SACRAMENTO REGIONAL

8-HOUR OZONE ATTAINMENT AND

REASONABLE FURTHER PROGRESS PLAN

APPENDICES

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B. PHOTOCHEMICAL MODELING

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Appendix A: Emissions Inventory

The 2002, 2011, 2014, 2017, and 2018 emission inventories are presented in various formats and details in this appendix.

Appendix A1 contains the on-road motor vehicle ROG and NOx emissions, vehicle population and activity Burden data generated using EMFAC2007 and February 2008 SACOG transportation activity data. It does not include CARB adjustments for recently adopted controls through December 31, 2006, and recently identified previously uninventoried categories.

Appendix A2 (available separately in electronic file format) contains the estimated VOC and NOx forecast summaries by EIC emission categories for the Sacramento Federal Nonattainment Area. It does not include CARB and district adjustments for recently adopted controls through December 31, 2006, and recently identified previously uninventoried categories.

Appendix A3 (available separately in electronic file format) contains the stationary point and area-wide source VOC and NOx inventories listed by EIC emission categories with growth and control factors and associated rules and growth parameters. It is based on data from California Emission Forecasting System (CEFS Version 1.06 Sacramento NAA (Rf#980) February 28, 2007) and it does not include CARB and district adjustments for recently adopted controls through December 31, 2006, and recently identified previously uninventoried categories.

Appendix A4 (available separately in electronic file format) contains the summary of offroad equipment emissions, horsepower, population and activity data for the Sacramento Federal Nonattainment Area using data outputs from OFFROAD2007 model. It does not include CARB and district adjustments for recently adopted controls through December 31, 2006, and recently identified previously uninventoried categories.

Appendix A5 contains recent emission inventory adjustments by the air districts and CARB. Unlike the VOC and NOx inventories presented in Chapter 5, Table 5-2 and Table 5-3, respectively, the inventories presented in Appendices A1 to A4 do not include CARB and district adjustments for recently adopted controls through December 31, 2006, and recently identified previously uninventoried categories. District inventory adjustments for reductions from recent district rules and for emission source additions are shown in Table A5-1. CARB inventory adjustments are presented in Table A5-2.

Appendix A6 contains a summary description and inventory of VOC and NOx emission reduction credits (ERCs) listed by the individual air districts. Included are: 1) unused ERCs issued for reductions that occurred prior to the 2002 base year, and 2) future bankable rice burning ERCs. The VOC and NOx ERC totals were added to the emission inventory forecast years in Chapter 5, Table 5-4 and Table 5-5, respectively.

Appendix A7 contains the calculation of the estimated 2019 VOC and NOx emissions by stationary, area-wide, on-road motor vehicles and other mobile sources major source categories. It also contains 2018 and 2019 VOC and NOx emissions inventory summary from CEFS (Version 1.06).

Appendix A1: On-Road Motor Vehicle Emissions Inventory

Appendix A1 contains the 2002, 2011, 2014, 2017, and 2018 on-road motor vehicle summer planning VOC and NOx inventories, vehicle population, VMT and trips for each EMFAC vehicle class category for the Sacramento federal nonattainment area. These updated motor vehicle emissions are based on ARB's EMFAC2007 emission factor model and the latest planning assumptions from SACOG's Metropolitan Transportation Plan (MTP2035) with Blueprint. The following emissions tables are Sacramento nonattainment area activities emissions summarized using the motor vehicle data from the EMFAC Burden output runs for the individual Sacramento nonattainment area counties.

Appendix A1: 2002 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2002 -- All model years in the range 1965 to 2002 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	LDA-NCAT	LDA-CAT	LDA-DSL	LDA-TOT	LDT1-NCAT	LDT1-CAT	LDT1-DSL	LDT1-TOT	LDT2-NCAT	LDT2-CAT	LDT2-DSL	LDT2-TOT	MDV-NCAT	MDV-CAT	MDV-DSL	MDV-TOT	LHDT1-NCAT	LHDT1-CAT
Vehicles	30384	744205	5175	779767	18438	166699	20670	205809	8189	296208	2649	307045	4799	120074	826	125700	707	20870
VMT/1000	476	26070	126	26669	312	6538	809	7660	148	11009	84	11243	114	4806	34	4954	16	788
Trips	134335	4729711	30592	4894640	82284	1062558	131546	1276389	38223	1886616	16381	1941227	25192	766784	5264	797241	23400	690106
Reactive Organic Gas Emissions																		
Run Exh	2.63	4.71	0.01	7.37	1.73	1.12	0.07	2.92	0.76	2.61	0.01	3.37	0.83	1.4	0	2.22	0.07	0.58
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02
Start Ex	0.63	4.32	0	4.94	0.38	0.84	0	1.21	0.16	2.03	0	2.21	0.14	0.98	0	1.11	0.15	0.63
Total Ex	3.27	9.03	0.01	12.31	2.12	1.95	0.07	4.13	0.92	4.64	0.01	5.58	0.95	2.39	0	3.36	0.2	1.25
Diurnal	0.55	2.31	0	2.86	0.32	0.43	0	0.74	0.14	0.89	0	1.03	0.01	0.36	0	0.39	0	0.01
Hot Soak	0.53	1.9	0	2.43	0.33	0.37	0	0.69	0.16	0.71	0	0.86	0.03	0.28	0	0.31	0.01	0.12
Running	2.7	5.2	0	7.91	1.17	1.17	0	2.35	0.43	2.37	0	2.8	0.05	0.92	0	0.99	0.14	0.8
Resting	0.3	1.09	0	1.41	0.2	0.24	0	0.43	0.08	0.43	0	0.51	0.01	0.19	0	0.2	0	0
Total	7.38	19.52	0.01	26.89	4.13	4.18	0.07	8.36	1.71	9.02	0.01	10.76	1.11	4.13	0	5.23	0.36	2.18
Oxides of Nitrogen Emissions																		
Run Exh	2.4	14.06	0.19	16.63	1.53	3.9	1.25	6.7	0.69	11.86	0.12	12.69	0.96	6.17	0.05	7.19	0.05	1.73
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Ex	0.2	3.02	0	3.21	0.12	0.62	0	0.75	0.05	2.12	0	2.16	0.06	0.9	0	0.97	0.01	1.42
Total Ex	2.57	17.07	0.19	19.85	1.65	4.52	1.25	7.43	0.75	13.98	0.12	14.85	1.01	7.05	0.05	8.13	0.06	3.15

Appendix A1: 2002 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2002 -- All model years in the range 1965 to 2002 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	LHDT1-DSL	LHDT1-TOT	LHDT2-NCAT	LHDT2-CAT	LHDT2-DSL	LHDT2-TOT	MHDT-NCAT	MHDT-CAT	MHDT-DSL	MHDT-TOT	HHDT-NCAT	HHDT-CAT	HHDT-DSL	HHDT-TOT	OBUS-NCAT	OBUS-CAT	OBUS-DSL
Vehicles	545	22123	406	5501	5295	11204	1816	4045	14178	20039	594	940	8935	10468	119	557	534
VMT/1000	19	825	9	210	206	423	16	162	805	981	8	111	1600	1719	1	27	25
Trips	6854	720360	13479	181905	66609	261994	82910	184753	397554	665217	27152	42898	45215	115267	5450	25460	14960
Reactive Organic Gas Emissions																	
Run Exh	0	0.64	0.02	0.1	0.04	0.19	0.08	0.14	0.18	0.42	0.12	0.28	2.71	3.1	0	0.01	0.01
Idle Exh	0	0.02	0	0	0	0.01	0	0.01	0	0.01	0	0	0.3	0.3	0	0	0
Start Ex	0	0.78	0.07	0.14	0	0.23	0.77	0.3	0	1.07	0.38	0.14	0	0.52	0.04	0.02	0
Total Ex	0	1.46	0.12	0.25	0.04	0.41	0.84	0.46	0.2	1.5	0.51	0.44	3.01	3.94	0.04	0.04	0.01
Diurnal	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hot Soak	0	0.14	0.01	0.01	0	0.04	0.04	0.01	0	0.07	0.01	0	0	0.01	0	0	0
Running	0	0.92	0.05	0.17	0	0.24	0.34	0.13	0	0.5	0.15	0.02	0	0.19	0.02	0.01	0
Resting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2.53	0.18	0.46	0.04	0.7	1.25	0.62	0.2	2.07	0.69	0.47	3.01	4.16	0.08	0.05	0.01
Oxides of Nitrogen Emissions																	
Run Exh	0.14	1.91	0.01	0.36	1.63	2.02	0.06	0.69	12.06	12.81	0.2	1.31	38.8	40.3	0	0.1	0.39
Idle Exh	0	0	0	0	0.01	0.01	0	0	0.12	0.12	0	0	1.59	1.59	0	0	0
Start Ex	0	1.44	0.01	0.32	0	0.34	0.09	0.62	0	0.71	0.12	0.35	0	0.46	0	0.06	0
Total Ex	0.14	3.35	0.03	0.7	1.64	2.38	0.16	1.3	12.16	13.63	0.32	1.65	40.38	42.35	0.01	0.16	0.39

Appendix A1: 2002 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2002 -- All model years in the range 1965 to 2002 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	OBUS-TOT	SBUS-NCAT	SBUS-CAT	SBUS-DSL	SBUS-TOT	UB-NCAT	UB-CAT	UB-DSL	UB-TOT	MH-NCAT	MH-CAT	MH-DSL	MH-TOT	MCY-NCAT	MCY-CAT	MCY-DSL	MCY-TOT	ALL-TOT
Vehicles	1211	61	269	1052	1385	6	139	281	427	2371	14150	1235	17758	39210	5448	0	44657	1547592
VMT/1000	54	1	10	40	53	1	15	33	49	22	161	15	201	261	53	0	314	55142
Trips	45871	246	1078	4214	5536	25	559	1130	1714	238	1415	123	1776	78412	10892	0	89305	10816540
Reactive Organic Gas Emissions																		
Run Exh	0.02	0.01	0.02	0.01	0.04	0	0.01	0.01	0.05	0.11	0.1	0	0.22	1.05	0.12	0	1.16	21.74
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.38
Start Ex	0.08	0	0	0	0.01	0	0	0	0	0	0	0	0	0.21	0.01	0	0.25	12.4
Total Ex	0.12	0.01	0.02	0.01	0.06	0	0.01	0.01	0.05	0.11	0.1	0	0.22	1.25	0.13	0	1.4	34.53
Diurnal	0	0	0	0	0	0	0	0	0	0	0.01	0	0.01	0.24	0.09	0	0.31	5.38
Hot Soak	0	0	0	0	0	0	0	0	0	0	0	0	0	0.13	0.01	0	0.14	4.7
Running	0.03	0	0	0	0.01	0	0	0	0	0	0	0	0	0.62	0.05	0	0.69	16.61
Resting	0	0	0	0	0	0	0	0	0	0	0	0	0	0.14	0.04	0	0.18	2.73
Total	0.15	0.01	0.03	0.01	0.06	0	0.01	0.01	0.05	0.11	0.12	0	0.24	2.39	0.32	0	2.72	63.92
Oxides of Nitrogen Emissions																		
Run Exh	0.48	0	0.05	0.65	0.71	0	0.08	0.84	0.93	0.09	0.52	0.23	0.84	0.36	0.07	0	0.43	103.63
Idle Exh	0	0	0	0.04	0.04	0	0	0	0	0	0	0	0	0	0	0	0	1.78
Start Ex	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0.01	10.14
Total Ex	0.57	0	0.05	0.68	0.77	0	0.08	0.84	0.94	0.09	0.53	0.23	0.84	0.39	0.08	0	0.47	115.54

A1: 2011 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary Page 1 of 3

Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
2008/03/17
2011 -- All model years in the range 1967 to 2011 selected
Summer
acramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
ee county detail
Tons Per Day

LDA-NCAT	LDA-CAT	LDA-DSL	LDA-TOT	LDT1-NCAT	LDT1-CAT	LDT1-DSL	LDT1-TOT	LDT2-NCAT	LDT2-CAT	LDT2-DSL	LDT2-TOT	MDV-NCAT	MDV-CAT	MDV-DSL	MDV-TOT	LHDT1-NCAT	LHDT1-CAT
8247	864379	2514	875140	5448	204634	16550	226634	2942	396298	1331	400571	1701	183086	772	185561	139	30594
111	29065	56	29229	82	6996	458	7538	45	13751	32	13828	35	6774	24	6833	2	1281
32381	5439763	13868	5486009	21722	1280583	101018	1403326	11761	2494001	7733	2513494	7206	1157025	4768	1169000	4587	1011662
rganic Gas Emissions																	
0.67	1.46	0	2.16	0.5	0.48	0.02	1.02	0.27	1.01	0	1.29	0.29	0.68	0	0.97	0.01	0.21
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03
0.16	2	0	2.14	0.11	0.5	0	0.6	0.05	1.13	0	1.2	0.03	0.67	0	0.72	0.02	0.41
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0.84	3.45	0	4.31	0.59	0.98	0.02	1.62	0.31	2.16	0	2.48	0.32	1.35	0	1.68	0.02	0.65
0.16	1.76	0	1.93	0.09	0.47	0	0.57	0.07	0.83	0	0.91	0.01	0.35	0	0.35	0	0
0.12	1.5	0	1.63	0.09	0.38	0	0.46	0.05	0.69	0	0.73	0.01	0.27	0	0.28	0	0.07
0.65	2.65	0	3.28	0.24	1.25	0	1.5	0.12	2.31	0	2.43	0.01	0.93	0	0.94	0.01	0.76
0.09	1.03	0	1.14	0.06	0.3	0	0.36	0.02	0.52	0	0.54	0	0.22	0	0.23	0	0
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1.87	10.37	0	12.26	1.11	3.35	0.02	4.5	0.58	6.49	0	7.09	0.38	3.11	0	3.48	0.06	1.49
litrogen Emissions																	
0.55	5.48	0.08	6.1	0.39	1.79	0.71	2.89	0.2	5.32	0.03	5.58	0.26	3.33	0.02	3.62	0	0.73
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.04	1.85	0	1.9	0.03	0.47	0	0.49	0.01	1.55	0	1.57	0.01	0.81	0	0.85	0	1.74
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0.6	7.33	0.08	8	0.42	2.26	0.71	3.37	0.21	6.88	0.03	7.14	0.28	4.15	0.02	4.48	0.01	2.45

Appendix A1: 2011 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2011 -- All model years in the range 1967 to 2011 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	LHDT1-DSL	LHDT1-TOT	LHDT2-NCAT	LHDT2-CAT	LHDT2-DSL	LHDT2-TOT	MHDT-NCAT	MHDT-CAT	MHDT-DSL	MHDT-TOT	HHDT-NCAT	HHDT-CAT	HHDT-DSL	HHDT-TOT	OBUS-NCAT	OBUS-CAT	OBUS-DSL
Vehicles	10553	41286	75	7943	7843	15860	684	4926	20046	25656	242	702	13040	13985	31	750	874
VMT/1000	449	1732	1	305	292	598	3	198	1048	1252	2	55	2335	2395	0	32	43
Trips	132728	1148974	2450	262609	98669	363724	31258	224951	562102	818308	11079	32088	65988	109155	1433	34215	24474
Reactive Organic Gas Emissions																	
Run Exh	0.07	0.28	0	0.03	0.07	0.11	0.02	0.08	0.2	0.29	0.03	0.16	2.62	2.84	0	0.01	0.01
Idle Exh	0	0.04	0	0.01	0	0.01	0	0.01	0	0.01	0	0	0.27	0.27	0	0	0
Start Ex	0	0.43	0.01	0.12	0	0.13	0.25	0.25	0	0.5	0.13	0.13	0	0.25	0.01	0.02	0
Total Ex	0.07	0.78	0.01	0.17	0.07	0.26	0.3	0.32	0.2	0.81	0.17	0.28	2.9	3.36	0.01	0.04	0.01
Diurnal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hot Soak	0	0.07	0	0.01	0	0.02	0.01	0.01	0	0.02	0.01	0	0	0.01	0	0	0
Running	0	0.78	0.01	0.22	0	0.23	0.12	0.16	0	0.29	0.06	0.02	0	0.09	0	0.01	0
Resting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0.07	1.62	0.03	0.43	0.07	0.52	0.44	0.52	0.2	1.17	0.26	0.31	2.9	3.46	0.01	0.06	0.01
Oxides of Nitrogen Emissions																	
Run Exh	2.01	2.74	0	0.2	1.54	1.76	0.01	0.43	8.41	8.89	0.04	0.63	35.46	36.14	0	0.1	0.31
Idle Exh	0.02	0.03	0	0	0.01	0.01	0	0	0.16	0.16	0	0	2.8	2.8	0	0	0.01
Start Ex	0	1.74	0	0.43	0	0.43	0.02	0.59	0	0.61	0.04	0.25	0	0.29	0	0.09	0
Total Ex	2.04	4.5	0	0.65	1.58	2.23	0.03	1.01	8.59	9.67	0.08	0.87	38.27	39.23	0	0.18	0.32

Appendix A1: 2011 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2011 -- All model years in the range 1967 to 2011 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	OBUS-TOT	SBUS-NCAT	SBUS-CAT	SBUS-DSL	SBUS-TOT	UB-NCAT	UB-CAT	UB-DSL	UB-TOT	MH-NCAT	MH-CAT	MH-DSL	MH-TOT	MCY-NCAT	MCY-CAT	MCY-DSL	MCY-TOT	ALL-TOT
Vehicles	1654	27	245	1391	1661	6	252	327	585	599	16234	2282	19115	50066	29987	0	80054	1887764
VMT/1000	74	1	9	53	62	1	27	37	66	5	190	26	221	359	276	0	634	64462
Trips	60124	107	978	5561	6645	25	1008	1307	2340	60	1624	229	1911	100120	59968	0	160090	13243094
Reactive Organic Gas Emissions																		
Run Exh	0.01	0	0.01	0.01	0.02	0	0.01	0.01	0.05	0.01	0.06	0	0.1	1.37	0.58	0	1.93	11.09
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.36
Start Ex	0.04	0	0	0	0	0	0	0	0	0	0	0	0	0.22	0.12	0	0.34	6.4
Total Ex	0.09	0	0.02	0.01	0.03	0	0.01	0.01	0.05	0.02	0.06	0	0.1	1.59	0.7	0	2.28	17.82
Diurnal	0	0	0	0	0	0	0	0	0	0	0.01	0	0.01	0.07	0.37	0	0.45	4.22
Hot Soak	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0.07	0	0.12	3.34
Running	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.14	0.19	0	0.32	9.91
Resting	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04	0.22	0	0.26	2.53
Total	0.1	0.01	0.02	0.01	0.05	0	0.01	0.01	0.05	0.02	0.08	0	0.11	1.86	1.56	0	3.43	37.85
Oxides of Nitrogen Emissions																		
Run Exh	0.41	0	0.02	0.69	0.73	0	0.07	0.69	0.78	0.01	0.28	0.25	0.57	0.5	0.3	0	0.82	70.99
Idle Exh	0.01	0	0	0.07	0.07	0	0	0	0	0	0	0	0	0	0	0	0	3.1
Start Ex	0.09	0	0	0	0	0	0	0	0	0	0	0	0	0.04	0.01	0	0.05	8.04
Total Ex	0.52	0	0.03	0.74	0.79	0	0.08	0.69	0.78	0.01	0.28	0.25	0.57	0.54	0.3	0	0.86	82.12

Appendix A1: 2014 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2014 -- All model years in the range 1970 to 2014 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	LDA-NCAT	LDA-CAT	LDA-DSL	LDA-TOT	LDT1-NCAT	LDT1-CAT	LDT1-DSL	LDT1-TOT	LDT2-NCAT	LDT2-CAT	LDT2-DSL	LDT2-TOT	MDV-NCAT	MDV-CAT	MDV-DSL	MDV-TOT	LHDT1-NCAT	LHDT1-CAT
Vehicles	3247	925263	1825	930337	2936	224024	13897	240857	1552	423718	1015	426283	1160	195637	682	197479	83	32997
VMT/1000	42	31251	38	31332	43	7641	355	8041	21	14471	22	14515	23	7061	20	7106	1	1332
Trips	12518	5805521	9808	5827839	11366	1394359	82713	1488438	6025	2650201	5748	2661971	4724	1227259	4116	1236099	2767	1091108
Reactive Organic Gas Emissions																		
Run Exh	0.26	1.1	0	1.37	0.26	0.4	0.01	0.69	0.12	0.83	0	0.96	0.19	0.57	0	0.77	0	0.18
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03
Start Ex	0.06	1.51	0	1.56	0.06	0.41	0	0.47	0.02	0.97	0	0.99	0.02	0.59	0	0.62	0.01	0.38
Total Ex	0.33	2.59	0	2.93	0.31	0.8	0.01	1.17	0.18	1.78	0	1.95	0.22	1.18	0	1.39	0.01	0.59
Diurnal	0.06	1.52	0	1.6	0.06	0.44	0	0.5	0.02	0.82	0	0.85	0	0.33	0	0.35	0	0
Hot Soak	0.05	1.38	0	1.44	0.04	0.39	0	0.44	0.01	0.72	0	0.73	0	0.28	0	0.29	0	0.07
Running	0.22	2.34	0	2.57	0.1	1.25	0	1.33	0.05	2.3	0	2.34	0.01	0.95	0	0.97	0.01	0.76
Resting	0.03	0.92	0	0.98	0.03	0.3	0	0.32	0.01	0.52	0	0.54	0	0.23	0	0.23	0	0
Total	0.71	8.78	0	9.49	0.56	3.14	0.01	3.71	0.29	6.12	0	6.41	0.26	2.99	0	3.23	0.02	1.43
Oxides of Nitrogen Emissions																		
Run Exh	0.21	4.24	0.06	4.49	0.19	1.49	0.55	2.22	0.1	4.27	0.02	4.42	0.17	2.75	0.02	2.98	0	0.6
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Ex	0.01	1.44	0	1.45	0.01	0.39	0	0.42	0.01	1.3	0	1.3	0.01	0.74	0	0.75	0	1.79
Total Ex	0.22	5.67	0.06	5.96	0.21	1.87	0.55	2.64	0.1	5.6	0.02	5.74	0.19	3.48	0.02	3.7	0	2.39

Appendix A1: 2014 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2014 -- All model years in the range 1970 to 2014 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	LHDT1-DSL	LHDT1-TOT	LHDT2-NCAT	LHDT2-CAT	LHDT2-DSL	LHDT2-TOT	MHDT-NCAT	MHDT-CAT	MHDT-DSL	MHDT-TOT	HHDT-NCAT	HHDT-CAT	HHDT-DSL	HHDT-TOT	OBUS-NCAT	OBUS-CAT	OBUS-DSL
Vehicles	10831	43911	32	8711	8102	16846	398	5312	21458	27168	132	630	13349	14108	16	739	999
VMT/1000	433	1765	0	333	298	631	2	217	1105	1325	1	47	2527	2573	0	29	50
Trips	136227	1230105	1079	288000	101923	391004	18179	242532	601705	862416	6043	28759	67544	102346	710	33771	28022
Reactive Organic Gas Emissions																	
Run Exh	0.06	0.23	0	0.03	0.06	0.1	0.01	0.05	0.18	0.24	0.02	0.12	2.09	2.24	0	0.01	0.01
Idle Exh	0	0.04	0	0.01	0	0.01	0	0.01	0	0.01	0	0	0.24	0.24	0	0	0
Start Ex	0	0.4	0	0.11	0	0.12	0.15	0.23	0	0.36	0.07	0.11	0	0.18	0	0.02	0
Total Ex	0.06	0.68	0	0.15	0.06	0.21	0.15	0.28	0.19	0.65	0.09	0.22	2.33	2.65	0	0.04	0.01
Diurnal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hot Soak	0	0.07	0	0.01	0	0.01	0.01	0.01	0	0.02	0	0	0	0	0	0	0
Running	0	0.76	0	0.21	0	0.22	0.07	0.15	0	0.22	0.03	0.02	0	0.05	0	0.01	0
Resting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0.06	1.52	0.01	0.4	0.06	0.47	0.23	0.46	0.19	0.89	0.12	0.25	2.33	2.72	0.01	0.06	0.01
Oxides of Nitrogen Emissions																	
Run Exh	1.68	2.28	0	0.15	1.27	1.43	0.01	0.32	6.43	6.78	0.02	0.48	26.33	26.83	0	0.08	0.24
Idle Exh	0.03	0.03	0	0	0.01	0.01	0	0	0.18	0.18	0	0	2.97	2.97	0	0	0.01
Start Ex	0	1.79	0	0.46	0	0.46	0.01	0.53	0	0.54	0.02	0.2	0	0.22	0	0.09	0
Total Ex	1.7	4.1	0	0.63	1.3	1.93	0.02	0.86	6.61	7.49	0.04	0.68	29.34	30.05	0	0.16	0.25

Appendix A1: 2014 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2014 -- All model years in the range 1970 to 2014 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	OBUS-TOT	SBUS-NCAT	SBUS-CAT	SBUS-DSL	SBUS-TOT	UB-NCAT	UB-CAT	UB-DSL	UB-TOT	MH-NCAT	MH-CAT	MH-DSL	MH-TOT	MCY-NCAT	MCY-CAT	MCY-DSL	MCY-TOT	ALL-TOT
Vehicles	1754	17	248	1493	1756	4	282	330	618	285	17511	2438	20234	44152	41033	0	85184	2006532
VMT/1000	80	0	10	56	66	0	32	38	70	1	207	28	238	307	365	0	673	68414
Trips	62503	63	987	5974	7026	17	1128	1323	2469	29	1752	243	2024	88294	82057	0	170351	14044593
Reactive Organic Gas Emissions																		
Run Exh	0.01	0	0.01	0.01	0.02	0	0.01	0.01	0.04	0.01	0.03	0	0.06	1.16	0.78	0	1.92	8.68
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.32
Start Ex	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.15	0	0.34	5.1
Total Ex	0.06	0	0.02	0.01	0.03	0	0.01	0.01	0.05	0.01	0.03	0	0.06	1.36	0.93	0	2.28	14.12
Diurnal	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.04	0.44	0	0.47	3.78
Hot Soak	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.1	0	0.12	3.13
Running	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.07	0.21	0	0.27	8.78
Resting	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.25	0	0.26	2.35
Total	0.09	0	0.02	0.01	0.04	0	0.02	0.01	0.05	0.01	0.06	0	0.08	1.5	1.93	0	3.41	32.14
Oxides of Nitrogen Emissions																		
Run Exh	0.32	0	0.02	0.68	0.71	0	0.08	0.6	0.68	0	0.24	0.23	0.48	0.43	0.39	0	0.84	54.48
Idle Exh	0.01	0	0	0.07	0.07	0	0	0	0	0	0	0	0	0	0	0	0	3.29
Start Ex	0.09	0	0	0	0	0	0.01	0	0.01	0	0	0	0	0.03	0.01	0	0.05	7.15
Total Ex	0.43	0	0.02	0.74	0.76	0	0.08	0.6	0.7	0	0.24	0.23	0.48	0.46	0.41	0	0.88	64.9

Appendix A1: 2017 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2017 -- All model years in the range 1973 to 2017 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	LDA-NCAT	LDA-CAT	LDA-DSL	LDA-TOT	LDT1-NCAT	LDT1-CAT	LDT1-DSL	LDT1-TOT	LDT2-NCAT	LDT2-CAT	LDT2-DSL	LDT2-TOT	MDV-NCAT	MDV-CAT	MDV-DSL	MDV-TOT	LHDT1-NCAT	LHDT1-CAT
Vehicles	929	986755	1292	988973	925	243905	11105	255935	534	452426	739	453700	777	208604	580	209958	47	35535
VMT/1000	11	33143	26	33179	13	8295	262	8572	8	15213	16	15237	15	7391	16	7424	1	1388
Trips	3514	6173793	6841	6184141	3508	1512287	64343	1580138	2033	2813086	4085	2819195	3033	1299270	3425	1305727	1582	1175022
Reactive Organic Gas Emissions																		
Run Exh	0.07	0.87	0	0.94	0.08	0.32	0.01	0.41	0.03	0.7	0	0.73	0.13	0.48	0	0.61	0	0.13
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04
Start Ex	0.01	1.14	0	1.15	0.01	0.35	0	0.36	0.01	0.79	0	0.8	0.01	0.51	0	0.53	0.01	0.35
Total Ex	0.08	1.99	0	2.09	0.1	0.66	0.01	0.77	0.07	1.49	0	1.56	0.14	0.99	0	1.16	0.01	0.54
Diurnal	0.01	1.34	0	1.35	0.01	0.42	0	0.43	0.01	0.81	0	0.82	0	0.35	0	0.36	0	0
Hot Soak	0.01	1.3	0	1.3	0.01	0.38	0	0.39	0	0.73	0	0.74	0	0.3	0	0.3	0	0.07
Running	0.05	2.14	0	2.2	0.02	1.2	0	1.23	0.01	2.26	0	2.28	0	0.97	0	0.98	0	0.79
Resting	0.01	0.87	0	0.87	0.01	0.29	0	0.3	0	0.54	0	0.54	0	0.24	0	0.24	0	0
Total	0.18	7.61	0	7.81	0.16	2.91	0.01	3.1	0.09	5.82	0	5.91	0.15	2.87	0	3.05	0.01	1.42
Oxides of Nitrogen Emissions																		
Run Exh	0.05	3.37	0.03	3.46	0.06	1.21	0.4	1.68	0.02	3.5	0.01	3.56	0.12	2.29	0.01	2.43	0	0.51
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Ex	0	1.08	0	1.08	0	0.34	0	0.34	0	1.08	0	1.09	0	0.63	0	0.64	0	1.88
Total Ex	0.07	4.45	0.03	4.54	0.07	1.53	0.4	2.02	0.02	4.6	0.01	4.65	0.12	2.92	0.01	3.07	0	2.37

Appendix A1: 2017 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2017 -- All model years in the range 1973 to 2017 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	LHDT1-DSL	LHDT1-TOT	LHDT2-NCAT	LHDT2-CAT	LHDT2-DSL	LHDT2-TOT	MHDT-NCAT	MHDT-CAT	MHDT-DSL	MHDT-TOT	HHDT-NCAT	HHDT-CAT	HHDT-DSL	HHDT-TOT	OBUS-NCAT	OBUS-CAT	OBUS-DSL
Vehicles	11080	46664	13	9469	8410	17892	169	5740	22904	28813	59	564	13683	14308	7	715	1140
VMT/1000	421	1810	0	359	304	663	1	235	1160	1399	1	41	2697	2739	0	26	59
Trips	139379	1315983	459	313098	105785	419340	7645	262163	642262	912069	2644	25792	69247	97681	302	32669	31940
Reactive Organic Gas Emissions																	
Run Exh	0.05	0.2	0	0.01	0.04	0.08	0	0.03	0.16	0.21	0.01	0.08	1.65	1.74	0	0	0.01
Idle Exh	0	0.04	0	0.01	0	0.01	0	0.01	0.01	0.01	0	0	0.22	0.22	0	0	0
Start Ex	0	0.37	0	0.1	0	0.1	0.06	0.21	0	0.25	0.03	0.08	0	0.12	0	0.02	0
Total Ex	0.06	0.62	0	0.13	0.05	0.18	0.07	0.25	0.17	0.49	0.04	0.17	1.88	2.08	0	0.04	0.01
Diurnal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hot Soak	0	0.07	0	0.01	0	0.01	0	0.01	0	0.01	0	0	0	0	0	0	0
Running	0	0.8	0	0.19	0	0.19	0.02	0.15	0	0.17	0.01	0.02	0	0.03	0	0.01	0
Resting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0.06	1.49	0	0.36	0.05	0.42	0.1	0.42	0.17	0.69	0.05	0.19	1.88	2.14	0	0.06	0.01
Oxides of Nitrogen Emissions																	
Run Exh	1.43	1.93	0	0.12	1.06	1.17	0	0.25	4.89	5.12	0.01	0.36	19.48	19.85	0	0.06	0.19
Idle Exh	0.03	0.03	0	0	0.01	0.01	0	0	0.18	0.18	0	0	3.13	3.13	0	0	0.01
Start Ex	0	1.88	0	0.47	0	0.47	0	0.47	0	0.48	0.01	0.17	0	0.18	0	0.08	0
Total Ex	1.45	3.83	0	0.61	1.07	1.68	0.01	0.73	5.05	5.78	0.02	0.53	22.62	23.17	0	0.15	0.2

Appendix A1: 2017 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2017 -- All model years in the range 1973 to 2017 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	OBUS-TOT	SBUS-NCAT	SBUS-CAT	SBUS-DSL	SBUS-TOT	UB-NCAT	UB-CAT	UB-DSL	UB-TOT	MH-NCAT	MH-CAT	MH-DSL	MH-TOT	MCY-NCAT	MCY-CAT	MCY-DSL	MCY-TOT	ALL-TOT
Vehicles	1861	7	250	1593	1851	2	298	349	649	102	18754	2554	21409	40218	50240	0	90460	2132467
VMT/1000	85	0	10	61	69	0	33	39	73	1	224	30	254	280	426	0	708	72212
Trips	64911	28	1002	6368	7397	8	1187	1400	2597	10	1875	255	2142	80431	100471	0	180901	14892235
Reactive Organic Gas Emissions																		
Run Exh	0.01	0	0.01	0.01	0.02	0	0.01	0.01	0.04	0	0.03	0	0.03	1.05	0.9	0	1.95	7.02
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.31
Start Ex	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0.18	0.19	0	0.36	4.12
Total Ex	0.04	0	0.02	0.01	0.03	0	0.02	0.01	0.05	0	0.03	0	0.03	1.24	1.08	0	2.32	11.44
Diurnal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.47	0	0.5	3.48
Hot Soak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11	0	0.12	2.96
Running	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.22	0	0.25	8.19
Resting	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.26	0	0.29	2.23
Total	0.06	0	0.02	0.01	0.04	0	0.02	0.01	0.05	0	0.05	0	0.06	1.3	2.19	0	3.49	28.3
Oxides of Nitrogen Emissions																		
Run Exh	0.24	0	0.02	0.67	0.69	0	0.08	0.6	0.68	0	0.18	0.21	0.39	0.41	0.46	0	0.86	42.07
Idle Exh	0.01	0	0	0.07	0.07	0	0	0	0	0	0	0	0	0	0	0	0	3.47
Start Ex	0.08	0	0	0	0	0	0.01	0	0.01	0	0	0	0	0.02	0.02	0	0.05	6.33
Total Ex	0.34	0	0.02	0.73	0.75	0	0.09	0.6	0.69	0	0.18	0.21	0.39	0.42	0.48	0	0.93	51.85

