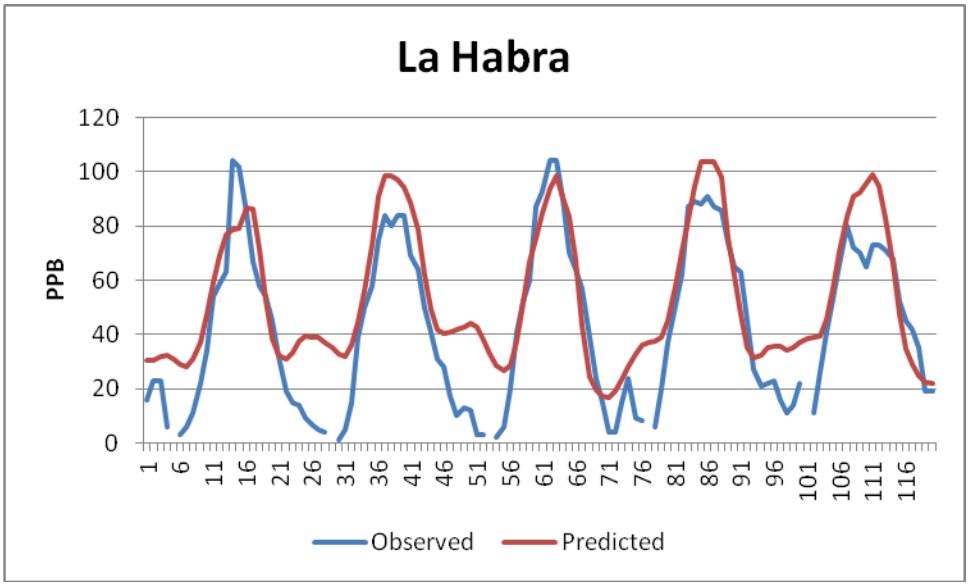
Observed
Predicted


La Habra
PPB
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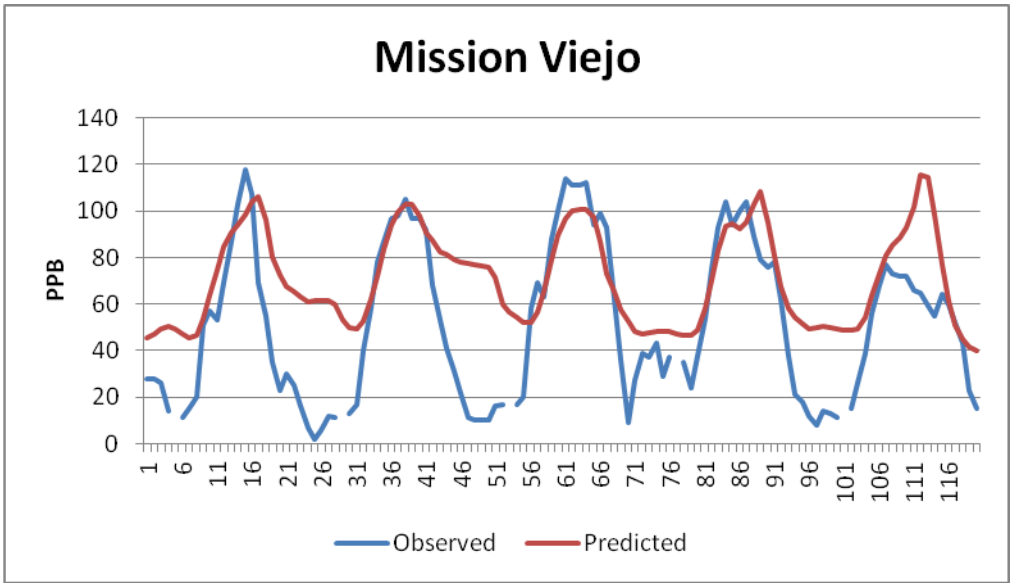
Observed
Predicted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PPB
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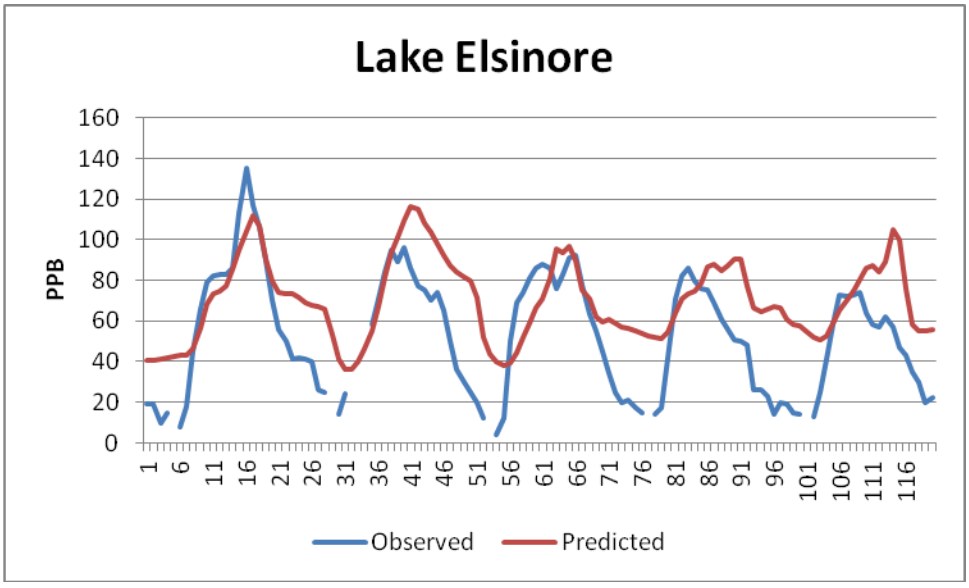
Observed
Predicted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PPB
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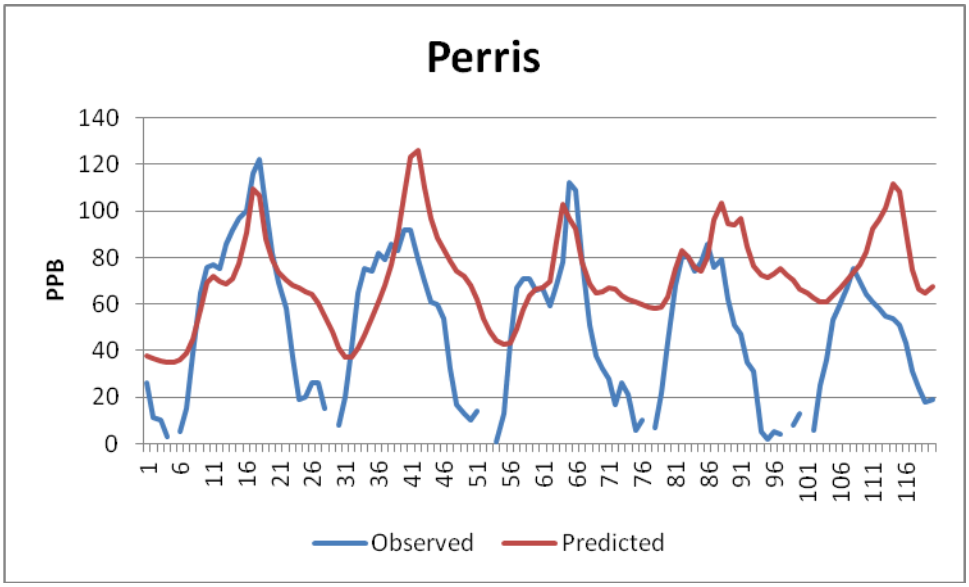
Observed
Predicted


Perris
PPB
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Observed
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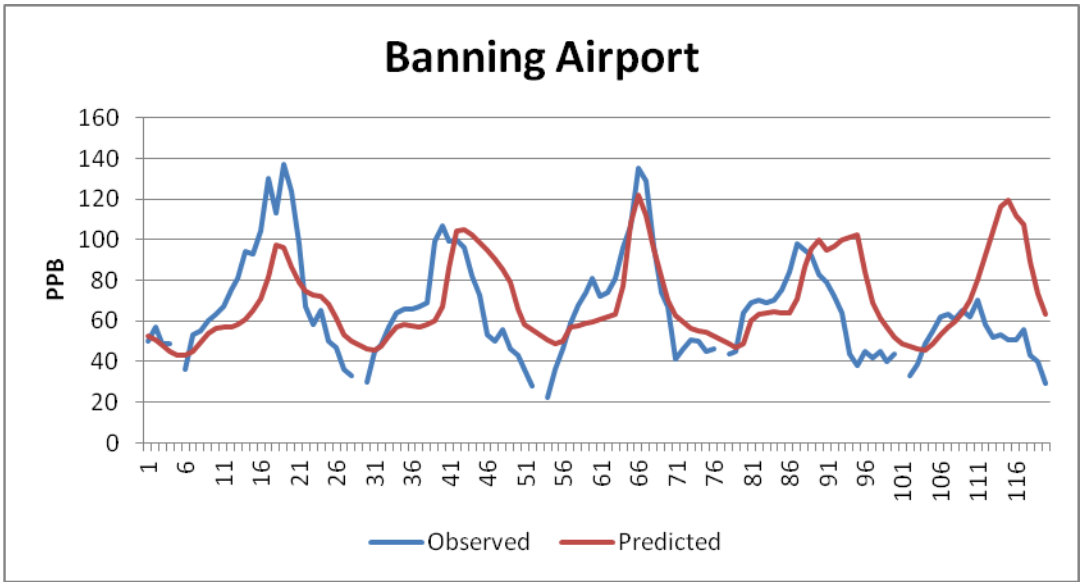
Banning Airport
PPB
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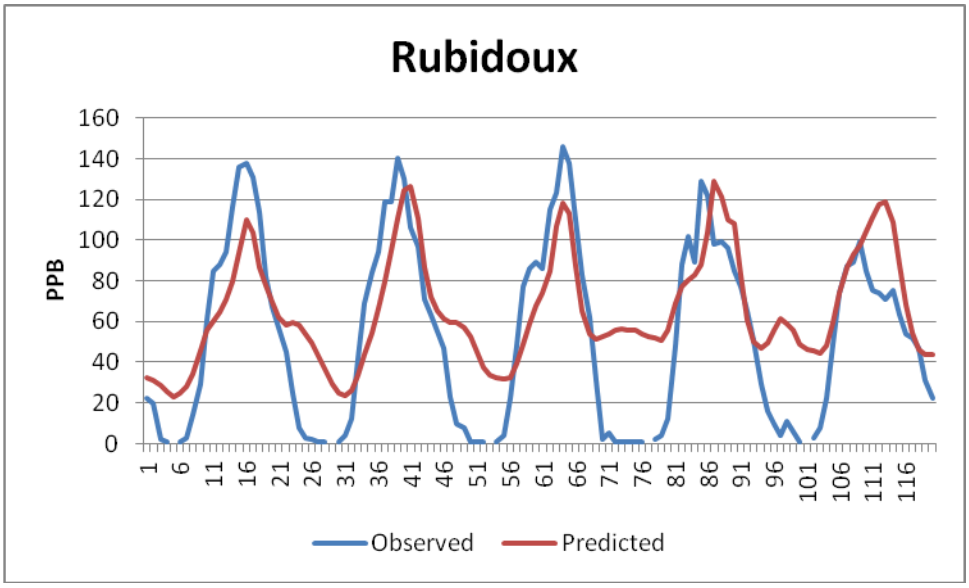
Observed
Predicted


Rubidoux
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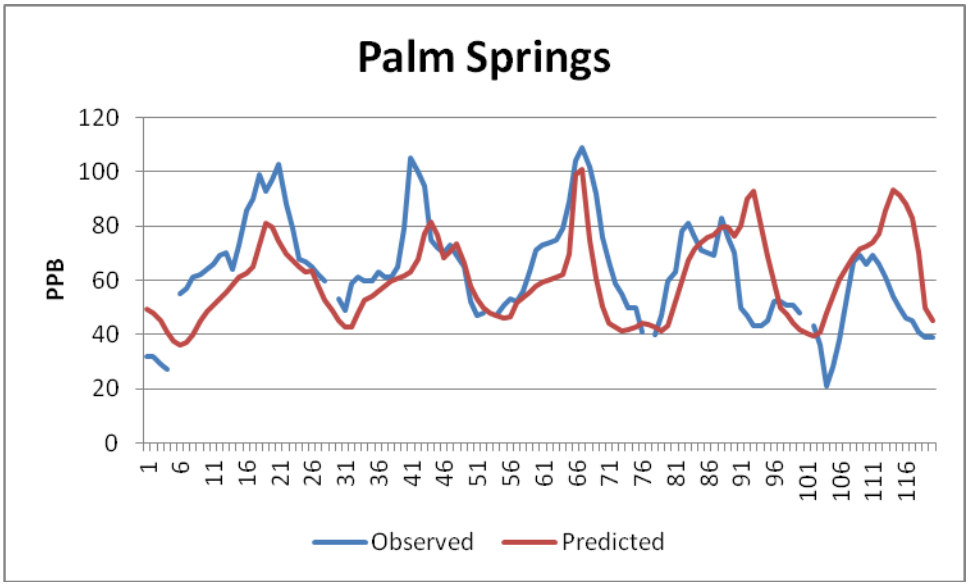
Observed
Predicted