Appendix A1: 2018 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2018 -- All model years in the range 1974 to 2018 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	LDA-NCAT	LDA-CAT	LDA-DSL	LDA-TOT	LDT1-NCAT	LDT1-CAT	LDT1-DSL	LDT1-TOT	LDT2-NCAT	LDT2-CAT	LDT2-DSL	LDT2-TOT	MDV-NCAT	MDV-CAT	MDV-DSL	MDV-TOT	LHDT1-NCAT	LHDT1-CAT
Vehicles	421	1007100	1149	1008670	391	250421	10206	261019	288	461991	661	462940	671	212908	541	214121	39	36391
VMT/1000	5	33728	23	33757	6	8500	237	8743	2	15464	13	15482	12	7507	14	7536	0	1408
Trips	1598	6295316	6059	6302970	1491	1551087	58555	1611134	1097	2867239	3620	2871954	2589	1323168	3171	1328929	1254	1203365
Reactive Organic Gas Emissions																		
Run Exh	0.03	0.8	0	0.85	0.02	0.29	0.01	0.34	0.01	0.65	0	0.68	0.12	0.46	0	0.58	0	0.12
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04
Start Ex	0	1.03	0	1.04	0	0.32	0	0.32	0	0.76	0	0.76	0.01	0.48	0	0.5	0	0.35
Total Ex	0.03	1.85	0	1.88	0.02	0.62	0.01	0.66	0.01	1.38	0	1.45	0.13	0.95	0	1.08	0.01	0.52
Diurnal	0.01	1.27	0	1.28	0	0.42	0	0.42	0	0.81	0	0.81	0	0.36	0	0.36	0	0
Hot Soak	0	1.22	0	1.23	0	0.37	0	0.38	0	0.71	0	0.74	0	0.3	0	0.3	0	0.07
Running	0.01	2.1	0	2.11	0	1.19	0	1.2	0	2.26	0	2.27	0	0.98	0	0.98	0	0.81
Resting	0	0.81	0	0.81	0	0.28	0	0.29	0	0.54	0	0.54	0	0.24	0	0.25	0	0
Total	0.09	7.27	0	7.35	0.07	2.84	0.01	2.92	0.04	5.72	0	5.78	0.14	2.84	0	3	0.01	1.41
Oxides of Nitrogen Emissions																		
Run Exh	0.01	3.13	0.02	3.19	0.01	1.14	0.37	1.53	0.01	3.29	0.01	3.34	0.11	2.16	0.01	2.28	0	0.48
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Ex	0	0.99	0	0.99	0	0.3	0	0.3	0	1.02	0	1.03	0	0.59	0	0.61	0	1.88
Total Ex	0.01	4.13	0.02	4.2	0.02	1.44	0.37	1.82	0.01	4.31	0.01	4.36	0.11	2.75	0.01	2.89	0	2.36

Appendix A1: 2018 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2018 -- All model years in the range 1974 to 2018 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	LHDT1-DSL	LHDT1-TOT	LHDT2-NCAT	LHDT2-CAT	LHDT2-DSL	LHDT2-TOT	MHDT-NCAT	MHDT-CAT	MHDT-DSL	MHDT-TOT	HHDT-NCAT	HHDT-CAT	HHDT-DSL	HHDT-TOT	OBUS-NCAT	OBUS-CAT	OBUS-DSL
Vehicles	11152	47582	5	9745	8494	18245	103	5883	23384	29371	35	542	13811	14386	4	705	1186
VMT/1000	419	1830	0	367	306	674	0	242	1181	1424	0	39	2739	2780	0	23	62
Trips	140279	1344898	153	322248	106853	429255	4693	268732	655714	929139	1573	24760	69885	96218	207	32214	33278
Reactive Organic Gas Emissions																	
Run Exh	0.05	0.2	0	0.01	0.04	0.07	0	0.03	0.16	0.2	0	0.07	1.54	1.61	0	0	0.01
Idle Exh	0	0.04	0	0.01	0	0.01	0	0.01	0.01	0.01	0	0	0.22	0.22	0	0	0
Start Ex	0	0.35	0	0.09	0	0.09	0.02	0.2	0	0.23	0.02	0.08	0	0.09	0	0.02	0
Total Ex	0.05	0.6	0	0.12	0.04	0.17	0.03	0.24	0.16	0.45	0.02	0.16	1.75	1.93	0	0.03	0.01
Diurnal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hot Soak	0	0.07	0	0.01	0	0.01	0	0.01	0	0.01	0	0	0	0	0	0	0
Running	0	0.82	0	0.19	0	0.19	0.01	0.15	0	0.16	0.01	0.02	0	0.02	0	0.01	0
Resting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0.05	1.48	0	0.35	0.04	0.4	0.06	0.4	0.16	0.63	0.03	0.18	1.75	1.97	0	0.06	0.01
Oxides of Nitrogen Emissions																	
Run Exh	1.34	1.84	0	0.11	0.98	1.09	0	0.22	4.44	4.65	0.01	0.32	17.73	18.04	0	0.06	0.18
Idle Exh	0.03	0.03	0	0	0.01	0.01	0	0	0.19	0.19	0	0	3.19	3.19	0	0	0.01
Start Ex	0	1.89	0	0.48	0	0.48	0	0.45	0	0.46	0	0.16	0	0.17	0	0.08	0
Total Ex	1.37	3.75	0	0.6	1.01	1.6	0	0.68	4.63	5.31	0.01	0.48	20.92	21.41	0	0.13	0.19

Appendix A1: 2018 On-Road Motor Vehicle Emissions Inventory - Sacramento Federal Nonattainment Area Summary

Version : Emfac2007 V2.3 Nov 1 2006 ** WIS Enabled **
Run Date : 2008/03/17
Scen Year: 2018 -- All model years in the range 1974 to 2018 selected
Season : Summer
Area : Sacramento Nonattainment Area [El Dorado (MC)+ Placer (SV & MC) + Sacramento + S. Sutter + Yolo + Solano (SV)]
I/M Stat : See county detail
Emissions: Tons Per Day

	OBUS-TOT	SBUS-NCAT	SBUS-CAT	SBUS-DSL	SBUS-TOT	UB-NCAT	UB-CAT	UB-DSL	UB-TOT	MH-NCAT	MH-CAT	MH-DSL	MH-TOT	MCY-NCAT	MCY-CAT	MCY-DSL	MCY-TOT	ALL-TOT
Vehicles	1896	4	253	1621	1880	2	303	356	659	59	19156	2590	21804	39320	52888	0	92209	2174782
VMT/1000	87	0	10	61	71	0	33	40	74	0	231	30	260	275	444	0	719	73434
Trips	65699	16	1011	6487	7517	8	1206	1421	2636	5	1915	259	2179	78631	105766	0	184398	15176932
Reactive Organic Gas Emissions																		
Run Exh	0.01	0	0.01	0.01	0.02	0	0.01	0.01	0.04	0	0.02	0	0.03	1.04	0.94	0	1.97	6.61
Idle Exh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.31
Start Ex	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0.16	0.2	0	0.37	3.82
Total Ex	0.04	0	0.02	0.01	0.03	0	0.02	0.01	0.05	0	0.02	0	0.03	1.21	1.14	0	2.35	10.73
Diurnal	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.5	0	0.5	3.4
Hot Soak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.12	0	0.12	2.89
Running	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.22	0	0.25	8.04
Resting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.29	0	0.29	2.2
Total	0.06	0	0.02	0.01	0.04	0	0.03	0.01	0.05	0	0.04	0	0.05	1.26	2.27	0	3.53	27.26
Oxides of Nitrogen Emissions																		
Run Exh	0.22	0	0.02	0.66	0.69	0	0.08	0.59	0.67	0	0.16	0.19	0.37	0.4	0.46	0	0.87	38.82
Idle Exh	0.01	0	0	0.07	0.07	0	0	0	0	0	0	0	0	0	0	0	0	3.52
Start Ex	0.08	0	0	0	0	0	0.01	0	0.01	0	0	0	0	0.01	0.02	0	0.05	6.09
Total Ex	0.32	0	0.02	0.73	0.75	0	0.09	0.59	0.69	0	0.18	0.19	0.37	0.42	0.5	0	0.93	48.41

Appendix A5: Recent Emission Inventory Adjustments

Emission inventory adjustments presented in this appendix include recent changes by the air districts and CARB, and are not reflected in Appendices A1 to A4. These emission changes are due to: 1) recently adopted control measures through December 31, 2006, 2) corrections to emission categories, and 3) recent or previously uninventoried sources. Tables A5-1 and A5-2 contain a summary of the district and CARB emission inventory adjustments, respectively.

Table A5-1. District Emission Inventory Adjustments in Sacramento Nonattainment Area

District Rule/Category/Source	Adoption Year	Implement Year	VOC Emission Changes* (TPD)				
			2002	2011	2014	2017	2018
PCAPCD-216,240 Degreasing/Solvent Cleaning	2003	2003-2004		-0.445	-0.475	-0.502	-0.511
PCAPCD-239 Graphic Arts	2004	2005		-0.122	-0.127	-0.136	-0.137
SMAQMD-496 Livestock Waste (Option A)	2006	2008		-0.018	-0.018	-0.018	-0.018
PCAPCD-243 Polyester Resin/Plastic Product Manufacturing	2003	2003		-0.194	-0.210	-0.222	-0.228
FRAQMD-3.20 Wood Products Coating	2005	2006		0.000	0.000	0.000	0.000
Correction to SMAQMD Oil&Gas Production Fugitive Emissions			-0.304	-0.304	-0.304	-0.304	-0.304
Correction to SMAQMD EIC 230-240-8300-0000 - Thinning & Cleanup Solvent Unspecified (Gun Cleaning)			0.424	0.318	0.346	0.370	0.379
Added Heritage Dairy (Yolo-Solano)				0.105	0.105	0.105	0.105
Added Cosumnes Power Plant (Sacramento)				0.082	0.082	0.082	0.082
Added Jepson Composting (Yolo-Solano)			4.110	4.110	4.110	4.110	4.110
Total District Adjustments			**4.230**	**3.533**	**3.510**	**3.486**	**3.479**

District Rule/Category/Source	Adoption Year	Implement Year	NOx Emission Changes* (TPD)				
			2002	2011	2014	2017	2018
SMAQMD-411 Boilers, Steam Generators, and Process Heaters	2005	2007-2009		-0.095	-0.097	-0.098	-0.098
FRAQMD-3.21 Boilers, Steam Generators, and Process Heaters	2006	2007		0.000	0.000	0.000	0.000
PCAPCD-242 IC Engines	2003	2003		-0.033	-0.029	-0.026	-0.025
Added Cosumnes Power Plant (Sacramento)				0.344	0.344	0.344	0.344
Total District Adjustments			**0.000**	**0.216**	**0.218**	**0.220**	**0.221**

*These changes, which include recently adopted control measures up to 12/31/06, are included in Chapter 5, Table 5-2 and Table 5-3. These changes are not included in the detailed inventories contained in Appendix A.

Table A5-2. CARB Emission Inventory Adjustments in Sacramento Nonattainment Area

CARB Rule/Category	VOC Emission Changes* (TPD)				
	2002	2011	2014	2017	2018
Pesticides/Fertilizers Corr.	-0.08	-0.66	-0.62	-0.58	-0.57
Reflash	0.00	0.00	0.00	0.00	0.00
Public Fleet	0.00	-0.03	-0.03	-0.02	-0.01
Idling	0.00	0.00	0.00	0.00	0.00
AB 1493 (Motor Vehicle Greenhouse Gases)	0.00	-0.03	-0.10	-0.18	-0.21
Moyer	0.00	-0.04	-0.04	-0.03	-0.02
Consumer Products	0.00	-0.60	-0.62	-0.64	-0.65
Off-road	0.00	-0.04	-0.07	-0.09	-0.09
Ships	0.00	0.00	0.00	0.00	0.00
Summary	**-0.08**	**-1.39**	**-1.47**	**-1.54**	**-1.56**

CARB Rule/Category	NOx Emission Changes* (TPD)				
	2002	2011	2014	2017	2018
Reflash	-0.14	-1.70	-1.11	-0.63	-0.50
Public Fleet	0.00	-0.03	-0.03	-0.02	-0.02
Idling	0.00	-2.26	-2.42	-2.58	-2.63
AB 1493 (Motor Vehicle Greenhouse Gases)	0.00	0.00	0.00	-0.01	-0.01
Moyer	-0.20	-0.26	-0.25	-0.17	-0.12
Off-road	0.00	-0.78	-0.78	-0.61	-0.57
Ships	0.00	-0.01	-0.01	-0.01	-0.01
Summary	**-0.34**	**-5.04**	**-4.61**	**-4.04**	**-3.86**

*These changes, which include recently adopted control measures up to 12/31/06, are directly incorporated in Chapter 5, Table 5-2 and Table 5-3. These changes are not included in the detailed inventories contained in Appendix A.

Appendix A6: Emission Reduction Credits (ERCs)

Unused ERCs Issued for Reductions That Occurred Prior to 2002 Base Year

Certain pollutant emission reductions due to equipment shutdown or voluntary control may be converted to emission reduction credits (ERCs) and registered with the air districts. These ERCs may then be used as "offsets" to compensate for an increase in emissions from a new or modified major emission source regulated by the air districts. Unused ERCs are considered as potential future emissions supplemental to the forecasted emissions inventory.

The amounts of unused ERCs from stationary sources that occurred prior to the 2002 base year are estimated at about 2.6 tons per day of VOC and 1.4 tons per day of NOx and are summarized by air district in Table A6-1. They are included in the emissions forecasts to ensure the potential future use of these credits does not interfere with reasonable further progress and attainment goals.

Future Bankable Rice Burning Emission Reduction Credits

Emission credits from reduction in burning may not be used to comply with offset requirements at a new major stationary source or a major modification, unless they are included in an approved attainment demonstration plan.[1] Therefore, the impact of accounting for ERCs from reduction in rice straw burning and other agricultural burning credits are being included in this 8-hour ozone attainment and RFP demonstration plan.

California legislation in 1991 (known as the Connelly bill) required rice farmers to phase down rice field burning on an annual basis, beginning in 1992. A burn cap of 125,000 acres in the Sacramento Valley Air Basin was established, and growers with 400 acres or less were granted the option to burn their entire acreage once every four years. Since the rice burning reductions were mandated by state law, they would ordinarily not be "surplus" and eligible for banking. However, the Connelly bill included a special provision declaring that the reductions qualified for banking if they met the State and local banking rules.

Due to the special consideration in the Connelly bill, potential future rice burning ERCs could be issued for previous reductions that are eligible for banking. The amounts of future bankable rice burning ERCs for the Sacramento nonattainment area are estimated at about 0.9 tons per day of VOC and 1.0 tons per day of NOx and are listed by air district in Table A6-2. They are included in the emissions forecasts to ensure the potential future use of these credits does not interfere with reasonable further progress and attainment goals.

[1] Pursuant to EPA correspondence letter dated October 30, 2003.

Table A6-1

Summary of Unused Banked Emission Reduction Credits In the Sacramento Nonattainment Area for 2002 Baseline		
Air District[a]	**Avg. Summer Day**	
	VOC (tpd)	**NOx (tpd)**
Sacramento Metropolitan AQMD	2.075	1.141
Yolo-Solano AQMD	0.082	0.137
Placer County APCD	0.394	0.045
Feather River AQMD (South Sutter)	0	0
Total Unused Banked ERCs	**2.551**	**1.323**

[a]There are no ERCs for El Dorado County AQMD.

Table A6-2

Summary of Future Bankable Rice Burning Emission Reduction Credits In the Sacramento Nonattainment Area		
Air District[a]	**Avg. Summer Day**	
	VOC (tpd)	**NOx (tpd)**
Sacramento Metropolitan AQMD	0.12	0.13
Yolo-Solano AQMD	0.32	0.35
Placer County APCD	0.18	0.20
Feather River AQMD (South Sutter)	0.29	0.32
Total Future Rice Burning ERCs	**0.91**	**1.00**

[a]There are no future bankable rice burning ERCs for El Dorado County AQMD.

Appendix A7: 2019 VOC and NOx Emissions Inventories

Appendix A7 contains the calculation for the estimated 2019 VOC and NOx planning inventories. The 2019 inventories are forecasted from the 2018 SIP planning inventories using scaling factors derived from CEFS (Version 1.06) 2019 and 2018 inventories. Table A7-1 contains the calculation. Tables A7-2 and A7-3 contain 2018 and 2019 VOC and NOx planning inventories from CEFS (Version1.06), respectively.

Table A7-1: 2019 VOC and NOx Calculation

Major Source Category	ROG From CEFS v1.06		ROG ratio	NOx From CEFS v1.06		NOx ratio
	2018	2019	2019/2018	2018	2019	2019/2018
STATIONARY	21.6	21.9	1.0130	13.7	13.5	0.9827
AREAWIDE	32.1	32.4	1.0100	3.5	3.6	1.0048
ON-ROAD MOTOR VEHICLES	25.2	24.3	0.9646	43.9	40.9	0.9334
OTHER MOBILE SOURCES	34.3	34.2	0.9968	39.1	37.9	0.9701
	113.2	112.8	0.9965	100.2	95.9	0.9570

Major Source Category	2018 From SIP Plan		Estimated 2019	
	ROG	NOx	ROG	NOx
STATIONARY	25.0	13.9	25.3	13.7
AREAWIDE	31.0	3.5	31.3	3.6
ON-ROAD MOTOR VEHICLES	27.0	45.2	26.0	42.1
OTHER MOBILE SOURCES	34.2	38.5	34.1	37.3
	117.1	101.1	116.7	96.7

Table A7-2: 2018 and 2019 VOC Inventory from CEFS v1.06

Ozone SIP Sacramento NAA (v1.06_RF980)

Reactive Organic Gases Projected Emission Inventory

SACRAMENTO REGIONAL NON-ATTAINMENT AREA

REPORT TYPE: GROWN AND CONTROLLED
SEASON: SUMMER
BASE YEAR: 2002

All emissions are represented in Tons per Day and reflect the most current data provided to ARB
Download this data as a comma delimited file.
Download more detail data as a comma delimited file.

STATIONARY SOURCES		
SUMMARY CATEGORY NAME	**2018**	**2019**
FUEL COMBUSTION		
ELECTRIC UTILITIES	0.261	0.261
COGENERATION	0.004	0.004
OIL AND GAS PRODUCTION (COMBUSTION)	0.188	0.188
MANUFACTURING AND INDUSTRIAL	0.086	0.087
FOOD AND AGRICULTURAL PROCESSING	0.686	0.681
SERVICE AND COMMERCIAL	0.249	0.249
OTHER (FUEL COMBUSTION)	0.056	0.053
*** TOTAL FUEL COMBUSTION**	1.531	1.524
WASTE DISPOSAL		
SEWAGE TREATMENT	0.04	0.041
LANDFILLS	0.419	0.425
INCINERATORS	0.006	0.006
SOIL REMEDIATION	0.111	0.112
OTHER (WASTE DISPOSAL)	0.018	0.018
*** TOTAL WASTE DISPOSAL**	0.595	0.602
CLEANING AND SURFACE COATINGS		
LAUNDERING	0.062	0.063
DEGREASING	2.084	2.103
COATINGS AND RELATED PROCESS SOLVENTS	4.158	4.223
PRINTING	1.465	1.487
ADHESIVES AND SEALANTS	0.756	0.751
OTHER (CLEANING AND SURFACE COATINGS)	0.003	0.003
*** TOTAL CLEANING AND SURFACE COATINGS**	8.527	8.63
PETROLEUM PRODUCTION AND MARKETING		
OIL AND GAS PRODUCTION	1.022	1.022
PETROLEUM MARKETING	5.177	5.269
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0	0
*** TOTAL PETROLEUM PRODUCTION AND MARKETING**	6.2	6.291
INDUSTRIAL PROCESSES		
CHEMICAL	2.663	2.711

FOOD AND AGRICULTURE	0.75	0.773
MINERAL PROCESSES	0.355	0.358
METAL PROCESSES	0	0
WOOD AND PAPER	0.939	0.952
ELECTRONICS	0.013	0.013
OTHER (INDUSTRIAL PROCESSES)	0.003	0.003
*** TOTAL INDUSTRIAL PROCESSES**	4.723	4.809
**** TOTAL STATIONARY SOURCES**	21.575	21.857
AREAWIDE SOURCES		
SUMMARY CATEGORY NAME	**2018**	**2019**
SOLVENT EVAPORATION		
CONSUMER PRODUCTS	15.704	15.909
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	8.112	8.228
PESTICIDES/FERTILIZERS	1.869	1.858
ASPHALT PAVING / ROOFING	0.872	0.875
*** TOTAL SOLVENT EVAPORATION**	26.556	26.869
MISCELLANEOUS PROCESSES		
RESIDENTIAL FUEL COMBUSTION	1.315	1.325
FARMING OPERATIONS	2.815	2.815
CONSTRUCTION AND DEMOLITION	0	0
PAVED ROAD DUST	0	0
UNPAVED ROAD DUST	0	0
FUGITIVE WINDBLOWN DUST	0	0
FIRES	0.045	0.046
MANAGED BURNING AND DISPOSAL	1.228	1.222
COOKING	0.144	0.146
*** TOTAL MISCELLANEOUS PROCESSES**	5.546	5.554
**** TOTAL AREAWIDE SOURCES**	32.102	32.424
MOBILE SOURCES		
SUMMARY CATEGORY NAME	**2018**	**2019**
ON-ROAD MOTOR VEHICLES		
LIGHT DUTY PASSENGER (LDA)	6.696	6.329
LIGHT DUTY TRUCKS - 1 (LDT1)	2.626	2.504
LIGHT DUTY TRUCKS - 2 (LDT2)	5.25	5.123
MEDIUM DUTY TRUCKS (MDV)	2.719	2.645
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	1.386	1.365
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.339	0.323
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.43	0.393
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.194	0.17
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.079	0.077
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.061	0.059
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.168	0.163
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	1.656	1.548
MOTORCYCLES (MCY)	3.365	3.389
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.021	0.021
HEAVY DUTY GAS URBAN BUSES (UB)	0.041	0.042
SCHOOL BUSES (SB)	0.053	0.052

OTHER BUSES (OB)	0.063	0.06
MOTOR HOMES (MH)	0.052	0.046
*** TOTAL ON-ROAD MOTOR VEHICLES**	25.198	24.305
OTHER MOBILE SOURCES		
AIRCRAFT	0.609	0.616
TRAINS	0.619	0.622
SHIPS AND COMMERCIAL BOATS	0.135	0.132
RECREATIONAL BOATS	16.25	16.215
OFF-ROAD RECREATIONAL VEHICLES	6.598	6.833
OFF-ROAD EQUIPMENT	7.721	7.522
FARM EQUIPMENT	0.986	0.9
FUEL STORAGE AND HANDLING	1.372	1.337
*** TOTAL OTHER MOBILE SOURCES**	34.289	34.178
**** TOTAL MOBILE SOURCES**	59.487	58.483
GRAND TOTAL FOR SACRAMENTO REGIONAL NON-ATTAINMENT AREA	113.165	112.764

* Emissions from natural sources are excluded.

Table A7-3: 2018 and 2019 NOx Inventory from CEFS v1.06

Ozone SIP Sacramento NAA (v1.06_RF980)

Oxides of Nitrogen Projected Emission Inventory

SACRAMENTO REGIONAL NON-ATTAINMENT AREA

REPORT TYPE: GROWN AND CONTROLLED
SEASON: SUMMER
BASE YEAR: 2002

All emissions are represented in Tons per Day and reflect the most current data provided to ARB
Download this data as a comma delimited file.
Download more detail data as a comma delimited file.

STATIONARY SOURCES		
SUMMARY CATEGORY NAME	**2018**	**2019**
FUEL COMBUSTION		
ELECTRIC UTILITIES	1.512	1.513
COGENERATION	0.009	0.009
OIL AND GAS PRODUCTION (COMBUSTION)	0.309	0.309
MANUFACTURING AND INDUSTRIAL	3.217	3.239
FOOD AND AGRICULTURAL PROCESSING	4.506	4.259
SERVICE AND COMMERCIAL	2.521	2.523
OTHER (FUEL COMBUSTION)	0.607	0.585
*** TOTAL FUEL COMBUSTION**	12.681	12.436
WASTE DISPOSAL		
SEWAGE TREATMENT	0.013	0.013
LANDFILLS	0.041	0.041
INCINERATORS	0.022	0.022
SOIL REMEDIATION	0.004	0.004
OTHER (WASTE DISPOSAL)	0	0
*** TOTAL WASTE DISPOSAL**	0.079	0.079
CLEANING AND SURFACE COATINGS		
LAUNDERING	0	0
DEGREASING	0	0
COATINGS AND RELATED PROCESS SOLVENTS	0.01	0.011
PRINTING	0.018	0.018
ADHESIVES AND SEALANTS	0	0
OTHER (CLEANING AND SURFACE COATINGS)	0	0
*** TOTAL CLEANING AND SURFACE COATINGS**	0.028	0.029
PETROLEUM PRODUCTION AND MARKETING		
OIL AND GAS PRODUCTION	0.01	0.01
PETROLEUM MARKETING	0.031	0.032
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0	0
*** TOTAL PETROLEUM PRODUCTION AND MARKETING**	0.041	0.042
INDUSTRIAL PROCESSES		
CHEMICAL	0.176	0.176

FOOD AND AGRICULTURE	0.022	0.022
MINERAL PROCESSES	0.59	0.594
METAL PROCESSES	0	0
WOOD AND PAPER	0.076	0.077
ELECTRONICS	0	0
OTHER (INDUSTRIAL PROCESSES)	0.003	0.003
*** TOTAL INDUSTRIAL PROCESSES**	0.866	0.872
**** TOTAL STATIONARY SOURCES**	13.695	13.458
AREAWIDE SOURCES		
SUMMARY CATEGORY NAME	**2018**	**2019**
SOLVENT EVAPORATION		
CONSUMER PRODUCTS	0	0
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0	0
PESTICIDES/FERTILIZERS	0	0
ASPHALT PAVING / ROOFING	0	0
*** TOTAL SOLVENT EVAPORATION**	0	0
MISCELLANEOUS PROCESSES		
RESIDENTIAL FUEL COMBUSTION	3.15	3.17
FARMING OPERATIONS	0	0
CONSTRUCTION AND DEMOLITION	0	0
PAVED ROAD DUST	0	0
UNPAVED ROAD DUST	0	0
FUGITIVE WINDBLOWN DUST	0	0
FIRES	0.015	0.015
MANAGED BURNING AND DISPOSAL	0.376	0.372
COOKING	0	0
*** TOTAL MISCELLANEOUS PROCESSES**	3.54	3.557
**** TOTAL AREAWIDE SOURCES**	3.54	3.557
MOBILE SOURCES		
SUMMARY CATEGORY NAME	**2018**	**2019**
ON-ROAD MOTOR VEHICLES		
LIGHT DUTY PASSENGER (LDA)	3.862	3.553
LIGHT DUTY TRUCKS - 1 (LDT1)	1.698	1.557
LIGHT DUTY TRUCKS - 2 (LDT2)	4.005	3.741
MEDIUM DUTY TRUCKS (MDV)	2.653	2.476
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	2.127	2.117
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.535	0.529
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.617	0.576
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.449	0.408
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	1.248	1.181
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.912	0.849
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	4.382	3.997
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	18.593	17.223
MOTORCYCLES (MCY)	0.858	0.865
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.519	0.515
HEAVY DUTY GAS URBAN BUSES (UB)	0.084	0.085
SCHOOL BUSES (SB)	0.668	0.66

OTHER BUSES (OB)	0.298	0.278
MOTOR HOMES (MH)	0.344	0.319
*** TOTAL ON-ROAD MOTOR VEHICLES**	43.852	40.931
OTHER MOBILE SOURCES		
AIRCRAFT	2.761	2.813
TRAINS	9.402	9.495
SHIPS AND COMMERCIAL BOATS	1.178	1.152
RECREATIONAL BOATS	5.933	5.954
OFF-ROAD RECREATIONAL VEHICLES	0.147	0.152
OFF-ROAD EQUIPMENT	14.325	13.452
FARM EQUIPMENT	5.331	4.891
FUEL STORAGE AND HANDLING	0	0
*** TOTAL OTHER MOBILE SOURCES**	39.076	37.908
**** TOTAL MOBILE SOURCES**	82.928	78.839
GRAND TOTAL FOR SACRAMENTO REGIONAL NON-ATTAINMENT AREA	100.163	95.854

* Emissions from natural sources are excluded.

Appendix B: Photochemical Modeling

This appendix contains summary information and documentation regarding the photochemical grid modeling performed by the California Air Resources Board in evaluating and supporting the attainment demonstration for the federal 8-hour ozone standard in the Sacramento region. Included in this appendix are the following specific modeling topics:

The following California Air Resource Board photochemical modeling documents for the Sacramento Federal Ozone Nonattainment Area provide more complete information. These documents are available at
http://www.airquality.org/notices/CAPUpdate/8hrAPandEIRWorkshopsSept2008.shtml
for reference.

A. Volume 1: Model Performance
B. Volume 2: Future Year Design Value and Carrying Capacity Calculations for the Sacramento Non-Attainment Area
C. Photochemical Modeling Protocol For Development Strategies to Attain The Federal 8-Hour Air Quality Standard in Central California
D. Modeling Emission Inventory
    a. Appendix a: Gridded Inventory Coordination Group Minutes
    b. Appendix b: Development and Vertical Distributions for Modeling Large Wildfires in the CCOS Domain
    c. Appendix c: Proposed Method to Improve Temporal Distribution Of Gridded On-road Motor Vehicle Emissions
    d. Appendix d: Development Of Version Two Of the California Integrated Transportation Network (ITN)
    e. Appendix e: ARB Letter
    f. Appendix f: Draft EMFAC Modeling Change Technical Memo
    g. Appendix g: Development of a biogenic hydrocarbon emission inventory for the Central California Ozone Study domain.
    h. Appendix h: Surrogate Cross-Reference Tables
    i. Appendix i: Sacramento Non-Attainment Area Tabular Summaries

In addition, the California Air Resources Board has established a website for documenting the technical products used to develop the State Implementation Plan (SIP). This website includes SIP modeling tools and documentation, and is located at:
http://eos.arb.ca.gov/eos/SIP_Modeling/

Selection and Characterization of Modeling Episodes

Episode Selection[1]

The evaluation of the episode days selected for air quality modeling included many local, state and federal governmental agencies, consultants, and stakeholder interest groups that participated in the Central California Ozone Study (CCOS) and other air quality technical committees formed in support of ozone SIP developments for Central California. A large body of work was produced by these study groups toward the goal of determining representative candidate episode periods for use in 8-hour ozone SIP modeling for the region. From this collective body of work, the following four episodes were identified as having the greatest potential for SIP modeling in the region:

- July 7-13, 1999 (captured with routine state and local measurements)
- July 29-August 2, 2000 (CCOS-studied episode)
- September 17-21, 2000 (CCOS-studied episode)
- August 8-17, 2002 (captures with routine state and local measurements)

Due to time constraints and based on model performance issues expressed by study efforts for the two later episodes, the first two episodes (July 7-13, 1999 and July 29-August 2, 2000) were determined to be the most adequate for the initial round of 8-hour ozone SIP attainment planning. Brief summaries of the two episodes selected for SIP modeling are included in the next section, Characterization of Selected Modeling Episodes.

With regard to the two potential episodes that were dropped from consideration, CCOS sponsored a project that was focused on developing the third episode (September 17-21, 2000) while the Sacramento Metropolitan Air Quality Management District sponsored a project to develop the fourth episode (August 8-17, 2002). As indicated above, achieving adequate model performance for both of these periods was problematic.

Characterization of Modeling Episodes

The following meteorological characterizations of large-scale synoptic weather patterns include two parameters which historically have correlated well with ozone formation in California. The measurements of 500 mb heights at a fixed location are a general indicator of behavior showing the sequence of pressure ridges and troughs. The 850 mb temperature is a measure of large-scale subsidence which produces stable layers in the atmosphere and limits vertical dispersion of air pollutants. As an example, at the Oakland NWS station during June-September 2000, the 500 mb heights ranged between 5,650 to 6,000 meters and the 850 mb temperatures ranged between 7 to

[1] "Photochemical Modeling Protocol for Developing Strategies to Attain the Federal 8-Hour Ozone Air Quality Standard in Central California" (California Air Resources Board, May 22, 2007).

27°C. In general, a strong positive correlation was evident between daily peak ozone concentrations in Central California and 850 mb temperatures and 500 mb heights.[2]

September 17-21, 2000 Ozone Episode

The September 17-21, 2000 ozone episode was characterized by a high pressure ridge moving into the West Coast and joining with the remnants of a persistent Four Corners high. The 500 mb height peaked at 5,970 m on September 18, and the 850 mb temperature reached 26°C on September 19 at the Oakland NWS station.[3] Peak 8-hour ozone concentrations in the central and southern parts of the San Joaquin Valley exceeded 100 ppb at many monitoring sites and rose as high as 120 ppb during September 18-20. The Bay Area did not experience any ozone exceedances during this episode, and the Sacramento region measured moderate 8-hour ozone exceedances on September 20 at multiple sites with a high of 100 ppb.

This ozone episode was evaluated by a team of modeling consultants headed by Alpine Geophysics and funded as a CCOS project. They prepared refined emissions, meteorological, and photochemical model input files and performed a base case simulation for the episode. There were substantial performance problems with the base case which included a systematic and large underprediction of ozone concentrations. Thus, the consultants were unsuccessful in developing a SIP-quality ozone modeling episode that met EPA performance goals.[4]

August 8-17, 2002 Ozone Episode

This episode is characterized by an Eastern Pacific high. The wind speeds and directions and surface temperatures at both Bethel Island and Sacramento are characteristic of more typical summer day values when an Eastern Pacific high is present.[5] The Bay Area experienced only limited ozone exceedances at Livermore during this episode. However, there were significant widespread 8-hour ozone exceedances throughout the Sacramento region and much of the San Joaquin Valley during most days of this episode. 8-hour ozone concentrations at Cool peaked at 137 ppb on August 14. San Joaquin Valley 8-hour ozone values were highest at Merced with 125 ppb on August 14 and at Arvin with 120 ppb on August 9.

The August 8-17, 2002 ozone episode was pursued by the Sacramento Air District under independent contract with the Desert Research Institute (DRI).[6] DRI conducted

[2] "Characterization of the CCOS 2000 Measurement Period" (Lehrman, et al., 2003, p. 2-1 to 2-3).
[3] "Characterization of the CCOS 2000 Measurement Period" (Lehrman, et al., 2001) Interim Report.
[4] "Evaluation of the 16-20 September 2000 Ozone Episode for Use in 1-Hr SIP Development in the California Central Valley" (Alpine Geophysics, Tesche et al., February 15, 2004).
[5] "Data Analysis and Episode Selection for SIP Modeling" (Desert Research Institute, September 9, 2003).
[6] "Photochemical Modeling Protocol for Developing Strategies to Attain the Federal 8-Hour Ozone Air Quality Standard in Central California" (California Air Resources Board, May 22, 2007).

meteorological analyses which indicated significant potential transport from the Bay Area into the Sacramento region.[7] However, DRI was not able to achieve adequate model performance with the episode, rendering it unusable for attainment demonstration modeling. This episode was found not to be representative due to the large number of wildfires within the domain and an especially large wildfire in southern Oregon. The smoke and presumably ozone precursors flowed along the coast and some of the smoke plume penetrated into central California near the San Francisco Bay Area.[8] Undoubtedly, emissions from the wildfire influenced ozone levels at many monitors, meaning that these days were not reflective of typical summertime high-ozone days, when precursor emissions are dominated by anthropogenic emissions.[9]

July 29-August 2, 2000 Ozone Modeling Episode

The summer 2000 ozone modeling episode includes 5 days from July 29 to August 2. The start of this episode was characterized by a typical high pressure system centered over the Four Corners area (Utah, Arizona, Colorado, and New Mexico). The relatively large high pressure ridge slowly migrated west and became centered near Reno, Nevada by July 31, creating meteorological conditions conducive to high ozone formation in Central California. The 850 mb temperature reached 27°C, and the 500 mb height peaked at 5,970 m at the Oakland NWS station.[10]

The high pressure system resulted in stable atmospheric layers with limited vertical mixing. Maximum mixing heights of 800-1100 meters were estimated from rawinsonde and ozonesonde data at Granite Bay.[11] Relatively calm to light surface daytime winds varying from the north, west, and southwest were measured in the lower Sacramento Valley region during the beginning and middle of the episode. The surface daytime winds transitioned to mainly delta breezes from the south and southwest near the end of the episode.[12] Maximum surface temperatures in Sacramento were hot throughout the episode and peaked at 40°C (or 104°F) on July 31 (see the following table).

[7] "Data Analysis and Episode Selection for SIP Modeling" (Desert Research Institute, September 9, 2003).
[8] "State Implementation Plan (SIP) Modeling" (Desert Research Institute, November 15, 2004).
[9] California Air Resources Board staff response regarding public comments on episode selection discussion. November 2008 correspondence to SMAQMD.
[10] "Characterization of the CCOS 2000 Measurement Period" (Lehrman, et al., 2003, p. 2-6).
[11] Ibid., p. 3-67.
[12] Surface daytime wind descriptions based on observed wind measurements at Rocklin, Folsom, Auburn, Cool, Sacramento-Del Paso Manor, Roseville, Sloughhouse, and Placerville.

Table B-1
Maximum Surface Temperatures in Sacramento
During the Jul-Aug 2000 Modeling Episode

Max. Temperature	July 29	July 30	July 31	August 1	August 2
Sac. Exec. Airport	37°C (98°F)	37°C (99°F)	40°C (104°F)	39°C (102°F)	38°C (100°F)

Ozone-conducive conditions were prevalent throughout the episode, but the highest ozone readings in the Sacramento region occurred on the last two days of the episode. On August 1, 8-hour ozone concentrations peaked in the southern part of the nonattainment area at Sloughhouse (108 ppb). On August 2, the maximum 8-hour ozone readings were measured in the northeast part of the region at Auburn (107 ppb) and Grass Valley (113 ppb). See the following table of selected high ozone sites:

Table B-2
Maximum 8-Hour Ozone in the Sacrament Region
During the Jul-Aug 2000 Modeling Episode

Max. 8-Hr Ozone (ppb)	July 29	July 30	July 31	August 1	August 2
Auburn (Placer Co.)	**86**	80	81	**95**	**107**
Cool (El Dorado Co.)	**94**	**87**	**89**	**99**	**103**
Grass Valley (Nevada Co.)	**86**	**86**	73	**94**	**113**
Sac-Del Paso Manor (Sac. Co.)	**92**	**93**	74	**100**	79
Sloughhouse (Sac. Co.)	**95**	**91**	82	**108**	**91**

Federal 8-hour ozone exceedances (>84 ppb) in **bold**.

July 9-13, 1999 Ozone Modeling Episode

The July 1999 ozone modeling episode includes 5 days from July 9 to 13. This episode is characterized by a much broader high pressure system than the summer 2000 episode. The high pressure system encompassed the Four Corners area, the Pacific Northwest region, and the Eastern Pacific Ocean, causing meteorological conditions conducive to high ozone formation in Central and Northern California. The 850 mb temperature peaked at 27°C on July 12, and the 500 mb height reached 5,940-5,950 m on July 10 to 12 at the Oakland NWS station.[13]

Relatively calm to light surface daytime winds varying mainly from the west and southwest were measured in the lower Sacramento Valley region during the episode. Sometimes in the morning, the surface winds flowed from the northwest direction as

[13] "Modeling Protocol - Development of a Photochemical Modeling System to Support the Bay Area Air Quality Management District's 2004 State Implementation Plan" (ENVIRON, et al., 2002, p. 2-48).

well.[14] Maximum surface temperatures in Sacramento rose steadily from July 9, peaking at 42°C (or 107°F) on July 12 (see the following table).

Table B-3
Maximum Surface Temperatures in Sacramento
During the July 1999 Modeling Episode

Max. Temperature	July 9	July 10	July 11	July 12	July 13
Sac. Exec. Airport	34°C (93°F)	36°C (97°F)	39°C (102°F)	42°C (107°F)	35°C (96°F)

High surface 8-hour ozone readings were fairly widespread throughout the Sacramento region during the episode. On July 9, maximum 8-hour ozone occurred in the eastern portion of the nonattainment area at Cool (116 ppb), Placerville (110 ppb), and Folsom (109 ppb). On July 10, 8-hour ozone concentrations were high in most of the Sacramento region at Folsom (129 ppb), Placerville (118 ppb), Cool (113 ppb), Sacramento-Del Paso Manor (110 ppb), and Sloughhouse (107 ppb). On July 11, the same areas continued to monitor 8-hour ozone exceedances with maximums at Folsom (123 ppb), Cool (117 ppb), Sloughhouse (113 ppb), and Roseville (113). On July 12, ozone declined in most of the nonattainment area, but still exceeded the 8-hour standard with maximum readings in the southern downwind areas at Jackson (105 ppb) and Sloughhouse (103 ppb) and in the western area at Vacaville (106 ppb). On the last day of the episode, 8-hour ozone concentrations were recorded just above the federal standard with a high of 91 ppb at Auburn. See the following table of selected high ozone sites:

Table B-4
Maximum 8-Hour Ozone in the Sacramento Region
During the July 1999 Modeling Episode

Max. 8-Hr Ozone (ppb)	July 9	July 10	July 11	July 12	July 13
Auburn (Placer Co.)	**104**	**102**	**106**	**90**	**91**
Cool (El Dorado Co.)	**116**	**113**	**117**	**98**	83
Folsom (Sac. Co.)	**109**	**129**	**123**	**101**	**85**
Jackson (Amador Co.)	**89**	**107**	**101**	**105**	**87**
Placerville (El Dorado Co.)	**110**	**118**	**104**	**96**	81
Roseville (Placer Co.)	**86**	**106**	**113**	**88**	**86**
Sac-Del Paso Manor (Sac. Co.)	77	**110**	**107**	**95**	77
Sloughhouse (Sac. Co.)	**86**	**107**	**113**	**103**	81
Vacaville (Solano Co.)	69	81	**102**	**106**	59

Federal 8-hour ozone exceedances (>84 ppb) in **bold**.

[14] Surface daytime wind descriptions based on observed wind measurements at Rocklin, Folsom, Elk Grove, Roseville, Sloughhouse, and Placerville.

Base Case Model Performance Evaluation

EPA modeling guidance[1] recommends the model performance evaluation should compare hourly ozone observations and predictions as well as 8-hour daily maxima observations and predictions over the episode days (excluding ramp-up days). The ozone data should be evaluated for all data pairs in which the observed concentrations are above 60 ppb, and for all data pairs without any minimum threshold. At a minimum, statistical calculations should be performed for: 1) mean normalized bias (MNB), 2) mean normalized gross error (MNGE), and 3) average peak prediction bias and error. The summary statistics should be calculated for individual days averaged over all sites and for individual sites averaged over all days, and then aggregated into meaningful subregions or subperiods.

EPA modeling guidance does not assign an acceptance criteria level that distinguishes between adequate and inadequate model performance. Instead, EPA recommends that a qualitative weight-of-evidence approach consisting of a variety of performance tests be used to determine whether a particular modeling application is valid for assessing the future attainment status of an area.

CARB conducted a model performance analysis of the photochemical modeling used in support of the attainment demonstration for the federal 8-hour ozone air quality standard SIP for Central California. Based on the statistical comparisons between observed and predicted ozone data, the base case modeling scenarios were determined to be performing adequately overall in the Sacramento region.

Various summary base case model performance statistics tables, additional base case model performance evaluations, and modeling documentation are provided in this appendix.

- Summary of Base Case Model Performance Evaluation for Sacramento Region
  - Table B-5: July 9 – July 13, 1999 1-Hour Ozone
  - Table B-6: July 9 – July 13, 1999 8-Hour Ozone
  - Table B-7: July 29 – August 2, 2000 1-Hour Ozone
  - Table B-8: July 29 – August 2, 2000 8-Hour Ozone

- Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
  - Table B-9: July 9, 1999 1-Hour Ozone
  - Table B-10: July 10, 1999 1-Hour Ozone
  - Table B-11: July 11, 1999 1-Hour Ozone
  - Table B-12: July 12, 1999 1-Hour Ozone
  - Table B-13: July 13, 1999 1-Hour Ozone

[1] "Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS" (EPA, October 2005, p. 96).

- Table B-14: July 9, 1999 8-Hour Ozone
- Table B-15: July 10, 1999 8-Hour Ozone
- Table B-16: July 11, 1999 8-Hour Ozone
- Table B-17: July 12, 1999 8-Hour Ozone
- Table B-18: July 13, 1999 8-Hour Ozone
- Table B-19: July 9-13, 1999 8-Hour Ozone

- Table B-20: July 29, 2000 1-Hour Ozone
- Table B-21: July 30, 2000 1-Hour Ozone
- Table B-22: July 31, 2000 1-Hour Ozone
- Table B-23: August 1, 2000 1-Hour Ozone
- Table B-24: August 2, 2000 1-Hour Ozone

- Table B-25: July 29, 2000 8-Hour Ozone
- Table B-26: July 30, 2000 8-Hour Ozone
- Table B-27: July 31, 2000 8-Hour Ozone
- Table B-28: August 1, 2000 8-Hour Ozone
- Table B-29: August 2, 2000 8-Hour Ozone
- Table B-30: Jul 29-Aug 2, 2000 8-Hour Ozone

Table B-5
Base Case Model Performance Evaluation for Sacramento Region
Site Comparisons Between Observed and Modeled 1-Hour Ozone
July 9 – July 13, 1999 Episode

Statistical Measure – All Sites	Jul 9	Jul 10	Jul 11	Jul 12	Jul 13
60 ppb observed threshold					
Mean Bias (ppb)	-3	-9	-10	-9	-5
Mean Gross Error (ppb)	10	15	12	12	13
Mean Normalized Bias (%)	-3	-9	-11	-10	-6
Mean Normalized Gross Error (%)	12	16	14	14	17
Observed Peak Site Conc. (ppb)	127	147	137	140	103
Peak Site Prediction Ratio	0.99	0.84	1.01	0.85	1.00
Region Peak Prediction Ratio	1.05	0.94	1.07	0.89	1.17
Number of Values Used (site-hrs)	157	199	224	218	160

Table B-6
Base Case Model Performance Evaluation for Sacramento Region
Site Comparisons Between Observed and Modeled 8-Hour Maximum Ozone
July 9 – July 13, 1999 Episode

Statistical Measure – All Sites	Jul 9	Jul 10	Jul 11	Jul 12	Jul 13
60 ppb observed threshold					
Mean Bias (ppb)	3	-6	-7	-10	3
Mean Gross Error (ppb)	8	13	10	11	11
Mean Normalized Bias (%)	5	-5	-7	-11	6
Mean Normalized Gross Error (%)	9	13	10	12	14
Observed Peak Site Conc. (ppb)	116	129	124	107	91
Peak Site Prediction Ratio	0.96	0.87	1.02	1.00	1.04
Region Peak Prediction Ratio	1.02	0.93	1.06	1.03	1.12
Number of Values Used (sites)	16	17	17	16	14

Table B-7
Base Case Model Performance Evaluation for Sacramento Region
Site Comparisons Between Observed and Modeled 1-Hour Ozone
July 29 – August 2, 2000 Episode

Statistical Measure – All Sites	Jul 29	Jul 30	Jul 31	Aug 1	Aug 2
60 ppb observed threshold					
Mean Bias (ppb)	-6	5	4	5	2
Mean Gross Error (ppb)	11	11	10	11	14
Mean Normalized Bias (%)	-6	7	6	6	4
Mean Normalized Gross Error (%)	14	15	13	14	17
Observed Peak Site Conc. (ppb)	118	121	103	133	121
Peak Site Prediction Ratio	1.07	1.04	1.19	1.09	1.04
Region Peak Prediction Ratio	1.11	1.09	1.41	1.15	1.07
Number of Values Used (site-hrs)	135	152	130	141	138

Table B-8
Base Case Model Performance Evaluation for Sacramento Region
Site Comparisons Between Observed and Modeled 8-Hour Maximum Ozone
July 29 – August 2, 2000 Episode

Statistical Measure – All Sites	Jul 29	Jul 30	Jul 31	Aug 1	Aug 2
60 ppb observed threshold					
Mean Bias (ppb)	-3	8	7	8	9
Mean Gross Error (ppb)	10	10	9	9	12
Mean Normalized Bias (%)	-2	12	10	10	13
Mean Normalized Gross Error (%)	11	13	12	11	17
Observed Peak Site Conc. (ppb)	97	93	89	109	107
Peak Site Prediction Ratio	1.03	1.15	1.13	1.05	0.98
Region Peak Prediction Ratio	1.07	1.21	1.32	1.09	1.00
Number of Values Used (sites)	15	15	15	15	16

Table B-9
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 9, 1999 1-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 190 (07/09) 1999
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm)

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	157	12.7	19	12.5	16	-3	0.99	-0.3	1.0	-0.03	0.12	0.75
	Subregional Peak:				13.3	17	-2	1.05	(at 84 x120) NSte: 3187; NSPk: 12.4				
2123	North Highlands-Blackf	1	6.6	16	10.1	16	0	1.53	3.5	3.5	0.53	0.53	-99.00
2143	Davis-UCD Campus	5	9.2	17	9.2	18	1	1.00	0.9	0.9	0.12	0.12	0.04
2731	Sacramento-Del Paso Ma	6	10.0	17	9.7	16	-1	0.97	0.1	1.2	0.03	0.16	0.18
2848	Pleasant Grove-4 miles	6	9.6	16	9.3	17	1	0.97	0.7	0.8	0.10	0.11	0.82
2891	Auburn-Dewitt-C Avenue	20	11.1	19	9.4	18	-1	0.85	-1.6	1.6	-0.19	0.19	0.89
2956	Roseville-N Sunrise Bl	10	9.7	15	10.4	17	2	1.08	0.6	0.8	0.07	0.09	0.94
2977	Elk Grove-Bruceville R	7	9.4	16	8.4	16	0	0.90	0.1	0.7	0.02	0.09	0.80
3002	Colfax-City Hall	16	10.0	19	8.6	18	-1	0.86	-0.4	0.5	-0.05	0.06	0.90
3008	Rocklin-Rocklin Road	10	10.3	16	10.3	18	2	1.00	0.1	0.6	0.01	0.07	0.86
3011	Sacramento-T Street	4	8.5	16	8.0	15	-1	0.94	-0.7	0.7	-0.09	0.09	0.11
3017	Placerville-Gold Nugge	20	12.7	19	12.5	17	-2	0.98	-0.5	1.0	-0.06	0.11	0.87
3155	Vacaville-Elmira Road	8	7.6	18	8.9	17	-1	1.18	0.7	1.0	0.09	0.14	0.79
3187	Folsom-Natoma Street	9	12.7	16	12.5	16	0	0.99	-0.3	0.6	-0.03	0.06	0.93
3196	Cool-Highway 193	16	12.1	15	10.6	18	3	0.88	-1.6	1.6	-0.17	0.17	0.92
3209	Sloughhouse	8	10.0	17	9.2	15	-2	0.92	-0.2	0.9	-0.01	0.10	0.59
3223	Sacramento-3801 Airpor	5	8.1	16	9.3	15	-1	1.15	1.2	1.2	0.17	0.17	0.50
3249	Woodland-Gibson Road	6	9.0	18	9.5	16	-2	1.07	0.3	0.8	0.04	0.11	0.48

Table B-10
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 10, 1999 1-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 191 (07/10) 1999
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm)

			------- Peak Concentrations --------					--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	199	14.7	16	12.4	14	-2	0.84	-0.9	1.5	-0.09	0.16	0.56
	Subregional Peak:				13.9	15	-1	0.94	(at 83 x115) NSte: 3209; NSPk: 12.0				
2123	North Highlands-Blackf	6	8.8	15	9.0	16	1	1.02	0.8	0.9	0.12	0.13	-0.33
2143	Davis-UCD Campus	8	10.1	15	10.0	15	0	0.99	0.4	0.5	0.05	0.06	0.86
2731	Sacramento-Del Paso Ma	10	13.1	14	10.7	17	3	0.81	-0.5	1.3	-0.03	0.12	0.74
2848	Pleasant Grove-4 miles	7	9.8	14	10.1	18	4	1.03	0.5	1.3	0.09	0.17	-0.84
2891	Auburn-Dewitt-C Avenue	21	10.7	15	8.6	14	-1	0.81	-1.9	1.9	-0.22	0.22	0.79
2956	Roseville-N Sunrise Bl	11	11.7	17	9.1	19	2	0.78	-1.4	1.6	-0.13	0.15	0.45
2977	Elk Grove-Bruceville R	8	11.8	16	10.0	17	1	0.85	-0.1	1.4	0.03	0.15	0.73
3002	Colfax-City Hall	13	9.7	19	7.8	14	-5	0.80	-0.7	0.8	-0.09	0.09	0.85
3008	Rocklin-Rocklin Road	13	11.9	18	8.7	12	-6	0.73	-1.8	1.8	-0.19	0.19	0.82
3011	Sacramento-T Street	8	10.7	14	9.9	16	2	0.93	0.5	0.8	0.08	0.11	0.81
3017	Placerville-Gold Nugge	22	12.9	19	9.4	16	-3	0.73	-2.1	2.1	-0.20	0.20	0.78
3155	Vacaville-Elmira Road	9	9.3	15	9.4	14	-1	1.01	-0.4	1.1	-0.05	0.15	0.64
3187	Folsom-Natoma Street	13	14.7	16	10.6	13	-3	0.72	-2.0	2.2	-0.15	0.18	0.74
3196	Cool-Highway 193	22	12.4	19	8.8	14	-5	0.71	-2.4	2.4	-0.26	0.26	0.90
3209	Sloughhouse	12	12.8	14	12.4	14	0	0.97	0.5	0.8	0.07	0.09	0.90
3223	Sacramento-3801 Airpor	8	10.0	14	10.6	16	2	1.06	1.3	1.4	0.18	0.19	0.61
3249	Woodland-Gibson Road	8	9.9	15	10.3	15	0	1.04	0.5	0.5	0.06	0.06	0.87

Table B-11
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 11, 1999 1-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 192 (07/11) 1999
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm)

			------- Peak Concentrations --------					--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	224	13.7	16	13.9	16	0	1.01	-1.0	1.2	-0.11	0.14	0.78
	Subregional Peak:				14.7	15	-1	1.07	(at 80 x117) NSte: 3187; NSPk: 13.8				
2123	North Highlands-Blackf	5	8.3	13	8.3	11	-2	1.00	0.4	0.5	0.06	0.07	0.79
2143	Davis-UCD Campus	10	9.7	14	9.1	16	2	0.94	-0.3	0.7	-0.02	0.09	0.86
2731	Sacramento-Del Paso Ma	12	12.1	14	11.3	13	-1	0.93	-0.4	0.5	-0.04	0.05	0.96
2848	Pleasant Grove-4 miles	7	8.1	12	7.6	11	-1	0.93	0.0	0.5	0.01	0.08	-0.52
2891	Auburn-Dewitt-C Avenue	20	13.3	18	11.4	19	1	0.86	-1.5	1.5	-0.16	0.17	0.84
2956	Roseville-N Sunrise Bl	17	12.8	15	10.9	18	3	0.85	-1.8	1.9	-0.21	0.22	0.80
2977	Elk Grove-Bruceville R	10	10.1	12	8.7	16	4	0.86	-1.0	1.1	-0.10	0.11	0.55
3002	Colfax-City Hall	12	10.5	20	9.8	20	0	0.94	-0.1	0.8	0.00	0.10	0.58
3008	Rocklin-Rocklin Road	13	12.8	15	11.6	18	3	0.91	-1.3	1.5	-0.12	0.14	0.70
3011	Sacramento-T Street	10	9.6	13	8.9	12	-1	0.93	-0.4	0.7	-0.04	0.09	0.87
3017	Placerville-Gold Nugge	19	11.4	18	11.4	16	-2	1.00	-1.5	1.8	-0.16	0.20	0.59
3155	Vacaville-Elmira Road	12	12.1	16	9.7	17	1	0.79	-1.6	1.6	-0.16	0.17	0.87
3187	Folsom-Natoma Street	20	13.7	16	13.9	16	0	1.01	-0.7	1.1	-0.10	0.14	0.94
3196	Cool-Highway 193	20	13.5	18	11.4	18	0	0.85	-1.5	1.6	-0.15	0.16	0.90
3209	Sloughhouse	18	13.1	14	11.4	16	2	0.87	-1.2	1.4	-0.15	0.16	0.88
3223	Sacramento-3801 Airpor	8	9.2	13	8.5	12	-1	0.92	-0.4	0.7	-0.04	0.08	0.14
3249	Woodland-Gibson Road	11	9.4	17	8.3	17	0	0.88	-0.6	0.6	-0.06	0.07	0.87

Table B-12
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 12, 1999 1-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 193 (07/12) 1999
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm)

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	218	14.0	15	11.9	13	-2	0.85	-0.9	1.2	-0.10	0.14	0.68
	Subregional Peak:				12.5	15	0	0.89	(at 67 x107) NSte: 3155; NSPk: 9.7				
2123	North Highlands-Blackf	2	6.9	11	7.1	11	0	1.03	0.4	0.4	0.06	0.06	-99.00
2143	Davis-UCD Campus	9	11.7	17	7.9	18	1	0.68	-1.8	1.9	-0.18	0.19	-0.60
2731	Sacramento-Del Paso Ma	12	11.1	18	8.9	19	1	0.80	-1.2	1.3	-0.12	0.14	0.64
2848	Pleasant Grove-4 miles	7	8.8	15	7.0	16	1	0.79	-1.0	1.1	-0.12	0.14	0.76
2891	Auburn-Dewitt-C Avenue	21	9.9	17	8.4	16	-1	0.84	-1.2	1.2	-0.15	0.15	0.81
2956	Roseville-N Sunrise Bl	14	10.8	19	7.8	20	1	0.72	-1.2	1.3	-0.14	0.15	0.69
2977	Elk Grove-Bruceville R	11	10.8	17	10.9	17	0	1.01	0.2	1.0	0.04	0.12	0.48
3002	Colfax-City Hall	14	8.1	19	8.0	18	-1	0.99	-0.1	0.3	-0.02	0.05	0.89
3008	Rocklin-Rocklin Road	16	10.4	19	8.1	14	-5	0.78	-1.3	1.3	-0.15	0.15	0.80
3011	Sacramento-T Street	10	9.7	18	8.4	18	0	0.86	-0.9	1.3	-0.10	0.16	0.17
3017	Placerville-Gold Nugge	18	10.3	16	9.6	17	1	0.93	-0.6	0.9	-0.07	0.11	0.82
3155	Vacaville-Elmira Road	11	14.0	15	9.8	17	2	0.70	-1.7	2.0	-0.14	0.19	0.66
3187	Folsom-Natoma Street	19	11.1	11	9.3	13	2	0.83	-1.1	1.3	-0.12	0.14	0.87
3196	Cool-Highway 193	21	10.5	11	8.9	13	2	0.85	-1.3	1.3	-0.16	0.16	0.91
3209	Sloughhouse	14	11.0	15	11.9	13	-2	1.08	0.2	0.7	0.02	0.08	0.89
3223	Sacramento-3801 Airpor	10	9.5	18	8.7	19	1	0.91	-0.4	0.9	-0.04	0.12	0.14
3249	Woodland-Gibson Road	9	11.0	18	7.5	17	-1	0.68	-1.3	1.5	-0.12	0.17	0.73

Table B-13
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 13, 1999 1-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 194 (07/13) 1999
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm)

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	160	10.3	14	10.3	17	3	1.00	-0.5	1.3	-0.06	0.17	0.33
	Subregional Peak:				12.1	14	0	1.17	(at 86 x115) NSte: 3017; NSPk: 9.1				
2143	Davis-UCD Campus	5	7.8	14	8.1	14	0	1.04	1.0	1.0	0.14	0.14	0.45
2731	Sacramento-Del Paso Ma	6	9.2	16	9.9	18	2	1.08	0.8	1.0	0.12	0.13	0.22
2848	Pleasant Grove-4 miles	2	6.4	15	7.6	15	0	1.19	1.2	1.2	0.19	0.19	-99.00
2891	Auburn-Dewitt-C Avenue	20	9.6	16	7.9	14	-2	0.83	-1.6	1.6	-0.19	0.19	0.46
2956	Roseville-N Sunrise Bl	11	9.8	14	9.1	18	4	0.93	-1.0	1.4	-0.10	0.17	0.21
2977	Elk Grove-Bruceville R	8	8.6	15	10.1	16	1	1.18	1.0	1.0	0.13	0.13	0.54
3002	Colfax-City Hall	12	7.3	15	7.7	16	1	1.05	0.1	0.3	0.02	0.05	0.74
3008	Rocklin-Rocklin Road	13	10.3	14	8.6	18	4	0.84	-1.4	1.5	-0.16	0.17	0.61
3011	Sacramento-T Street	4	7.6	15	9.1	17	2	1.20	1.5	1.5	0.21	0.21	-0.37
3017	Placerville-Gold Nugge	23	8.9	1	9.1	13	12	1.03	-1.5	1.7	-0.20	0.22	0.64
3155	Vacaville-Elmira Road	4	7.1	15	9.2	13	-2	1.30	1.8	1.8	0.26	0.26	0.14
3187	Folsom-Natoma Street	15	9.2	17	9.7	12	-5	1.06	-0.5	1.2	-0.07	0.16	0.70
3196	Cool-Highway 193	18	8.9	15	8.0	15	0	0.90	-1.6	1.6	-0.20	0.20	0.43
3209	Sloughhouse	9	9.2	17	10.3	17	0	1.12	0.8	1.2	0.09	0.16	0.80
3223	Sacramento-3801 Airpor	5	8.0	16	9.8	17	1	1.23	1.4	1.4	0.20	0.20	0.34
3249	Woodland-Gibson Road	5	8.9	15	7.8	17	2	0.88	-0.5	0.9	-0.06	0.11	-1.00

Table B-14
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 9, 1999 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 190 (07/09) 1999
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	16	11.6	12	11.2	13	1	0.96	0.3	0.8	0.05	0.09	-42.79
	Subregional Peak:				11.8	13	1	1.02	(at 85 x120) NSte: 3017; NSPk: 11.0				
2143	Davis-UCD Campus	1	7.1	12	8.5	13	1	1.21	1.5	1.5	0.21	0.21	
2731	Sacramento-Del Paso Ma	1	7.8	13	8.2	12	-1	1.05	0.4	0.4	0.05	0.05	
2848	Pleasant Grove-4 miles	1	7.3	12	8.5	12	0	1.16	1.2	1.2	0.16	0.16	
2891	Auburn-Dewitt-C Avenue	1	10.5	14	9.0	12	-2	0.86	-1.4	1.4	-0.14	0.14	
2956	Roseville-N Sunrise Bl	1	8.6	12	9.5	12	0	1.10	0.8	0.8	0.10	0.10	
2977	Elk Grove-Bruceville R	1	7.5	12	7.7	12	0	1.03	0.3	0.3	0.03	0.03	
3002	Colfax-City Hall	1	8.9	13	8.3	13	0	0.93	-0.6	0.6	-0.07	0.07	
3008	Rocklin-Rocklin Road	1	9.4	13	9.5	12	-1	1.02	0.2	0.2	0.02	0.02	
3011	Sacramento-T Street	1	6.7	13	7.1	12	-1	1.05	0.4	0.4	0.05	0.05	
3017	Placerville-Gold Nugge	1	11.0	13	11.2	13	0	1.01	0.1	0.1	0.01	0.01	
3155	Vacaville-Elmira Road	1	7.0	13	7.8	12	-1	1.12	0.8	0.8	0.12	0.12	
3187	Folsom-Natoma Street	1	10.9	13	10.8	12	-1	0.99	-0.1	0.1	-0.01	0.01	
3196	Cool-Highway 193	1	11.6	12	10.0	12	0	0.86	-1.6	1.6	-0.14	0.14	
3209	Sloughhouse	1	8.7	13	8.5	12	-1	0.98	-0.1	0.1	-0.02	0.02	
3223	Sacramento-3801 Airpor	1	6.4	13	8.3	12	-1	1.28	1.8	1.8	0.28	0.28	
3249	Woodland-Gibson Road	1	7.6	12	8.2	12	0	1.09	0.7	0.7	0.09	0.09	

Table B-15
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 10, 1999 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 191 (07/10) 1999
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	17	12.9	11	11.2	12	1	0.87	-0.6	1.3	-0.05	0.13	-76.79
	Subregional Peak:				12.1	12	1	0.93	(at 82 x115) NSte: 3209; NSPk: 11.0				
2123	North Highlands-Blackf	1	7.9	11	9.2	12	1	1.16	1.2	1.2	0.16	0.16	
2143	Davis-UCD Campus	1	8.8	12	9.4	11	-1	1.08	0.7	0.7	0.08	0.08	
2731	Sacramento-Del Paso Ma	1	11.1	12	10.2	12	0	0.92	-0.9	0.9	-0.08	0.08	
2848	Pleasant Grove-4 miles	1	8.1	11	9.0	12	1	1.11	0.9	0.9	0.11	0.11	
2891	Auburn-Dewitt-C Avenue	1	10.3	14	8.3	12	-2	0.81	-2.0	2.0	-0.19	0.19	
2956	Roseville-N Sunrise Bl	1	10.7	12	8.6	12	0	0.80	-2.1	2.1	-0.20	0.20	
2977	Elk Grove-Bruceville R	1	9.3	12	9.2	12	0	0.99	-0.1	0.1	-0.01	0.01	
3002	Colfax-City Hall	1	8.6	13	7.7	12	-1	0.89	-0.9	0.9	-0.11	0.11	
3008	Rocklin-Rocklin Road	1	10.7	12	8.5	11	-1	0.79	-2.2	2.2	-0.21	0.21	
3011	Sacramento-T Street	1	8.8	12	9.3	12	0	1.06	0.5	0.5	0.06	0.06	
3017	Placerville-Gold Nugge	1	11.9	13	9.1	12	-1	0.77	-2.7	2.7	-0.23	0.23	
3155	Vacaville-Elmira Road	1	8.2	12	8.4	10	-2	1.01	0.1	0.1	0.01	0.01	
3187	Folsom-Natoma Street	1	12.9	11	9.8	12	1	0.76	-3.1	3.1	-0.24	0.24	
3196	Cool-Highway 193	1	11.4	12	8.5	11	-1	0.75	-2.8	2.8	-0.25	0.25	
3209	Sloughhouse	1	10.7	12	11.2	12	0	1.05	0.5	0.5	0.05	0.05	
3223	Sacramento-3801 Airpor	1	8.5	12	9.8	11	-1	1.16	1.4	1.4	0.16	0.16	
3249	Woodland-Gibson Road	1	9.0	12	9.6	11	-1	1.07	0.7	0.7	0.07	0.07	

Table B-16
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 11, 1999 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 192 (07/11) 1999
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

			------- Peak Concentrations --------					--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	17	12.4	11	12.6	11	0	1.02	-0.7	1.0	-0.07	0.10	-47.81
	Subregional Peak:				13.1	11	0	1.06	(at 80 x117) NSte: 3187; NSPk: 12.7				
2123	North Highlands-Blackf	1	6.9	8	8.2	12	4	1.20	1.4	1.4	0.20	0.20	
2143	Davis-UCD Campus	1	9.2	11	8.6	11	0	0.94	-0.6	0.6	-0.06	0.06	
2731	Sacramento-Del Paso Ma	1	10.7	11	10.3	11	0	0.96	-0.5	0.5	-0.04	0.04	
2848	Pleasant Grove-4 miles	1	7.2	10	7.5	11	1	1.04	0.3	0.3	0.04	0.04	
2891	Auburn-Dewitt-C Avenue	1	10.6	14	9.0	13	-1	0.84	-1.7	1.7	-0.16	0.16	
2956	Roseville-N Sunrise Bl	1	11.3	12	9.5	12	0	0.83	-1.9	1.9	-0.17	0.17	
2977	Elk Grove-Bruceville R	1	9.7	11	8.5	12	1	0.88	-1.1	1.1	-0.12	0.12	
3002	Colfax-City Hall	1	8.7	13	8.6	16	3	1.00	0.0	0.0	0.00	0.00	
3008	Rocklin-Rocklin Road	1	11.2	12	9.6	12	0	0.86	-1.5	1.5	-0.14	0.14	
3011	Sacramento-T Street	1	8.8	11	8.1	11	0	0.92	-0.7	0.7	-0.08	0.08	
3017	Placerville-Gold Nugge	1	10.4	14	9.9	11	-3	0.95	-0.5	0.5	-0.05	0.05	
3155	Vacaville-Elmira Road	1	10.2	11	8.2	12	1	0.80	-2.1	2.1	-0.20	0.20	
3187	Folsom-Natoma Street	1	12.4	11	12.6	11	0	1.02	0.3	0.3	0.02	0.02	
3196	Cool-Highway 193	1	11.8	12	9.8	13	1	0.83	-2.0	2.0	-0.17	0.17	
3209	Sloughhouse	1	11.3	11	10.6	12	1	0.94	-0.7	0.7	-0.06	0.06	
3223	Sacramento-3801 Airpor	1	8.5	10	8.1	11	1	0.96	-0.4	0.4	-0.04	0.04	
3249	Woodland-Gibson Road	1	8.7	11	7.9	11	0	0.91	-0.8	0.8	-0.09	0.09	