Palm Springs
PPB
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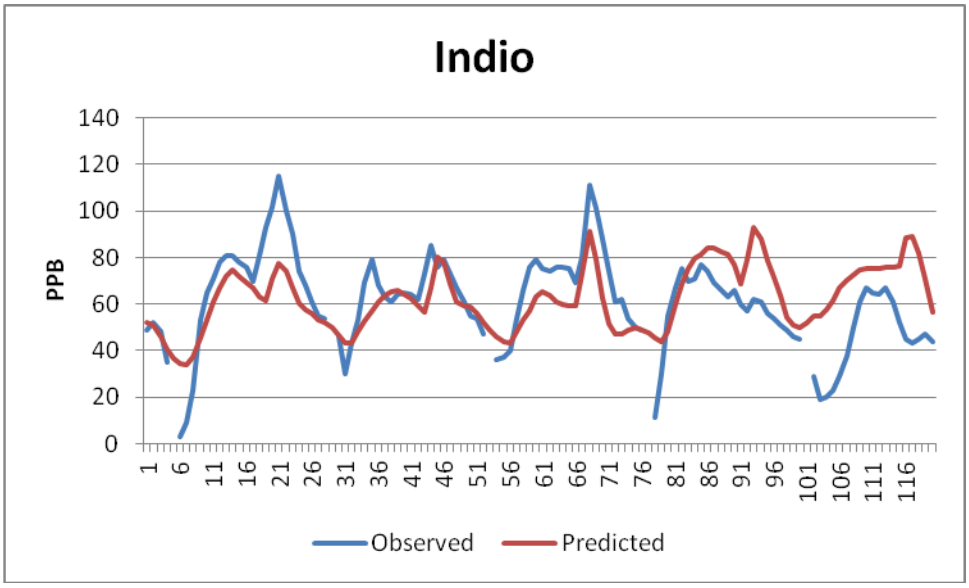
Observed
Predicted


Indio
PPB
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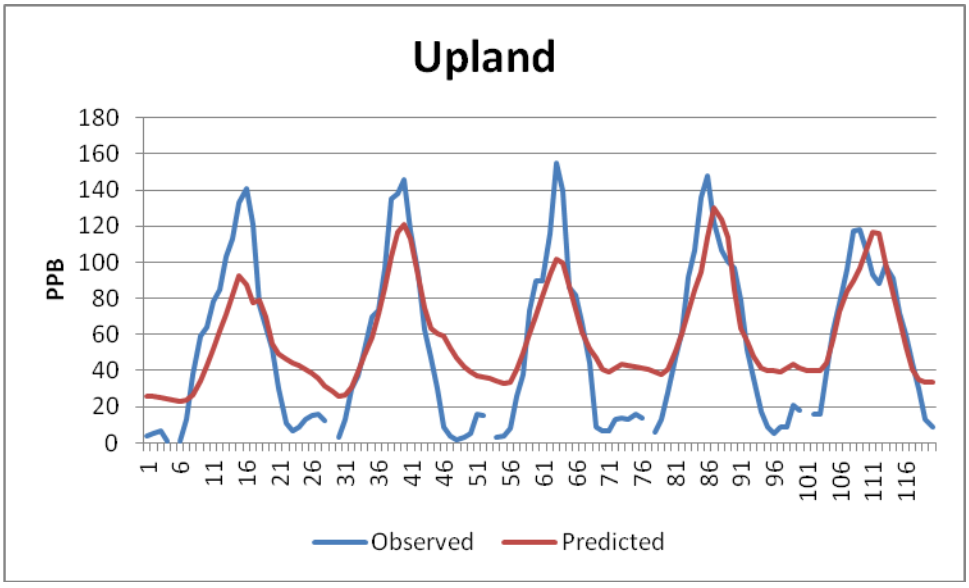
Observed
Predicted


Upland
PPB
180
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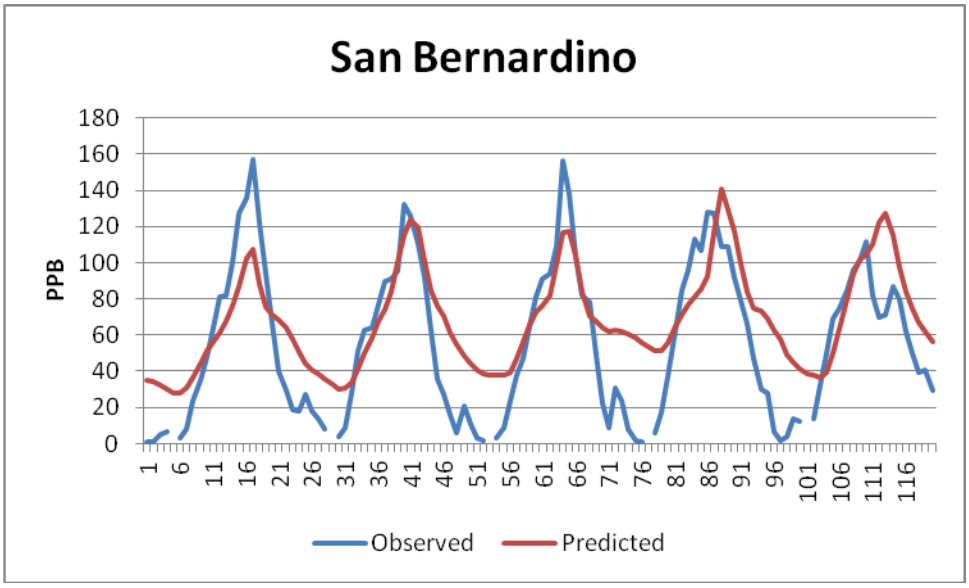
Observed
Predicted


San Bernardino
PPB
180
160
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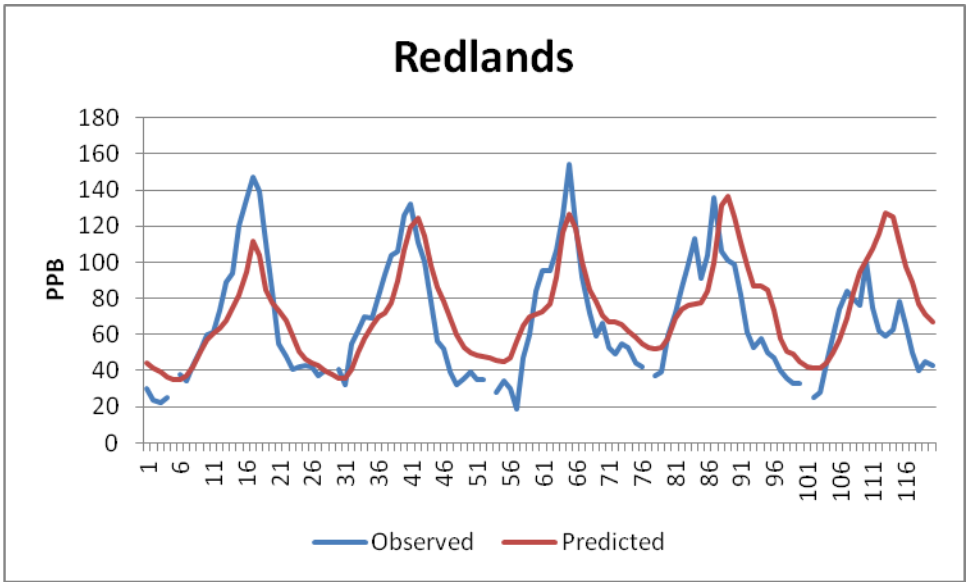
Observed
Predicted


Redlands
PPB
180
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Observed
Predicted

Attachment-3

CEPA Analysis

Run Date: 9/25/2012 2:06:26 PM

(PC-CEPA V4.4 / October 2008)
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C:\Users\SYan\Documents\AQMP2012\ARB-dump082212\SC\ems22sc.txt
C:\Users\SYan\Documents\AQMP2012\CMs\DF070612-Clean\1hr-O3-092012\scen_cm.txt
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Year 2022 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(A) Reductions Without Overlapping/Double-Counting With Other Control Measures (1)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-01	Revised Controls from R1118	0.00	0.13	0.00	0.13
BA-02	Adjustment for R1110.2	-0.03	-1.61	-0.07	-1.61
BA-03	Adjustment for R1147	0.00	-4.55	0.00	-4.55
BA-04	Adjustment for NonAgICE (CES89664)	0.00	0.15	0.04	0.15
CMB-01	Reclaim NOx Reductions	0.00	3.08	0.00	3.08
CMB-03	Commercial Space Heating [Nox]	0.00	0.15	0.00	0.15
CTS-01	Architectural Coatings [VOC]	2.52	0.00	0.00	0.00
CTS-02	Misc. Coatings, Adhesives, Solvents & Lubricants [VOC]	1.04	0.00	0.00	0.00
CTS-03	Mold Release[VOC]	1.14	0.00	0.00	0.00
FUG-02	LPG Transfer and Dispensing [VOC]	0.99	0.00	0.00	0.00
FUG-03	Fugitive Emissions [VOC]	1.01	0.00	0.00	0.00
P07SMOG1	Annual Inspection of Older Vehicles	1.63	3.93	0.00	4.24
P07SMOG2	Inspection of Motocycles	1.21	0.41	0.00	0.45
P07SMOG3	Annual Inspection of High Mileage Vehicles	0.29	0.80	0.00	0.86
P07RETIRE	Expanded Passenger Vehicle Retirement Program	0.42	0.32	0.00	0.35
P07LOCO1	Accelerated Intro. of Cleaner Line-Haul Locomotives	0.00	12.14	0.00	12.14
P07OGV1	OGV Cleaner Main Engines	0.00	6.21	0.00	6.20
P07OFRD1	Off-Road Recreational Vehicle Expanded Emissions Stds.	3.61	0.00	0.00	0.00
OFRD-01	SOON [NOX]	0.00	7.47	0.00	7.47
Black Box	Black Box (VOC:mobile+airc:0.882; NOx:Allsrce+RC:0.484>CC150)	20.58	157.93	0.00	161.71
Grand Total (Net)		34.42	186.55	-0.03	190.78

Year 2022 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(B) Reductions With Overlapping/Double-Counting With Other Control Measures (2)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-01	Revised Controls from R1118	0.00	0.13	0.00	0.13
BA-02	Adjustment for R1110.2	-0.03	-1.61	-0.07	-1.61
BA-03	Adjustment for R1147	0.00	-4.55	0.00	-4.55
BA-04	Adjustment for NonAgICE (CES89664)	0.00	0.15	0.04	0.15
CMB-01	Reclaim NOx Reduction	0.00	3.08	0.00	3.08
CMB-03	Commercial Space Heating [Nox]	0.00	0.15	0.00	0.15
CTS-01	Architectural Coatings [VOC]	2.52	0.00	0.00	0.00
CTS-02	Misc. Coatings, Adhesives, Solvents & Lubricants [VOC]	1.04	0.00	0.00	0.00
CTS-03	Mold Release[VOC]	1.14	0.00	0.00	0.00
FUG-02	LPG Transfer and Dispensing [VOC]	0.99	0.00	0.00	0.00
FUG-03	Fugitive Emissions [VOC]	1.01	0.00	0.00	0.00
P07SMOG1	Annual Inspection of Older Vehicles	1.63	3.93	0.00	4.24
P07SMOG2	Inspection of Motocycles	1.21	0.41	0.00	0.45
P07SMOG3	Annual Inspection of High Mileage Vehicles	0.30	0.85	0.00	0.92
P07RETIRE	Expanded Passenger Vehicle Retirement Program	0.43	0.34	0.00	0.38
P07LOCO1	Accelerated Intro. of Cleaner Line-Haul Locomotives	0.00	12.14	0.00	12.14
P07OGV1	OGV Cleaner Main Engines	0.00	6.21	0.00	6.20
P07OFRD1	Off-Road Recreational Vehicle Expanded Emissions Stds.	3.61	0.00	0.00	0.00
OFRD-01	SOON [NOX]	0.00	7.47	0.00	7.47
Black Box	Black Box (VOC:mobile+airc:0.882; NOx:Allsrce+RC:0.484>CC150)	21.43	174.14	0.00	178.15
Grand Total (with potential overlapping)		35.29	202.84	-0.03	207.31

EMISSION SUMMARY FOR
(POINT, AREA, MOBILE SOURCE, AND OFF-ROAD MV)

BASELINE EMISSIONS

	VOC	NOx	CO	NO2
Point source	40.05	5.59	37.94	5.59
Area source	218.32	30.94	171.97	40.12
RECLAIM	0.00	27.23	0.00	27.23
Total Stationary	258.37	63.77	209.90	72.94
On-road	72.78	134.81	622.73	142.19
Off-road	104.39	120.67	665.66	111.88
Aircraft	4.41	15.44	41.71	15.44
TOTAL	439.94	334.69	1540.00	342.46

EMISSION REDUCTIONS

Point source	2.12	2.17	-0.07	2.17
Area source	4.56	13.91	0.04	18.64
RECLAIM	0.00	15.54	0.00	15.54
Total Stationary	6.68	31.62	-0.03	36.35
On-road	11.72	72.20	0.00	76.23
Off-road	15.50	74.76	0.00	70.23
Aircraft	0.52	7.97	0.00	7.97
TOTAL	34.42	186.55	-0.03	190.78

REMAINING EMISSIONS

Point source	37.93	3.42	38.01	3.42
Area source	213.76	17.03	171.92	21.47
RECLAIM	0.00	11.69	0.00	11.69
Total Stationary	251.69	32.15	209.93	36.59
On-road	61.06	62.61	622.73	65.96
Off-road	88.88	45.91	665.66	41.66
Aircraft	3.89	7.47	41.71	7.47
TOTAL	405.52	148.14	1540.02	151.68
AQMP/Set-Aside	4.56	1.89	0.00	1.89
Public Funding	0.00	0.00	0.00	0.00
GRAND TOTAL (T/D)	410.08	150.03	1540.02	153.57
Mobility Adjustments	0.00	0.00	0.00	0.00

(1) Emission reductions for individual measures were estimated based on the sequence of listing contained here. When the sequence changes, reductions from each measure could be affected, but the net total remain the same. The purpose of this table is to estimate total emission reductions without overlapping or double-counting between measures.
(2) Emission reductions for individual measures were estimated in the absence of other measures. Therefore, the sequence of listing does not affect the reduction estimates. The purpose of this table is to provide emission reduction estimates for Appendix IV control measure summary tables as well as cost effectiveness analysis.