Table B-17
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 12, 1999 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 193 (07/12) 1999
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	16	10.7	10	10.7	11	1	1.00	-1.0	1.1	-0.11	0.12	-89.01
	Subregional Peak:				11.0	12	2	1.03	(at 82 x112) NSte: 3209; NSPk: 10.7				
2143	Davis-UCD Campus	1	9.2	11	7.3	12	1	0.79	-1.9	1.9	-0.21	0.21	
2731	Sacramento-Del Paso Ma	1	9.5	12	8.0	12	0	0.84	-1.5	1.5	-0.16	0.16	
2848	Pleasant Grove-4 miles	1	7.6	10	7.1	13	3	0.95	-0.4	0.4	-0.05	0.05	
2891	Auburn-Dewitt-C Avenue	1	9.1	11	7.9	11	0	0.87	-1.2	1.2	-0.13	0.13	
2956	Roseville-N Sunrise Bl	1	8.8	12	7.4	13	1	0.84	-1.4	1.4	-0.16	0.16	
2977	Elk Grove-Bruceville R	1	9.5	10	9.4	11	1	0.99	-0.1	0.1	-0.01	0.01	
3002	Colfax-City Hall	1	7.5	13	7.7	16	3	1.03	0.2	0.2	0.03	0.03	
3008	Rocklin-Rocklin Road	1	9.0	12	7.6	10	-2	0.85	-1.4	1.4	-0.15	0.15	
3011	Sacramento-T Street	1	8.7	11	7.4	12	1	0.85	-1.3	1.3	-0.15	0.15	
3017	Placerville-Gold Nugge	1	9.7	14	9.1	14	0	0.94	-0.6	0.6	-0.06	0.06	
3155	Vacaville-Elmira Road	1	10.7	10	8.5	11	1	0.80	-2.2	2.2	-0.20	0.20	
3187	Folsom-Natoma Street	1	10.2	10	8.8	10	0	0.86	-1.4	1.4	-0.14	0.14	
3196	Cool-Highway 193	1	9.9	11	8.6	11	0	0.87	-1.3	1.3	-0.13	0.13	
3209	Sloughhouse	1	10.4	11	10.7	11	0	1.03	0.3	0.3	0.03	0.03	
3223	Sacramento-3801 Airpor	1	8.3	11	7.6	12	1	0.92	-0.6	0.6	-0.08	0.08	
3249	Woodland-Gibson Road	1	8.6	12	7.2	12	0	0.83	-1.5	1.5	-0.17	0.17	

Table B-18
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 13, 1999 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 194 (07/13) 1999
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	14	9.1	12	9.5	11	-1	1.04	0.3	1.1	0.06	0.14	-94.41
	Subregional Peak:				10.2	10	-2	1.12	(at 82 x115) NSte: 3209; NSPk: 9.4				
2143	Davis-UCD Campus	1	6.1	12	7.8	11	-1	1.27	1.6	1.6	0.27	0.27	
2731	Sacramento-Del Paso Ma	1	7.7	12	8.6	11	-1	1.12	0.9	0.9	0.12	0.12	
2891	Auburn-Dewitt-C Avenue	1	9.1	12	7.6	11	-1	0.83	-1.5	1.5	-0.17	0.17	
2956	Roseville-N Sunrise Bl	1	8.6	12	7.5	11	-1	0.87	-1.1	1.1	-0.13	0.13	
2977	Elk Grove-Bruceville R	1	7.8	11	8.8	11	0	1.13	1.0	1.0	0.13	0.13	
3002	Colfax-City Hall	1	6.9	11	7.0	10	-1	1.02	0.1	0.1	0.02	0.02	
3008	Rocklin-Rocklin Road	1	8.9	12	7.5	11	-1	0.84	-1.4	1.4	-0.16	0.16	
3011	Sacramento-T Street	1	6.2	12	8.1	12	0	1.30	1.9	1.9	0.30	0.30	
3017	Placerville-Gold Nugge	1	8.1	10	7.6	10	0	0.94	-0.5	0.5	-0.06	0.06	
3187	Folsom-Natoma Street	1	8.6	12	8.8	11	-1	1.02	0.2	0.2	0.02	0.02	
3196	Cool-Highway 193	1	8.3	14	7.9	10	-4	0.94	-0.5	0.5	-0.06	0.06	
3209	Sloughhouse	1	8.1	12	9.5	11	-1	1.17	1.4	1.4	0.17	0.17	
3223	Sacramento-3801 Airpor	1	6.4	11	8.5	12	1	1.33	2.1	2.1	0.33	0.33	
3249	Woodland-Gibson Road	1	7.0	11	7.4	11	0	1.05	0.4	0.4	0.05	0.05	

Table B-19
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 9-13, 1999 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0799_99_camx Simulation ID: 050c

Subregion 0006 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 190 through 194
Unpaired Subregional Maximum of 10.6 at Cell 80 x 116 -- Nearest Site: 3209

Site ID	Site Description	Observed Site Avg.	Obs DOY 190	Obs DOY 191	Obs DOY 192	Obs DOY 193	Obs DOY 194	Obs DOY 195	Simulated Site Avg.	Sim DOY 190	Sim DOY 191	Sim DOY 192	Sim DOY 193	Sim DOY 194	Sim DOY 195	Avg. Ratio
2123	North Highlands-Blackf	7.4	5.3	7.9	6.9	4.9	3.3		8.4	9.1	9.2	8.2	7.5	8.0		1.13
2143	Davis-UCD Campus	8.1	7.1	8.8	9.2	9.2	6.1		8.3	8.5	9.4	8.6	7.3	7.8		1.03
2731	Sacramento-Del Paso Ma	9.4	7.8	11.1	10.7	9.5	7.7		9.0	8.2	10.2	10.3	8.0	8.6		0.97
2848	Pleasant Grove-4 miles	7.6	7.3	8.1	7.2	7.6	5.5		8.0	8.5	9.0	7.5	7.1	7.8		1.06
2891	Auburn-Dewitt-C Avenue	9.9	10.5	10.3	10.6	9.1	9.1		8.4	9.0	8.3	9.0	7.9	7.6		0.84
2956	Roseville-N Sunrise Bl	9.6	8.6	10.7	11.3	8.8	8.6		8.5	9.5	8.6	9.5	7.4	7.5		0.88
2977	Elk Grove-Bruceville R	8.7	7.5	9.3	9.7	9.5	7.8		8.7	7.7	9.2	8.5	9.4	8.8		1.00
3002	Colfax-City Hall	8.1	8.9	8.6	8.7	7.5	6.9		7.9	8.3	7.7	8.6	7.7	7.0		0.97
3008	Rocklin-Rocklin Road	9.8	9.4	10.7	11.2	9.0	8.9		8.6	9.5	8.5	9.6	7.6	7.5		0.87
3011	Sacramento-T Street	7.8	6.7	8.8	8.8	8.7	6.2		8.0	7.1	9.3	8.1	7.4	8.1		1.02
3017	Placerville-Gold Nugge	10.2	11.0	11.9	10.4	9.7	8.1		9.4	11.2	9.1	9.9	9.1	7.6		0.92
3155	Vacaville-Elmira Road	9.0	7.0	8.2	10.2	10.7	6.0		8.2	7.8	8.4	8.2	8.5	8.0		0.90
3187	Folsom-Natoma Street	11.0	10.9	12.9	12.4	10.2	8.6		10.1	10.8	9.8	12.6	8.8	8.8		0.92
3196	Cool-Highway 193	10.6	11.6	11.4	11.8	9.9	8.3		9.0	10.0	8.5	9.8	8.6	7.9		0.85
3209	Sloughhouse	9.8	8.7	10.7	11.3	10.4	8.1		10.1	8.5	11.2	10.6	10.7	9.5		1.03
3223	Sacramento-3801 Airpor	7.6	6.4	8.5	8.5	8.3	6.4		8.5	8.3	9.8	8.1	7.6	8.5		1.11
3249	Woodland-Gibson Road	8.2	7.6	9.0	8.7	8.6	7.0		8.1	8.2	9.6	7.9	7.2	7.4		0.99

Table B-20
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 29, 2000 1-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 211 (07/29) 2000
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm)

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	135	11.8	14	12.6	14	0	1.07	-0.6	1.1	-0.06	0.14	0.56
	Subregional Peak:				13.2	15	1	1.11	(at 81 x115) NSte: SLU ; NSPk: 12.5				
CUS	Cool Stn (1400 American	13	10.9	12	7.9	13	1	0.73	-1.3	1.3	-0.14	0.14	0.78
DVS	Davis/UCD Campus Stn	6	9.2	14	9.8	14	0	1.07	0.6	0.6	0.08	0.08	0.64
ELK	Elk Grove Stn (Brucevil	5	7.7	14	8.8	14	0	1.14	1.3	1.3	0.20	0.20	-0.26
FLN	Folsom Stn (Natoma St.)	7	8.4	17	10.2	17	0	1.22	1.9	1.9	0.26	0.26	0.97
NAT	Sacramento/Natoma Stn (	7	9.5	15	8.5	17	2	0.90	0.0	0.7	0.01	0.08	0.65
PGN	Placerville Stn (Gold N	17	10.5	18	8.7	18	0	0.83	-1.4	1.4	-0.16	0.16	0.88
PGV	Pleasant Grove Stn (4 S	8	8.7	15	8.6	17	2	0.98	-0.1	1.1	0.01	0.15	-0.32
ROC	Rocklin Stn (5000 Rockl	11	9.7	18	8.0	17	-1	0.82	-1.2	1.2	-0.15	0.16	0.60
ROS	Roseville Stn (151 N Su	9	10.6	17	8.5	17	0	0.81	-1.4	1.4	-0.16	0.16	0.81
S13	Sacramento Stn (1309 T	5	8.8	14	8.1	14	0	0.92	-0.5	0.6	-0.06	0.07	0.50
SDP	Sacramento Stn (Del Pas	9	11.0	15	9.8	14	-1	0.89	-0.9	1.0	-0.10	0.11	0.92
SLU	Sloughouse Rd. Stn	10	11.8	14	12.6	14	0	1.07	0.3	0.5	0.02	0.06	0.98
WLN	Woodland Stn	7	10.0	14	9.1	16	2	0.91	-0.1	0.5	0.00	0.06	0.80
GNBY	Granite Bay Stn	11	11.5	17	9.0	17	0	0.78	-1.9	1.9	-0.22	0.22	0.86
SNH	Sacramento-North Highla	10	9.8	15	8.8	17	2	0.89	-0.9	0.9	-0.10	0.10	0.86

Table B-21
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 30, 2000 1-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 212 (07/30) 2000
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm)

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	152	12.1	15	12.5	16	1	1.04	0.5	1.1	0.07	0.15	0.38
	Subregional Peak:				13.2	16	1	1.09	(at 76 x116) NSte: SDP ; NSPk: 13.1				
AUBD	Auburn-Dewitt-C Avenue	16	8.4	15	8.4	15	0	1.00	-0.4	0.5	-0.06	0.07	0.94
CUS	Cool Stn (1400 American	12	8.9	15	9.0	16	1	1.01	-0.2	0.3	-0.03	0.04	0.92
DVS	Davis/UCD Campus Stn	7	9.3	14	9.8	15	1	1.05	0.8	0.9	0.10	0.11	0.38
ELK	Elk Grove Stn (Brucevil	2	6.3	16	9.5	17	1	1.50	3.0	3.0	0.49	0.49	-99.00
FLN	Folsom Stn (Natoma St.)	8	7.4	13	10.7	15	2	1.45	3.4	3.4	0.53	0.53	-0.11
NAT	Sacramento/Natoma Stn (	7	8.3	17	10.3	17	0	1.25	1.7	1.7	0.22	0.22	-0.24
PGN	Placerville Stn (Gold N	19	9.4	17	9.3	16	-1	0.99	-0.4	1.0	-0.04	0.13	0.40
PGV	Pleasant Grove Stn (4 S	8	8.1	14	9.7	18	4	1.20	1.2	1.2	0.17	0.17	-0.03
ROC	Rocklin Stn (5000 Rockl	11	8.6	12	8.6	16	4	1.00	0.2	0.9	0.03	0.12	0.44
ROS	Roseville Stn (151 N Su	9	9.2	12	9.0	18	6	0.97	-0.3	0.9	-0.04	0.11	-0.13
S13	Sacramento Stn (1309 T	7	8.4	14	11.2	15	1	1.34	2.3	2.3	0.32	0.32	0.44
SDP	Sacramento Stn (Del Pas	9	9.9	17	12.5	16	-1	1.27	1.2	1.5	0.13	0.16	0.84
SLU	Sloughouse Rd. Stn	7	12.1	15	10.5	16	1	0.87	-0.5	0.9	-0.04	0.08	0.81
WLN	Woodland Stn	7	8.0	14	9.2	16	2	1.15	0.9	0.9	0.12	0.12	0.87
GNBY	Granite Bay Stn	13	10.2	12	9.3	18	6	0.91	-0.5	1.0	-0.06	0.13	0.70
SNH	Sacramento-North Highla	10	8.4	16	10.1	18	2	1.20	0.3	0.9	0.04	0.11	0.78

Table B-22
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 31, 2000 1-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 213 (07/31) 2000
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm)

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	130	10.3	14	12.2	14	0	1.19	0.4	1.0	0.06	0.13	0.27
	Subregional Peak:				14.5	15	1	1.41	(at 79 x110) NSte: ELK ; NSPk: 11.4				
AUBD	Auburn-Dewitt-C Avenue	12	8.9	17	8.1	15	-2	0.91	-0.9	0.9	-0.11	0.12	0.42
CUS	Cool Stn (1400 American	10	9.9	11	8.8	15	4	0.89	-1.2	1.3	-0.13	0.14	0.30
DVS	Davis/UCD Campus Stn	8	10.3	14	9.8	13	-1	0.95	-0.1	0.6	0.00	0.07	0.66
ELK	Elk Grove Stn (Brucevil	6	7.3	15	11.4	15	0	1.56	3.6	3.6	0.53	0.53	0.40
NAT	Sacramento/Natoma Stn (	8	8.7	13	9.2	12	-1	1.05	0.7	0.7	0.10	0.11	0.47
PGN	Placerville Stn (Gold N	14	8.7	13	9.2	17	4	1.05	-0.1	0.8	-0.02	0.10	0.78
PGV	Pleasant Grove Stn (4 S	8	7.8	15	8.2	15	0	1.05	0.6	0.6	0.08	0.08	0.58
ROC	Rocklin Stn (5000 Rockl	8	7.8	13	8.7	15	2	1.12	1.0	1.0	0.13	0.13	0.51
ROS	Roseville Stn (151 N Su	8	8.0	13	8.6	16	3	1.07	1.2	1.2	0.17	0.17	0.21
S13	Sacramento Stn (1309 T	7	8.5	14	9.7	13	-1	1.14	0.4	0.8	0.06	0.11	0.34
SDP	Sacramento Stn (Del Pas	9	8.1	13	9.5	13	0	1.18	0.8	1.4	0.10	0.19	0.54
SLU	Sloughouse Rd. Stn	8	10.0	14	12.2	14	0	1.22	1.2	1.3	0.15	0.16	0.90
WLN	Woodland Stn	8	8.0	12	7.8	13	1	0.97	-0.2	0.6	-0.03	0.07	-0.09
GNBY	Granite Bay Stn	9	8.5	13	8.7	16	3	1.03	0.3	0.4	0.04	0.05	0.78
SNH	Sacramento-North Highla	7	8.1	12	8.6	16	4	1.06	0.6	0.7	0.09	0.09	-0.11

Table B-23
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
August 1, 2000 1-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 214 (08/01) 2000
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm)

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	141	13.3	15	14.5	15	0	1.09	0.5	1.1	0.06	0.14	0.68
	Subregional Peak:				15.3	16	1	1.15	(at 82 x114) NSte: SLU ; NSPk: 14.3				
AUBD	Auburn-Dewitt-C Avenue	12	10.3	15	10.0	15	0	0.97	-0.1	0.4	0.00	0.05	0.91
CUS	Cool Stn (1400 American	12	12.0	16	10.0	14	-2	0.83	-0.6	1.1	-0.06	0.11	0.66
DVS	Davis/UCD Campus Stn	6	9.5	15	9.5	13	-2	1.01	0.7	0.8	0.09	0.11	0.41
ELK	Elk Grove Stn (Brucevil	6	7.8	17	10.8	17	0	1.39	3.1	3.1	0.45	0.45	0.50
NAT	Sacramento/Natoma Stn (	7	9.9	16	10.4	13	-3	1.05	0.5	0.9	0.06	0.10	-0.23
PGN	Placerville Stn (Gold N	14	10.2	18	9.5	18	0	0.93	-0.8	1.1	-0.10	0.14	0.58
PGV	Pleasant Grove Stn (4 S	9	10.1	15	10.3	15	0	1.02	0.2	0.8	0.03	0.09	0.69
ROC	Rocklin Stn (5000 Rockl	9	10.3	15	11.8	15	0	1.15	1.7	1.7	0.21	0.21	0.96
ROS	Roseville Stn (151 N Su	9	11.5	15	12.3	14	-1	1.07	1.4	1.4	0.17	0.17	0.92
S13	Sacramento Stn (1309 T	7	9.6	15	10.5	13	-2	1.10	1.8	1.8	0.25	0.25	0.51
SDP	Sacramento Stn (Del Pas	10	11.5	15	13.0	14	-1	1.13	0.4	1.1	0.04	0.13	0.83
SLU	Sloughouse Rd. Stn	11	13.3	15	14.5	15	0	1.09	0.2	0.8	0.02	0.09	0.95
WLN	Woodland Stn	7	10.0	15	9.7	15	0	0.97	0.1	1.0	0.02	0.12	0.36
GNBY	Granite Bay Stn	12	11.5	16	12.3	15	-1	1.07	0.5	0.8	0.05	0.09	0.93
SNH	Sacramento-North Highla	10	12.0	15	12.0	13	-2	1.00	0.5	1.1	0.06	0.13	0.67

Table B-24
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
August 2, 2000 1-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 215 (08/02) 2000
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm)

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	138	12.1	15	12.6	16	1	1.04	0.2	1.4	0.04	0.17	0.58
	Subregional Peak:				13.0	14	-1	1.07	(at 78 x123) NSte: ROC ; NSPk: 11.9				
AUBD	Auburn-Dewitt-C Avenue	13	11.5	18	12.6	16	-2	1.10	-0.6	1.1	-0.06	0.11	0.85
CUS	Cool Stn (1400 American	13	11.6	18	11.0	16	-2	0.95	-0.3	0.9	-0.03	0.10	0.77
DVS	Davis/UCD Campus Stn	5	8.2	13	10.7	15	2	1.31	2.2	2.2	0.31	0.31	0.36
ELK	Elk Grove Stn (Brucevil	4	7.2	14	11.3	15	1	1.56	3.3	3.3	0.48	0.48	-0.10
FLN	Folsom Stn (Natoma St.)	8	11.1	15	10.6	18	3	0.96	-0.8	1.5	-0.09	0.19	0.75
NAT	Sacramento/Natoma Stn (	7	9.6	14	11.2	16	2	1.17	1.3	1.7	0.18	0.25	0.39
PGN	Placerville Stn (Gold N	15	9.5	17	8.6	17	0	0.90	-0.5	0.8	-0.06	0.10	0.72
PGV	Pleasant Grove Stn (4 S	4	8.8	14	10.4	16	2	1.19	2.0	2.0	0.26	0.26	-0.86
ROC	Rocklin Stn (5000 Rockl	10	11.0	16	11.6	14	-2	1.05	0.4	0.9	0.05	0.10	0.76
ROS	Roseville Stn (151 N Su	9	11.2	15	11.4	13	-2	1.02	0.3	1.1	0.04	0.12	0.57
S13	Sacramento Stn (1309 T	4	8.0	14	9.4	15	1	1.17	1.0	1.0	0.15	0.15	0.71
SDP	Sacramento Stn (Del Pas	8	10.2	14	10.6	17	3	1.04	0.3	1.9	0.04	0.27	0.46
SLU	Sloughouse Rd. Stn	11	10.3	16	11.0	17	1	1.07	-0.8	1.4	-0.10	0.18	0.75
WLN	Woodland Stn	6	9.0	14	9.9	16	2	1.10	1.5	1.5	0.21	0.21	0.51
GNBY	Granite Bay Stn	13	12.1	15	10.8	18	3	0.89	-0.8	1.3	-0.09	0.15	0.82
SNH	Sacramento-North Highla	8	10.8	15	11.7	13	-2	1.08	1.3	1.5	0.16	0.18	0.64

Table B-25
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 29, 2000 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 211 (07/29) 2000
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	15	9.7	12	10.0	11	-1	1.03	-0.3	1.0	-0.02	0.11	-101.56
	Subregional Peak:				10.4	12	0	1.07	(at 82 x114) NSte: SLU ; NSPk: 9.9				
CUS	Cool Stn (1400 American	1	9.4	11	7.7	12	1	0.81	-1.8	1.8	-0.19	0.19	
DVS	Davis/UCD Campus Stn	1	7.7	11	8.4	11	0	1.09	0.7	0.7	0.09	0.09	
ELK	Elk Grove Stn (Brucevil	1	6.4	12	8.2	12	0	1.28	1.8	1.8	0.28	0.28	
FLN	Folsom Stn (Natoma St.)	1	7.0	12	8.8	11	-1	1.26	1.8	1.8	0.26	0.26	
NAT	Sacramento/Natoma Stn (	1	8.0	12	8.2	12	0	1.02	0.1	0.1	0.02	0.02	
PGN	Placerville Stn (Gold N	1	9.7	12	8.2	12	0	0.84	-1.6	1.6	-0.16	0.16	
PGV	Pleasant Grove Stn (4 S	1	7.7	11	7.7	12	1	1.00	0.0	0.0	0.00	0.00	
ROC	Rocklin Stn (5000 Rockl	1	8.5	12	7.5	11	-1	0.88	-1.0	1.0	-0.12	0.12	
ROS	Roseville Stn (151 N Su	1	9.0	12	7.6	11	-1	0.84	-1.4	1.4	-0.16	0.16	
S13	Sacramento Stn (1309 T	1	7.2	12	7.1	12	0	0.98	-0.1	0.1	-0.02	0.02	
SDP	Sacramento Stn (Del Pas	1	9.2	12	8.4	11	-1	0.91	-0.8	0.8	-0.09	0.09	
SLU	Sloughouse Rd. Stn	1	9.6	12	10.0	11	-1	1.05	0.5	0.5	0.05	0.05	
WLN	Woodland Stn	1	8.1	11	8.1	11	0	1.00	0.0	0.0	0.00	0.00	
GNBY	Granite Bay Stn	1	9.7	12	8.0	11	-1	0.83	-1.7	1.7	-0.17	0.17	
SNH	Sacramento-North Highla	1	8.9	11	7.9	12	1	0.89	-0.9	0.9	-0.11	0.11	

Table B-26
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 30, 2000 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 212 (07/30) 2000
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	15	9.3	11	10.7	12	1	1.15	0.8	1.0	0.12	0.13	-139.05
	Subregional Peak:				11.3	12	1	1.21	(at 77 x117) NSte: SDP ; NSPk: 10.9				
AUBD	Auburn-Dewitt-C Avenue	1	8.0	11	8.0	12	1	0.99	-0.1	0.1	-0.01	0.01	
CUS	Cool Stn (1400 American	1	8.7	11	8.5	12	1	0.98	-0.2	0.2	-0.02	0.02	
DVS	Davis/UCD Campus Stn	1	8.0	11	9.0	12	1	1.12	1.0	1.0	0.12	0.12	
FLN	Folsom Stn (Natoma St.)	1	6.6	12	10.0	12	0	1.52	3.4	3.4	0.52	0.52	
NAT	Sacramento/Natoma Stn (	1	7.6	11	9.4	12	1	1.25	1.9	1.9	0.25	0.25	
PGN	Placerville Stn (Gold N	1	8.6	15	8.8	12	-3	1.02	0.2	0.2	0.02	0.02	
PGV	Pleasant Grove Stn (4 S	1	7.4	12	8.7	13	1	1.18	1.3	1.3	0.18	0.18	
ROC	Rocklin Stn (5000 Rockl	1	7.9	11	8.3	12	1	1.05	0.4	0.4	0.05	0.05	
ROS	Roseville Stn (151 N Su	1	8.5	10	8.5	12	2	1.00	0.0	0.0	0.00	0.00	
S13	Sacramento Stn (1309 T	1	7.2	11	9.4	12	1	1.30	2.2	2.2	0.30	0.30	
SDP	Sacramento Stn (Del Pas	1	9.3	11	10.7	12	1	1.15	1.4	1.4	0.15	0.15	
SLU	Sloughouse Rd. Stn	1	9.1	12	8.8	12	0	0.97	-0.3	0.3	-0.03	0.03	
WLN	Woodland Stn	1	7.3	11	8.3	12	1	1.15	1.1	1.1	0.15	0.15	
GNBY	Granite Bay Stn	1	9.2	11	9.0	12	1	0.97	-0.2	0.2	-0.03	0.03	
SNH	Sacramento-North Highla	1	8.1	12	8.8	12	0	1.09	0.7	0.7	0.09	0.09	

Table B-27
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 31, 2000 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 213 (07/31) 2000
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	15	8.9	11	10.1	12	1	1.13	0.7	0.9	0.10	0.12	-128.73
	Subregional Peak:				11.8	12	1	1.32	(at 81 x108) NSte: ELK ; NSPk: 10.1				
AUBD	Auburn-Dewitt-C Avenue	1	8.2	13	7.5	11	-2	0.91	-0.7	0.7	-0.09	0.09	
CUS	Cool Stn (1400 American	1	8.9	11	7.9	11	0	0.88	-1.1	1.1	-0.12	0.12	
DVS	Davis/UCD Campus Stn	1	8.9	11	9.0	12	1	1.01	0.1	0.1	0.01	0.01	
ELK	Elk Grove Stn (Brucevil	1	6.4	12	10.1	12	0	1.57	3.7	3.7	0.57	0.57	
NAT	Sacramento/Natoma Stn (	1	7.6	11	8.3	11	0	1.09	0.7	0.7	0.09	0.09	
PGN	Placerville Stn (Gold N	1	8.1	13	8.5	12	-1	1.06	0.5	0.5	0.06	0.06	
PGV	Pleasant Grove Stn (4 S	1	7.3	11	7.9	11	0	1.08	0.6	0.6	0.08	0.08	
ROC	Rocklin Stn (5000 Rockl	1	7.3	11	8.2	12	1	1.13	1.0	1.0	0.13	0.13	
ROS	Roseville Stn (151 N Su	1	7.0	11	8.2	11	0	1.17	1.2	1.2	0.17	0.17	
S13	Sacramento Stn (1309 T	1	7.4	12	7.9	11	-1	1.07	0.5	0.5	0.07	0.07	
SDP	Sacramento Stn (Del Pas	1	7.4	12	8.6	11	-1	1.16	1.2	1.2	0.16	0.16	
SLU	Sloughouse Rd. Stn	1	8.3	12	10.1	12	0	1.22	1.8	1.8	0.22	0.22	
WLN	Woodland Stn	1	7.6	12	7.5	11	-1	0.98	-0.1	0.1	-0.02	0.02	
GNBY	Granite Bay Stn	1	8.0	11	8.3	11	0	1.04	0.3	0.3	0.04	0.04	
SNH	Sacramento-North Highla	1	7.7	10	8.2	11	1	1.06	0.5	0.5	0.06	0.06	

Table B-28
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
August 1, 2000 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 214 (08/01) 2000
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

			------- Peak Concentrations --------					--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	15	10.9	12	11.4	12	0	1.05	0.8	0.9	0.10	0.11	-105.27
	Subregional Peak:				11.8	12	0	1.09	(at 80 x116) NSte: SLU ; NSPk: 11.3				
AUBD	Auburn-Dewitt-C Avenue	1	9.5	12	9.5	12	0	1.00	0.0	0.0	0.00	0.00	
CUS	Cool Stn (1400 American	1	9.9	13	9.3	12	-1	0.94	-0.6	0.6	-0.06	0.06	
DVS	Davis/UCD Campus Stn	1	8.1	9	9.0	11	2	1.11	0.9	0.9	0.11	0.11	
ELK	Elk Grove Stn (Brucevil	1	6.6	12	9.7	11	-1	1.48	3.2	3.2	0.48	0.48	
NAT	Sacramento/Natoma Stn (	1	9.0	11	9.7	11	0	1.08	0.7	0.7	0.08	0.08	
PGN	Placerville Stn (Gold N	1	8.9	14	8.6	13	-1	0.96	-0.3	0.3	-0.04	0.04	
PGV	Pleasant Grove Stn (4 S	1	9.3	12	9.4	11	-1	1.01	0.1	0.1	0.01	0.01	
ROC	Rocklin Stn (5000 Rockl	1	8.9	11	10.5	11	0	1.19	1.7	1.7	0.19	0.19	
ROS	Roseville Stn (151 N Su	1	9.3	11	10.7	11	0	1.16	1.5	1.5	0.16	0.16	
S13	Sacramento Stn (1309 T	1	7.6	12	9.5	11	-1	1.25	1.9	1.9	0.25	0.25	
SDP	Sacramento Stn (Del Pas	1	10.1	12	10.7	11	-1	1.07	0.7	0.7	0.07	0.07	
SLU	Sloughouse Rd. Stn	1	10.9	12	11.4	12	0	1.05	0.5	0.5	0.05	0.05	
WLN	Woodland Stn	1	8.4	12	8.7	11	-1	1.03	0.3	0.3	0.03	0.03	
GNBY	Granite Bay Stn	1	9.9	12	10.6	11	-1	1.07	0.7	0.7	0.07	0.07	
SNH	Sacramento-North Highla	1	10.0	12	10.5	11	-1	1.05	0.5	0.5	0.05	0.05	

Table B-29
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
August 2, 2000 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Statistics were calculated for the 24-hour period of DOY 215 (08/02) 2000
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	16	10.7	12	10.5	12	0	0.98	0.9	1.2	0.13	0.17	-72.44
	Subregional Peak:				10.8	12	0	1.00	(at 79 x124) NSte: ROC ; NSPk: 10.3				
AUBD	Auburn-Dewitt-C Avenue	1	10.7	12	10.5	12	0	0.98	-0.2	0.2	-0.02	0.02	
CUS	Cool Stn (1400 American	1	10.4	13	10.0	12	-1	0.97	-0.3	0.3	-0.03	0.03	
DVS	Davis/UCD Campus Stn	1	6.7	12	8.7	11	-1	1.30	2.0	2.0	0.30	0.30	
ELK	Elk Grove Stn (Brucevil	1	6.3	12	8.7	11	-1	1.39	2.4	2.4	0.39	0.39	
FLN	Folsom Stn (Natoma St.)	1	9.5	12	9.1	11	-1	0.96	-0.4	0.4	-0.04	0.04	
NAT	Sacramento/Natoma Stn (	1	7.5	12	9.2	11	-1	1.24	1.8	1.8	0.24	0.24	
PGN	Placerville Stn (Gold N	1	8.7	14	8.1	12	-2	0.92	-0.7	0.7	-0.08	0.08	
PGV	Pleasant Grove Stn (4 S	1	6.6	11	9.8	11	0	1.48	3.2	3.2	0.48	0.48	
ROC	Rocklin Stn (5000 Rockl	1	9.8	11	10.2	11	0	1.04	0.4	0.4	0.04	0.04	
ROS	Roseville Stn (151 N Su	1	9.7	11	10.1	11	0	1.04	0.4	0.4	0.04	0.04	
S13	Sacramento Stn (1309 T	1	6.3	13	8.4	11	-2	1.32	2.0	2.0	0.32	0.32	
SDP	Sacramento Stn (Del Pas	1	8.0	12	9.2	11	-1	1.16	1.3	1.3	0.16	0.16	
SLU	Sloughouse Rd. Stn	1	9.1	12	8.8	11	-1	0.96	-0.4	0.4	-0.04	0.04	
WLN	Woodland Stn	1	7.0	12	8.8	11	-1	1.26	1.8	1.8	0.26	0.26	
GNBY	Granite Bay Stn	1	10.3	11	9.6	11	0	0.94	-0.6	0.6	-0.06	0.06	
SNH	Sacramento-North Highla	1	8.7	10	10.4	11	1	1.19	1.7	1.7	0.19	0.19	

Table B-30
Base Case Model Performance Evaluation for Individual Sites in Sacramento Region
July 29 - August 2, 2000 8-Hour Ozone

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: arb_050c_0700_00_camx Simulation ID: 050c

Subregion 0006 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 211 through 215
Unpaired Subregional Maximum of 10.0 at Cell 78 x 117 -- Nearest Site: SDP

Site ID	Site Description	Site Avg.	Observed DOY 211	DOY 212	DOY 213	DOY 214	DOY 215	DOY 216	Site Avg.	Simulated DOY 211	DOY 212	DOY 213	DOY 214	DOY 215	DOY 216	Avg. Ratio
AUBD	Auburn-Dewitt-C Avenue	9.1	-99.0	8.0	8.2	9.5	10.7		8.5	7.2	8.0	7.5	9.5	10.5		0.94
CUS	Cool Stn (1400 American	9.5	9.4	8.7	8.9	9.9	10.4		8.7	7.7	8.5	7.9	9.3	10.0		0.92
DVS	Davis/UCD Campus Stn	7.9	7.7	8.0	8.9	8.1	6.7		8.8	8.4	9.0	9.0	9.0	8.7		1.12
ELK	Elk Grove Stn (Brucevil	6.4	6.4	5.0	6.4	6.6	6.3		9.1	8.2	8.7	10.1	9.7	8.7		1.42
FLN	Folsom Stn (Natoma St.)	7.7	7.0	6.6	1.9	-99.0	9.5		9.5	8.8	10.0	8.6	10.8	9.1		1.23
NAT	Sacramento/Natoma Stn (	7.9	8.0	7.6	7.6	9.0	7.5		9.0	8.2	9.4	8.3	9.7	9.2		1.13
PGN	Placerville Stn (Gold N	8.8	9.7	8.6	8.1	8.9	8.7		8.4	8.2	8.8	8.5	8.6	8.1		0.96
PGV	Pleasant Grove Stn (4 S	7.7	7.7	7.4	7.3	9.3	6.6		8.7	7.7	8.7	7.9	9.4	9.8		1.13
ROC	Rocklin Stn (5000 Rockl	8.5	8.5	7.9	7.3	8.9	9.8		9.0	7.5	8.3	8.2	10.5	10.2		1.06
ROS	Roseville Stn (151 N Su	8.7	9.0	8.5	7.0	9.3	9.7		9.0	7.6	8.5	8.2	10.7	10.1		1.04
S13	Sacramento Stn (1309 T	7.2	7.2	7.2	7.4	7.6	6.3		8.4	7.1	9.4	7.9	9.5	8.4		1.18
SDP	Sacramento Stn (Del Pas	8.8	9.2	9.3	7.4	10.1	8.0		9.5	8.4	10.7	8.6	10.7	9.2		1.08
SLU	Sloughouse Rd. Stn	9.4	9.6	9.1	8.3	10.9	9.1		9.8	10.0	8.8	10.1	11.4	8.8		1.05
WLN	Woodland Stn	7.7	8.1	7.3	7.6	8.4	7.0		8.3	8.1	8.3	7.5	8.7	8.8		1.08
GNBY	Granite Bay Stn	9.4	9.7	9.2	8.0	9.9	10.3		9.1	8.0	9.0	8.3	10.6	9.6		0.97
SNH	Sacramento-North Highla	8.7	8.9	8.1	7.7	10.0	8.7		9.1	7.9	8.8	8.2	10.5	10.4		1.05

Air Quality Modeling Results

This section of Appendix B provides a summary of the air quality modeling analysis process and includes additional information and graphs on the air quality modeling results described in Chapters 6 and 8 of the main report.

Air Quality Modeling Runs Performed

After the photochemical modeling base case episodes were shown to perform adequately, the modeling was used for assessing attainment of the federal ozone standard. First, the air quality model was run with 2002 baseline year emissions to provide baseline year ozone concentrations. Next, model runs with emissions forecasts (including ERCs and existing control strategies) for 2018 were conducted to estimate the future ozone concentrations. The relative decline between modeled baseline and future year ozone concentrations at each ozone nonattainment monitoring site was calculated. This relative reduction factor was applied to baseline ozone design values to predict a future ozone design value for each monitoring site and then compared to the federal ozone standard. Based on the photochemical modeling results, attainment was predicted at all ozone monitors in 2018, except for two sites (Cool and Folsom) located in the eastern part of the Sacramento region. Therefore, supplemental modeling runs were done to estimate the additional emission reductions needed to demonstrate attainment of the 8-hour ozone NAAQS.

Development of Ozone/Emission Reduction Graphs

Systematic reductions in all anthropogenic VOC and/or NOx emissions were simulated to characterize the change in the resulting ozone concentrations. For each individual modeling run, domain-wide (including areas outside of the Sacramento nonattainment area) emissions for NOx-only, VOC-only, or both VOC and NOx are scaled by factors ranging from 100% to 80% in increments of 5%. As a result, forecasted ozone concentrations were determined for 25 different combinations of varying VOC and/or NOx emission reductions. For example, one modeling run scaled VOC emissions by 95% and NOx emissions by 85%, and then another run scaled VOC emissions by 85% and NOx emissions by 95%.

The forecasted ozone concentration data (in ppb) associated with each of the 25 emission reduction modeling scenarios were used to calculate the future ozone design values, which were plotted on a graph for an individual monitoring site. These diagrams show the pattern of ozone responses to varying combinations in VOC and NOx emission reductions. This exercise was performed for the 2018 attainment demonstration year, and evaluated at each of the nonattainment air monitoring sites.

2018 Ozone/Emission Reduction Graphs for Peak Ozone Site and Other Nonattainment Sites

The 2018 ozone/emission reduction graph for the peak ozone site at Cool is provided in Figure B-1. The 2018 ozone/emission reduction graphs for other nonattainment ozone monitoring sites (Auburn, Colfax, Folsom, Grass Valley, North Highlands, Placerville, Roseville, Sacramento-Del Paso Manor, and Sloughhouse) in the Sacramento region are presented in Figures B-2 through B-10. See Figure B-11 for a map of the location of the ozone monitoring stations.

The graph for the peak ozone design value site in the Sacramento region will generally determine the extent of additional emission reductions needed for attainment.

Some general conclusions can be drawn based on the 2018 modeling results of forecasted emissions and the additional across-the-board percent emission reduction scenarios. The air quality modeling analysis shows that attainment can be reached by 2018 with different combinations of VOC and NOx control. The modeling results indicate that both VOC and NOx reductions provide ozone benefits in the Sacramento region, but on a ton for ton basis NOx reductions provide greater ozone benefits than VOC reductions.

EPA modeling guidance states that the modeled attainment test is conducted using the predicted future ozone design value concentrations (truncated to whole ppb). All modeled ozone concentrations are truncated to integers for purposes of determining attainment. Following EPA guidance, for example, and truncating all numbers to the whole number, 84.99 would be truncated to 84 ppb.

Figure B-1 contains the ozone and pollutant emission reduction graph for the 2018 peak ozone design value site at Cool in the Sacramento region. The x and y axes represent fractional emissions reductions from the forecasted 2018 planning emissions inventory (without new control measures): 121 tpd of ROG and 104 tpd of NOx. The whole numbers on the graph represent predicted ozone design value concentrations (truncated to whole ppb), based on modeling results for fractional VOC and NOx reductions at 5% increments. For example, the upper right corner truncated integer (88 ppb) represents the predicted 2018 ozone design value at Cool with existing control strategies and no additional fractional emission reductions.

Because planning commitments to specific emissions reduction projections may not be one of the exact modeled reduction scenarios reflected on the ozone/emission reduction graph, contours are drawn to estimate a continuum of reductions between the modeled points with the same ozone concentration (called isopleths). Because of the truncation policy, these contours would be more accurately characterized as bands, than lines. However, for simplicity the contours are drawn as lines.

The CARB modeling results for predicted ozone design value concentrations were provided to the districts as truncated integers at a resolution of 5% emission reduction increments. Therefore, in an effort to better characterize the ozone modeling results and the relative benefits of VOC and NOx emissions reduction strategies, District staff obtained ozone modeling output files which provided 5% increment modeled ozone values rounded to the tenth of a ppb. Staff interpolated whole ppb results to establish the ozone concentration contour lines in Figure B-1. The 85 ppb ozone contour line lies just below the CARB truncated 85 ppb concentrations and has a slope that illustrates the relative benefit of VOC strategies to NOx strategies. Looking at the relative ozone benefit from a 20 percent reduction in anthropogenic emissions of VOC and NOx suggests that overall a 1 ton per day reduction in NOx is equivalent to a 7 ton per day reduction in VOC.

Attainment Demonstration Evaluation

Attainment of the 8-hour ozone NAAQS is evaluated for a 2018 “severe” classification scenario, based on modeling results for the peak ozone site (Cool) in the Sacramento region. The 2018 ozone/emission reduction graph for the peak ozone site at Cool (Figure B-1) shows the various combinations of percent emission reduction attainment levels below the 85 ppb contour line. There are any number of potential VOC and NOx reduction combinations that could provide for attainment. The combined reductions from new state and federal control measures and from new regional and local proposed control measures contained in this plan are used to assess future 2018 attainment. Attainment is evaluated for:

1) the 2018 emission reductions from all new local, regional, state and federal control measure committals. The total benefits from all new measures are estimated to be 14 tpd of VOC and 18 tpd of NOx in 2018.

2) the 2018 emission reductions from only the new local, regional, state and federal control measures adopted by the end of 2008. The benefits from adopted new measures are estimated to be 4 tpd of VOC and 13 tpd of NOx in 2018.

The total emission reductions from new measures already adopted by the end of 2008 and expected future new measures are included in the 2018 attainment demonstration for the Sacramento area. These new control measures are included as a SIP commitment to meet the Clean Air Act and EPA requirements[1] for nonattainment areas to adopt all reasonably available control measures (RACM) and to attain the 1997 federal 8-hour ozone standard as expeditiously as practicable. These measures will also provide a buffer in the event that CARB's estimate of emission reductions from the Cleaner In-Use Heavy Duty Trucks, are reduced due to changes in the final rule

[1] CAA Section 172(c)(1) and Section 181(a)(1), and 40 CFR 51.912(d)

adopted December 11, 2008[2]. However, these additional emission reductions from new measures expected to be adopted after 2008 are less certain and may change during the rule development process. Even though these future new committal measures are required for expeditious attainment, it is anticipated that attainment would be achieved by the 2018 deadline even if there is a reduction in their emission benefits.

Attainment Demonstration Results

The combination of emission reductions from new control measures were converted to percent emission reductions of the forecasted 2018 planning emissions inventory (without new control measures): 121 tpd of ROG and 104 tpd of NOx. The combination of percent emission reductions was plotted on the graph in Figure B-1 to demonstrate attainment of the 1997 federal 8-hour ozone standard (84 ppb). Attainment demonstration results are given for:

1) the 2018 emission reductions from all new local, regional, state and federal control measure committals (11.6% of VOC and 17.3% of NOx, designated at Point A). These reductions are more than the percent reduction attainment targets for attaining the 1997 federal 8-hour ozone standard by 2018, and so will provide reductions for accelerated progress.

2) the 2018 emission reductions from only the new local, regional, state and federal control measures adopted by the end of 2008 (3.3% of VOC and 12.5% of NOx, designated at Point B). These levels also provide for attainment (just below the 85 ppb ozone contour line).

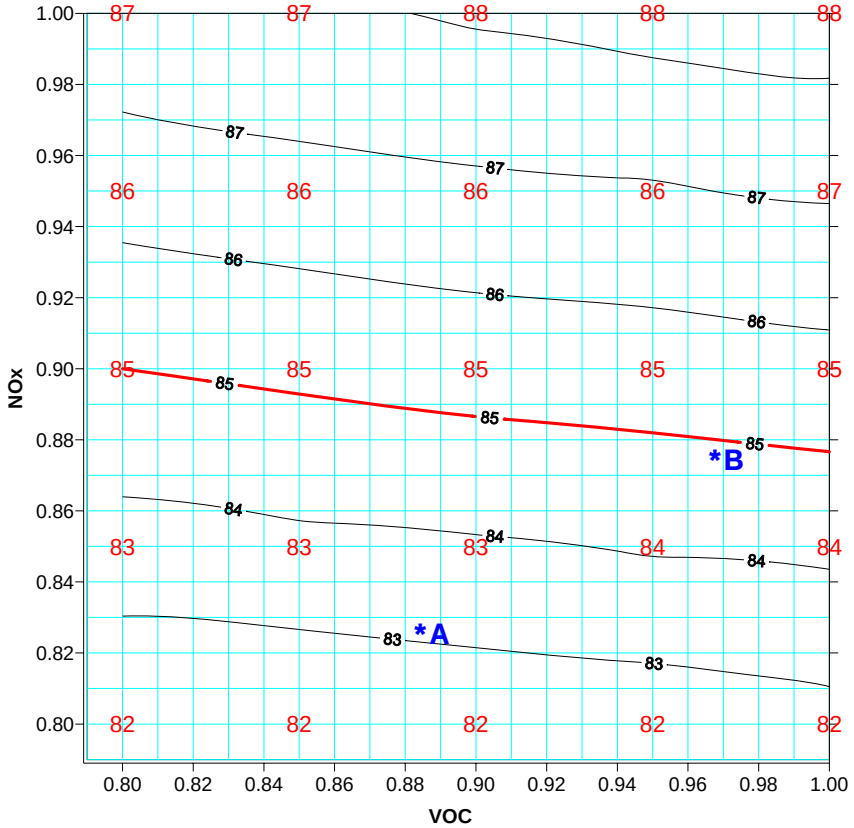
[2] This is considered to be unlikely since on December 17, 2008 CARB staff informed district staff that it does not anticipate a decrease in emission reduction estimates (personal communication Ravi Ramalingan to SIP working group.)

Figure B-1
2018 Ozone/Emission Reduction Graph for the Cool Monitoring Site Based on Photochemical Modeling Results

Year: 2018 **Model:** CAMX/MM5/SAPRC99
Site: CUS - Cool Stn (1400 American **Subregion:** 6 **Reference Year Design Value:** 105 ppb

Episode Days	99190	99191	99192	99193	99194	00211	00212	00213	00214	00215
Performance Status	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass
Peak Observed 8-hour Ozone	116	114	118	100	94	94	87	90	99	104
Peak Simulated 8-hour Ozone	95	82	93	83	76	75	83	78	92	100
Peak Simulated 8-hour Ozone within 15 km	111	86	106	85	79	81	88	85	98	105
Reference Year 15-km, 8-hour Average Ozone	98									
Future Year 15-km, 8-hour Average Ozone	93	75	87	72	69	72	76	72	85	89
Use in RRF Analysis?	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes

With RRFs, Offset = 40 ppb
Ozone Design Values (ppb)



1. The upper right corner point designates the predicted 2018 peak ozone design value (88 ppb) based on the forecasted 2018 planning emissions inventory (without new control measures): 121 tpd of VOC and 104 tpd of NOx.
2. The x and y axes represent fractional emissions reductions from the forecasted 2018 planning emissions inventory.
3. The whole numbers on the graph represent predicted ozone design value concentrations (truncated to whole ppb), based on modeling results for fractional VOC and NOx reductions at 5% increments. Values below 85 ppb represent attainment of the federal 8-hour ozone standard.

4. The horizontal contour lines represent the District's interpolated ppb 8-hour ozone concentrations based on 5% increment modeled ozone values rounded to the tenth of a ppb.
5. Point A designates the 2018 emission reductions (11.6% VOC and 17.3% NOx) from all new local, regional, state and federal control measure committals, and provides for attainment.
6. Point B designates the 2018 emission reductions (3.3% VOC and 12.5% NOx) from only the new local, regional, state and federal control measures adopted by the end of 2008. These levels also provide for attainment.

Figure B-2
2018 Ozone/Emission Reduction Graphs – Auburn Monitoring Site
Based on Photochemical Modeling Results

Year: 2018 **Model:** CAMX/MM5/SAPRC99
Site: AUBD - Auburn-Dewitt-C Avenue **Subregion:** 6 **Reference Year Design Value:** 98 ppb

Episode Days	99190	99191	99192	99193	99194	00211	00212	00213	00214	00215
Performance Status	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass
Peak Observed 8-hour Ozone	105	103	107	102	91	-99	80	82	95	107
Peak Simulated 8-hour Ozone	87	80	86	77	73	71	78	74	93	104
Peak Simulated 8-hour Ozone within 15 km	106	84	101	84	77	79	86	83	106	106
Reference Year 15-km, 8-hour Average Ozone	105									
Future Year 15-km, 8-hour Average Ozone	89	73	83	71	67	70	75	74	91	90
Use in RRF Analysis?	Yes	No	Yes	No	No	No	No	No	Yes	Yes

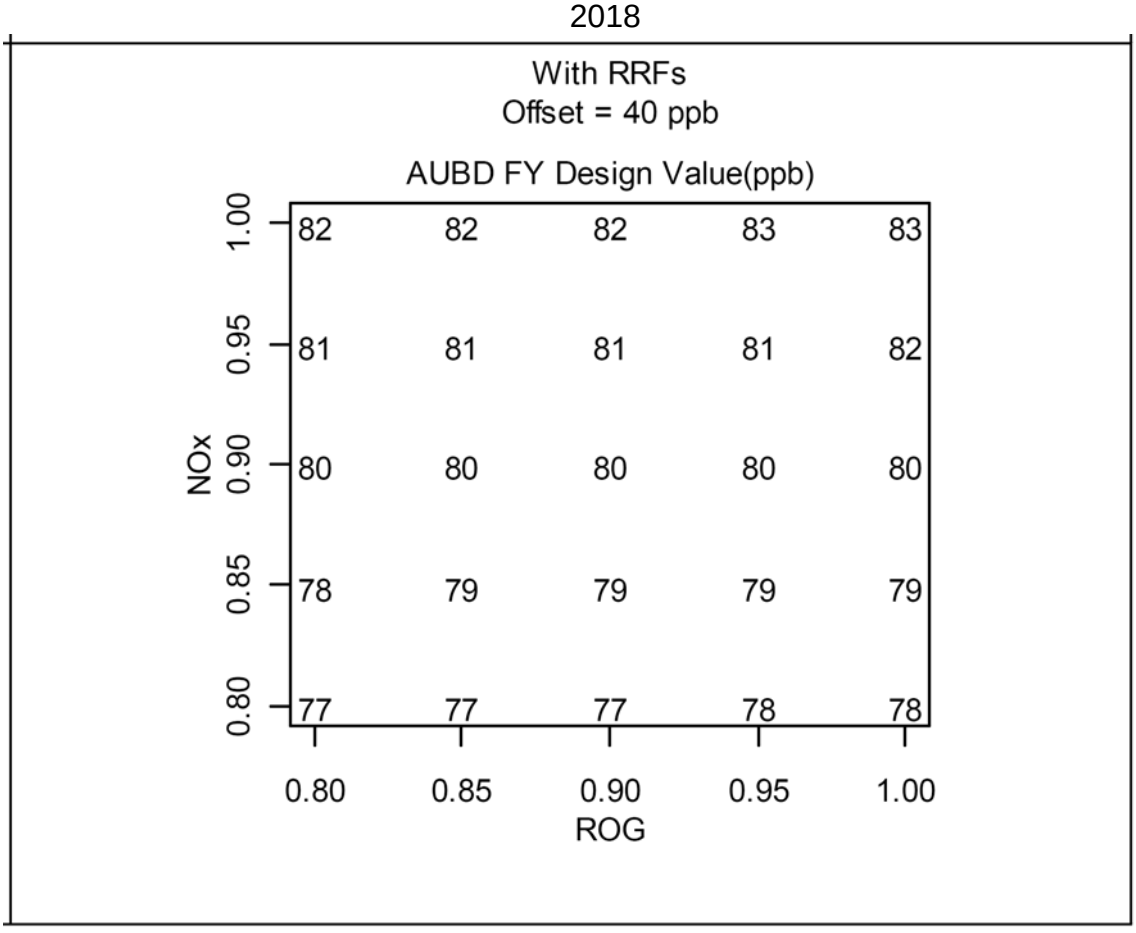


Figure B-3
2018 Ozone/Emission Reduction Graphs – Colfax Monitoring Site
Based on Photochemical Modeling Results

Year: 2018 **Model:** CAMX/MM5/SAPRC99
Site: 3002 - Colfax-City Hall **Subregion:** 6 **Reference Year Design Value:** 85 ppb

Episode Days	99190	99191	99192	99193	99194	00211	00212	00213	00214	00215
Performance Status	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass
Peak Observed 8-hour Ozone	89	86	87	82	69	-99	-99	-99	-99	-99
Peak Simulated 8-hour Ozone	81	75	83	75	69	75	78	74	85	100
Peak Simulated 8-hour Ozone within 15 km	92	80	91	82	74	78	83	79	92	105
Reference Year 15-km, 8-hour Average Ozone	91									
Future Year 15-km, 8-hour Average Ozone	76	70	75	69	65	70	73	69	79	89
Use in RRF Analysis?	Yes	No	Yes	No	No	No	No	No	No	No

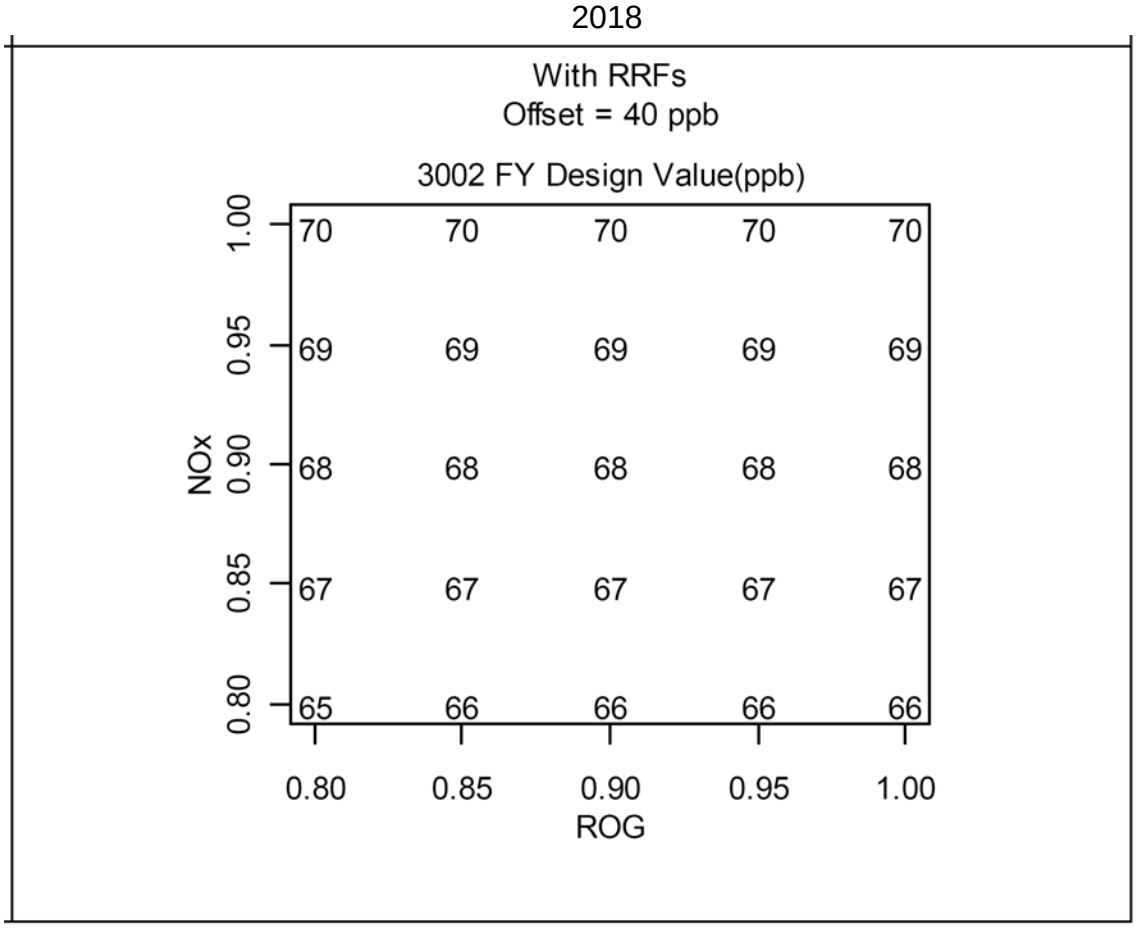


Figure B-4
2018 Ozone/Emission Reduction Graphs – Folsom Monitoring Site
Based on Photochemical Modeling Results

Year: 2018 **Model:** CAMX/MM5/SAPRC99
Site: FLN - Folsom Stn (Natoma St.) **Subregion:** 6 **Reference Year Design Value:** 99 ppb

Episode Days	99190	99191	99192	99193	99194	00211	00212	00213	00214	00215
Performance Status	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass
Peak Observed 8-hour Ozone	109	129	124	102	86	70	66	43	-99	95
Peak Simulated 8-hour Ozone	109	96	121	87	87	88	97	84	105	88
Peak Simulated 8-hour Ozone within 15 km	115	114	125	98	98	101	107	92	116	104
Reference Year 15-km, 8-hour Average Ozone	108									
Future Year 15-km, 8-hour Average Ozone	102	96	101	80	87	88	96	82	98	90
Use in RRF Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes

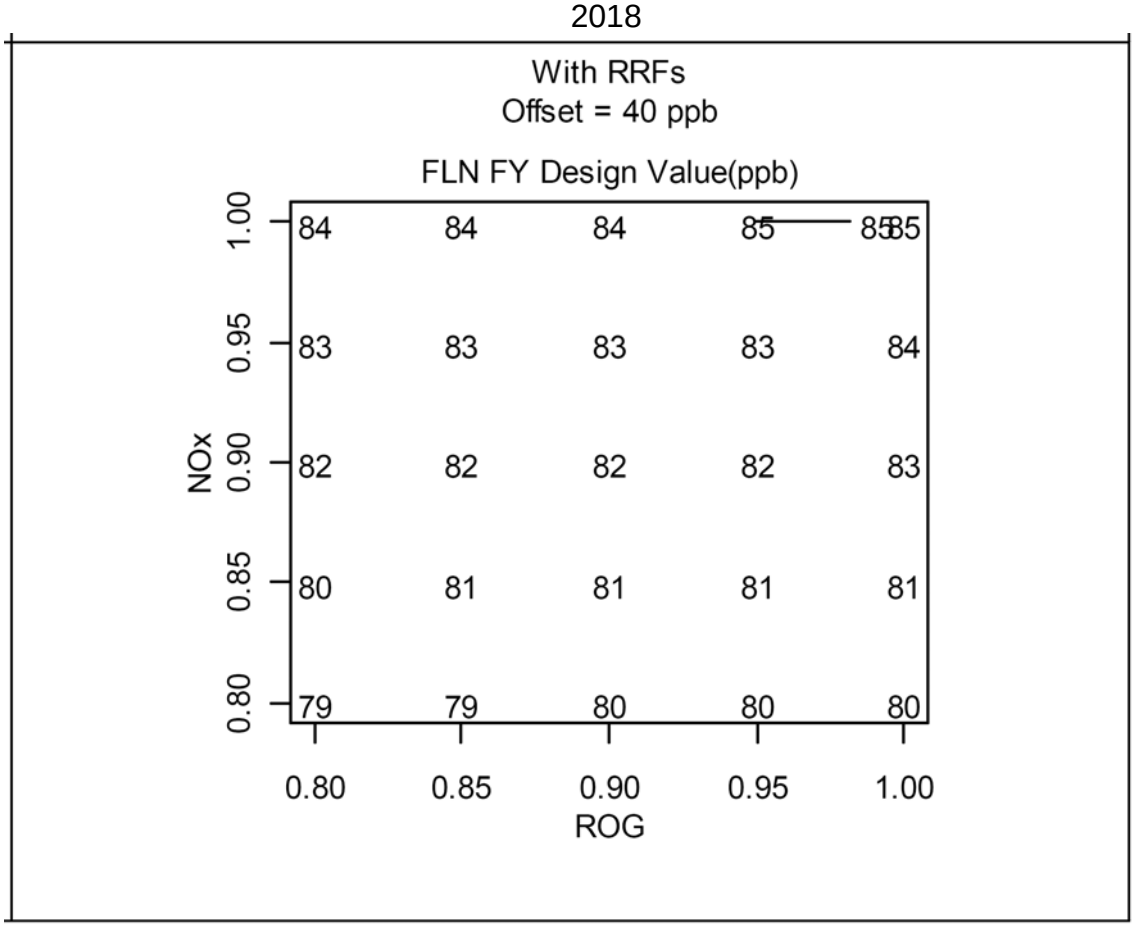
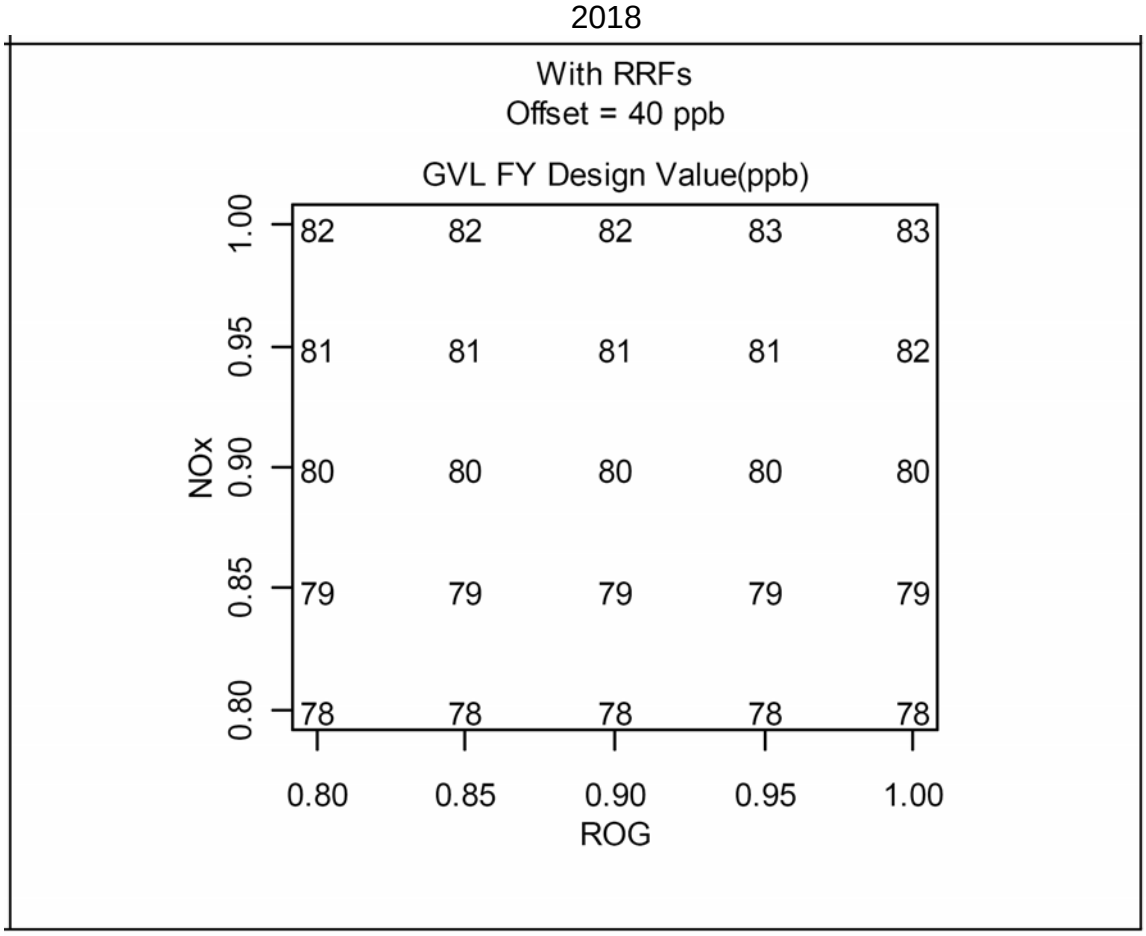


Figure B-5
2018 Ozone/Emission Reduction Graphs – Grass Valley Monitoring Site*
Based on Photochemical Modeling Results

Year: 2018 **Model:** CAMX/MM5/SAPRC99
Site: GVL - Grass Valley Stn- Litto **Subregion:** 13 **Reference Year Design Value:** 97 ppb

Episode Days	99190	99191	99192	99193	99194	00211	00212	00213	00214	00215
Performance Status	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Peak Observed 8-hour Ozone	93	93	97	100	82	79	87	78	94	113
Peak Simulated 8-hour Ozone	78	71	79	75	68	74	76	72	83	91
Peak Simulated 8-hour Ozone within 15 km	85	78	84	76	72	76	81	75	91	99
Reference Year 15-km, 8-hour Average Ozone	95									
Future Year 15-km, 8-hour Average Ozone	73	69	71	66	64	69	74	67	78	84
Use in RRF Analysis?	No	No	No	No	No	No	No	No	Yes	Yes



*Grass Valley monitoring site is outside the Sacramento nonattainment area, but is a nearby downwind site.

Figure B-6
2018 Ozone/Emission Reduction Graphs – North Highlands Monitoring Site Based on Photochemical Modeling Results

Year: 2018 **Model:** CAMX/MM5/SAPRC99
Site: SNH - Sacramento-North Highla **Subregion:** 6 **Reference Year Design Value:** 89 ppb

Episode Days	99190	99191	99192	99193	99194	00211	00212	00213	00214	00215
Performance Status	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass
Peak Observed 8-hour Ozone	53	79	69	64	80	89	81	77	100	87
Peak Simulated 8-hour Ozone	90	88	79	72	78	78	85	79	103	102
Peak Simulated 8-hour Ozone within 15 km	103	105	124	85	90	94	110	87	113	105
Reference Year 15-km, 8-hour Average Ozone	101									
Future Year 15-km, 8-hour Average Ozone	100	91	101	72	84	84	99	78	98	92
Use in RRF Analysis?	No	Yes	No	No	Yes	Yes	No	No	Yes	Yes

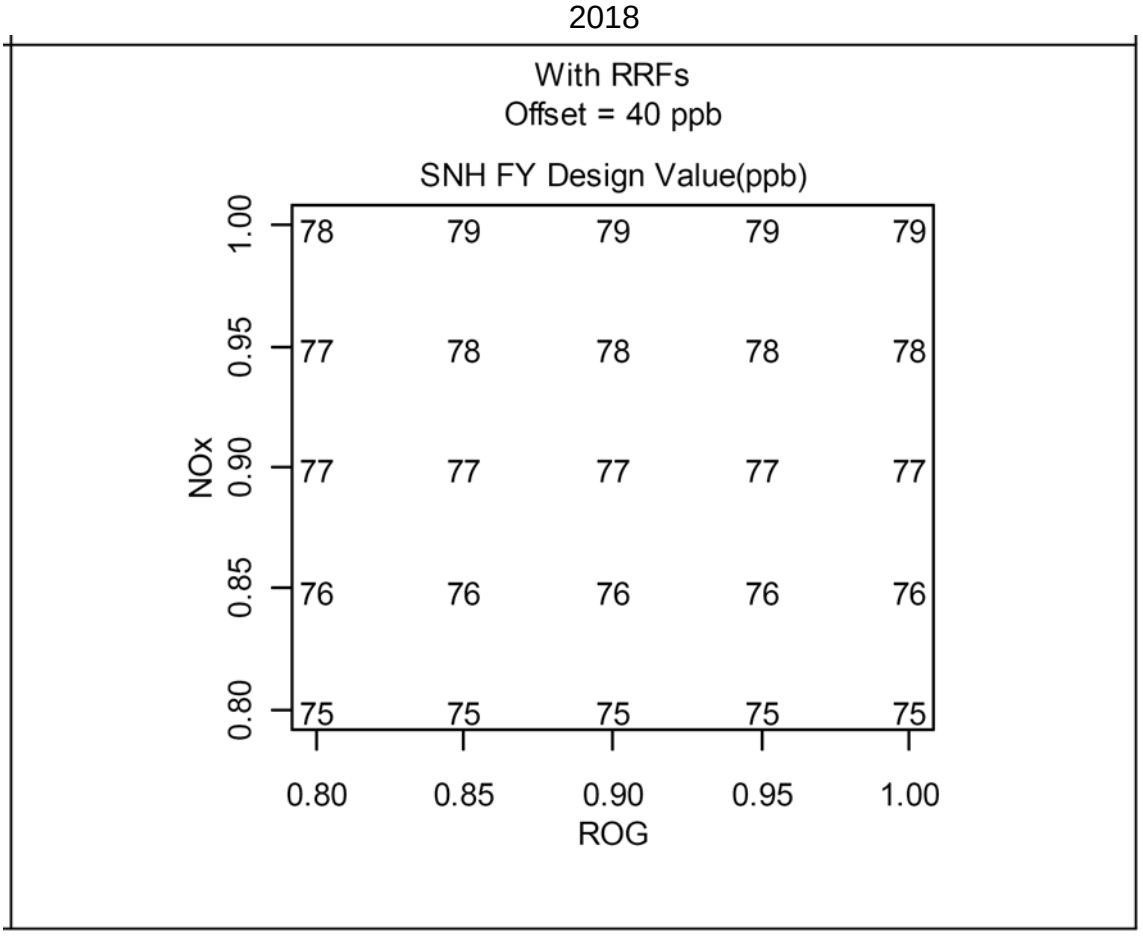


Figure B-7
2018 Ozone/Emission Reduction Graphs – Placerville Monitoring Site
Based on Photochemical Modeling Results

Year: 2018 **Model:** CAMX/MM5/SAPRC99
Site: PGN - Placerville Stn (Gold N **Subregion:** 6 **Reference Year Design Value:** 94 ppb

Episode Days	99190	99191	99192	99193	99194	00211	00212	00213	00214	00215
Performance Status	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass
Peak Observed 8-hour Ozone	110	119	111	98	92	97	93	82	89	88
Peak Simulated 8-hour Ozone	107	88	94	89	74	80	85	83	85	79
Peak Simulated 8-hour Ozone within 15 km	115	106	106	95	92	97	94	86	93	91
Reference Year 15-km, 8-hour Average Ozone	99									
Future Year 15-km, 8-hour Average Ozone	98	89	87	78	78	83	82	75	81	78
Use in RRF Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes

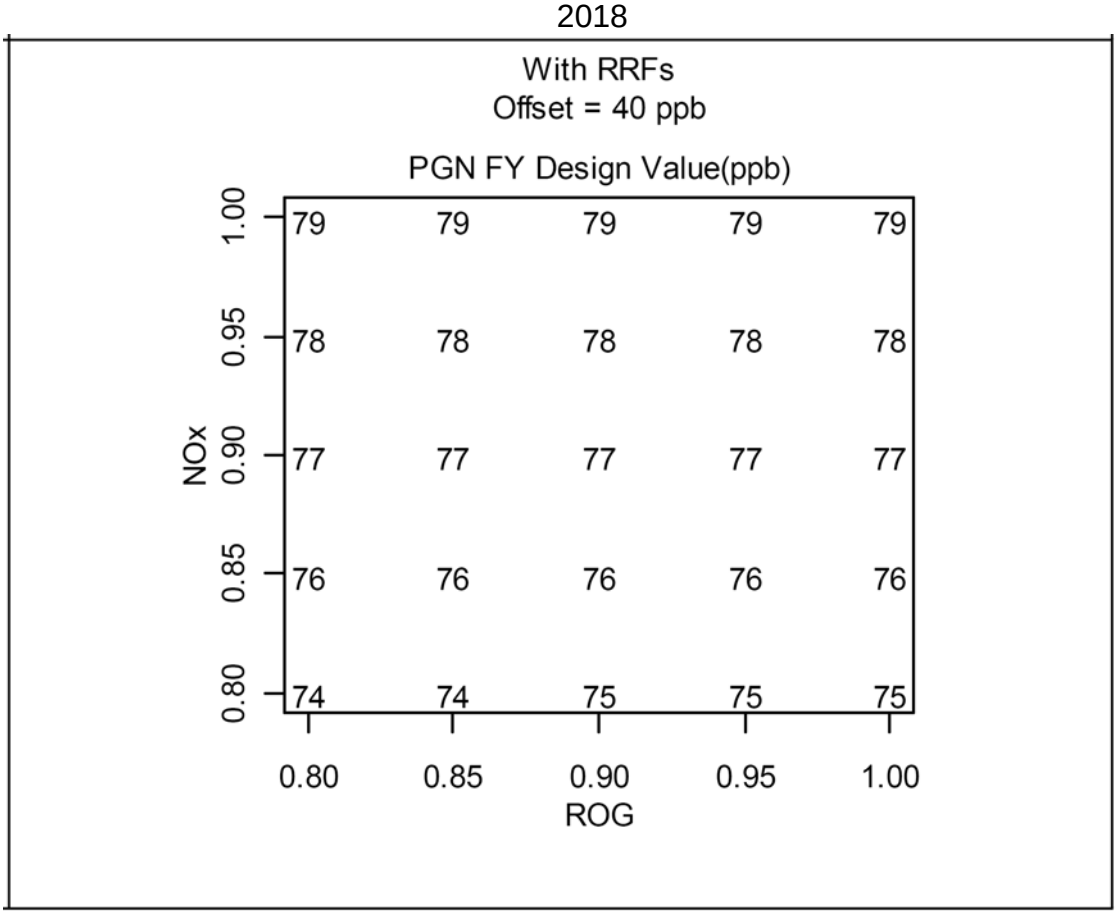


Figure B-8
2018 Ozone/Emission Reduction Graphs – Roseville Monitoring Site
Based on Photochemical Modeling Results

Year: 2018 **Model:** CAMX/MM5/SAPRC99
Site: ROS - Roseville Stn (151 N Su **Subregion:** 6 **Reference Year Design Value:** 89 ppb

Episode Days	99190	99191	99192	99193	99194	00211	00212	00213	00214	00215
Performance Status	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass
Peak Observed 8-hour Ozone	86	107	113	88	86	90	85	70	93	97
Peak Simulated 8-hour Ozone	92	83	86	71	73	75	83	80	107	102
Peak Simulated 8-hour Ozone within 15 km	111	101	125	89	90	92	107	85	113	106
Reference Year 15-km, 8-hour Average Ozone	103									
Future Year 15-km, 8-hour Average Ozone	102	86	101	74	80	81	94	76	97	92
Use in RRF Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes

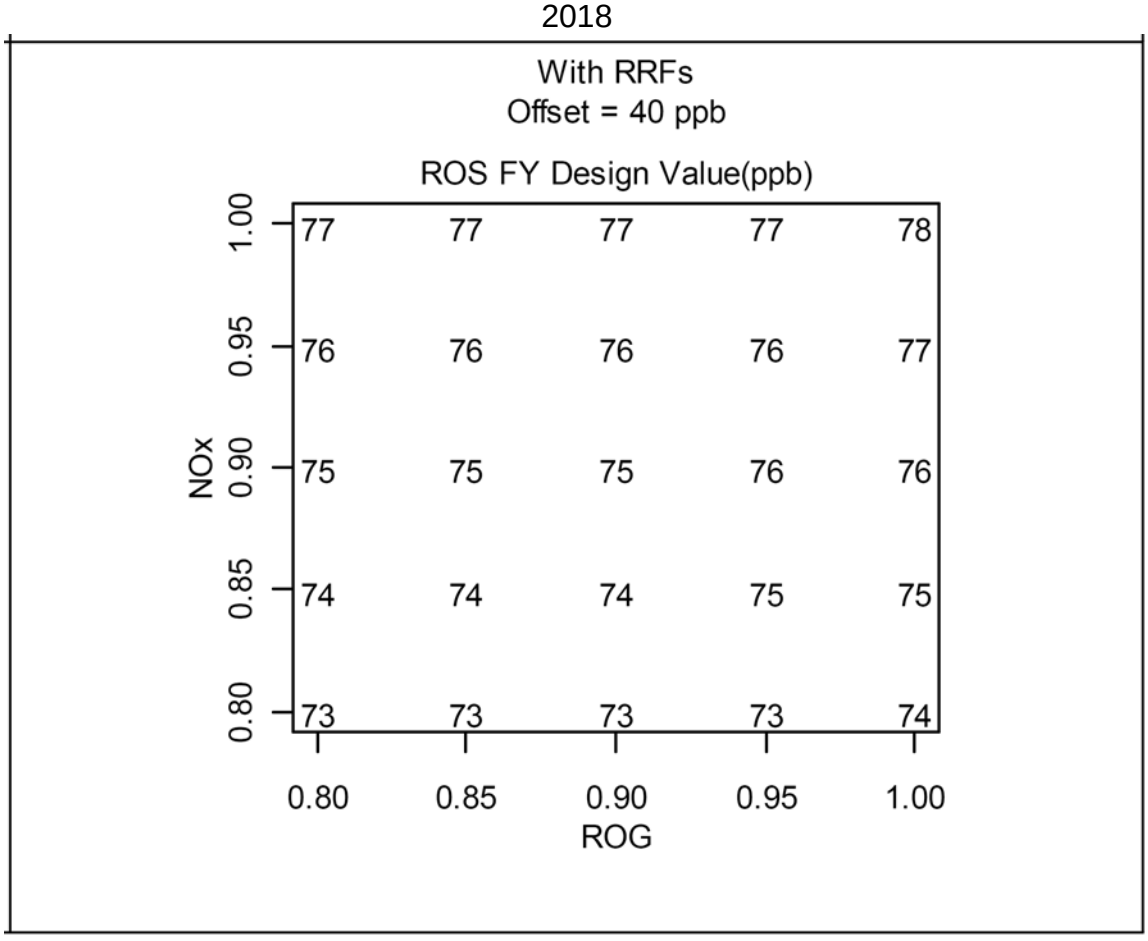


Figure B-9
2018 Ozone/Emission Reduction Graphs – Sacramento DPM Monitor Site Based on Photochemical Modeling Results

Year: 2018 **Model:** CAMX/MM5/SAPRC99
Site: SDP - Sacramento Stn (Del Pas **Subregion:** 6 **Reference Year Design Value:** 95 ppb

Episode Days	99190	99191	99192	99193	99194	00211	00212	00213	00214	00215
Performance Status	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass
Peak Observed 8-hour Ozone	78	111	107	95	77	92	93	74	101	80
Peak Simulated 8-hour Ozone	81	100	100	78	85	84	107	84	105	90
Peak Simulated 8-hour Ozone within 15 km	103	113	124	102	95	99	110	99	115	102
Reference Year 15-km, 8-hour Average Ozone	107									
Future Year 15-km, 8-hour Average Ozone	100	97	101	84	88	89	100	92	98	92
Use in RRF Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes

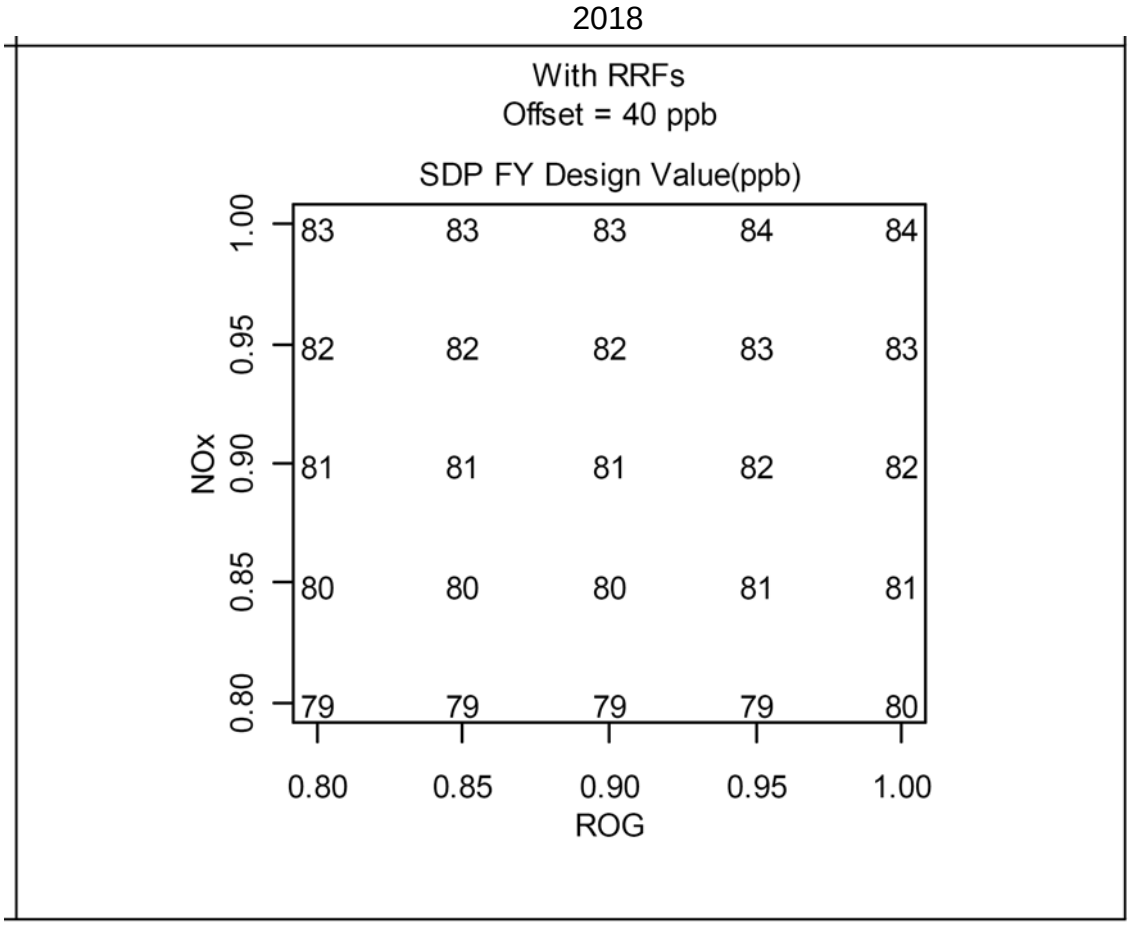


Figure B-10
2018 Ozone/Emission Reduction Graphs – Sloughhouse Monitoring Site
Based on Photochemical Modeling Results

Year: 2018 **Model:** CAMX/MM5/SAPRC99
Site: SLU - Sloughouse Rd. Stn **Subregion:** 6 **Reference Year Design Value:** 94 ppb

Episode Days	99190	99191	99192	99193	99194	00211	00212	00213	00214	00215
Performance Status	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail	Pass	Pass
Peak Observed 8-hour Ozone	-99	-99	-99	-99	-99	96	91	83	109	91
Peak Simulated 8-hour Ozone	85	111	106	102	94	98	87	99	110	87
Peak Simulated 8-hour Ozone within 15 km	99	116	125	107	99	102	110	110	116	91
Reference Year 15-km, 8-hour Average Ozone	103									
Future Year 15-km, 8-hour Average Ozone	94	98	101	87	88	90	100	97	98	85
Use in RRF Analysis?	No	No	No	No	No	Yes	No	No	Yes	Yes

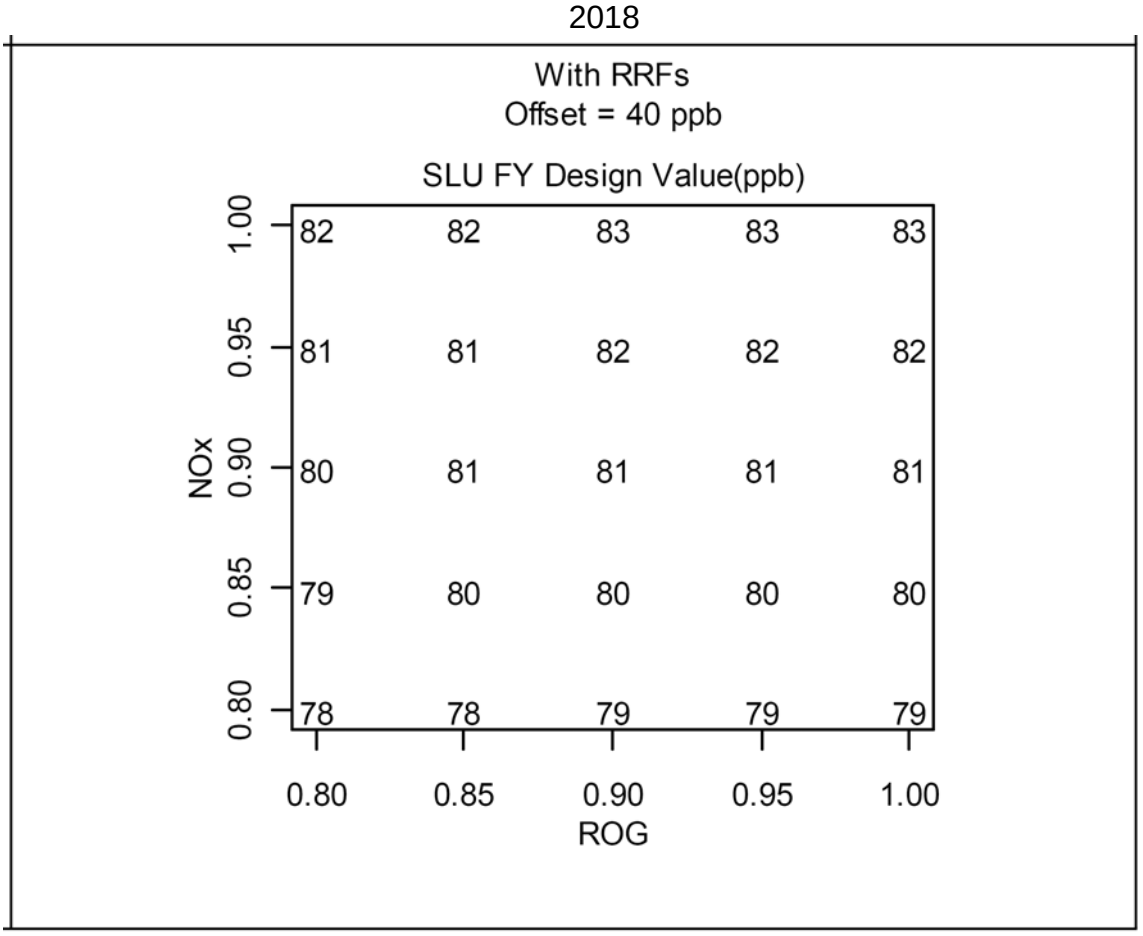
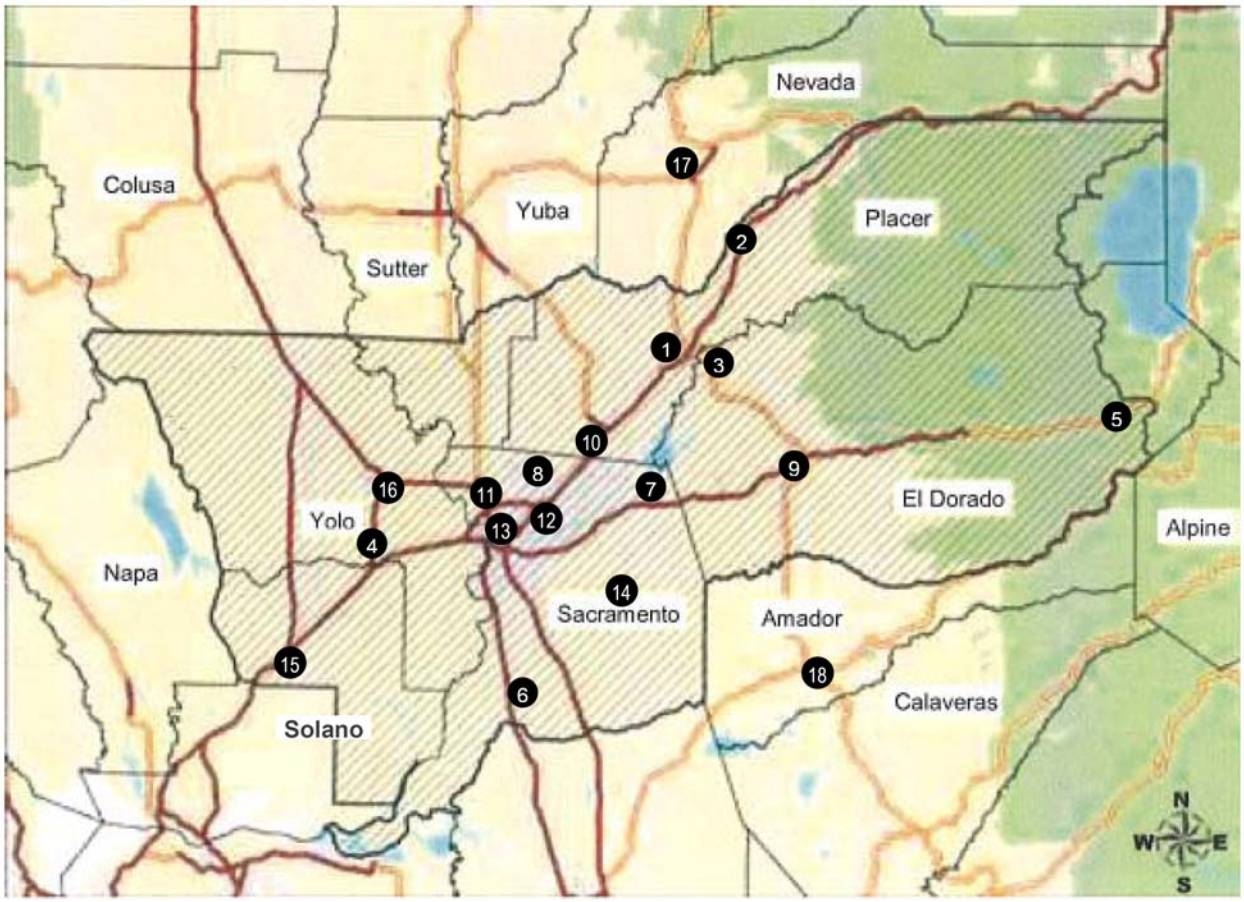


Figure B-11
Sacramento Nonattainment Area
Ozone Monitoring Stations



2008 Ozone Monitoring Sites (County)

Sacramento Nonattainment Area Sites

1. Auburn (Placer Co.)
2. Colfax (Placer Co.)
3. Cool (El Dorado Co.)
4. Davis (Yolo Co.)
5. Echo Summit (El Dorado Co.)
6. Elk Grove (Sac. Co.)
7. Folsom (Sac. Co.)
8. North Highlands (Sac. Co.)
9. Placerville (El Dorado Co.)
10. Roseville (Placer Co.)
11. Sacramento – Airport Rd. (Sac. Co.)
12. Sacramento – Del Paso Manor (Sac. Co.)
13. Sacramento – T Street (Sac. Co.)
14. Sloughhouse (Sac. Co.)
15. Vacaville (Solano Co.)
16. Woodland (Yolo Co.)

Other Sites

17. Grass Valley* (Nevada Co.)
18. Jackson** (Amador Co.)

*Grass Valley site: 2007 ozone design value = 95 ppb, and modeling analysis is applied for 2018.
**Jackson site informational only: 2007 ozone design value = 81 ppb, and modeling analysis is not applied.

Appendix C: Proposed Control Measures

Appendix C contains the more detailed descriptions of the proposed regional and local control measures for the Sacramento nonattainment area and is compiled as a separate document.

Appendix D: Transportation Control Measures

The following section outlines the development process, selection criteria, and analysis procedures used by the Sacramento Area Council of Governments (SACOG) in identifying potential transportation control measures (TCMs). Based on this analysis, measures were either: i) included in the 8-hour ozone attainment plan, ii) rejected as infeasible, or iii) rejected and referred to the air district for its determination on whether the measures, as well as all other feasible rejected measures, would advance the attainment date by one or more years. The purpose of this analysis is to ensure that the Sacramento Region is implementing all reasonably available control measures (RACM), as required to demonstrate attainment of the 8-hour ozone standard as expeditiously as practicable.

Regional Transportation Control Measures

Background

Transportation Control Measures (TCMs) are defined as strategies that adjust trip patterns or otherwise modify vehicle use in ways that reduce air pollutant emissions, and which are specifically identified and committed to in the most recently approved Air Quality Management Plan or State Implementation Plan (AQMP/SIP). TCMs are included in the SIP as part of the overall control strategy to demonstrate the region's ability to come into attainment with the National Ambient Air Quality Standards (NAAQS). Historically, the majority of emission reductions from mobile sources have come from technological improvements in vehicle engines and fuel, which are stipulated by U.S. EPA and CARB. However, by law, and according to the Transportation Conformity Rule, vehicle technology-based, fuel chemistry-based and fleet maintenance-based measures cannot be considered as TCMs for timely implementation purposes.

A definition of TCMs is provided in EPA's Transportation Conformity Rule - 40 CFR Parts 51 and 93:

Transportation control measure (TCM) is any measure that is specifically identified and committed to in the applicable implementation plan that is either one of the types listed in §108 of the CAA, or any other measure for the purpose of reducing emissions or concentrations of air pollutants from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions. Notwithstanding the above, vehicle technology-based, fuel-based, and maintenance-based measures which control the emissions from vehicles under fixed traffic conditions are not TCMs for the purposes of this subpart.

The Rule also defines the criteria and procedures for timely implementation of TCMs as follows:

§93.113 Criteria and procedures: Timely Implementation of TCMs
(c) For TIPs, this criterion is satisfied if the following conditions are met:

(1) An examination of the specific steps and funding source(s) needed to fully implement each TCM indicates that TCMs which are eligible for funding under title 23 U.S.C. or the Federal Transit Laws are on or ahead of the schedule established in the applicable implementation plan, or, if such TCMs are behind the schedule established in the applicable implementation plan, the MPO and DOT have determined that past obstacles to implementation of the TCMs have been identified and have been or are being overcome, and that all State and local agencies with influence over approvals or funding for TCMs are giving maximum priority to approval or funding of TCMs over other projects within their control, including projects in locations outside the nonattainment or maintenance area.

(2) If TCMs in the applicable implementation plan have previously been programmed for Federal funding but the funds have not been obligated and the TCMs are behind the schedule in the implementation plan, then the TIP cannot be found to conform if the funds intended for those TCMs are reallocated to projects in the TIP other than TCMs, or if there are no other TCMs in the TIP, if the funds are reallocated to projects in the TIP other than projects which are eligible for Federal funding intended for air quality improvement projects, e.g. the Congestion Mitigation and Air Quality Improvement Program.

(3) Nothing in the TIP may interfere with the implementation of any TCM in the applicable implementation plan.

CAA Section 108(f)(1)(A)6 lists the following sixteen categories as illustrative of TCMs.

i. Programs for improved use of public transit;
ii. Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;
iii. Employer-based transportation management plans, including incentives;
iv. Trip-reduction ordinances;
v. Traffic flow improvement programs that achieve emission reductions;
vi. Fringe and transportation corridor parking facilities, serving multiple occupancy vehicle programs or transit service;
vii. Programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration, particularly during periods of peak use;
viii. Programs for the provision of all forms of high-occupancy, shared-ride services, such as the pooled use of vans;
ix. Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;
x. Programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;
xi. Programs to control extended idling of vehicles;
xii. Programs to reduce motor vehicle emissions, consistent with Title II of the Clean Air Act, which are caused by extreme cold start conditions;
xiii. Employer-sponsored programs to permit flexible work schedules;
xiv. Programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;
xv. Programs for new construction and major reconstruction of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation, when economically feasible and in the public interest; and

xvi. Programs to encourage the voluntary removal from use and the marketplace of pre- 1980 model year light duty vehicles and pre-1980 model light duty trucks.

In addition to the measures listed above, other measures may be considered as TCMs if they reduce emissions or concentrations of air pollutants from transportation sources by modifying vehicle use, changing traffic flow, or mitigating traffic congestion conditions. TCMs may be voluntary programs, incentive-based programs, regulatory programs, as well as market- or pricing-based programs.

Based on suggestions received from interagency consultation and discussions with transportation and air quality stakeholders via the Regional Planning Partnership (RPP), SACOG formally refines the types of projects to be included as TCMs as appropriate during the SIP and/or Metropolitan Transportation Improvement Program (MTIP) and MTIP Guidelines development process. During the regular update cycle for each of the listed documents, SACOG, in coordination with the RPP, will refine and revise TCM descriptions and definitions in order to clarify the general TCM process as well as resolve specific implementation issues. It is SACOG's aim to work with the project implementing agencies, air quality stakeholders, and any other interested parties, primarily through the RPP, to facilitate the TCM process and implement TCMs appropriately.

It is SACOG's responsibility to ensure that TCM strategies are funded in a manner consistent with the implementation schedule established in the MTIP at the time a project is identified as a committed TCM. The transportation conformity process is designed to ensure timely implementation of TCM strategies. If the implementation of a TCM strategy is delayed, or if a TCM strategy is only partially implemented, the emission reduction shortfall must be made up by either substituting a new TCM strategy or by enhancing other control measures through the substitution process described in this Appendix.

TCM Enforceability and Monitoring

The TCM strategies contained in the SIP are expected to be real, quantifiable, and enforceable. The region's long-range transportation plan (the previously triennial and now quadrennial Metropolitan Transportation Plan, or MTP) and the shorter-term programming used to fund the improvements (the MTIP) together form the foundation and the keystone for improving transportation system performance while at the same time assuring the timely attainment of air quality goals within the region.

Assessing the consistency of emissions deriving from these mobility strategies against the corresponding mobile source emission budgets contained in the applicable SIP serves as the basis for determining conformity to the SIP. The MTIP provides the information needed in assuring the timely implementation of TCM strategies described in this document. The projects and programs that make up the MTP and MTIP form the basis for assuring an enforceable commitment for each TCM. Federal law requires that

funding priority be given to TCMs in developing the MTIP. Therefore, the report on the timely implementation of TCMs will continue to serve as one of the methods of monitoring the air quality impacts of transportation system improvements.

Developing a List of Potential Transportation Control Measures Assumptions and Approach

SACOG is now working with the region's air districts on the development of a new SIP designed to meet the 1997 8-hour ozone standard. The inclusion of TCMs in the SIP sends a clear signal that SACOG is serious about doing its part in helping to attain the federal air quality standards.

The Clean Air Act defines a list of sixteen potential TCM categories (see previous section). Essentially a TCM can be any measure that is focused on reducing vehicle use or traffic/congestion.

Risks

There are some risks with designating projects as transportation control measures, and they are significant. Every time SACOG makes a conformity determination to accompany a new Metropolitan Transportation Plan (MTP), a new Metropolitan Transportation Improvement Program (MTIP) or an amendment to either document, we must demonstrate that all TCMs are still on track to be implemented in a timely fashion.

Implications

If a TCM does not stay on schedule or experiences a funding shortfall, SACOG must show that "all State and local agencies with influence over approvals or funding for TCMs are giving maximum priority to approval or funding of TCMs over other projects within their control…" (40CFR 93.113 (c) 1). If the TCMs are shown to be falling behind the schedule shown in the SIP or are not fully funded, "then the TIP cannot be found to conform." In other words, SACOG may not be able to demonstrate conformity on a new or amended MTP or MTIP if a TCM is failing. SACOG and any other responsible agencies would have to either ensure that the TCM is able to get back on schedule and demonstrate that it is fully-funded, or begin the TCM substitution process if that is not feasible.

Specific Situations:

Example: Regional Rideshare Program

Several years ago, the State cut funding for ridesharing programs. The SACOG Board wanted to eliminate the program. However, since the Regional Rideshare Program is a TCM, it could not be eliminated.

Example: The Bay Area's Transit Ridership Increase TCM

The San Francisco Bay Area adopted a TCM that called for an increase in transit ridership of 15% over five years. When the region failed to meet that benchmark, the

MPO was sued and the region went into a conformity lapse. Eventually a substitute TCM was adopted, a settlement was reached and the region came out of the lapse.

Substitution Process

A standardized TCM substitution process was established as part of the Federal transportation bill, SAFETEA-LU (Section 6011(d))[19]. The TCM substitution process will allow SACOG and the Air District to substitute TCMs that either are unable to be delivered, are no longer feasible or otherwise are no longer desired as TCMs. Prior to the changes implemented as part of SAFETEA-LU, a SIP revision and a conformity determination were required. These actions are no longer required. The following is an outline of the general requirements:

For a TCM in an approved SIP to be removed and replaced with an alternate TCM, SAFETEA-LU requires that:

- the substitute TCM(s) must achieve equal or greater emission reductions;
- the substitute TCM(s) must be implemented on a schedule that is consistent with the schedule for the TCM(s) being removed from the SIP; or, if the implementation date has passed for the TCM(s) being replaced, the replacement TCM must be implemented as soon as practicable but not later than the date on which emission reductions from the TCM(s)are necessary to achieve the purpose of the implementation plan;
- the substitute TCM(s) must be accompanied by evidence of adequate personnel, and funding and authority under state or local law to implement, monitor and enforce the TCM(s);
- the substitute TCM(s) must be developed through a collaborative process that includes participation by all affected jurisdictions (state and local air pollution control agencies and state and local transportation agencies such as the MPO, state and city DOTs, and transit providers); consultation with EPA; and reasonable notice and opportunity for public comment; and
- the equivalency of the substitute TCM(s) must be concurred on by the MPO, the state air pollution control agency and EPA.

A full description of this process is outlined in Attachment A-1 for information.

Preliminary Analysis of the Projects

The projects selected for inclusion in this list of potential TCMs was based on several criteria. TCMs chosen were to provide air quality benefits, while at the same time leaving as much flexibility as possible for implementation. Projects likely to experience delays or cost overruns were avoided. Nearly all the TCMs have the following

[19] Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (Section 6011(d)) amended Section 176(c) of the Clean Air Act (42 U.S.C. 7506(c)) by adding Substitution of Transportation Control Measures as paragraph (8).

characteristics: early completion dates (most are almost done or will be soon), reasonable costs, fully committed funding, and projects of small or moderate-sized scope. Big projects were seen to represent too big a cost commitment and also likely to experience overruns and delays. SACOG also avoided projects such as HOV lanes where the science for estimating the air quality benefits is uncertain at best. For some categories, we grouped individual projects altogether. This has the benefit of a smaller number of projects to track and more flexibility of selecting the 'right project at the right time.' In all cases, funding levels have been kept at a reasonable and conservative level in the event that future funding sources are reduced or unavailable. Emissions reduction calculations are included for projects where that data exists. Most of the emission reduction figures were produced using the California Air Resources Board "*Automated Methods to Find the Cost-Effectiveness of Funding Air Quality Projects".* These are provided only as information and would be used if a TCM substitution were required. All of the TCMs were included in the travel modeling that was used to prepare the motor vehicle emissions inventory. Therefore, the emissions benefits from the TCMs are included in this SIP emissions inventory projections and motor vehicle emissions budgets.

New and Continuing Projects

All of the projects chosen were selected because they had early completion dates, costs were reasonable, funding was already committed and delivery appeared to be likely. Given the serious consequences with TCM failures, these projects were specifically chosen to maximize the potential for timely TCM implementation.

Individual Projects

Intelligent Transportation Systems (ITS) Projects

ITS projects use advanced technology to help improve the operating efficiency of the existing infrastructure by increasing traffic flow, providing real-time information on traffic conditions, and coordinating operations at local traffic centers. Examples of ITS technology and tools are freeway ramp meters, dynamic message signs, and traffic signal timing.

CONTROL MEASURE NUMBER: ITS-1

TCM ID: ITS-1
Control Measure Title: Arden Way "Smart Corridor"

Control Measure Description

Construct improvements on Arden Way from Del Paso Boulevard to Watt Avenue. Project includes the following intelligent transportation system (ITS) elements:

- A fiber optic trunk line
- Closed circuit television cameras
- Transit signal priority
- Changeable message signs, and
- Count stations

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2008.

Cost

The total budget for this measure is $2,627,794

Needed Resources and Authority

City of Sacramento Department of Transportation

Eligible per the Clean Air Act as Amended, Section 108 (f) (v)

CONTROL MEASURE NUMBER: ITS-2

TCM ID: ITS-2
Control Measure Title: Sacramento Traffic Operations Center

Control Measure Description

This project will evaluate and implement on downtown and other major corridors, Intelligent Transportation System (ITS) elements and infrastructure necessary to provide traffic responsive/coordinated signal timing and communications to the Traffic Operation Center.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2009.

Cost

The total budget for this measure is $1,130,000

Needed Resources and Authority

City of Sacramento Department of Transportation

Eligible per the Clean Air Act as Amended, Section 108 (f) (v)

CONTROL MEASURE NUMBER: ITS-3

TCM ID: ITS-3
Control Measure Title: Watt Avenue Phase 3 Smart Corridor

Control Measure Description

In Sacramento County, Watt Avenue Corridor, implement phase 3 priority and mobility enhancement demonstration project. This project includes deployment of ITS components within the Watt Avenue corridor to improve the efficiency of transit in the corridor. The objectives of the project are to improve traffic safety, pedestrian safety, transit efficiency and the overall aesthetics of the intersection. The improvements will include:

- Construct a queue jump for buses approaching the southeast corner of Watt Avenue and Fair Oaks Boulevard
- ADA improvements at all four corners of the intersection with audible signals, push buttons, sidewalk ramps and re-striping

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2009

Cost

The total budget for this measure is $2,200,000

Needed Resources and Authority

Sacramento County Department of Transportation

Eligible per the Clean Air Act as Amended, Section 108 (f) (v)

CONTROL MEASURE NUMBER: ITS-4

TCM ID: ITS-4
Control Measure Title: STARNET Implementation

Control Measure Description

The Sacramento Transportation Area Network, or STARNET, is an information exchange network and operations coordination framework that will be used by the operators of transportation facilities and emergency responders in the Sacramento region of California. STARNET will enable the real-time sharing of data and live video, and refinement of joint procedures pertaining to the operation of roadways and public transit, and public safety activities. It will also provide more information for travelers via the region's 511 web site and interactive telephone service (dial 511).
The goals of STARNET are:

- Make travel easier and safer
- Gather and disseminate more and better real-time travel information
- Better travel decisions – time, mode, route
- Provide transportation system managers and emergency responders with more and better real-time information
- Including information from other agencies
- Better operational decisions and actions
- Allow shared use of field devices when appropriate
- Better use of resources and better operation

STARNET will build upon the previous Intelligent Transportation System (ITS) investments by using, with little to no modifications, the existing field infrastructure (cameras, changeable message signs, traffic signals, vehicle location systems, etc) and central systems (freeway management systems, traffic signal systems, transit management systems, computer aided dispatch systems, etc) already operated by each agency. As part of the STARNET implementation, interfaces will be developed to these existing systems to enable them to share data and video with each other, provide data and video to the public via the 511 regional travel information system, and provide operations and emergency response personnel with a map-based regional transportation management display.