Attachment 4 of Appendix VII
Table of Contents

INTRODUCTION 2
IDENTIFYING AND EVALUATING REASONABLY AVAILABLE CONTROL MEASURES 4
Step 1 - Air Quality Technology Symposium 4
Step 2 – U.S. EPA's Suggested List of Control Measures 5
Step 3 – Reasonably Available Control Technology (RACT) 6
Step 4 - Other Districts' Current Rules and Regulations 10
Step 5 - Other Districts' Control Measures 10
Step 6 - Additional Studies and Analyses 15
CONCLUSION 16
REFERENCES 17

INTRODUCTION

As discussed in Appendix VII of the 2012 Draft Final AQMP, the purpose of the 2012 1-hour ozone SIP revision is to provide an attainment demonstration to respond to the U.S. EPA's published "SIP call" proposal on September 19, 2012, finding the existing approved 1-hour ozone SIP substantially inadequate to provide for attainment of the revoked 1-hour ozone standard by the applicable attainment date of November 15, 2010. EPA's proposed SIP call was in turn a response to the decision of the Ninth Circuit Court of Appeals in *Association of Irritated Residents, et al, v. United States Environmental Protection Agency, et al.,* 686 F. 2d 668 (Amended January 12, 2012). For further background details, please refer to Appendix VII of the 2012 Draft Final AQMP. The EPA's proposed SIP call gives the State up to one year after the effective date of the SIP call to submit the revised attainment demonstration. The District intends to demonstrate that a period of the full 10 years allowed by law is needed to attain the 1-hour ozone standard, and submit the updated 1-hour ozone attainment demonstration as part of the 2012 AQMP. This Attachment is a part of Appendix VII - 1-hour Ozone Attainment Demonstration, and the information presented in this Attachment is largely summaries and replications of information presented in the Appendix VI of the Draft Final 2012 AQMP.

The CAA, Section 172(c)(1), sets the overall framework for the Reasonably Available Control Measures (RACM) analysis. The CAA requires the nonattainment air districts to:

> *"provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology)and shall provide for attainment of the national primary ambient air quality standards."*

The U.S. EPA provided further guidance on the RACM in the preamble and the final "Clean Air Fine Particle Implementation Rule" to implement the 1997 PM2.5 NAAQS which were published in the Federal Register in November 1, 2005 and April 25, 2007, respectively, which can be applied to the ozone RACM demonstration. [1, 2] The U.S. EPA's long-standing interpretation of the RACM provision stated in the 1997 PM2.5 Implementation Rule is that the nonattainment air districts should consider all candidate measures that are available and technologically and economically feasible to implement within the nonattainment areas, including any measures that have been suggested; however, the districts are not obligated to adopt all measures, but should demonstrate that there are no additional reasonable measures

available that would advance the attainment date by at least one year or contribute to reasonable further progress (RFP) for the area.

Regarding the approach of identifying emission reduction programs, the U.S. EPA recommends the nonattainment air districts to first identify the emission reduction programs that have already been implemented at the federal, other states and local air districts. Next, the U.S. EPA recommends the air districts to examine additional RACM/RACTs adopted for other nonattainment areas to attain the ambient air quality standards as expeditiously as practicable. In addition, the U.S. EPA recognizes that each nonattainment area has its own profile of emitting sources, and thus neither requires specific RACM/RACT to be implemented in every nonattainment area, nor includes a specific source size threshold for the RACM/RACT analysis. The U.S. EPA however recommends severe nonattainment air districts to evaluate controls for smaller sources if needed for attainment.

A RACM/RACT demonstration must be provided within the State Implementation Plan (SIP). For areas projected to attain within five years of designation, a limited RACM/RACT analysis including the review of available reasonable measures, the estimation of potential emission reductions, and the evaluation of the time needed to implement these measures is sufficient. The areas that cannot reach attainment within five years must conduct a thorough RACM/RACT analysis to demonstrate that sufficient control measures could not be adopted and implemented cumulatively in a practical manner in order to reach attainment at least one year earlier.

In regards to economically feasible, the U.S. EPA did not propose a fixed dollar per ton cost threshold and recommended the air districts to include health benefits in the cost analysis. As indicated in the preamble of the 1997 PM2.5 Implementation Rule:

> "*In regard to economic feasibility, U.S. EPA is not proposing a fixed dollar per ton cost threshold for RACM, just as it is not doing so for RACT…Where the severity of the nonattainment problem makes reductions more imperative or where essential reductions are more difficult to achieve, the acceptable cost of achieving those reductions could increase. In addition, we believe that in determining what are economically feasible emission reduction levels, the States should also consider the collective health benefits that can be realized in the area due to projected improvements."*

The objective of this Appendix is to demonstrate that the District has conducted a thorough RACM/RACT analysis to meet the requirement of the CAA following closely the policy and guidance approach provided by the U.S. EPA.

For the scope of this RACM analysis, District staff will closely study the attainment strategies for stationary and area sources, the rules and regulations of the air districts responsible for the nonattainment areas, namely Ventura, San Francisco, San Joaquin Valley, Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria Texas, and New York Metropolitan while taking into account all available candidate measures proposed by the U.S. EPA, CARB, the Advisory Committee members, the technical experts in air pollution control as well as the public and variety of stakeholders. Staff selected the air districts listed above based on the severity of their nonattainment status and their near-term attainment dates. The RACM analysis for Transportation Control Measures is conducted by SCAG and the RACM analysis for mobile sources conducted by the CARB is shown in applicable Attachments of the Appendix VII.

IDENTIFYING AND EVALUATING REASONABLY AVAILABLE CONTROL MEASURES

To demonstrate that the District has considered all candidate measures that are available and technologically and economically feasible to implement within the Basin, the District staff has conducted 6-steps analysis described below.

Step 1 - Air Quality Technology Symposium

District staff conducted the 2012 Air Quality Technology Symposium in September 2011with participation of technical experts from a variety of areas and the public to solicit new and innovative concepts to assist the Basin in attaining the NAAQS) for PM2.5 by 2014-2019 and ozone by 2024-2032. In addition, the District's Planning, Rules Development and Area Sources Division conducted multiple internal meetings with the District's Technology Advancement Office and the Engineering & Compliance Division from September through November of 2011 to brainstorm ideas for feasible control measures. In addition, the District also conducted an on-going extensive outreach to engage a wide range of stakeholders in the process. In general, the following concepts were proposed:

- Promoting zero or near-zero emission measures and providing incentives for on-road and non-road mobile sources as well as goods movement;

- Further reducing VOC emissions from marine coatings, aerospace coatings, solvents and various consumer products, and focusing on reformulations or alternatives to VOC based-solvents;

- Conducting a mandatory technology review for NO_x RECLAIM, and further reducing NOx emissions through the use of low NO_x burners, fuel cells, biogas control, distributed power generation applications, and assessment for all feasible measures, as well as incentives;

- Addressing energy-climate change and co-benefits, the need for electricity storage and smart grid, or new fossil-fueled peaking plants, to compensate for fluctuations in renewable energy supply, and the use of outreach to promote energy efficiency measures; and

- Influencing consumer behavior, expanding carpool programs, incentivizing with outreach, increasing gas tax, and promoting public-private participation and multi-agency collaboration.

Step 2 – U.S. EPA's Suggested List of Control Measures

District staff reviewed for inclusion the control measure concepts suggested by the U.S. EPA for PM2.5 nonattainment areas described in the preamble of the PM2.5 Implementation Rule. Many of these concepts are intended to reduce NOx, a precursor of PM2.5 as well as ozone. As summarized in Table 1, the District either has an existing rule or developed a 2012 control measure for each control measure concept suggested by the U.S. EPA.

TABLE 1

Demonstration of Compliance with Control Measures Recommended by U.S. EPA

U.S. EPA'S CONTROL MEASURE CONCEPTS	2012 CONTROL MEASURES AND EXISTING RULES
STATIONARY SOURCE MEASURES	
Diesel engine retrofit, rebuild, replacement, with catalyzed particle filter	Rule 1470, Rule 1110.2
New or upgraded emission controls for direct PM2.5 (e.g., baghouse or electrostatic precipitator; improved monitoring methods)	Rule 1155, Rule 1156
New/upgraded emission controls for PM2.5 precursors (e.g., scrubbers)	2010 RECLAIM Amendment
Energy efficiency measures to reduce fuel consumption	Rule 1146, Rule 1146.1, Rule 1146.2, Rule 1114, Rule 1111, Control Measure EDU-01, INC-01

MOBILE SOURCE MEASURES	
On-road diesel engine retrofits for school buses and trucks using U.S. EPA-verified technologies	Refer to CARB's Existing Rules and Control Measures
Non-road diesel engine retrofit, rebuild/replace with catalyzed particle filter	Refer to CARB's Existing Rules and Control Measures
Diesel idling programs for trucks, locomotive, and other mobile sources	Refer to CARB's Existing Rules and Control Measures
Transportation control measures (including those listed in section 108(f) of the CAA as well as other TCMs), as well as other transportation demand management and transportation systems management strategies	Refer to SCAG's Control Measures
Programs to reduce emissions and accelerate retirement of high emitting vehicles, boats, lawn and garden equipment	Refer to CARB's Rules and Control Measures
Emissions testing and repair/maintenance programs for on-road vehicles	Refer to CARB's Rules and Control Measures
Emissions testing and repair/maintenance programs for non-road heavy duty vehicles and equipment	Refer to CARB's Rules and Control Measures
Programs to expand use of clean burning fuels	Refer to CARB's Rules and Control Measures
Opacity/emissions standards for gross-emitting diesel equipment or vessels	Refer to CARB's Rules and Control Measures
AREA SOURCE MEASURES	
New open burning regulations and/or measures to minimize emissions from forest and agricultural burning activities	Rule 444
Reduce emissions from woodstoves and fireplaces	Rule 445, Control Measure BCM-01
Regulate charbroiling/other commercial cooking operations	Control Measure BCM-02
Reduce solvent usage or solvent substitution	Control Measure CTS-02
Reduce dust from construction activities/vacant disturbed areas, paved and unpaved roads.	Rule 1157

Step 3 – Reasonably Available Control Technology (RACT)

As required by the CAA, Section 172(c)(1), the nonattainment areas must implement applicable RACTs. While RACM refers to measures which may be applicable to a wide range of sources, stationary as well as area and mobile sources, the U.S. EPA defines RACT as the lowest level of control specifically designed for stationary sources:

"*lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility*".

The CAA, Section 172(c)(1) and Section 182, require nonattainment areas for ozone that are designated at moderate or above to adopt RACT for major sources. Nonattainment areas classified as serious, severe, or extreme must adopt control measures above and beyond the minimum RACT levels to fulfill attainment.

In addition, the CAA, Section 183, requires the U.S. EPA to provide guidance to the air districts on the "presumptive" RACT levels. As a result, the U.S. EPA developed several Control Techniques Guidelines (CTGs) for VOC sources, and Alternatives Control Techniques (ACT) documents for VOC and NOx sources. Most of the CTGs were issued prior to 1990, and most of the ACT documents were issued in the mid-1990s. The CTGs contain mandated emission standards and work practices whereas the ACTs describe available control techniques and their cost effectiveness, but do not define "presumptive" RACT levels. The U.S. EPA is required to update existing CTG/ACTs, or develop new guidelines, on a frequent basis as new or updated control technologies become available.

The CAA, Section 182(b)(2), further requires the air districts to revise their SIPs to include the mandated RACT levels covered by the CTGs issued after November 15, 1990 and prior to the area's date of attainment. The U.S. EPA's final rule to implement the 8-hour ozone standard discusses RACT requirements which states that where a RACT SIP is required, the states must assure that RACT is met, either through a certification that previously required RACT controls represent RACT for 8-hour ozone standards, or through a new RACT determination.[3] To satisfy this requirement, the District developed and submitted to CARB and U.S. EPA a demonstration and certification that the District's rules and regulations fulfill the 8-hour ozone RACT requirements developed between 1990 and the beginning of 2006.[4] The U.S. EPA approved the District's RACT demonstration in December 2008.[5]

Subsequently, the U.S. EPA developed twelve new CTGs in 2006-2008 to update the requirements for several types of coatings, and staff again conducted an analysis comparing the current requirements in the District's rules with those requirements in the new CTGs. The 12 new CTGs developed by the U.S. EPA are: [6]

- Flat Wood Paneling Coatings (2006)
- Flexible Packaging Printing Materials (2006)

- Industrial Cleaning Solvents (2006)
- Lithographic Materials and Letterpress Printing Materials (2006)
- Large Appliance Coatings (2007)
- Metal Furniture Coatings (2007)
- Paper, Film, and Foil Coatings (2007)
- Miscellaneous Metal Products Coatings (2008)
- Plastic Parts Coating (2008)
- Auto and Light-Duty Truck Assembly Coatings (2008)
- Fiberglass Boat Manufacturing Materials, and Miscellaneous (2008)
- Industrial Adhesives (2008)

District staff's analysis is summarized in Table 2. As shown in Table 2, three District's VOC rules, Rule 1130 – Graphic Arts, Rule 1115 – Motor Vehicle Assembly Line Coating Operations and Rule 1168 - Adhesives and Sealants have met or exceeded most, but not all, minimum requirements of the CTGs. Consequently, District staff has developed one or more control measures to address these issues. Staff estimates a potential reduction of 0.2 tons per day VOC associated with Rule 1130, and less than 0.01 tons per day VOC associated with Rule 1115, and no emission reduction estimate for Rule 1168 is available at this time. District staff is aware that additional assessments may be required, such as a determination that major VOC sources subject to Rules 1130, 1115, and 1168 met the minimum requirements in the CTGs, or a negative declaration that there are no sources in the area subject to the CTGs. These additional analyses will be provided during the rule development phase, or at the time of developing the 8-hour ozone AQMPs, whichever comes first.

TABLE 2
Evaluation of 2006-2008 U.S. EPA's VOC CTGs

CTG TITLE	DISTRICT RULE	EVALUATION
Flat Wood Paneling Coatings (2006)	Rule 1104 - Wood Flat Stock Coating Operations	Overall equivalency to CTG emission standards. No further action is needed. [1]
Flexible Packaging Printing Materials (2006); Lithographic Printing Materials and Letterpress Printing Materials (2006)	Rule 1130 - Graphic Arts	Regarding flexible packaging printing, the rule is more stringent than CTG, and thus no further action is needed. Regarding lithographic and letterpress printing, the CTG standards for alcohol content in fountain solution and overall control efficiency are more stringent. Staff estimated a potential reduction of 0.2 tpd and may pursue rule update as part of Control Measure MCS-01 – Application of All Feasible Measure Assessment if needed for ozone attainment. [1]
Industrial Cleaning Solvents (2006)	Rule 1171 - Solvent Cleaning Operations	District rule is more stringent than CTG. No further action is needed. [2]
Large Appliance Coatings (2007); Metal Furniture Coatings (2007); and Miscellaneous Metal Products Coatings (2008)	Rule 1107 - Coating of Metal Parts and Products	District rule is equivalent or more stringent than CTGs, thus no further action is needed. [2]
Paper, Film, and Foil Coatings (2007)	Rule 1128 - Paper, Fabric, and Film Coatings	District rule is more stringent than CTG. No further action is needed.[1]
Plastic Parts Coatings (2008)	Rule 1145 - Plastic, Rubber, Glass Coatings	District rule is equivalent or more stringent than CTG. No further action is needed. [1]
Auto and Light-Duty Truck Assembly Coatings (2008)	Rule 1115 - Motor Vehicle Assembly Line Coating Operations	CTG has more stringent limits for electro-deposition primer at 84 g/L (145 g/L in Rule 1115); sprayable primer, primer-surfacer, and topcoat at 144 g/L (180 g/L in Rule 1115); and trunk coatings, interior coatings, sealers, and deadeners at 650 g/L (Rule 1115 provides an exemption for these categories). However, Rule 1115 has a small inventory of about 0.01 tpd, thus no action is needed. [1]
Fiberglass Boat Manufacturing Materials, and Miscellaneous (2008)	Rule 1162 - Polyester Resin Operations	The rule has an overall equivalency to CTG based on more stringent transfer efficiency requirements. No further action is needed. [2]
Industrial Adhesives (2008)	Rule 1168 - Adhesives and Sealants	CTG has more stringent limits for reinforced plastic composite at 200 g/L (250 g/L in Rule 1168); single-ply roof membrane adhesive primer at 250 g/L (450 g/L in Rule 1168); other adhesive primers at 250 g/L (420 g/L in Rule 1168); the control efficiency is 85% (80% in Rule 1168); and the work practices is limited only for stripping cured adhesives or sealants for Rule 1148. Staff may further pursue rule update as part of Control Measure MCS-01 – Application of All Feasible Measures Assessment or CTS-02 – Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants if needed for ozone attainment. [3]

Note: 1) Evaluation conducted by Hopps and Ono; 2) Evaluation conducted by Morris and Ono; 3) Evaluation conducted by Calungcagin and De Boer.

Step 4 - Other Districts' Current Rules and Regulations

Because the District is classified as extreme nonattainment, the District staff commits to search for innovative control technologies, make improvements, and update the District's rules and regulations as expeditiously as possible to effectively help the Basin reach attainment. District staff's envisioned that the control technologies available and cost-effective to be implemented in other local areas in California, or any other areas in the nation, would be available and cost-effective for use in the Basin in a timely manner.

To catch all the improvements on innovative control technologies and identify the areas for improvements in its rules and regulations, the District staff re-evaluated all the District's source-specific rules and regulations, and compared the requirements in these rules with more than 100 rules recently adopted or amended by four local air districts in California from 2007 to 2012. The four air districts selected are San Joaquin Valley, Sacramento Metropolitan, Ventura, and San Francisco Bay Area. Staff selected these districts based on the severity of their nonattainment status and their near-term attainment dates.The summary of this analysis is presented in Table 3. In this table, staff *only* listed the areas where the requirements in other local air district's rules are more stringent than those in the District's rules and regulations. The analysis in Table 3 shows that in general the District's current rules and regulations are equivalent to or more stringent than those developed by other air districts. However, where improvements are possible, District staff has developed several control measures to further study the situations. Details of the control measures, emission reductions, cost effectiveness, prioritization and implementation schedule are discussed in Appendix VII. The control measures of which emission reductions cannot be quantified will not be considered RACMs since they cannot be used collectively to estimate the advancement of the attainment date. In addition, staff commits to monitor the rule development in other air districts and conduct further analysis if necessary, and has developed a catch-all Control Measure MCS-01 – Application of All Feasible Measures Assessment to facilitate this activity.

Step 5 - Other Districts' Control Measures

In an effort to ensure that all feasible candidate control measures are considered, District staff evaluated more than 100 control measures adopted within the period of 2007-2012 by the nonattainment air districts as shown below.

Ventura

Ventura is classified as serious nonattainment for the 2008 8-hour ozone standard. In the 2006-2008 Final Triennial Assessment and Plan Update,[7] the Ventura County Air Pollution Control District conducted an analysis of all feasible control measures, and identified 7 new control measures in addition to the 15 control measures in the Ventura's 2007 AQMP. In this list, there is only one new Ventura's control measure described below that is more stringent than the requirements in the existing District's rules:

Ventura adopted a control measure to eliminate the current vapor pressure limit (45 mmHg) of low VOC spray gun cleaning and establish a new limit of 25 g/L VOC content for cleaning solutions used in aerospace assembly and component manufacturing operations, adhesives and sealants, marine coating operations, and pleasure craft coatings and commercial boatyard operations. Currently, the cleaning solutions used in marine coating operations, pleasure craft coatings, and adhesives and sealants in the Basin are subject to District's Rule 1171 limit of 25 g/L, and there is no vapor pressure limit in Rule 1171. However, the limit for cleaning solutions and strippers in District's Rule 1124 – Aerospace Assembly and Component Manufacturing Operations are currently at 200 g/L (or 45 mmHg) and 300 g/L (or 9.5 mmHg), respectively, and there is a potential to reduce these limits. Further assessment will be conducted through the District's Control Measure CTS-02 – Further Emission Reduction from Miscellaneous Coatings, Adhesives, Solvents and Lubricants.

San Francisco Bay Area

San Francisco Bay Area is a nonattainment area for PM2.5 standard and a marginal nonattainment for 8-hour ozone standards. On September 15, 2010, the Bay Area adopted the final Bay Area 2010 Clean Air Plan (CAP)[8] to provide an integrated, multi-pollutant strategy to address ozone, PM, air toxics and greenhouse gases. The plan established 55 feasible control measures to be implemented in the 2010-2012 timeframe in which there are 18 measures for stationary and area sources and 4 energy and climate measures. The following 6 Bay Area's control measures are currently above and beyond the requirements in the existing District's rules:

- Bay Area's Control Measure SSM1 – Metal Melting, and Control Measure SSM6 – PM Limitation proposed to reduce particulate emission limits and encourage the use of high efficiency filtration at foundry operations and metal melting facilities, and other facilities whenever appropriate. The Bay area has developed and proposed amended rule for SSM1 and scheduled for a Public Hearing in 2012. District staff will conduct further analysis

study on this concept through the District's Control Measure MCS-01 – Application of All Feasible Measures Assessment.

- Bay Area's Control Measure SSM2 – Digital Printing proposed to control VOC emissions from digital printing. The Bay Area is currently collected emissions information from this fairly new category of printing, including solvent-based injet printing and laser printing. It is forecasted to have 21% market share by 2025, and thus there will be a potential to reduce VOC emissions from this category. District staff will conduct further study on this concept through the District's Control Measure MCS-01 – Application of All Feasible Measures Assessment.

- Bay Area's Control Measure SSM5 – Vacuum Trucks requires carbon or other control technology on vacuum trucks to reduce emissions of VOCs. District staff will conduct further study on this concept through the District's Control Measure FUG-01 – Further VOC Reductions from Vacuum Trucks.

- Bay Area's Control Measure SSM9 – Cement Kilns, SSM10 – Refinery Boilers and Heaters, SSM11 - Glass Furnaces proposed to further reduce NOx from these source category. District staff will conduct further study through the Control Measure CMB-01 – Further NOx Reductions from RECLAIM.

- Bay Area's Control Measure ECM1 – Energy Efficiency proposed 1) to promote education and training to increase awareness on energy efficiency; 2) to provide technical assistance to local governments and encourage them to adopt and enforce energy efficient building codes; and 3) to provide incentives for improving energy efficiency at schools. These concepts are similar to those described in the District's Control Measure EDU-01 – Further Criteria Pollutant Reductions from Education, Outreach and Incentives.

- Bay Area's Control Measure ECM2 - Renewable Energy proposed to promote distributed renewable energy generation (solar, micro wind turbines, cogeneration, etc.) on commercial and residential buildings, and at industrial facilities. These concepts are covered under the District's Control Measure EDU-01 – Further Criteria Pollutant Reductions from Education, Outreach and Incentives.

The District already spearheaded in implementing other concepts in the Bay Area's AQMP that called for reducing SO_2 emissions from coke calciner and cement kilns; further controlling VOC emissions from livestock waste and natural gas production facilities; and NOx emissions from residential fan type furnaces, space heating, dryers, and ovens. The

District also has an on-going program that promotes tree planting. Other Bay Area's control measures addressing New Source Review, Air Toxics "Hot Spots" program, and greenhouse gases in permitting, are either administrative in nature or not related to criteria pollutants.