STARNET was identified as a high priority project for the Sacramento area in the region's Intelligent Transportation Systems Strategic Deployment Plan.

During 2006, the involved agencies are preparing a concept of operations, system requirements, and a request for proposals for system integration. The system is expected to be operational in 2008.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2009.

Cost

The total budget for this measure is $3,260,000

Needed Resources and Authority

Sacramento Area Council of Governments

Eligible per the Clean Air Act as Amended, Section 108 (f) (v)

Park and Ride Lots / Transit Centers

CONTROL MEASURE NUMBER: TF-1

TCM ID: TF-1
Control Measure Title: El Dorado Central Park and Ride Facility

Control Measure Description

In Diamond Springs, on Commerce Way at State Route 49: Construct Central Transfer Facility and Park & Ride with capacity for 95 spaces. This property is adjacent to El Dorado Transit's office and maintenance facility.
The location of this facility is approximately 42 miles from downtown Sacramento, and thus has the potential of reducing passenger vehicle travel by 2,000,000 miles per year.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2009.

Cost

The total budget for this measure is $550,574.

Needed Resources and Authority

El Dorado County Transit Authority

Eligible per the Clean Air Act as Amended, Section 108 (f) (vi)

CONTROL MEASURE NUMBER: TF-2

TCM ID: TF-2
Control Measure Title: Improvements to Loomis Multimodal Center

Control Measure Description

Design and construct pedestrian and landscaping improvements at the multimodal center including a Class I bike facility adjacent to Taylor Rd. from downtown Loomis to Sierra College Blvd. Specific improvements include:

- Construct pedestrian walkways up to Taylor Road and around the depot
- Install bike parking equipment
- Install landscaping and other transit and pedestrian amenities

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed in 2010.

Cost

The total budget for this measure is $659,225

Needed Resources and Authority

Town of Loomis Department of Public Works

Eligible per the Clean Air Act as Amended, Section 108 (f) (xv)

CONTROL MEASURE NUMBER: TF-3

TCM ID: TF-3
Control Measure Title: 13th and 16th Street Light Rail Station Improvements

Control Measure Description

RT, in partnership with the Capitol Area Development Authority (CADA) and the City of Sacramento, is improving the 13th & 16th Street light rail stations. This project is to renovate and improve connectivity to the 13th Street and 16th Street light rail stations, which are within the R Street Corridor redevelopment area. The total project cost is estimated at $1,883,000. The project will be implemented by RT (for the portion comprising the light rail stations and bus stops) and the City of Sacramento (for the portions within City rights-of-way). RT's portion of the project cost is estimated at $988,000.

RT, in partnership with the Capitol Area Development Authority (CADA) and the City of Sacramento, has applied for and received a grant of $1,693,000 from the SACOG Community Development Grants program. The grant is administered by the California Transportation Commission (CTC) and the California Department of Transportation (Caltrans). Of the $190,000 local match, $90,000 is coming from CADA tax increment revenues, and $100,000 is being contributed by RT from Measure A funds.

Scope of Work (revised 7/30/07)

13th Street Station:

- Mini-high shelters on ramps
- Cosmetic improvements to existing shelter
- Cosmetic improvements to existing walls
- Additional light poles
- New seating
- Miscellaneous plant replacements
- Miscellaneous tree and shrub pruning
- Repainting

16th Street Station:

- New mini-high ramp and removal of existing vertical lift
- Mini-high Shelters on ramps
- Replace existing shelter canopy
- Additional light poles
- New seating
- Cosmetic improvements to walls on north side
- Increase sitting/standing pavement area on south side

- Planting screen on garage face
- Miscellaneous plant replacements
- Miscellaneous tree and shrub pruning
- Repainting

Both stations will also receive sidewalk improvements and directional signage within a 1-block radius, as well as other improvements to be constructed by the City.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed in 2009.

Cost

The total budget for this measure is $988,000.

Needed Resources and Authority

Sacramento Regional Transit District

Eligible per the Clean Air Act as Amended, Section 108 (f) (xv)

Funding Programs

Transit Service

Investment in transit is one of the cornerstones of the MTP for 2035. The overall philosophy followed in the MTP for 2035 seeks to increase transit service significantly, aimed at:

- improving service for the transit dependent,
- attracting riders who could otherwise choose to drive,
- extending rail where it can be cost effective considering surrounding housing and employment densities, and
- setting up new bus or rail services on corridors connecting suburban activity centers.

In that context, SACOG through the MTP gives primary priority to transit expansion, with the objective of an effective transit system that both serves those who rely on transit and attracts riders who also have the choice to drive. The MTP proposes to invest the maximum feasible share of the region's flexible capital funding into transit expansion, commensurate with funding to operate and need for road capacity for transit to run on. This investment approximately triples the amount of transit available in 2035 compared to today. There are no funds available to operate more service beyond that level, and a modest amount of flexible funds must be invested in road improvements so that transit can move effectively through areas of congested traffic.

Travel by transit is of great interest in the Sacramento region for several reasons. First, transit provides an opportunity for substantially reducing VMT, through shifts from low-occupancy modes like driving alone to a very high occupancy mode of travel. Second, for commute trips, which tend to occur at peak periods of travel demand when congestion is highest, transit can provide substantial congestion relief. Finally, high quality transit service can provide necessary mobility to residents and employees in higher density, mixed-use areas, where auto travel can be impractical. For these reasons, SACOG proposes making a commitment to maintain existing levels of transit service through the following TCMs:

Transit Vehicle Acquisitions (TR-1)

List of bus replacement projects include:

TCM ID	SACOG ID	Measure Title	Cost
TR-1	PLA25223	Auburn Transit Bus Replacement	$225,000
	PLA25371	Roseville Transit Bus Purchase	$2,300,000
	PLA25322	Roseville Transit Bus Replacement	$375,000
	SAC24365	Replacement Neighborhood Ride Buses	$255,000
	SAC24418	E-Tran Replacement Buses	$1,400,000
	REG17924	SRTD Neighborhood Ride Vehicle Replacement	$3,600,000
	YST10418	Yuba Sutter Transit Bus Expansion	$1,500,000
	YCT18176	YCTD Bus Replacement	$1,700,000

CONTROL MEASURE NUMBER: TR-1A

TCM ID: TR-1A
Control Measure Title: Auburn Transit Bus Replacement

Control Measure Description

Replacement of 1 CNG bus for Auburn Transit.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed in 2008.

Cost

The total budget for this measure is $225,000.

Needed Resources and Authority

City of Auburn Department of Public Works

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-1B

TCM ID: TR-1B
Control Measure Title: Roseville Transit Bus Purchase

Control Measure Description

Purchase 3 30' replacement fixed route buses, 3 30' expansion fixed route buses, and 1 40' replacement commuter bus

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed in 2009.

Cost

The total budget for this measure is $2,300,000.

Needed Resources and Authority

City of Roseville Department of Public Works

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-1C

TCM ID: TR-1C
Control Measure Title: Roseville Transit Bus Replacement

Control Measure Description

Replace five (5) cutaway buses.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2008.

Cost

The total budget for this measure is $375,000.

Needed Resources and Authority

City of Roseville Department of Public Works

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-1D

TCM ID: TR-1D
Control Measure Title: Replacement Neighborhood Ride Buses

Control Measure Description

Replace three diesel cutaways that are used for neighborhood ride routes and paratransit service.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2012.

Cost

The total budget for this measure is $255,000.

Needed Resources and Authority

City of Elk Grove

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-1E

TCM ID: TR-1E
Control Measure Title: E-Tran Replacement Buses

Control Measure Description

Purchase six CNG replacement buses for the City of Elk Grove's E-Tran bus transit buses. The CNG buses replace six CNG and diesel buses that are beyond their useful life. Later, programming team moved $1,070,000 from 2010 back to 2009.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2010.

Cost

The total budget for this measure is $1,400,000.

Needed Resources and Authority

City of Elk Grove

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-1F

TCM ID: TR-1F
Control Measure Title: SRTD Neighborhood Ride Vehicle Replacement

Control Measure Description

Purchase 14 Neighborhood Ride Vehicles to replace vehicles which have surpassed their useful lives. 17 are needed, but 3 will be funded from an alternate source. RT assumes $110,000 per vehicle and a 5-year life.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2010.

Cost

The total budget for this measure is $3,600,000.

Needed Resources and Authority

Sacramento Regional Transit District

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-1G

TCM ID: TR-1G
Control Measure Title: Yuba Sutter Transit Bus Expansion

Control Measure Description

Purchase three specially equipped, heavy-duty clean diesel commuter buses with a seating capacity of 45 or more to expand the current fleet of commuter buses from 11 to 14. These three commuter buses will be 40' to 45' in length.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed in 2010.

Cost

The total budget for this measure is $1,500,000.

Needed Resources and Authority

Yuba Sutter Transit

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-1H

TCM ID: TR-1H
Control Measure Title: YCTD Bus Replacement

Control Measure Description

This project will replace 4 40-ft 1993 CNG transit buses.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2010.

Cost

The total budget for this measure is $1,700,000.

Needed Resources and Authority

Yolo County Transportation District

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

Transit Operations (TR-2)

For these control measures, transit operations consists of 'transit operating assistance' for public transit operators. The operating assistance funds the difference between the costs of operating an eligible public transportation service and the revenues derived from system operations. Operating assistance funds can be used by public transit operators for any transit service that is open to the general public (i.e. it cannot be used for school bus or charter services). These funds can be used for fixed route transit service as well as for dial-a-ride or paratransit service. Some transit operators also use these funds for preventive maintenance of their transit vehicles.

List of funded transit operations include:

TCM ID	SACOG ID	Measure Title	Cost
TR-2	ELD19267	El Dorado Transit Operating Assistance	$580,000
	PLA25215	Roseville Operating Assistance	$145,000
	SAC24060	Elk Grove Operating Assistance	$1,800,000
	SAC24061	Folsom Operating Assistance	$745,000
	PAR10002	Paratransit Operating Assistance	$350,000
	SAC24173	Sacramento County Operating Assistance	$59,000
	REG16670	Regional Transit Operating Assistance	$364,000,000
	YCT18094	YCTD Operating Assistance	$1,100,000

CONTROL MEASURE NUMBER: TR-2A

TCM ID: TR-2A
Control Measure Title: El Dorado Transit Operating Assistance

Control Measure Description

Operating Assistance (FTA 5311 Cycle 26)

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2009.

Cost

The total budget for this measure is $580,000.

Needed Resources and Authority

El Dorado County Transit

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-2B

TCM ID: TR-2B
Control Measure Title: Roseville Operating Assistance

Control Measure Description

The City of Roseville Transit is applying for $71,514 in JARC funds in order to extend their weekday revenue hours on core fixed routes, as well as an extension of the hours on their Dial-A-Ride (DAR) services (and operate DAR on 3 current non-service holidays) to provide transportation to employees getting off work in the evening. The additional hours will also allow employees to connect with Placer County Transit and Sacramento Regional Transit in the evening.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This measure will be in effect through 2008.

Cost

The total budget for this measure is $145,000.

Needed Resources and Authority

City of Roseville Department of Public Works

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-2C

TCM ID: TR-2C
Control Measure Title: Elk Grove Operating Assistance

Control Measure Description

In Elk Grove, preventive maintenance for Elk Grove transit operations.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This measure will be in effect through 2011.

Cost

The total budget for this measure is $1,800,000.

Needed Resources and Authority

City of Elk Grove

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-2D

TCM ID: TR-2D
Control Measure Title: Folsom Operating Assistance

Control Measure Description

In Folsom, provide operating assistance for Folsom Stage Lines.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This measure will be in effect through 2011.

Cost

The total budget for this measure is $745,000.

Needed Resources and Authority

City of Folsom Department of Public Works

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-2E

TCM ID: TR-2E
Control Measure Title: Paratransit Operating Assistance

Control Measure Description

Paratransit, Inc. is asking for FFY 2006 JARC funds to continue to provide much needed and currently limited transportation options between low-income residential areas, and employment & job training centers, especially in the Point West area, in the retail areas around Arden Fair Mall, as well as other parts of Sacramento County. [Contains FFY 06 and 07 operating funds]

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This measure will be in effect through 2008.

Cost

The total budget for this measure is $350,000.

Needed Resources and Authority

Paratransit, Inc.

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-2F

TCM ID: TR-2F
Control Measure Title: Sacramento County Operating Assistance

Control Measure Description

Expand the South County Transit/Link Highway 99 bus services between the City of Lodi in San Joaquin County, Galt, Elk Grove, and the Regional Transit Transfer Center at Florin Mall. This route provides connections to the South County Transit Galt and Delta routes, Elk Grove Transit (e-TRAN), Sacramento Regional Transit, Lodi Grapeline transit service, and the San Joaquin Regional Transit District.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This measure will be in effect through 2008.

Cost

The total budget for this measure is $59,000.

Needed Resources and Authority

Sacramento County Department of Transportation

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-2G

TCM ID: TR-2G
Control Measure Title: Regional Transit Operating Assistance

Control Measure Description

Continued operation and maintenance of bus, light rail, and paratransit services.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This measure will be in effect through 2010.

Cost

The total budget for this measure is $364,000,000.

Needed Resources and Authority

Sacramento Regional Transit District

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

CONTROL MEASURE NUMBER: TR-2H

TCM ID: TR-2H
Control Measure Title: YCTD Operating Assistance

Control Measure Description

YCTD FY 08 Operating Assistance for ADA Paratransit Service

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This measure will be in effect through 2008.

Cost

The total budget for this measure is $1,100,000.

Needed Resources and Authority

Yolo County Transportation District

Eligible per the Clean Air Act as Amended, Section 108 (f) (i)

Air Quality Programs

CONTROL MEASURE NUMBER: AQ-1

TCM ID: AQ-1
Control Measure Title: Freeway Service Patrol

Control Measure Description

The Freeway Service Patrol (FSP) is a program which reduces freeway congestion by quickly finding and removing minor incidents from the freeway. Minor incidents include stalled cars and "fender-bender" accidents which, in total, account for more than half of all non-recurrent freeway congestion.

FSP's special team of tow truck drivers patrol the Sacramento freeways during the times when they are the busiest (the two peak commute periods, one in the morning and the other in the late afternoon). FSP drivers assist stranded motorists by helping them change a flat tire, providing a gallon of fuel, jump-starting their car, or making other minor repairs as needed. If FSP cannot quickly get the vehicle running, it is towed to a CHP-approved location off the freeway away from the fast-moving traffic and where the motorist can arrange for towing and/or repair.

The efforts of FSP to quickly remove minor freeway incidents during peak commute periods saves Sacramento motorists over 2 million wasted hours every year.
The Freeway Service Patrol program operates on the following Sacramento Freeways:

- Highway 99 - Grant Line Road to the Hwy 99/50 Interchange
- Capital City Freeway (Business 80) - Hwy 99/50 Interchange to the I-80 Interchange
- Interstate 5 - Elk Grove Blvd to the Highway 99 Interchange
- Highway 50 - Interstate 5 to Scott Road
- Interstate 80 - Interstate 5 to the Placer County Line; in Yolo County from Mace Blvd. to Jefferson Blvd.

The Freeway Service Patrol operates from 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:30 p.m. Monday through Friday (except holidays).

FSP is coordinated by the STA, California Highway Patrol, and Caltrans. Major funding is provided by the State of California and the Sacramento Area Council of Governments (SACOG). There is absolutely no charge to motorists for FSP services.

Most of the funding for our FSP Program comes from the State of California through the State Highway Account and from the Sacramento Area Council of Governments (SACOG) which staffs and manages the Capitol Valley Regional Service Authority for Freeways and Expressways (SAFE). The SAFE monies from SACOG serves as the

required by the local match obligation attached to the State monies. STA administration funds are also used to supplement funding.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This measure is implemented continuously through 2018.

Cost

The annual budget for this measure is $1,400,000.

Needed Resources and Authority

Sacramento Transportation Authority

Eligible per the Clean Air Act as Amended, Section 108 (f) (v)

CONTROL MEASURE NUMBER: AQ-2

TCM ID: AQ-2
Control Measure Title: SECAT

Control Measure Description

The Sacramento Emergency Clean Air & Transportation (SECAT) Program is a partnership between the Sacramento Metropolitan Air Quality Management District (SMAQMD) and the Sacramento Area Council of Governments (SACOG). The Program's goal is to reduce harmful emissions from on-road heavy-duty vehicles operating in the Sacramento region. This program was originally created by California Assembly Bill (AB) 2511 to help assure that the Sacramento region meet its commitments under the State Implementation Plan (SIP) for air quality attainment. The goal of the program is to reduce the nitrogen oxide emissions in our air from heavy-duty vehicles to meet the 2018 federal 8-hour ozone standard.

Emission Reductions

Total emission reductions taken for this measure will be:
NOx: 0.91 tons per day
ROG: 0.06 tons per day

Note: The reductions noted here include benefits from other funding streams.

Timeframe

This measure is implemented continuously through 2018.

Cost

The annual budget for this measure is $3,000,000.

Needed Resources and Authority

Sacramento Metropolitan Air Quality Management District

Eligible per the Clean Air Act as Amended, Section 108 (f) (xvi)

CONTROL MEASURE NUMBER: TCM-ONMS-ED-1 (AQ-3)

Control Measure Title: Notification for Spare the Air Days

Control Measure Description

The “Spare the Air” program is a year-round public education program with an episodic ozone reduction element during the summer ozone season, plus general awareness throughout the rest of the year. It is designed to inform people when air quality is unhealthy and achieve voluntary emission reductions by encouraging them to reduce vehicle trips. The Spare the Air program has operated in the Sacramento region since 1995 and has been funded largely by Congestion Mitigation and Air Quality funds.

The program includes but is not limited to a Web site (www.SpareTheAir.com), daily regional air quality forecasting, mapping of real time air quality data, production and airing of television and radio commercials, free Air Alert notifications, brochures and other printed materials distributed to the public & business community, elementary school assemblies, participation in community events throughout the region. This measure also commits to perform an annual awareness survey to judge the program's effectiveness.

This control measure seeks to reduce vehicle activity. The current Spare the Air program is included in the most recent approved MTP. This program currently costs approximately $600,000 per year and will require adjustments to account for inflationary cost increases. This measure is to continue the program funding and achieve at least the same effectiveness as today's program.

This is a transportation control measure (TCM) measure with its primary goal being to reduce passenger car VMT, trips, or both.

Targeted EIC Categories and Planning Inventory

This measure discourages vehicle use for light-duty vehicles. These 10-digit codes have been summarized into 3-digit EIC summary codes where most sub-codes are equally affected by the measure. The resting and diurnal evaporative emissions categories are not affected by the measure to the same degree. However, due to the small size of this portion of the inventory, the inclusion of EICs from the third column (reflecting resting and diurnal evaporative emissions) is unlikely to reduce the accuracy of the emission reduction results.

3-digit EIC	10-digit EICs equally affected by the measure	10-digit EICs excluded
710	7107011100, 7107061100, 7107081100, 7107121100, 7107141100, 7107180248, 7107205410, 7107311100, 7107341100, 7107361100, 7107401100, 7107421100, 7107440248, 7107465410, 7107611210, 7107641210, 7107660248, 7107685410	7107101100, 7107381100
722	7227011100, 7227061100, 7227081100, 7227121100, 7227141100, 7227180248, 7227205410, 7227311100, 7227341100, 7227361100, 7227401100, 7227421100, 7227440248, 7227465410, 7227611210, 7227641210, 7227660248, 7227685410	7227101100, 7227381100
723	7237011100, 7237061100, 7237081100, 7237121100, 7237141100, 7237180248, 7237205410, 7237311100, 7237341100, 7237361100, 7237401100, 7237421100, 7237440248, 7237465410, 7237611210, 7237641210, 7237660248, 7237685410	7237101100, 7237381100
750	7507011100, 7507061100, 7507081100, 7507121100, 7507141100, 7507180248, 7507205410, 7507311100, 7507341100, 7507361100, 7507401100, 7507421100, 7507440248, 7507465410, 7507611210, 7507641210, 7507660248, 7507685410	7507101100, 7507381100

2018

EIC Code	EIC Description	Fuel	Nonattainment Planning Inventory	
			NOx (tpd)	ROG (tpd)
710	Light Duty Passenger	All	4.16	7.27
722	Light Duty Truck 1	All	1.82	2.89
723	Light Duty Truck 2	All	4.36	5.72
750	Motorcycle	All	0.93	3.53
		Total	**11.27**	**19.40**

Emission Reductions

The current program (as surveyed in 2005) resulted in 1% of drivers decreasing their activity by 3.0 trips each due to outreach. The assessment of the benefits is made using the quantification methodology developed in consultation with the California Air Resources Board. This analysis uses public opinion surveys to estimate the number of drivers who purposefully reduced driving as a result of this program. The reductions here use survey results from 2005. We expect that the program will generate the same level of activity reduction in the future as the effectiveness noted above is consistent with the effectiveness in the 6 years prior to 2005. A formal methodology for conducting

the surveys and quantifying the emission benefits is expected to be subject to public review in 2009 and submitted as part of the State Implementation Plan.

From the California Highway Patrol website and the census bureau, the number of licensed drivers in the SFNA counties and partial counties was determined. The number of licensed drivers in SFNA is approximately 1,400,000 in 2004 based on CHP county estimates and apportioned counties in SFNA. Knowing the number of trips avoided, percent of drivers participating, and total number of drivers in the SFNA, we can calculate the number of trips avoided under the current program.

Year	Number of Licensed Drivers in SFNA	Avoided Trips under Current Program
2018	1,847,503	55,425

The emissions benefits are estimated based on the program's total avoided trips compared to total trips in each year and applying this ratio to the appropriate emission events (such as hot starts). Emission reductions are shown below for 2018 for light duty passenger vehicles, light duty trucks 1, light duty trucks 2, and motorcycles.

2018

EIC Code	NOx		ROG	
	Tpd	%	Tpd	%
710	0.017	0.40%	0.021	0.29%
722	0.007	0.40%	0.009	0.31%
723	0.018	0.40%	0.018	0.31%
750	0.004	0.40%	0.011	0.31%
TOTAL	**0.046**	**0.40%**	**0.059**	**0.30%**

Timeframe

Measure is implemented 2008-2018.

Cost and Cost Effectiveness

The cost effectiveness of the current program was estimated based on the 2006 budget of approximately $600,000.

	2018
	X
Pollutant	**Lifetime Cost Effectiveness ($/ton)**
NO_x	$ 1,293,071
ROG	$ 1,007,279
NOx + ROG	$ 566,211

Note that this cost effectiveness is much higher than would generally be acceptable. This measure provides other valuable benefits including; 1) education to motivate behavior changes which result in longer term benefits that aren't quantified here 2) protection of public health by providing tools to media, businesses, and individuals to take action during high pollution episodes, and 3) building and maintaining public support for other emission-reducing measures such as Blueprint, rules and ordinances that air district Boards, the SACOG Board, and local jurisdictions will consider to fulfill their SIP obligations.

Needed Resources and Authority

Potential Implementing Agency	Agency Type	Authority Origin
SMAQMD	Local	Coordinates the program on behalf of the air districts in the SFNA. **§ 41014. Programs or projects to control transportation emission** The Sacramento district may conduct public education, marketing, demonstration, monitoring, research, and evaluation programs or projects with respect to transportation emission control measures. www.arb.ca.gov/bluebook/bb06/hea41014/hea_41014.htm
All SFNA districts and SACOG	Local/Regional	These agencies provide funding for the program. SACOG is the regional agency that coordinates flow of federal transportation funding (currently Congestion Management and Air Quality) that supports this program. Air districts provide the local match funding required by the funding source.

References

Lori Kobza, SMAQMD staff. August 2006.

CA CHP. 2004 Annual Report of Fatal and Injury Motor Vehicle Traffic Collisions: Statewide Integrated Traffic Records System (SWITRS). http://www.chp.ca.gov/switrs/#section3. Viewed July 2006.

"Sacramento Region Air Quality Basin: "Spare the Air" Campaign 2005 Evaluation Final Research Report", Aurora Research Group 2006.

U.S. Census Bureau Data.

Sacramento MTP 2006 List of Projects.

Cleaner Air Partnership letter, "Test Comparison of ARB and CAP Method for Quantifying Emission Reductions from Spare the Air Program, Jude Lamare, February 5, 2003.

Regional Funding Programs

In July 2002, SACOG adopted the Metropolitan Transportation Plan for 2025 (MTP 2025). This 23-year, $22 billion plan for the region included four federally funded programs to be used for regional transportation and related priorities that implement the goals of the MTP. The four programs, with 23-year funding amounts are:

- Air Quality $180 million
- Bicycle and Pedestrian $350 million
- Transportation Demand Management $ 44 million
- Community Design $500 million

When the MTP 2025 was adopted, it was the intent of SACOG to continue these four regional funding programs into the foreseeable future in each successive MTP. Since the adoption of the MTP 2025, SACOG has adopted several other MTPs, and the funding programs have been continued.

Air Quality Funding Program (FP-1)

The SACOG region is within a non-attainment area for ozone under federal air quality laws. Because the region must meet stringent federal air quality requirements in the Rate of Progress SIP, SACOG will place highest priority on the selection of cost-effective transportation projects that contribute the most to reaching attainment.

This air quality funding program includes funding air quality programs: Freeway Service Patrol, SECAT, and Spare The Air.

Bicycle and Pedestrian Funding Program (FP-2)

The purpose of this funding program is to provide facilities for walking and biking in the cities and towns of the region, or to provide connections between them. Bicycle and pedestrian facilities in new developments are expected to be paid for by developers in cooperation with cities and counties. Facilities that serve strictly recreational trips or equestrians are also expected to obtain other funding.

List of projects include:

TCM ID	SACOG ID	Measure Title	Cost
FP-2	Adopted Projects from SACOG's Regional Bike/Pedestrian Funding Program		
	6	City of Sacramento: I-80 Bike/Ped Bridge at the West Canal	$6,600,000
	12	City of Folsom Bikestation and "Bikelink" On-Demand Long-Term Class I Bike Parking at Transit Stations	$178,000
	14	City of Elk Grove: Elk Grove Creek Bike/Ped Bridge Crossing at SR 99	$5,600,000
	13	Retrofit Yolobus bus fleet with higher capacity bike racks	$67,500

CONTROL MEASURE NUMBER: FP-2A

TCM ID: FP-2A
Control Measure Title: I-80 Bike/Ped Bridge at the West Canal

Control Measure Description

Construct bike/pedestrian bridge across I-80 at the West Canal, as well as across the West Canal.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2012.

Cost

The total budget for this measure is $6,600,000

Needed Resources and Authority

City of Sacramento Department of Transportation

Eligible per the Clean Air Act as Amended, Section 108 (f) (x & xv)

CONTROL MEASURE NUMBER: FP-2B

TCM ID: FP-2B
Control Measure Title: City of Folsom Bikestation and "Bikelink" On-Demand Long-Term Class I Bike Parking at Transit Stations

Control Measure Description

To retrofit and install on-demand long-term bike parking at Folsom Light Rail stations and new parking garage.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2010.

Cost

The total budget for this measure is $178,000

Needed Resources and Authority

City of Folsom Department of Public Works

Eligible per the Clean Air Act as Amended, Section 108 (f) (x & xv)

CONTROL MEASURE NUMBER: FP-2C

TCM ID: FP-2C
Control Measure Title: City of Elk Grove: Elk Grove Creek Bike/Ped Bridge Crossing at SR 99

Control Measure Description

Extend the existing Class I bikeway from Laguna Springs Dr cross over W. Stockton Blvd/SR-99 and E Stockton Blvd and connect to Emerald Park Drive. Project includes a bike/pedestrian overcrossing at State Route 99.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2011.

Cost

The total budget for this measure is $5,600,000

Needed Resources and Authority

City of Elk Grove

Eligible per the Clean Air Act as Amended, Section 108 (f) (x & xv)

CONTROL MEASURE NUMBER: FP-2D

TCM ID: FP-2D
Control Measure Title: Retrofit Yolobus bus fleet with higher capacity bike racks.

Control Measure Description

Replace bike racks with higher capacity (3 bicycle) bike racks on 40-45 buses; plus a slide out double bike rack on up to two over-the-road coaches.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2011.

Cost

The total budget for this measure is $67,500

Needed Resources and Authority

Yolo County Transportation District

Eligible per the Clean Air Act as Amended, Section 108 (f) (x & xv)

Transportation Demand Management Funding Program (FP-3)

Transportation Demand Management (TDM) is composed of strategies that can lower the demands made on the road and highway system and improve air quality by encouraging the use of carpooling, vanpooling, public transit, bicycling and walking. SACOG currently operates the regional ridesharing database and performs a number of marketing activities that publicize TDM strategies to the general public. SACOG also sponsors the TDM Task Force, a group of Transportation Management Associations (TMAs) and other organizations that perform or promote TDM services for employers and residents of the region.

The goal of this funding program is to reduce single-occupant vehicle trips in the Sacramento region using TDM strategies and measure the effects of these strategies.

List of projects include:

TCM ID	SACOG ID	Measure Title	Cost
FP-3	VAR56025	SACOG Regional Rideshare Program	$1,200,000 annually through 2018

CONTROL MEASURE NUMBER: FP-3

TCM ID: FP-3
Control Measure Title: SACOG Regional Rideshare Program

Control Measure Description

Provide ride matching services for the Sacramento metropolitan area; cooperate with local agencies in El Dorado and Placer counties on outreach efforts; manage regional programs supporting alternatives to driving alone; provide funding for 12 Transportation Management Organizations (TMOs) in region through grants.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This measure is implemented continuously through 2018.

Cost

$1,200,000 per year through 2018.

Needed Resources and Authority

Sacramento Area Council of Governments

Eligible per the Clean Air Act as Amended, Section 108 (f) (vii & xiv)

Community Design Funding Programs (FP-4)

The overall purpose of the Community Design program is to provide support for planning and capital development projects that promote the Blueprint Project principles.

The Community Design Program supports implementation of the Blueprint Project with financial incentives to local governments. Grants are awarded to projects sponsored by qualified public agencies in the SACOG region. These projects must support specific development or planning projects that conform to the seven Blueprint Principles:

- Transportation choices;
- Housing diversity;
- Compact development;
- Mixed land uses;
- Use of existing assets;
- Natural resource protection; and
- Quality design.

The MTP for 2025 authorized the program through 2025. The intent of the Community Design program is to use regional transportation funding to promote the construction of land use developments (or land use and projects) that lead to fewer vehicle miles traveled and more walking, biking and transit usage. The program results from the recognition that land use influences travel behavior and can be a powerful tool to improve the efficiency and effectiveness of the regional transportation system. If it is convenient for people to travel to common destinations by walking, biking, or public transit, we can reap air quality and congestion-relief benefits at the local and regional scale.

List of projects include:

TCM ID	SACOG ID	Measure Title	Cost
FP-4	Adopted Projects from SACOG's Regional Community Design Funding Program		
	5	City of Marysville: East 10th Street and Ramirez Street Intersection Improvement	$510,000
	6	City of Rancho Cordova: Folsom Boulevard Complete Streets	$12,200,000
	11	Sacramento County: Complete Streets for Freedom Park Drive and North Watt Avenue	$6,400,000
	16	City of Woodland: Lemen, North, East Streets Intersection Realignment	$2,600,000

CONTROL MEASURE NUMBER: FP-4A

TCM ID: FP-4A
Control Measure Title: City of Marysville: East 10th Street and Ramirez Street Intersection Improvement

Control Measure Description

Install a new traffic signal, complete pedestrian improvements and landscaping improvements (community design portion), complete a road rehabilitation in and adjacent to the intersection and complete channelization changes to the East 10th and Ramirez Intersection in Marysville.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2011.

Cost

The total budget for this measure is $510,000

Needed Resources and Authority

City of Marysville Department of Public Works

Eligible per the Clean Air Act as Amended, Section 108 (f) (x & xv)

CONTROL MEASURE NUMBER: FP-4B

TCM ID: FP-4B
Control Measure Title: City of Rancho Cordova: Folsom Blvd. Enhancements & SR2S Phase 2

Control Measure Description

Safe Routes to School (SR2S) Install landscaping and streetscaping on Folsom Blvd., between Rod Beaudry Dr. and Sunrise Blvd.: to provide safe bicycle and pedestrian access to transit from Bradshaw Road to Rio Del Oro Parkway. The CMAQ and RSTP funding in 2009/10 is to provide complete street improvements at the east end of Folsom Blvd accommodating Kinney High School and the light rail station. Improvements include bicycle lanes and pedestrian facilities.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2012.

Cost

The total budget for this measure is $12,200,000.

Needed Resources and Authority

City of Rancho Cordova

Eligible per the Clean Air Act as Amended, Section 108 (f) (x & xv)

CONTROL MEASURE NUMBER: FP-4C

TCM ID: FP-4C
Control Measure Title: Sacramento County: Complete Streets for Freedom Park Drive and North Watt Avenue

Control Measure Description

In Sacramento County, Freedom Park Drive, from 32nd St. to Watt Ave and Watt Ave, from Don Julio Blvd to Karl Dr on the west side of the roadway in the community of North Highlands. Construct pedestrian and streetscape improvements to serve as a gateway into adjacent McClellan Park.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2011.

Cost

The total budget for this measure is $6,400,000.

Needed Resources and Authority

Sacramento County Department of Transportation

Eligible per the Clean Air Act as Amended, Section 108 (f) (x & xv)

CONTROL MEASURE NUMBER: FP-4D

TCM ID: FP-4D
Control Measure Title: City of Woodland: Lemen, North, East Streets Intersection Realignment

Control Measure Description

In Woodland, Lemen Avenue and North Street at East Street: realign Lemen Avenue to connect with North Street at East Street (Phase 1).

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is expected to be completed in 2011.

Cost

The total budget for this project is $2,600,000.