San Joaquin Valley

San Joaquin Valley is extreme nonattainment with respect to 2008 8-hour ozone standards and nonattainment with respect to PM2.5 standards. Up to date, the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) has developed two separate plans to address the 8-hour ozone standards in 2007 and the 1997 PM2.5 standards in 2008. Recently, the SJVUAPCD developed a 2010 mid-course review for the ozone plan, and continued the feasibility study for several other measures such as refinery wastewater separators, refinery turnaround units, refinery vacuum devices and municipal water treatment plans. In addition, the SJVUAPCD is in the process of developing a plan to address the 2006 PM2.5 standards in cooperation with CARB and the District. District staff reviewed the list of control measures completed and listed in the San Joaquin Valley's 2010 mid-course review in comparison with the 2012 control measures recommended by the District. Overall, the District has either already implemented or developed control measures with similar concepts proposed in the SJVUAPCD plans.[9-11]

Dallas-Fort Worth (DFW) Texas

The entire state of Texas is in attainment of the PM2.5 standards, but the state has two nonattainment areas with respect to the 8-hour ozone standards: the Dallas-Fort Worth and the Houston-Galveston-Brazoria. The DFW area was reclassified from a moderate to a serious nonattainment area for the 1997 8-hour ozone standard, and is moderate nonattainment with respect to the 2008 8-hour ozone. The area must attain the 1997 and 2008 8-hour ozone standards by June 2013 and December 2018, respectively. In their previous SIPs, the Texas Commission on Environmental Quality (TCQE) identified 8 new RACMs for area sources and point sources, and 6 of these measures were already implemented at the District. The remaining 2 measures, one for the cement kilns and one for the voluntary energy efficiency and renewable energy will be implemented through the District's Control Measure CMB-01 – Further NOx Reductions from RECLAIM and Control Measure EDU-01 – Further Criteria Pollutant Reductions from Education, Outreach and Incentives.[12]

After being reclassified from a moderate to a serious nonattainment area, TCQE conducted additional RACM analysis in 2011 and made a determination not to adopt any additional

measures since modeling demonstrated that the area would be able to meet the attainment date of 2013 for the 1997 ozone standard.

Houston-Galveston-Brazoria (HGB) Texas

The Houston-Galveston-Brazoria area was reclassified from moderate to a severe nonattainment area for the 1997 8-hour ozone standard, and classified as marginal for the 2008 8-hour ozone standard. The HGB area must attain the 1997 8-hour ozone standards by June 2019. The TCQE identified 11 RACMs for area sources and point sources. After being reclassified to severe nonattainment area, the TCQE conducted additional RACM analysis, analyzed additional 100 potential control measures, and determined that there is only one control measure that would help advance the attainment date for the HGB by one year.[13]

This specific control measure calls for a 25% additional reduction of the facility's highly reactive VOC (HRVOC) caps from the facilities which are located in the Harris County and regulated under the HRVOC Emissions Cap and Trade program. The HRVOC cap includes the emissions from cooling towers, process vents, and flares. The District does not have a VOC cap and trade program, nevertheless plans to further control emissions from flares and from process vents at specific facilities through the District's Control Measure CMB-02 – NOx Reductions from Biogas Flares, FUG-01 – Further VOC Reductions from Vacuum Trucks, FUG-02 – Emission Reduction from LPG Transfer and Dispensing , and FUG-03 – Further VOC Reductions from Fugitive VOC Emissions. The District has no plan to further regulate the emissions from cooling towers at this stage.

New York Metropolitan

The New York Metropolitan Area is classified as nonattainment area or the 1997 annual PM2.5 standard of 15 µg/m3. All of the New York State is in compliance with the 1997 24-hour PM2.5 standard of 65 µg/m3. To satisfy the requirement of the CAA, the New York Department of Environmental Conservation (NYDEC) finalized the final annual PM2.5 SIP in July 2008.[14] In this final PM2.5 SIP, it was determined that modeling will be used to demonstrate attainment in 2010 taking into effect the emission reduction programs already in place, the control measures already proposed, and the contingency measures, if needed. The three stationary source control measures that are more stringent than the District's existing rules are:[15]

- Portland Cement Plants. The NYDEC has revised its regulations for cement plants on June 11, 2010 to require case-by-case RACT analysis for cement kilns. The District selects to

reduce cement kiln NOx emissions through the District's Control Measure CMB-01 – Further Reductions from NOx RECLAIM.

- Glass Furnaces. The NYDEC has revised its regulation for glass manufacturing facilities on June 11, 2010 to require case-by-case RACT analysis to potentially include control technologies such as oxy-fuel firing, low NOx burners, SCR, SNCR. The District selects to reduce emissions from glass furnaces through Control Measure CMB-01 – Further Reductions from NOx RECLAIM.

- Stationary Combustion Installations. The NYDEC has revised its regulation on June 8, 2010 to include stricter, case-by-case RACT determination for major stationary sources that contain natural gas and/or oil-fired Industrial/Commercial/Institutional boilers, or combined cycle/cogeneration combustion turbines. The Districts will reduce emissions from this category of sources through the District's Control Measure CMB-01 – Further Reductions from NOx RECLAIM.

In addition, many counties in the New York state are nonattainment areas with respect to the 8-hour ozone standards. The NYDEC developed a comprehensive plan to address multi-pollutant attainment for criteria pollutants, greenhouse gases and toxics in June 2010.[16] In addition to the control measures for cement kilns, glass furnaces, boilers and turbines addressed above, the NYDEC includes several measures for VOC Clean Air Interstate Trading of NOx and SO_2. Some of the VOC measures are more stringent than the District's existing rules which will be further analyzed under District's Control Measure MCS-01 – Application of All Feasible Measures Assessment.

New Jersey and Sacramento Metro

District staff also reviewed the control measures developed by Sacramento Metro and New Jersey Department of Environmental Protection for their 8-hour ozone plans. There are no additional new measure concepts that the District has not yet considered for this Draft Final 2012 AQMP. [17-20]

Step 6 - Additional Studies and Analyses

In addition to all of the above analyses, SCAG, CARB, and the District have completed the following analyses to meet the requirements of the CAA:

- RACM analyses and demonstration conducted by SCAG and CARB for transportation and mobile sources control measures are included in Appendix IV-C and in the Addendum to this Attachment.[21]

- Costs and cost effectiveness analyses, planning and scheduling to implement for each District's stationary source and mobile source control measures, if available, are provided in Chapter IV, Appendix IV-A and B.

CONCLUSION

Following are the District staff's findings:

- As required by the CAA and the U.S. EPA's PM2.5 Implementation Rule, District staff evaluated and analyzed all feasible control measure concepts that were currently available for inclusion in the Draft Final 2012 AQMP. These concepts were either provided by the public and experts, or recommended by U.S. EPA, or implemented by other air districts. From these concepts, District staff selected and developed 8 short-term stationary source control measures to address the 24-hour PM2.5 attainment, 16 early-action stationary source control measures and 17 on-road and off-road control measures to address the 8-hour ozone attainment. District staff also developed a catch-all Control Measure MSC-01 – Application of All Feasible Measures Assessment to facilitate the inclusion of any incoming innovative air pollution control technologies or ideas that can help the Basin achieve the NAAQS as expeditiously as possible.

- Following the approach recommended by the U.S. EPA in the PM2.5 Implementation Rule, District staff conducted a study of more than 100 rules and regulations and 100 control measures recently developed in the 2007-2012 timeframe by other nonattainment air districts in the nation. In general, the District's existing rules and regulations are equivalent to, or more stringent than other districts' rules and regulations and their proposed control measures in their respective SIPs. In the few areas where the District's rules can be amended to promote cleaner technologies, add additional best management practices, and improve enforceability, District staff has developed one or more control measures to facilitate these activities.

- The control measures that do not have estimated emission reductions cannot be considered RACMs, and the District commits to further conduct analyses to refine the emission inventory, emission reductions, and cost-effectiveness for these measures. The District's

ambient air quality data and modeling analysis in Chapter 3 and Chapter 5 demonstrates that the Basin would be able to meet the 24-hour PM2.5 attainment date by 2014 withthe implementation of a few episodic control measures discussed in Chapter 4.

- With regards to the early actions to achieve ozone attainment, District staff has developed an effective menu of controls to meet the attainment dates as expeditiously as possible. The available control measures that District staff did not include would not collectively advance the attainment date or contribute to the RFP because of the uncertain non-quantifiable amount of emission reductions that they may potentially generate.

- In conclusion, the District has conducted the RACM/RACT analysis for identifying and selecting the control measures for the Draft Final 2012 AQMP is in compliance with the requirements of the CAA, the U.S. EPA's PM2.5 Implementation Rule, as well as the U.S. EPA's policy and guidelines.

REFERENCES

1. Clean Air Fine Particle Implementation Rule. 40 CFR Part 51, Federal Register, Volume 72, No. 79, page 20586. April 25, 2007.

2. Proposed Rule to Implement the Fine Particle National Ambient Air Quality Standards. 40 CFR Part 51 and 52, Federal Register, Volume 70, No. 210, page 65984. November 1, 2005.

3. Implementation Guidance for the 2006 24-Hour Fine Particle (PM2.5) National Ambient Air Quality Standard (NAAQS) Memorandum from Stephen Page, Director of Office of Air Quality Planning and Standards (OAQPS) to Regional Air Directors, March 2, 2012.

4. Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard. 40 CFR Part 51, 52, and 80, Federal Register, Volume 70, No. 228, page 71612. November 29, 2005

5. Adopt SCAQMD 8-Hour Reasonably Available Control Technology State Implementation Plan, Agenda #37, Governing Board Meeting, July 7, 2006.

6. U.S. EPA's RACTs, http://www.epa.gov/ttn/naaqs/ozone/ctg_act/index.htm, as of May 29, 2012.

7. Ventura County Triennial Assessment and Plan Update, 2006-2008, June 14, 2011.

8. Bay Area Clean Air Plan, Bay Area Air Quality Management District, Adopted September 15, 2010.

9. San Joaquin Valley APCD, Draft 2012 PM2.5 Attainment Plan for 2006 PM2.5 Federal Standards, April 30, 2012.

10. San Joaquin Valley APCD, 2010 Ozone Mid-Course Review, June 2010

11. San Joaquin Valley APCD, 2008 PM2.5 Attainment Plan for 1997 PM2.5 Federal Standards, April 30, 2008.

12. List of Control Measures for Affected Areas in Texas, http://www.tceq.texas.gov/airquality/sip/sipstrategies.html#point.

13. SIP Revision for Houston–Galveston-Brazoria of Texas, Chapter 4 - Control Strategies and Required Elements, March 10, 2010, http://www.tceq.state.tx.us/assets/public/implementation/air/sip/hgb/hgb_sip_2009/09017SIP_Ch4_ado.pdf

14. New York Department of Environmental Conservation, Final Revision of State Implementation Plan for PM2.5 for New York Metropolitan Area, July 10, 2008. http://www.dec.ny.gov/chemical/60541.html

15. New York Department of Environmental Conservation, Reasonably Available Control Measures Analysis in the Final Revision of State Implementation Plan for PM2.5 for New York Metropolitan Area, July 10, 2008. http://www.dec.ny.gov/chemical/60567.html

16. New York Department of Environmental Conservation, Air Quality Management Plan – Multi-Component Approach, Final Draft June 2010. http://www.dec.ny.gov/chemical/72352.html

17. 2009 Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress, March 26, 2009. http://www.airquality.org/plans/federal/ozone/8hr1997/2009AandRFP/

18. 2011 Sacramento Regional 8-Hour Ozone Attainment and Reasonable Progress Plan, http://www.airquality.org/plans/federal/ozone/8hr1997/2009AandRFP/PlanAndAppendicesAfterSIPRevis-Clean.pdf, November 10, 2011.

19. The State of New Jersey Department of Environmental Protection - State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Fine Particulate Matter (PM2.5) National Ambient Air Quality Standard – PM2.5 Attainment Demonstration, http://www.nj.gov/dep/baqp/pm25sip/PM2.5%20SIP%20Document%20Final%202009.pdf. March 24, 2009.

20. The State of New Jersey Department of Environmental Protection - State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard – Ozone Attainment Demonstration, October 29, 2007. http://www.nj.gov/dep/baqp/8hrsip/Final_CompleteSIP.pdf

21. RACM/RACT Analysis for Transportation & Mobile Source Control Measures, e-mails communication between Pham of SCAQMD, Nadler of SCAG, and Ramalingan and Lawrence of CARB, dated May 24, August 15, August 22, and September 4, 2012.

TABLE 3

Evaluation of SCAQMD Rules and Regulations - NOx and SOx Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1109	NOx	Emissions of Oxides of Nitrogen from Boilers and Process Heaters – Petroleum Refineries (Amended 8/5/88)	0.03 lbs/mmBTU of heat input (~25 ppmv). Subsumed by RECLAIM. RECLAIM (Amended 1/2005): • 5 ppmv for >110 mmbtu/hr units • 25 ppmv for units 40-100 mmbtu/hr	San Joaquin Rule 4306 (Amended 10/18/08) has the following limits: NOx limits for refinery gas: • 5 ppmv for units >110 mmbtu/hr; • 25 ppmv for units 65-110 mmbtu/hr; and • 30 ppmv for 5-65 mmbtu/hr units San Joaquin Rule 4320 (Amended 9/5/08) has the following limits for refinery gas: • 5 ppmv for >110 mmbtu/hr units • 5 - 6 ppmv for units between 20 - 110 mmbtu/hr Compliance may be mitigated with annual emissions fee.	Further study the feasibility of lowering the NOx limits through: CMB-01 – Further NOx Reductions from RECLAIM
1110.2	NOx, VOC, CO	Emissions from Gaseous and Liquid Fueled Engines (Amended 7/9/2010)	Rule 1110.2 has NOx, VOC, CO limits for all stationary and portable engines over 50 brake horse power (bhp). In general, the limits applicable to 1) stationary, non-emergency engines by 7/1/2011, and 2) biogas (landfill and digester gas) engines by 7/1/2012 are:	San Joaquin Valley Rule 4702 (Amended 8/19/2011) has NOx, VOC, CO and SOx limits for engines rated over 25 bhp. For engines over 50 bhp: - By 1/1/2017, the limits for spark-ignited engines are: • 11 ppmv NOx	Further study the feasibility of lowering the NOx limits through: CMB-01 – Further NOx Reductions from RECLAIM

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - NOx and SOx Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
			• 11 ppmv NOx • 30 ppmv VOC • 250 ppmv CO Limits for new non-emergency engines driving electrical generators are: • 0.07 lbs NOx per MW-hr • 0.20 lbs CO per MW-hr • 0.10 lbs VOC per MW-hr NOx limits for low usage biogas engines: • 36 ppmv, engines ≥ 500 bhp 45 ppmv, engines < 500 bhp VOC and CO limits for low usage biogas engines: • 40 ppmv VOC, landfill gas • 250 ppmv VOC, digester gas • 2000 ppmv CO. Portable and agricultural engines are not subject to the general limits listed above. Many of Rule 1110.2 engines are in RECLAIM, and RECLAIM will be amended to incorporate feasible BARCT.	• 250 ppmv VOC (rich-burn) and 750 ppmv VOC (lean burn), and • 2000 ppmv CO - Engines used in agricultural operations (AO), or fueled with waste gas, or limited used, or cyclic loaded and field gas fueled are subject to higher limits than the above - In general, all compression ignited engines must meet EPA Tier 4 standards. Engines between 25 bhp - 50 bhp, non agricultural operations (AO), must meet federal standards 40CFR Part 60 Subpart IIII and JJJJ. The SOx limits are: 1) Natural gas, propane, butane, LPG, or combination, or 2) 5 grains/100 scf for gaseous fuel, or 3) 15 ppmv liquid fuel, or 4) CA reformulated gasoline for spark-ignited engines, or 5) CA reformulated diesel for compression ignited engines, or 6) 95% control.	

TABLE 3 (continued)
Evaluation of SCAQMD Rules and Regulations - NOx and SOx Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1111	NOx	NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces (Amended 11/6/09)	40 nanograms per joule heat output until 2014. A lower standard of 14 ng/J is required with staggering compliance dates from 2014-2018.		
1112	NOx	Emissions of Oxides of Nitrogen from Cement Kilns (Amended 6/6/86)	Applicable to gray cement only. 11.6 lbs/ton clinker averaged over 24 hours and 6.4 lbs/ton clinker averaged over 30 days. Subsumed by RECLAIM. RECLAIM, amended 1/2005 version, had no recommendation for cement kiln BARCT. However, RECLAIM BARCT analysis is an on-going process and will be evaluated every three years.		Further study the feasibility of lowering the NOx limits through: CMB-01 – Further NOx Reductions from RECLAIM
1117	NOx	Emissions of Oxides of Nitrogen from Glass Melting Furnaces (Amended 1/6/84)	4 lb/NOx per ton of glass pulled. Flat glass and fiberglass melting furnaces are exempt. Many of these R1117 units are in RECLAIM. RECLAIM (Amended 1/2005 version) had no BARCT recommendation for this class. However, BARCT analysis is an on-going process and will be reevaluated every three years.	San Joaquin Rule 4354 – Glass Melting Furnaces (Amended 5/19/2011) have NOx, CO, VOC, SOx limits. There are several options for the NOx limits: • Container Glass: 1.5 lbs/ton (rolling 30-day average) • Fiberglass: 1.3-3 lbs/ton (24-hour average)	Further study the feasibility of lowering NOx limit through: CMB-01 – Further NOx Reductions from RECLAIM

TABLE 3 (continued)
Evaluation of SCAQMD Rules and Regulations - NOx and SOx Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1117 (Cont.)				• Flat Glass: 2.9 lbs/ton (30-day average) – 3.7 lbs/ton (24-hour average) The SOx limits are: • Container Glass: 0.9-1.1lbs/ton (rolling 30-day average) • Fiberglass: 0.9 lbs/ton (rolling 24-hour average) • Flat Glass: 1.2 lbs/ton (30-day average) – 1.7 lbs/ton (24-hour average) The VOC limits are: • Container or Fiberglass: 0.25 lbs/ton or 20 ppmv • Flat Glass: 0.10 lbs/ton or 20 ppmv.	
1121	NOx	Control of Nitrogen Oxides from Residential Type, Natural-Gas-Fired Water Heaters (Amended 9/3/2009)	15 ppmv at 3% O2, dry input (or 10 ng/j output) for all stationary water heaters; and 55 ppmv at 3% O2, dry input (40 ng/j output) for mobile water heaters.	Other Districts' plans propose to accelerate replacements of old water heaters with electric units or new highly-efficient lower-emitting water heaters with the use of incentives.	Further study the possibility of using incentives to promote electric heaters through: INC-01 – Economic Incentive Programs to Adopt Zero and Near-Zero Technologies [NOx] In addition, further consider the feasibility of technology transfer through: CMB-03 – Reductions from Commercial Space Heating

TABLE 3

Evaluation of SCAQMD Rules and Regulations - NOx and SOx Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1134	NOx	Emissions of Oxides of Nitrogen from Stationary Gas Turbines (Amended 8/8/97)	Standard = Reference Limit x (Unit Efficiency/25%), where reference limit depends on size of units, varying from 9 ppmv for units rating at equal to or larger than 10MW to 25 ppmv for units rating from 0.3 MW to less than 2.9 MW. RECLAIM, amended 1/2005 version, indicated that 5 ppmv was achieved in practice but not cost effective, therefore did not propose BARCT. This analysis may need to be revised based on new information. RECLAIM BARCT is an on-going process that is planned to be reviewed every 3 years.	Bay Area, Regulation 9, Rule 9 (Adopted 12/6/06) contains the following limits: • 9 ppmv for units between 250-500 mmBTU/hr and • 5 ppmv for units more than 500 mmBTU/hr San Joaquin Valley Rule 4703, (Amended 8/17/06) requires 3 ppmv for combined cycle >10 MW, and standards from 5 – 50 ppmv for other units. Sacramento Rule 413 (Amended 03/24/05) requires 9 – 25 ppmv depending on size of units, but are independent on equipment efficiency. Ventura Rule 74.9 (Amended 11/08/05) requires 25 – 125 ppmv depending on fuel type but are independent from equipment size and efficiency. Control efficiency 90% - 96%. In addition, all units have to meet 20 ppmv NH3.	Further study the feasibility of lowering the NOx standard and establish ammonia standard through: CMB-01 – Further NOx Reductions from RECLAIM MCS-01 – Application of All Feasible Measures Assessment (for non-RECLAIM facilities)

TABLE 3 (continued)
Evaluation of SCAQMD Rules and Regulations - NOx and SOx Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1135	NOx	Emissions of Oxides of Nitrogen From Electric Power Generating Systems (Amended 7/19/91)	Mass emission limits and emission reduction goals for utility boilers. Only City of Glendale is subject to Rule 1135, which is allowed to meet 0.2 lb/MW-hr (or a daily mass limit of 390 lb NOx per day, or an annual limit of 35 tons per year). Other utility boilers are in RECLAIM subject to declining NOx allocations which were determined based on a level of 7 ppmv = 0.07 lb/MW-hr = 0.008 lb/mmbtu, assuming a heat rate of 8130 Btu/kw-hr. The utility boilers are operated at various BARCT levels from 5 - 30 ppmv. (Note)	Ventura Rule 59 (amended 7/15/97) requires: • 0.1 lb NOx/MW-Hr for utility boilers and • 0.04 lb/MW-hr for auxiliary boilers. San Joaquin Rule 4306 – Phase 3 (amended 3/17/2005) requires boilers more than 20 mmbtu/hr to comply with the following options: • Standard option of 9 ppmv (or 0.011 lb/mmbtu) complied by 2005-2007, or • Enhanced option of 6 ppmv (or 0.007 lb/mmbtu) complied by 2006-2008. (Assuming a heat rate of 8130 Btu/kw-hr, 6 ppmv is about 0.06 lb/MW-hr.)	Further study the feasibility of lowering the emission targets through: CMB-01 – Further NOx Reductions from RECLAIM facilities MCS-01 – Application of All Feasible Measures Assessment

Note: RECLAIM facilities have flexibility to operate their utility boilers provided that the total facility emissions must be at or below their allocations determined based on a level of 7 ppmv. Regarding BARCT levels, according to Marty Kay and John Yee, the utility boilers at Southern California Edison, Department of Water and Power, and City of Burbank are operated at a level from 5 – 7 ppmv (1-hr to 1-month average time) whereas City of Pasadena boilers are operated at a level of 30 ppmv. In addition, since heat rate (mmbtu per kw-hr) varies with each utility boiler, District staff used 8130 BTU/kw-hr to convert the ppmv to lb/MW-hr for the unit operated by City of Glendale.

TABLE 3 (continued)
Evaluation of SCAQMD Rules and Regulations - NOx and SOx Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1146	NOx	Emissions of Oxides of Nitrogen from Industrial, Institutional and Commercial Boilers, Steam Generators, and Process Heaters (Amended 9/5/2008)	Applicable to units rating of more than 5 mmbtu/hr. Current NOx limits: • For digester gas: 15 ppmv • For landfill gas: 25 ppmv • For refinery gas: 30 ppmv (the 2008 amendment did not revise limits for refinery gas) • For other types of fuels: 5 ppmv for ≥75 mmbtu/hr, natural gas; 30 ppmv for ≥75 mmbtu/hr, other fuels; and 5 or 9 ppmv for 20–75 mmbtu/hr units CO limit: 400ppmv Many Rule 1146 units are in RECLAIM. RECLAIM (Amended 1/2005 version) contains the following NOx limits: • For refinery gas: 5 ppmv for units > 110 mmbtu/hr; and 25 ppmv for units < 110 mmbtu/hr units • For other units: 9 ppmv for units > 20 mmbtu/hr; and 12 ppmv for units >2 mmBTU/hr	Sacramento Rule 411 (Amended 10/27/05) limits for gaseous fuel are 9 ppmv for units greater than 20 mmbtu/hr, and 15 ppmv for units from 5 to 20 mmbtu/hr. San Joaquin Rule 4306 (Amended 10/18/08) has the following limits: NOx limits: • 30 ppmv for 5-65 mmbtu/hr units using refinery gas. For units from 40 – 100 mmbtu/hr, refer to the comparison under Rule 1109. • For other types of fuels: 9 ppmv for >20 mmbtu/hr units; 15 ppmv for ≤20 mmbtu/hr units (6 – 9 ppmv for enhanced options) • Other units: 15 – 30 ppmv CO limit: 400 ppmmv. San Joaquin Valley further reduces NOx, CO, SO2 and PM10 emissions by adopting Rule 4320 on 10/16/08. The limits in Rule 4320 are:	Further explore the feasibility of lowering the NOx standards for Rule 1146 (e.g. refinery fuels, digester and landfill gases) and RECLAIM through: CMB-01 – Further NOx Reductions from RECLAIM

TABLE 3 (continued)
Evaluation of SCAQMD Rules and Regulations - NOx and SOx Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1146 (Cont.)	NOx			NOx limits: • For refinery gas: 5 – 6 ppmv for units between 20-110 mmbtu/hr; 6 – 9 ppmv for units between 5 - 20 mmbtu/hr; and 9 ppmv for units firing of less than 50% by vol PUC quality gas. Refer to the comparison under Rule 1109 for 40 mmbtu/hr units and above using refinery gas. • For oil field generators: 5 - 7 ppmv for units greater than 20 mmbtu/hr; 6 – 9 ppmv for units larger than 5 but less than 20 mmtu/hr; and 9 ppmv for units firing of less than 50% by vol PUC quality gas • For low usage units: 9 ppmv • For units at a wastewater treatment facilities firing on less than 50% by vol PUC quality gas: 9 ppmv • For other units: 5 – 7 ppmv for units larger than 20 mmbtu/hr; and 6 – 9 ppmv for units between 5 mmbtu/hr and 20 mmbtu/hr Compliance may be mitigated with annual emission fees.	

TABLE 3 (continued)
Evaluation of SCAQMD Rules and Regulations - NOx and SOx Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1146.1	NOx	Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Amended 9/5/2008)	Applicable to units rating from 2 mmbtu/hr to 5 mmbtu/hr. NOx limits: • Atmospheric Units: 12 ppmv • Digester gas: 15 ppmv • Landfill gas: 25 ppmv • All others: 9 ppmv CO limit: 400 ppmv. Many Rule 1146.1 units are in RECLAIM, and RECLAIM (Amended 1/2005 version) BARCT analysis recommended 12 ppmv for less than 20 mmbtu/hr units based on ultra low NOx technology that is achieved in practice. RECLAIM (Amended in 2005) has a limit of 12 ppmv NOx for boilers in this size range.	Bay Area Rule 9-11 (Amended 5/17/00) has following limits for boilers using gaseous fuel 1) 10 ppmv for boilers with rated input greater than 1.75 mmbtu/hr, 2) 25 ppmv for boilers from 1.5-1.75 mmbtu/hr, 3) 30 ppmv for boilers less than 1.5 million btu/hr. Non-gaseous fuel combustion devices have higher limits than gaseous fuel devices. San Joaquin Rule 4307 (Amended 5/19/2011) has the following limits: NOx limits: - For New or Replacement Units: Atmospheric Units: 12 ppmv, and Non-Atmospheric Units: 9 ppmv - For Retrofit Units: 30 ppmv burning gaseous fuels; and 40 ppmv burning liquid fuels Sulfur limits for SO2: - For natural gas, propane, butane, or LPG: 5 grains of total sulfur per 100 scf, or 9 ppmv SO2, or 95% control - For liquid fuels: 15 ppmv sulfur	Further study the feasibility of promoting the use of cleaner units through incentives through one of the following: INC-01 – Economic Incentive Programs to Adopt Zero and Near-Zero Technologies [NOx]

TABLE 3 (continued)
Evaluation of SCAQMD Rules and Regulations - NOx and SOx Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1146.2	NOx	Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers (Amended 5/5/06)	Applicable to units less than 2 mmbtu/hr. Current limits are: • 20 ppmv for units from 400,000 btu/hr – 2 mmbtu/hr • 55 ppmv for units rating less than 400,000 btu/hr	San Joaquin Valley Rule 4308, (Amended 12/17/09) requires: • 20 ppmv for units used PUC gas from 75,000 btu/hr – 2 mmbtu/hr • 30 ppmv for units from 400,000 btu/hr - 2 mmbtu/hr used other types of fuels • 77 ppmv for units rating from 75,000 btu/hr – 400,000 btu/hr used other types of fuels	Further study the feasibility of promoting the use of cleaner units through: INC-01 – Economic Incentive Programs to Adopt Zero and Near-Zero Technologies [NOx]
2000 - 2015	NOx, SOx	RECLAIM (Amended 5/6/05)	Include facility allocations for NOx and SOx for RECLAIM facilities.	Since other Districts do not have RECLAIM, refer to comparison for individual rules such as Rule 1146, 1146.1, 1110.2 etc.	Further review BARCT through: CMB-01 – Further NOx Reductions from RECLAIM . District has set most stringent BARCT for SOx sources in the 2010 RECLAIM Amendments.

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1106	VOC	Marine Coating Operations (Amended 1/13/95)	Coating-specific emission limits from 275 – 780 g/L. In lieu of complying with specific emission limits, operator can use air pollution control system with at least 85% efficiency. Solvent cleaning operations must comply with Rule 1171.	Ventura Rule 74.24 (Amended 11/11/03) generally has the same limits as South Coast Rule 1106, except the limit for special marking of items such as flight decks, ship numbers is 420 g/L (490 g/L in Rule 1106) Bay Area Rule 8-43 (Amended 10/16/02) generally has the same limits as South Coast Rule 1106, except it has lower limit for pretreatment wash primer at 420 g/L (780 g/L in Rule 1106)	Further study the potential of lowering the emission standards for this source category through: CTS-02 – Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants
1106.1	VOC	Pleasure Craft Coating Operations (Amended 2/12/99)	Coating-specific emission limits from 340 – 780 g/L. Solvent cleaning operations must comply with Rule 1171.	San Joaquin Valley's Rule 4603 (Amended 9/17/09) limit for teak primer, wood sealer, and clear wood varnish is 420 g/L, which is more stringent than the limits in Rule 1106.1 (i.e. 775 g/L for teak primer, 550 g/L for clear wood sealers, and 490 g/L for clear wood varnishes.)	Further study the potential of lowering the emission standards for this source category through: CTS-02 – Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants
1113	VOC	Architectural Coatings (Amended 6/3/2011)	Coating-specific emission limits from 50 g/L – 730 g/L. Allow averaging, scheduled to be phased out on January 1, 2015.		Further study the potential of lowering the emission standards for this source category through: CTS-01 – Further VOC Reductions from Architectural Coatings (R1113)

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1107	VOC	Coating of Metal Parts and Products (Amended 1/6/06)	Coating-specific emission limits from 2.3 lbs/gal – 3.5 lbs/gal. In lieu of complying with specific emission limits, operator can use air pollution control system with at least 95% control efficiency (or 5 ppmv outlet) and 90% capture efficiency. Solvent cleaning operations must comply with Rule 1171.	Ventura Rule 74.12 (Amended 1/6/06) generally has the same coating-specific limits as South Coast Rule 1107, except in the following categories: • Limit for metallic coating is 3 lbs/gal (3.5 lbs/gal in Rule 1107); • Limit for camouflage is 3 lbs/gal (3.5 lbs/gal in Rule 1107); • Limit of pretreatment coatings is 2.3 lbs/gal (3.5 lbs/gal in Rule 1107) • Overall minimum control efficiency is 90%, higher than Rule 1107 requirement at 85% San Joaquin Valley Rule 4603 (Amended 9/17/09) have more stringent limits than Rule 1107 for baked camouflage and baked metallic coating at 360 g/L (420 g/L in Rule 1107)	Explore the feasibility of lowering the VOC limits considering the diversity of applications, and if feasible, implement through the following control measure: CTS-02 – Further Emission Reduction from Miscellaneous Coatings. Adhesives, Solvents, and Lubricants, or MSC-01 – Application of All Feasible Measures Assessment

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1115	VOC	Motor Vehicle Assembly Line Coating Operations (Amended 5/12/95)	Limits from 1.2 lbs VOC/gal coating for electrophoretic primer to 15 lbs/gal of applied solids for primer, primer surfacer and topcoat. Cleaning operations must comply with Rule 1171.	San Joaquin Valley Rule 4602, (Amended 9/17/09) has more stringent limits for: 1) Primer at 0.7 lbs/gal and 2) Primer surface and topcoat at 12 lbs/gal	Further lowering the VOC limits
1118	All	Refinery Flares (Amended 11/4/05)	• Minimize flare emissions & require smokeless operations • Specify SO_2 gradually decreasing performance target to less than 0.5 tons per million barrels of crude by 2012. • If the performance target is exceeded, the operator must 1) pay mitigation fee; or 2) submit a Flare Mitigation Plan to reduce emissions. • Require Cause Analysis for event exceeding 100 lbs VOC, 500 lbs of SO2, or 500,000 scfm of vent gas, excluding planned shutdown, startup and turnarounds • Require 160 ppmv H2S, 3 hour average by 1/1/2009, and no limits for NOx, VOC, PM and CO.	U.S. EPA suggested the District to further re-evaluate Rule 1118 (FR Vol 76 No 217, Nov 9, 2011, CBE comments). San Joaquin Valley Rule 4311 (Amended 6/18/09) has VOC/NOx limits for ground-level enclosed flares; SO_2 Targets (1.50 tons/million barrels of crude by 2011, and 0.5 tons/million barrels by 2012); Flare Minimization Plan for refinery flares more than 5 mmbtu/hr; and operational requirements for all flares that have potential to emit more than 10 tons/yr VOC and more than 10 tons/yr of NOx. Bay Area Rule 12-12 (Adopted 4/5/06) does not specify a declining SO2 target and does not contain a mitigation fee option.	Explore the possibility of further minimizing flare related events, through: MSC-03 – Improved Start-Up, Shutdown and Turnaround Procedures In addition, further study the feasibility of reducing emissions of landfill flares through: CMB-02 – NOx Reductions from Biogas Flares

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1122	VOC	Solvent Degreasers (Amended 5/1/09)	Contain various work practice and design requirements.		Further study to assess the feasibility of reducing emissions through: CTS-02 - Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants
1124	VOC	Aerospace Assembly and Component Manufacturing Operations (Amended 9/21/01)	Coating-specific emission limits from 160 – 1000 g/L. Specific high transfer coating applications (e.g. HVLP spray). In lieu of complying with specific emission limits, operator can use air pollution control system with at least 95% control efficiency (or 50 ppmv outlet) and 90% capture efficiency. Solvent cleaning operations must comply with Rule 1171.	San Joaquin Valley Rule 4605 (Amended 6/16/2011) has the following limits that are more stringent than those in Rule 1124: • Flight Test Coatings = 600 g/L (840 g/L in Rule 1124) • Fastener Sealant = 600 g/L (675 g/L in Rule 1124) Sacramento Rule 456 (Amended 10/23/08) has the following limits that are more stringent than those in Rule 1124: • Conformal Coating = 600 g/L (Rule 1124 limit is 750 g/L)	Explore the feasibility of lowering the VOC limits through: CTS-02 - Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1124 (Cont.)				• Fire Resistant Coatings = 600 g/L. (Rule 1124 limits are 650 g/L for Commercial; 800 g/L for Military) • High-Temperature Coating = 420 g/L. (Rule 1124 limit is 850 g/L) • Mold Release Coatings = 762 g/L. (Rule 1124 limit is 780 g/L) • Radiation Effect = 600 g/L. (Rule 1124 limit is 800 g/L) • Rain Erosion Resistant Coating = 600 g/L in All Other Category. (Rule 1124 limit is 800 g/L) Ventura 2006-2008 Triennial Assessment and Plan Update has a control measure to require 25 g/L VOC limit for cleaning solutions and remove the 45 mmHg vapor pressure allowance. (Rule 1124 limits for cleaning solutions and strippers are 200 g/L (or 45 mmHg vapor pressure) and 300 g/L (or 9.5 mmHg vapor pressure)	

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1125	VOC	Metal Container, Closure, and Coil Coating Operations (Amended 3/7/2008)	Coating-specific emission limits from 0 g/L (for non food cans) – 660 g/L. Specific high transfer coating applications (e.g. HVLP spray). In lieu of complying with specific emission limits, operator can use air pollution control system with at least 95% control efficiency (or 50 ppmv outlet) and 90% capture efficiency, which is equivalent to an overall control efficiency of 85%. Solvent cleaning operations must comply with Rule 1171.	The following limit in San Joaquin Rule 4604 (Amended 9/20/07) are more stringent than those in Rule 1125: • Two-Piece Interior Body Spray = 420 g/L (440 g/L in Rule 1125) • Three-Piece Interior Body Spray = 360 g/L (510g/L in Rule 1125) In addition, SJV Rule 4604 have many limits that are not listed in Rule 1125 such as 20 g/L for end seal compounds and 225 g/L for two-piece interior sheet base coating and over-vanish. Sacramento Rule 452 (Amended 9/25/2008) has the following more stringent limits than Rule 1125: • Two-Piece Interior Body Spray = 420 g/L (440 g/L in Rule 1125) • Three-Piece Interior Body Spray = 360 g/L (510g/L in Rule 1125)	Explore the feasibility of lowering the VOC limits through: CTS-02 - Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants, or MSC-01 – Application of All Feasible Measures Assessment

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1130	VOC	Graphic Arts (Amended 10/8/99)	VOC content limits: 80 g/l – 100 g/l for fountain solution, 150 g/l for adhesives, 225 g/l - 300 g/l for inks and coatings. In lieu of meeting specific emission limits, control device with overall control efficiency from 75% - 85% can be used to achieve equal or better emission reductions. VOC limits for cleaning solutions for printing presses are in Rule 1171 ranging from 25 g/l (0.21 lb/gal) for flexographic printing to 100 g/l (0.83 lb/gal) for lithographic printing (even though 500 g/l is allowed up to end of year 2007.)	The following limits in San Joaquin Valley Rule 4607 (Amended 12/18/08) are more stringent: 1) 95% control efficiency for heat-set web offset lithographic or letterpress printers that emit greater than 25 tons per year VOC; 2) 1.6% VOC content for fountain solution used in heat-set lithographic printers, 5% for fountain solution used in cold-set and sheet-fed lithographic printers, and 8% for fountain solution used in other presses. Sacramento Rule 450 is more stringent in the following: 1) overall control efficiency of 95% for heat-set web offset lithographic and letterpress printing and 80% for flexible package printing (Rule 1130 requires only 75% control efficiency) ; 2) VOC in fountain solution is lower, generally from 1.6% to 5%; 3) electronic circuit limit is 800 g/l (850 g/l in Rule 1130.1)	Further study to assess the feasibility of increasing the overall control efficiency and reducing the alcohol usage in fountain solution through the implementation of: MSC-01 – Application of All Feasible Measures Assessment

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1130 (Cont.)				Bay Area, Regulation 8, Rule 20 (Amended 11/19/08) requires 8% VOC content in fountain solution. In addition, the rule requires recordkeeping for digital printing, cleaning and stripping of UV or electron beam-cured inks for further study potential emission reductions in a near future. Ventura Rule 74.19 (Amended 6/14/11) requires low VOC content in fountain solution used in lithographic presses. In addition, the U.S. EPA CTG for lithographic and letterpress, September 2006, recommends: • Destruction efficiency of 90% to 95% depending on date of installation (or 20 ppmv outlet concentration) for heat-set web with potential to emit, prior to controls, of at least 25 tpy. • For operations emitting 15 lb/day, fountain solution must be 1) 1.6% alcohol or less, or	

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1130 (Cont.)				2) 3% with refrigerated chiller or 3) 5% alcohol substitute for heat-set web presses; 4) 5% alcohol for sheet-fed presses; 5) 5% alcohol substitute and no alcohol in fountain solution for cold-set web presses. The EPA CTG for rotogravure and flexographic, adopted in September 2006, recommends control efficiency of 80% for presses installed after March 1995, and 65% - 75% for older presses.	
1130.1	VOC	Screen Printing Operations (Amended 12/13/96)	VOC content limits ranges from 400 g/l – 800 g/l for materials used in screen printing. In lieu of specific emission limits, control device can be used to achieve equal or better reductions, at least 95%.	Bay Area, Regulation 8, Rule 20 (Amended 11/19/08) has more stringent limit for adhesives at 150 g/L (400 g/L in Rule 1130.1). Sacramento Rule 450 (Amended 10/23/08) has more stringent limits than Rule 1130.1 in the following areas: 1) limit for electronic circuit ink is 800 g/L (850 g/L in Rule 1130.1); 2) limit for adhesives is 150 g/L (400 g/L in Rule 1130.1)	Further study to assess the feasibility of reducing the VOC limits for adhesives through: MSC-01 – Application of All Feasible Measures Assessment

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1132	VOC	Further Control of VOC from High Emitting Spray Booths (Amended 5/7/04)	Further reduce emissions by 65% from the baseline primarily through the installation of control devices, beyond and above the use of coatings that comply with existing coating rules.		
1136	VOC	Wood Products Coatings (Amended 6/14/96)	VOC content limits range from 2.3 – 6.3 lbs/gal VOC. Averaging provisions and add-on control are allowed. Transfer efficiency is at least 65%, or operator must use certain type of equipment (e.g. HVLP). Solvent cleaning operations must comply with Rule 1171.	Ventura Rule 74.30 (Amended 6/27/06) has more stringent limit for high-solid stains on new wood products at 2 lbs/gal (2.9 lbs/gal in Rule 1136). In lieu of coating specific limits, control equipment achieving 90% efficiency is required. No averaging provisions in Ventura. San Joaquin Valley Rule 4606 (Amended 10/16/08) is more stringent in the following areas: • Rule 1136 allows the use of a stripper with limits higher than 350 g/L if the stripper has low vapor pressure of 2 mmHg. SJV does not have this allowance; • SJV Rule 4606 requires a min overall control efficiency of 85% - 90% for flat wood paneling products, whereas Rule 1136 does not have control efficiency requirement.	Explore the feasibility of lowering the VOC limits for wood products coatings through: CTS-02 - Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants, or MSC-01 – Application of All Feasible Measures Assessment

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1136 (Cont.)				Bay Area, Regulation 8, Rule 32, (Amended 8/5/09) has lower limits for surface preparation and cleanup, including stripping, at 0.21 lbs/gal.	
1144	VOC	Metalworking Fluids and Direct-contact Lubricants (Amended 7/9/2010)	Various limits from 50 g/L – 340 g/L. Add-on control at 90% capture efficiency, 95% control efficiency (or 5 ppmv outlet)		Further study the potential of lowering the VOC limits through: CTS-02 - Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1151	VOC	Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations (Amended 12/2/05)	VOC content limits range from 250 – 840 grams VOC per liter. Averaging provisions are allowed. High transfer coating equipment (e.g. HVLP) is required. Solvent cleaning operations must comply with Rule 1171.	San Joaquin Valley Rule 4602 (Amended 9/17/09) is more stringent in the following areas: 1) adhesive at 250 g/L (540 g/L in Rule 1151), 2) gasket/gasket sealing at 200 g/L (400 g/L in Rule 1151), and 3) truck bed liner coating at 200 g/L (310 g/L in Rule 1151) Sacramento Rule 459 (Amended 8/25/11) is more stringent in the following areas: 1) multi-color coating at 520 g/L for mobile equipment driven on rails (680 g/L in Rule 1151), 2) truck bed liner coating at 200 g/L (310 g/L in Rule 1151) Bay Area, Regulation 8, Rule 45 (Amended 12/3/08) is more stringent in the following areas: 1) VOC limit for surface preparation and cleanup, including stripping, of 0.2 lbs/gal or 2) a minimum 85% overall control efficiency.	Further study the feasibility of lowering the VOC limits for coatings through: CTS-02 - Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants, or MSC-01 – Application of All Feasible Measures Assessment
1162	VOC	Polyester Resin Operations (Amended 7/8/05)	VOC limits (monomer content) from 10-48% by weight or alternatively 90% control efficiency for add-on control	Regulation 8, Rule 50 (Amended 12/2/09) is similar to Rule 1162, except the limit for corrosion resistant resin is more stringent at 40% - 46% (48% in Rule 1162). The rule allows some usage of acetone	Further study the feasibility of lowering the VOC limits through: MSC-01 – Application of All Feasible Measures Assessment

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1168	VOC	Adhesive and Sealant Applications (Amended 1/7/05)	VOC limits for solvents range from 30 – 775 lbs VOC per gallon. Require the use of high transfer efficiency equipment (e.g. HVLP spray). In lieu of meeting the VOC limits, using add-on control with 80% control efficiency is allowed.	San Joaquin Valley Rule 4653 (Amended 9/16/2010) has more stringent limits in the following areas: • 100 g/L for Cellulosic Plastic Welding Adhesive, 100 g/L for Styrene Acrylonitrile Welding Adhesive, and 200 g/L for Reinforced Plastic Composite Adhesive (Rule 1168 limit is 250 g/L limits for all three categories) • Minimum overall control efficiency is 85% (80% in Rule 1168)	Further study the feasibility of lowering the VOC limits through: CTS-02 - Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1171	VOC	Solvent Cleaning Operations (Amended 5/1/2009)	VOC limits for solvents are 25 g/l in general, and have a 100-800 g/l VOC for specific cleaning operations. In lieu of meeting the VOC limits, add-on control having 90% collection efficiency and 95% destruction efficiency or meeting 50 ppmv outlet concentration can be used. The rule however only requires (70%)(95%) = 66.5% overall control efficiency for graphic arts and screen printing applications	The U.S. EPA RACT published in September 2006 limit is 50 g/l or an overall control efficiency of 85%. The U.S. EPA is not recommending limits beyond 50 g/l; but also recommends states to adopt higher limits based on individual performance requirements of specific applications. Rule 1171 meets the U.S. EPA RACT.	Further study the feasibility of lowering the VOC limits and increasing the overall control efficiency requirement for control devices located at graphic arts facilities through: CTS-02 - Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants,
462	VOC	Organic Liquid Loading (Amended 5/14/99)	Limit in Rule 462 is 0.08 lbs per 1000 gallons of liquid loaded for Class A facility loading of 20,000 gallons or more. This limit is not applicable to small facilities (Class B and C).	Bay Area, Regulation 8, Rule 33 (Amended 4/15/09) has a limit of 0.04 lbs/1000 gallons of liquid loaded and requires stringent monitoring requirements	Further study to assess the feasibility of reducing the VOC limits through: MSC-01 – Application of All Feasible Measures Assessment

TABLE 3 (continued)

Evaluation of SCAQMD Rules and Regulations – VOC, PM Rules

RULE	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2007-2012 RULES	EVALUATION
1133, 1133.1, 1133.2	PM, VOC, NH3	Composting, Co-Composting, and Related Operations (Rule 1133, Adopted 1/10/2003; Rule 1133.1, Amended 7/8/2011; and Rule 1133.2, Adopted 1/10/2003)	Various performance standards. Air pollution control must have 80% control efficiency or greater. Existing operations must reduce up to 70% baseline VOC and ammonia emissions. Baseline emission factors are 1.78 lbs VOC/ton throughput and 2.93 lbs NH3/ton throughput.	San Joaquin Rule 4565 – Biosolids, Animal Manure, and Poultry Litter Operations (Adopted 3/15/07) and Rule 4566 – Organic Material Composting Operations (Adopted 8/18/11) have various operational requirements for these operations as well as the operators who landfills, composts, or co-composts these materials. The applicability of Rules 4565/4566 is broader than the applicability of Rule 1133.3. In addition, Rules 4565/4566 include additional mitigation measures to control VOC from composting active piles (e.g. maintain minimum oxygen concentration of 5%, moisture content of 40%-70%, carbon to nitrogen ratio of 20-1). San Joaquin's rule does not address chipping & grinding as in Rule 1133.1.	Further study the feasibility of further control through: MCS-02 – Further Emission Reductions from Green Waste Processing
1133.3	VOC NH_3	Emission Reductions from Greenwaste Composting Operations (Adopted 7/8/2011)	Include requirements for composting greenwaste, or greenwaste in combination of manure or foodwaste. Include various performance standards. Require air pollution control with efficiency of 80% or greater for operations greater than 5000 tons/year of foodwaste. For operations less than 5000 tons/year, require the composting piles to be covered, watered, and turned, or operated with measures that reduce at least 40% VOC emission and 20% NH_3 emissions.		

TABLE 3 (continued)

444	All	Open Burning (Amended 11/7/2008)	Contains requirements and prohibitions for open burning to minimize emissions and smoke impacts to the public.	San Joaquin Valley Rule 4103 (Amended 4/15/2010) contains additional best management practices compared to Rule 444 such as best management practices to control open burning of weeds. Bay Area, Reg 5, sets requirements for open burning, and was to forbid recreational burning during curtailment periods.	Further study to include additional good management practices and a possibility of restricting burning during episodic curtailment periods through: BCM-02 – Further Reductions from Open Burning

CALIFORNIA AIR RESOURCES BOARD
Mobile Source RACM Analysis for the South Coast 2012 Draft Final AQMP

Given the significant emission reductions needed for attainment in California, ARB has adopted some of the most stringent control measures nationwide for on-road and off-road mobile sources and the fuels that power them. These measures target both new and in-use equipment. And while California first focused on cleaning up cars – new car emissions have been reduced by 99 percent – the scope of California's program is vast. The State has implemented regulations and programs to reduce emissions from freight transport equipment, including heavy-duty trucks, ocean going vessels, locomotives, harbor craft, and cargo handling equipment. In addition, the State has standards for lawn and garden equipment, recreational vehicles and boats, and other newly manufactured off-road equipment. California has also adopted many measures that focus on achieving reductions from in-use mobile sources that include accelerated replacement of older equipment with newer, less polluting equipment; more stringent inspection and maintenance requirements; and operational requirements such as truck and bus idling restrictions and speed reduction requirements for ocean going vessels.

California has unique authority under Clean Air Act section 209 to adopt and implement new emission standards for many categories of on-road vehicles and engines, and new and in-use off-road vehicles and engines. Use of this authority is subject to U.S. EPA waiving the applicable federal standard upon their finding that the standards adopted by California are, in the aggregate, at least as stringent as the comparable federal standard.

To support the attainment plans submitted to U.S. EPA in 2007 for 8-hour ozone and PM2.5, ARB undertook an extensive public consultation process to identify potential SIP measures. New measures developed by ARB as part of this 2007 State Strategy focused on cleaning up the in-use fleet, and increasing the stringency of emissions standards for a number of engine categories, fuels, and consumer products. These measures build on ARB's already comprehensive program that addresses emissions from all types of mobile sources.

In 2011, U.S. EPA approved the State mobile source control program as being RACM in the context of the 2007 and 2008 South Coast and San Joaquin Valley PM2.5 plans (76 FR 69928 at 69933). In its proposed approval of the 2007 South Coast PM2.5 Attainment Plan, U.S. EPA recognized that the "State of California has been a leader in the development of some of the most stringent control measures nationwide for on-road and off-road mobile sources and the fuels that power them" (76 FR 41562 at 41570). In the 2007 State Strategy, ARB identified and committed to propose new defined measures for the sources under its jurisdiction. Of these new measures,

U.S. EPA noted that "many, if not most, of these measures are being proposed for adoption for the first time anywhere in the nation" (76 FR 41562 at 41570).

California's comprehensive mobile source program continues to be RACM as it expands and further reduces emissions. The 2012 PM2.5 SIPs rely on additional regulations adopted since the State's last major SIP revision in 2007. In January 2012, ARB adopted the Advanced Clean Cars program, which combines the control of smog-causing pollutants and greenhouse gas emissions into a single coordinated package of requirements for model years 2017 through 2025. The program was developed in tandem with the federal government over several years, including a joint fact-finding process with shared engineering and technical studies. Benefits from this new program are reflected in emission inventories used in the 2012 PM2.5 attainment plans.