Needed Resources and Authority

City of Woodland Department of Public Works

Eligible per the Clean Air Act as Amended, Section 108 (f) (x & xv)

Miscellaneous

CONTROL MEASURE NUMBER: M-2

TCM ID: M-2
Control Measure Title: Light Rail Grade Separation at Watt Avenue and Folsom Boulevard

Control Measure Description

In Sacramento County, Regional Transit Light Rail tracks south of Folsom Blvd on Watt Ave, grade separate the rail tracks over Watt Ave.

Emissions Reductions

ROG: 8,203 lbs per year
NOx: 2,958 lbs per year
Cost Effectiveness: $12 per lb

Timeframe

This project is expected to be completed in 2009.

Cost

The total budget for this measure is $25,149,715.

Needed Resources and Authority

Sacramento County Department of Transportation

Eligible per the Clean Air Act as Amended, Section 108 (f) (v)

Research and Policy Development Further Study Measures

These studies are included as TCMs because they are expected to eventually result in policies that are likely to help improve the region's air quality. Exactly what those policies will be or to what extent they will lead to improved air quality is unknown at this time. Because of this, and since these are included as studies only, no associated emissions reduction benefits are included as part of this SIP. Emissions reductions for future adopted policies would be accounted for in future SIPs. The only Research and Policy Development TCMs intended to be implemented as policies for the purposes of the SIP are those that identify "adopting" a policy. The following are the recommended research and policy development TCMs:

- Blueprint Implementation & Planning Technical Assistance
- Develop Rural-Urban Connections Strategy & Best Practices Toolkit
- Research a Transportation Pricing Policy
- Research a Regional Parking Regulation Policy to Provide Incentives for Use of Alternative Modes
- Adopt a Complete Streets Policy
- Initiate a Complete Streets Technical Assistance Program
- Adopt a Safe Routes to School Policy and Implement Pilot Program

CONTROL MEASURE NUMBER: RP-1

TCM ID: RP-1
Control Measure Title: Blueprint Implementation & Planning Technical Assistance

Control Measure Description

SACOG has no land use authority and cannot directly affect the pattern that future land uses will take. However, it can strive to implement the Blueprint Vision through existing and new programs. SACOG will continue to fund the regional Community Design Grant Program which funds transportation projects that are part of mixed-use, higher density developments. The Community Design component of the MTP for 2035 could encourage growth patterns that promote alternatives to the automobile by creating mixed-use developments that would include residences, shops, parks, and civic institutions linked to pedestrian-and-bicycle friendly public transportation centers. Projects would be awarded a Community Design grant if they incorporate design features such as improved street connectivity, public amenities, and a concentration of residences and jobs in proximity to transit routes. Implementation of this strategy could result in more balanced land use conditions throughout the region and less land converted to urban uses due to the higher-density, infill focus of the grant program.

SACOG's other Blueprint Implementation Programs include development of a Form-Based Code handbook, Blueprint Development Reviews, and Technical Assistance to Local Governments.

- *Form-Based Code Handbook.* Form-based zoning codes are an approach to regulate development through the use of graphics and standards to define the form and scale of new development, while at the same time making the uses allowed in any given area much more flexible than a typical zoning code. This is in contrast to conventional development regulations, which primarily utilize only narrative descriptions. Form-based codes (FBCs) typically provide for significant public input during their creation. The handbook will assist local jurisdictions in implementing form-based codes in areas where they are trying to encourage Smart Growth development (mixed-use, compact development with high street connectivity).

- *Blueprint Development Review.* At the request of a local government SACOG will evaluate a proposed development project for its consistency with the Blueprint Principles and Vision Map.

- *Technical Assistance to Local Governments.* At the request of a local government, SACOG will provide technical planning assistance in the development or update of general plans, community plans, specific plans, etc.

This assistance can include analysis of the Blueprint Vision map or training in use of modeling tools.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed in 2012.

Cost

The total budget for this measure is $450,000

Needed Resources and Authority

Sacramento Area Council of Governments

Eligible per the Clean Air Act as Amended, Section 108 (f) (xiv)

CONTROL MEASURE NUMBER: RP-2

TCM ID: RP-2
Control Measure Title: Rural Urban Connections Strategy & Best Practices Toolkit

Control Measure Description

Within 3 years of adoption of the MTP 2035, SACOG will develop a Rural-Urban Connections Strategy, to expand on and help to support implementation of, the Blueprint growth strategy and the MTP. The Rural-Urban Connections Strategy will utilize state-of-the-practice data collection, modeling, research and participation practices to develop a toolkit of best practices to promote land use practices in rural areas that are economically viable for land owners and local governments and environmentally sustainable. Issues to be addressed include, but are not limited, to: agricultural practices, natural resource protection, development practices that support agricultural and natural resource values, infrastructure needs in rural areas, energy production, and methods to promote jobs-housing balance (with a specific emphasis on effective jobs-generating practices in appropriate areas.) The toolkit of best practices will include assessment of vehicle miles traveled and air emissions, including greenhouse gases. Building on local conservation efforts, the strategy will identify areas where mitigation for development should be directed to maximize the benefit of such acquisitions. It is also expected that this project will result in programs that will help reduce the need for single-occupant vehicle travel, relative to commuting in particular. Another important outcome will be the identification of environmental services, such as flood control, groundwater recharge, and carbon sequestration, which are enhanced through a comprehensive approach to urban and rural planning. It is anticipated that the Rural-Urban Connections Strategy effort will be completed within 3 years.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed by 2012.

Cost

The total budget for this measure is $1,000,000

Needed Resources and Authority

Sacramento Area Council of Governments

Eligible per the Clean Air Act as Amended, Section 108 (f) (xiv)

CONTROL MEASURE NUMBER: RP-3

TCM ID: RP-3
Control Measure Title: Research a Transportation Pricing Policy

Control Measure Description

SACOG will prepare an analysis on the impacts and viability of using pricing policies with the transit system and selected portions of the road network to encourage people to drive less and use transit, walking and bicycling modes more. This study will identify strategies to reduce emissions that will include, but are not limited to, free or reduced transit fares during "spare the air" days; fare-free zones on the transit system; transit vouchers; days on which transit is free; congestion pricing options for portions of the road system, such as tolls on freeways and highways; and congestion-pricing to enter certain high-traffic areas served by public transit (e.g., downtown Sacramento).

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed by 2012.

Cost

The total budget for this measure is $300,000.

Needed Resources and Authority

Sacramento Area Council of Governments

Eligible per the Clean Air Act as Amended, Section 108 (f) (vii)

CONTROL MEASURE NUMBER: RP-4

TCM ID: RP-4
Control Measure Title: Research a Regional Parking Regulation Policy to Provide Incentives for Use of Alternative Modes

Control Measure Description

SACOG will prepare an analysis and perform travel modeling and air emissions analysis to identify a range of alternatives for local governments to use to modify current parking regulations to create incentives for people to use available transit, walking and biking options and neighborhood electric vehicles. The analysis will address impacts of parking maximum and minimum requirements, shared parking systems, and parking pricing on travel behavior and air emissions. The study will also include the potential for application of alternative energy technologies, such as solar shading and power generation, at both structured and surface parking facilities. The I-PLACE^{3}S energy module will be used to support this research. This study will be conducted cooperatively with key partners such as the air districts and local governments within the region.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed in 2012.

Cost

The total budget for this measure is $350,000.

Needed Resources and Authority

Sacramento Area Council of Governments

Eligible per the Clean Air Act as Amended, Section 108 (f) (vi)

CONTROL MEASURE NUMBER: RP-5

TCM ID: RP-5
Control Measure Title: Adopt a "Complete Streets" Policy

Control Measure Description

SACOG will adopt a "Complete Streets" policy to require that applicants for SACOG regional funding programs demonstrate that the planning, design, construction and maintenance of roadway and transit facilities include the needs of all transportation users – pedestrians, bicyclists, the disabled, transit users, and motorists. Examples include facilities (sidewalks, bike lanes, etc.) that allow for safe walking, biking and wheelchair access along roadways. Through its Complete Streets policy, SACOG will require that applicants for local funding programs administered by SACOG demonstrate that their project is multi-modal and will consider the needs of bicyclists, pedestrians and disabled travelers. SACOG's policy will be consistent with current, adopted regional and local plans, and in accordance with locally adopted policies such as Sacramento County's Measure A program that earmarks funds for multi-modal improvements (highway, street, and road construction; highway, street, and road maintenance; bus and light rail capital and operations; improved transportation services for elderly and handicapped persons; and transportation-related air quality programs). In the absence of such plans, federal, state, and local standards and guidelines should be used to determine appropriate accommodations for pedestrians, bicyclists, and disabled travelers.

The policy will also require applicants for State funding programs to ensure that projects are consistent with *Caltrans Directive 64*, which states that the California Department of Transportation, "fully considers the needs of non-motorized travelers (including pedestrians, bicyclists and persons with disabilities) in all programming, planning, maintenance, construction, operations and project development activities and products." The policy will also require that applicants for federal funding programs ensure that projects are consistent with the United States Department of Transportation Policy Statement on "Accommodating Bicyclists and Pedestrians in Transportation Projects".

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed in 2012.

Cost

The total budget for this measure is $50,000.

Needed Resources and Authority

Sacramento Area Council of Governments

Eligible per the Clean Air Act as Amended, Section 108 (f) (x)

CONTROL MEASURE NUMBER: RP-6

TCM ID: RP-6
Control Measure Title: Initiate a "Complete Streets" Technical Assistance Program

Control Measure Description

To implement the Complete Streets policy, SACOG will review and analyze the practices of local governments within the SACOG region and around the nation to identify appropriate "Best Practices" for complete street design within the SACOG region. "Complete Streets" means design of the right-of-way for all relevant modes of travel, including pedestrian, bicyclists and transit as well as automobiles. The best practices will address the functional needs of different types of streets, including arterials, major and minor collectors, and local streets. SACOG will develop a curriculum, conduct educational seminars/workshops to disseminate the best practices information and provide technical assistance for local governments (public works and planning staff, planning commissioners and elected officials) and members of the private land use development, planning, engineering and design communities to assist the design and construction of "Complete Streets" throughout the MTP Plan Area. SACOG will also provide technical assistance to local governments on a case-by-case basis, as requested, to help them to successfully implement this concept.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed in 2012.

Cost

The total budget for this measure is $100,000.

Needed Resources and Authority

Sacramento Area Council of Governments

Eligible per the Clean Air Act as Amended, Section 108 (f) (x)

CONTROL MEASURE NUMBER: RP-7

TCM ID: RP-7
Control Measure Title: Adopt a "Safe Routes to School" Policy and Implement a Pilot Program

Control Measure Description

Within 3 years from the adoption of the MTP 2035, SACOG will adopt a Safe Routes to Schools (SRTS) policy to promote the practice of safe bicycling and walking to and from schools throughout the MTP Plan Area in order to reduce traffic congestion, improve air quality, and enhance neighborhood safety. There are both federal and state funding programs for SRTS. As a regional agency, SACOG is an eligible applicant under the Federal program for both infrastructure and non-infrastructure projects. Under the state program, only cities and counties are eligible applicants for infrastructure projects (Caltrans, 2007). With the passage of the Safe Routes to School bill (AB 1475), a "one-third" distribution formula for federal safety funds to be allocated in equal amounts to: state highways, local roads, and Safe Routes to School (SRTS) construction program was established.

SACOG will also join the Safe Routes to School National Partnership, a network of more than 300 nonprofit organizations, government agencies, schools, and professionals working together to advance the Safe Routes to School movement in the United States.

In addition, SACOG will host a regional workshop for all cities, counties, school districts and transit operators within the region to identify other potential opportunities for collaboration that would reduce greenhouse gas impacts. At a minimum, the issues discussed will include the findings from the Safe Routes to School activities described above, opportunities to increase the number of students with bus or other transit options to get to and from school, and integrating school siting practices with goals of promoting walkable neighborhoods with a wide range of easily accessible services. This workshop will be patterned after the "Stretching Community Dollars Guidebook" and workshop series that the SACOG Executive Director wrote for the California City, County, Schools (CCS) Partnership (a non-profit organization of the League of California Cities, California State Association of Counties and California School Boards Association). That workshop series is specifically designed to help these three local government entities to take maximum advantage of opportunities for collaboration. SACOG will ask the CCS Partnership to co-host the event, and offer to make the materials prepared for the event available to the CCS Partnership for use in its on-going workshop series around the state.

Emission Reductions

No emission reductions are being claimed for this measure in the SIP.

Timeframe

This project is estimated to be completed in 2012.

Cost

The total budget for this measure is $200,000.

Needed Resources and Authority

Sacramento Area Council of Governments

The federal Safe Routes to School program (SRTS) was authorized by Section 1404 of the *SAFETEA-LU (the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users*). SACOG will also obtain federal funds from the Federal Highway Administration through Caltrans to implement at least one SRTS pilot program within the MTP Plan Area.

The State-legislated Safe Routes to School program (SR2S) is contained in Streets & Highways Code Section 2330-2334. SACOG will encourage its member agencies to apply for funds available through the State Highway Safety Improvement fund for eligible infrastructure projects in order to improve bicycle and pedestrian safety for schoolchildren.

Eligible per the Clean Air Act as Amended, Section 108 (f) (xiv)

Attachment A

Potential Transportation Control Measures
Clean Air Act, Section 108 (f)

i) Programs for improved public transit;

ii) Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high-occupancy vehicles (HOV);

iii) Employer-based transportation management plans, including incentives;

iv) Trip-reduction ordinances;

v) Traffic flow improvement programs that achieve emissions reductions;

vi) Fringe and transportation corridor parking facilities serving multiple-occupancy vehicle programs or transit service;

vii) Programs to limit or restrict vehicle use in downtown areas or other areas of emissions concentration particularly during periods of peak use;

viii) Programs for the provision of all forms of high-occupancy, shared-rides;

ix) Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;

x) Programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;

xi) Programs to control extended idling of vehicles;

xii) Reducing emissions from extreme cold-start conditions;

xiii) Employer-sponsored programs to permit flexible work schedules;

xiv) Programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;

xv) Programs for new construction and major reconstruction of paths, tracks, or areas solely for use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest. For purposes of this clause, the Administrator shall also consult with the Secretary of the Interior; and

xvi) Programs to encourage removal of pre-1980 vehicles.

Attachment A-1

Substitution of Transportation Control Measures

SAFETEA-LU section 6011(d) reads as follows:

(d) Substitution of Transportation Control Measures.--Section 176(c) of the Clean Air Act (42 U.S.C. 7506(c)) (as amended by subsection (c)) is amended by inserting after paragraph (7) the following:

"(8) Substitution of transportation control measures.—

- "(A) In general.--Transportation control measures that are specified in an implementation plan may be replaced or added to the implementation plan with alternate or additional transportation control measures-
    - o "(i) if the substitute measures achieve equivalent or greater emissions reductions than the control measure to be replaced, as demonstrated with an emissions impact analysis that is consistent with the current methodology used for evaluating the replaced control measure in the implementation plan;
      "(ii) if the substitute control measures are implemented-
        - ▪ "(I) in accordance with a schedule that is consistent with the schedule provided for control measures in the implementation plan; or
          "(II) if the implementation plan date for implementation of the control measure to be replaced has passed, as soon as practicable after the implementation plan date but not later than the date on which emission reductions are necessary to achieve the purpose of the implementation plan;

      "(iii) if the substitute and additional control measures are accompanied with evidence of adequate personnel and funding and authority under State or local law to implement, monitor, and enforce the control measures;
      "(iv) if the substitute and additional control measures were developed through a collaborative process that included-
        - ▪ "(I) participation by representatives of all affected jurisdictions (including local air pollution control agencies, the State air pollution control agency, and State and local transportation agencies);
          "(II) consultation with the Administrator; and
          "(III) reasonable public notice and opportunity for comment; and

"(v) if the metropolitan planning organization, State air pollution control agency, and the Administrator concur with the equivalency of the substitute or additional control measures.

- "(B) Adoption.-
    - "(i) Concurrence by the metropolitan planning organization, State air pollution control agency and the Administrator as required by subparagraph (A)(v) shall constitute adoption of the substitute or additional control measures so long as the requirements of subparagraphs (A)(i), (A)(ii), (A)(iii) and (A)(iv) are met.
      "(ii) Once adopted, the substitute or additional control measures become, by operation of law, part of the state implementation plan and become federally enforceable.
      "(iii) Within 90 days of its concurrence under subparagraph (A)(v), the State air pollution control agency shall submit the substitute or additional control measure to the Administrator for incorporation in the codification of the applicable implementation plan. Notwithstanding any other provision of this Act, no additional State process shall be necessary to support such revision to the applicable plan.

- "(C) No requirement for express permission.--The substitution or addition of a transportation control measure in accordance with this paragraph and the funding or approval of such a control measure shall not be contingent on the existence of any provision in the applicable implementation plan that expressly permits such a substitution or addition.

- "(D) No requirement for new conformity determination.--The substitution or addition of a transportation control measure in accordance with this paragraph shall not require-
    - "(i) a new conformity determination for the transportation plan; or
      "(ii) a revision of the implementation plan.

- "(E) Continuation of control measure being replaced.--A control measure that is being replaced by a substitute control measure under this paragraph shall remain in effect until the substitute control measure is adopted by the State pursuant to subparagraph (B).

- "(F) Effect of adoption.--Adoption of a substitute control measure shall constitute rescission of the previously applicable control measure."

Reasonably Available Control Measure (RACM) Analysis

Background

The Sacramento region has been designated by the U.S. Environmental Protection Agency (EPA) as a non-attainment area under the federal 8-hour ozone standard. The region is currently in the process of preparing a new state implementation plan (SIP) to demonstrate how it will reach attainment of the 8-hour ozone standard. Section 172 (c)(1) of the Clean Air Act requires that state implementations plans include an analysis of what are known as reasonably available control measures (RACM). The purpose of this analysis is to ensure that the Sacramento Region is implementing all reasonably available control measures, as required to demonstrate attainment of the 8-hour ozone standard as expeditiously as practicable. The Sacramento Area Council of Governments (SACOG) conducted this RACM analysis in conjunction with the Sacramento Metropolitan Air Quality Management District (SMAQMD).[20]

RACM Analysis Overview and Criteria

In its 1992 General Preamble for implementation of the 1990 Clean Air Act Amendments, EPA explains that it interprets Section 172 (c)(1) as a requirement that states incorporate in a SIP all reasonably available control measures that would advance a region's attainment date. However, regions are obligated to adopt only those measures that are reasonably available for implementation in light of local circumstances. In the Preamble, EPA laid out guidelines to help states determine which measures should be considered reasonably available. These guidelines are summarized in the sections that follow.

Implementation Date

Implementation of a measure or a group of measures is typically expected to assist the region in advancing the date of attainment at least one year. With the current attainment demonstration year set at 2018, this would require a reduction in ozone levels by 2017.

Enforceability

Once a transportation control measure is added to a SIP, it becomes legally binding. If the state or local government does not have the authority necessary to implement or enforce a measure, the measure is not creditable in the SIP and therefore cannot be declared a RACM. A measure is considered enforceable when all state or local government agencies responsible for funding, implementation and enforcement of the measure have committed in writing to its implementation and enforcement.

[20] Yolo-Solano AQMD staff consulted with the Association of Bay Area Governments (ABAG) to identify any TCMs that might be implemented in the YSAQMD portion of Solano County, and determined that ABAG is not committing to any TCMs in that area. (YSAQMD, Matt Jones e-mail 12-10-08)

Technological Feasibility

All technology-based control measures must include technologies that have been verified by EPA. The region cannot take SIP credit for technologies that do not produce EPA-verifiable results.

Economic Feasibility and Cost Effectiveness

Another key RACM test is whether or not the measures are economically feasible. This test analyzes both the cost-effectiveness of the proposed measure, as well as the overall availability of funding to fully implement the measure as proposed. In many cases, a finding of "not economically feasible" is a result of insufficient resources to fully implement the measure as proposed. The Transportation Research Board in recent research set a range of $10,000-$20,000 per ton of pollution reduced (in 2000 dollars), below which measures can be considered to be economically feasible.[21] The Washington D.C. Metropolitan Area set a threshold of $3,500-$5,000 per ton as part of their 2007 RACM analysis. The Sacramento Area Metropolitan Air Quality Management District has imposed a variety of rules whose cost-effectiveness has ranged from $2,000-$34,000 per ton. For the purposes of this RACM analysis, $34,000 per ton will be used as the cost-effectiveness threshold.

Substantial and Widespread Adverse Impacts

The potential exists for some candidate control measures to cause substantial and widespread adverse impacts to a particular social group or sector of the economy. From an environmental justice standpoint, any measures that are found to cause substantial or widespread adverse impacts will not be considered RACM.

Advancing the Attainment Date

Another test is whether or not the collective total of available regional and local control measures that are considered but not proposed to be adopted (including stationary, area, land use, and mobile source measures) would be sufficient to advance the attainment date by one year (one full ozone season earlier than expected). This analysis was conducted by the air districts using information supplied by SACOG staff. If the test results would not advance the attainment date, then the measures not being proposed for adoption would not be considered RACM.

[21] Transportation Research Board: The Congestion Mitigation and Air Quality Improvement Program, Assessing 10 Years of Experience, Special Report 264. TRB, National Research Council, Washington D.c., 2002.

Intensive and Costly Effort

Considered altogether, the cost of implementing the proposed measures cannot exceed the resources available to the region.[22]

Analysis Methodology

SACOG and the Sacramento Metropolitan Air Quality Management District (SMAQMD) have jointly compiled a list of potential control measures from the following sources:

- Clean Air Act Section 108(f) measures
- Measures considered in the San Francisco Bay Area, San Joaquin Valley and South Coast Air Quality Management District RACM analyses
- Air District Workshop
- The MTP 2035 Draft Project List

TCM Development Process

The first step was to develop a list of transportation control measures for possible consideration. This list was developed from a variety of sources: prior Sacramento Area RACM processes, TCM-eligible projects from the draft MTP for 2035, other regions' SIPs and measures suggested by partner agencies and the public through the interagency consultation process. SACOG staff reviewed over 1,400 projects from the draft MTP 2035 project list and considered those that met the CAA TCM eligibility requirements as part of the potential list of TCMs.

In addition, other area's 8-hour ozone SIPs were reviewed and cross-referenced against measures already on the list. The other 8-hour ozone SIPs reviewed includes the following:

2005 Bay Area Ozone Strategy
2007 South Coast 8-Hour Ozone Plan
2007 San Joaquin Valley 8-Hour Ozone Plan
2007 San Diego County 8-Hour Ozone Attainment Plan
2007 Metropolitan Washington 8-Hour Ozone SIP
2007 Cecil County MD 8-Hour Ozone SIP

The TCM development process and draft lists of potential TCMs were presented at public meetings on ten different dates from September 10, 2007 – March 6, 2008. These included discussions at SACOG's Regional Planning Partnership (RPP), Land Use, Housing and Air Quality Committee (subsequently the Climate and Air Quality Committee), the Transportation Committee, the Flood Management Committee and the Government Relations and Public Affairs Committee, as well as the SACOG Board of

[22] RACM Analysis for Four Serious Areas Designated Nonattainment for 1-hr Ozone NAAQS. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, and Office of Transportation and Air Quality, Ann Arbor. October 12, 2000.

Directors. This process resulted in a thorough list of control measures for consideration as potential TCMs, which could be considered as a Reasonably Available Control Measure or RACM.

These measures were evaluated using the criteria noted above, and are documented in Attachment A-2.

RACM Determination and Analysis Results

Attachment A-2 lists the potential control measures, organized by category, and notes whether they are considered RACM, and if not, the reasons they were not found to be RACM. The measures that have been determined to be RACM will be included in the SIP as TCMs.

Attachment A-2

Control Measure Number	Control Measure Title and Strategy Type	Conclusions, Comments, and Status
Recommended and Proposed Transportation Control Measures		
ITS-1	Arden Way "Smart Corridor" from Del Paso to Watt	Expected to be completed in 2008
ITS-2	Sacramento Traffic Operations Center	Expected to be completed in 2009
ITS-3	Watt Avenue Phase 3 Smart Corridor	Expected to be completed in 2009
ITS-4	Sacramento Transportation Area Network (STARNET) Implementation	Expected to be operational in 2008 and be completed in 2009
TF-1	El Dorado Central Park and Ride Facility	Expected to be completed in 2009
TF-2	Improvements to Loomis Multimodal Center	Expected to be completed in 2010
TF-3	13th and 16th Light Rail Station Improvements	Expected to be completed in 2009
TR-1	Transit Vehicle Acquisitions – Bus Replacement	This task divided into 8 components. See below.
TR-1A	Auburn Transit Bus Replacement	Expected to be completed in 2008
TR-1B	Roseville Transit Bus Purchase	Expected to be completed in 2009
TR-1C	Roseville Transit Bus Replacement	Expected to be completed in 2008
TR-1D	Replacement Neighborhood Ride Buses	Expected to be completed in 2012
TR-1E	E-Tran Replacement Buses	Expected to be completed in 2010
TR-1F	SRTD Neighborhood Ride Vehicle Replacement	Expected to be completed in 2010
TR-1G	Yuba Sutter Transit Bus Expansion	Expected to be completed in 2010
TR-1H	YCTD Bus Replacement	Expected to be completed in 2010
TR-2	Transit Operations – Fund Transit operators	This task divided into 8 components. See below.
TR-2A	El Dorado Transit Operating Assistance	Expected to be completed in 2009
TR-2B	Roseville Operating Assistance	Implemented in 2008
TR-2C	Elk Grove Operating Assistance	Implemented in 2011
TR-2D	Folsom Operating Assistance	Implemented in 2011
TR-2E	Paratransit Operating Assistance	Implemented in 2008
TR-2F	Sacramento County Operating Assistance	Implemented in 2008
TR-2G	Regional Transit Operating Assistance	Implemented in 2010
TR-2H	YCTD Operating Assistance	Implemented in 2008
AQ-1	Freeway Service Patrol – provide motorist assistance and towing for disable vehicles during peak hours	Implemented in 2008 to 2018

AQ-2	Sacramento Emergency Clean Air & Transportation (SECAT) Program	Implemented in 2008 to 2018
TCM-ONMS-ED-1 (AQ-3)	Notification of Spare The Air	Implemented in 2008 to 2108
FP-1	Air Quality Funding Program	Fund AQ-1, AQ-2, and AQ-3
FP-2	Bicycle and Pedestrian Funding Program	This task divided into 4 components. See below.
FP-2A	I-80 Bike/Ped Bridge at the West Canal	Expected to be completed in 2012
FP-2B	City of Folsom Bikestation and "Bikelink" On-Demand Long-Term Class I Bike Parking at Transit Stations	Expected to be completed in 2010
FP-2C	City of Elk Grove: Elk Grove Creek Bike/Ped Bridge	Expected to be completed in 2011
FP-2D	Retrofit Yolobus bus fleet with higher capacity bike racks	Expected to be completed in 2011
FP-3	Transportation Demand Management Funding Program	Implemented in 2008 to 2018
FP-4	Community Design Funding Program	This task divided into 4 components. See below.
FP-4A	City of Marysville: East 10th Street and Ramirez Street Intersection Improvement	Expected to be completed in 2011
FP-4B	City of Rancho Cordova: Folsom Blvd. Enhancements & SR2S Phase 2	Expected to be completed in 2012
FP-4C	Sacramento County: Complete Streets for Freedom Park Drive and North Watt Avenue	Expected to be completed in 2011
FP-4D	City of Woodland: Lemen, North, East Streets Intersection Realignment	Expected to be completed in 2011
M-2	Light Rail Grade Separation at Watt and Folsom Boulevard	Expected to be completed in 2009
RP-1	Blueprint implementation and Planning Technical Assistance	Expected to be completed in 2012
RP-2	Development Rural-Urban Connections Strategy and Create Best Practices Toolkit	Expected to be completed in 2012
RP-3	Research a Transportation Pricing Policy	Expected to be completed in 2012
RP-4	Research a Regional Parking Regulation to Provide Incentives for Use of Alternative Modes	Expected to be completed in 2012
RP-5	Adopt "Complete Streets" Policy	Expected to be completed in 2012
RP-6	Initiate a "Complete Streets" Technical Assistance Program	Expected to be completed in 2012
RP-7	Adopt a Safe Routes to School Policy and Implement Pilot Program	Expected to be completed in 2012

Other Control Measures Considered – Bike/Walk Communities Control Measure		
TCM-201	Increase Bike/Walk Trips	Not Recommended – Not economically feasible; some implementation will occur through TCM FP-2 and TCMs RP-5, RP-6 and RP-7.
TCM-15	Increased Walk-to-School Programs	Subset of TCM-201
TCM-177	Bicycle stations	Subset of TCM-201
TCM-217	Expanded Pedestrian and Bicycle Infrastructure	Subset of TCM-201
TCM-22	Bike Access at Transit Stations	Subset of TCM-201
TCM-276	More Bike Parking	Subset of TCM-201
TCM-277	Wide Road Shoulders and Narrow Gutters	Subset of TCM-201
TCM-284	Minimize Bollards Use	Subset of TCM-201
TCM-286	Debris-free Roads – swept bikeway frequently	Subset of TCM-201
TCM-292	Underground Utilizes – Place utilities close to street centerline	Subset of TCM-201
TCM-315	Require More Bike Trips	Subset of TCM-201
TCM-318	Showers and Lockers at Work	Subset of TCM-201
TCM-319	More River and Railroad Crossings	Subset of TCM-201
TCM-320	More Freeway Crossings and Modified Interchange	Subset of TCM-201
TCM-323	Bicycle-friendly Streets	Subset of TCM-201
TCM-324	Increase Funding of Cycling Programs	Subset of TCM-201
TCM-327	Treatment of Cyclists with Respect	Subset of TCM-201
TCM-280	Police Enforcement of Bike Law	Subset of TCM-201
TCM-283	Motorists Share Roads	Subset of TCM-201
TCM-285	Promote Cycling	Subset of TCM-201
TCM-288	Universal Bike Education	Subset of TCM-201
TCM-289	Minimize Traffic Lanes	Subset of TCM-201
TCM-296	Cycling Incentives like for Carpoolers or Transit Users	Subset of TCM-201
TCM-298	Increase Bike Deliveries	Subset of TCM-201
TCM-301	Bike Cars on Train	Subset of TCM-201
TCM-317	Info on Bike Access	Subset of TCM-201
TCM-330	Bike Use by Government Employees	Subset of TCM-201
TCM-88	Walking and Bicycling Events	Subset of TCM-201
TCM-329	Education of Road Users	Subset of TCM-201
TCM-314	Subsidize Purchase of Bike Accessories	Subset of TCM-201
Other Control Measures Considered – Educational/Voluntary Control Measures		
TCM-113	Displaying air quality data on billboards	Not Recommended – Minimal Emissions Reductions
TCM-145	Public Education on NOx and ROG sources in Schools and Small Businesses	Not Recommended – Minimal Emissions Reductions
TCM-153	Public Education to School	Subset of TCM-145
TCM-166	Increase outreach efforts to small businesses	Subset of TCM-145
TCM-195	Public Information about the total costs of gasoline use	Not Recommended – Minimal Emissions Reductions

Other Control Measures Considered – Episodic Control Measures		
TCM-104	Reduce Work-Related Trips	Not Recommended – No authority to implement; not economically feasible.
TCM-205	More Episodic Controls	Subset of TCM-104
TCM-97	Increase fees for parking garages and meters during episodes	Not Recommended – No authority to implement; not economically feasible. Some elements of this considered measure will be analyzed as part of TCM RP-4.
TCM-86	Provide free public transit during episodes	Not Recommended – Not economically feasible.
Other Control Measures Considered – HOV Lane Control Measures		
TCM-107	Dedicated Bus Lanes	Not Recommended – Not economically feasible.
Other Control Measures Considered – Work Related Trip Reduction Control Measures		
TCM-123	Work-Related Trip Reduction Program	Partially Implemented (See below)
TCM-184	Regional Guaranteed Ride Home	Subset of TCM-123; to be implemented through TCM FP-3.
TCM-297	Bike Use at Businesses	Subset of TCM-123 Not Recommended – No authority to implement.
TCM-302	Government Staff Dedicate to Cycling	Subset of TCM-123 Not Recommended – No authority to implement.
TCM-373	Carpool program	Subset of TCM-123; to be implemented through TCM FP-3.
TCM-124	Telework/Alternative Work Schedule	Subset of TCM-123 Not Recommended – Not Enforceable
TCM-186	Increase telecommuting	Subset of TCM-123 Not Recommended – No authority to implement.
TCM-229	Various Traffic Reduction Strategies – Address the transportation to the public and reduce emissions from automobile by encouraging and supporting carpool and use of public transportation	Subset of TCMs-123 and 174; to be partially implemented through TCM FP-3.
TCM-100	Reduce business/government hours of operation	Subset of TCM-123; no authority to implement.
TCM-94	Close Government on Pollution Days	Subset of TCMs-100 and 123; no authority to implement.
TCM-174	Regional Rideshare Program	Implemented as TCM FP-3.
TCM-208	Regional alternatives work schedules	Not Recommended – No authority to implement.
TCM-143	Stagger work schedules	Not Recommended – No authority to implement.

Other Control Measures Considered – Traffic Information Control Measure		
TCM-179	Enhance real time traffic information to allow drivers to make better decisions about when and where to travel	Not Recommended – Not economically feasible; to be partially implemented through TCMs ITS-1 through 4.
TCM-273	Road Hazard Reporting	Subset of TCM-179; not economically feasible.

Other Control Measures Considered – Parking Control Measures		
TCM-199	Reduce the number of public parking spaces in the City of Sacramento by 25%	Not Recommended – No authority to implement and not economically feasible. Some elements of this considered measure will be analyzed as part of TCM RP-4.
TCM-306	Parking Cash Out	Not Recommended – No authority to implement and not economically feasible. Some elements of this considered measure will be analyzed as part of TCM RP-4.
TCM-310	Charge City-owned parking garage pass-holders a fee for more than one entrance and exit each day	Not Recommended – No authority to implement and not economically feasible. Some elements of this considered measure will be analyzed as part of TCM RP-4.
TCM-311	Refunds to Parking Garage Pass-Holders	Not Recommended – No authority to implement and not economically feasible. Some elements of this considered measure will be analyzed as part of TCM RP-4.
TCM-316	Eliminate Timed Parking	Not Recommended – No authority to implement and not economically feasible. Some elements of this considered measure will be analyzed as part of TCM RP-4.
TCM-76	Extended the Parking Cash-Out law to employer-owned parking spaces	Not Recommended – No authority to implement and not economically feasible. Some elements of this considered measure will be analyzed as part of TCM RP-4.
Other Control Measures Considered – Pay to Pollute Control Measures		
TCM-57	Require passenger vehicles not meeting the standards of passenger cars to pay an annual fee and/or a fee upon purchase	Not Recommended – No authority to implement.
TCM-247	Tax on Inefficient Vehicles	Subset of TCM-57
TCM-261	Tax SUVs	Subset of TCM-57
TCM-359	Pricing strategies to affect Consumer Demand	Subset of TCM-57
TCM-118	Increase Vehicle Registration Fee and Traffic and Parking Violation Fines	Not Recommended – No authority to implement.
TCM-196	Ticket Surcharges	Not Recommended – No authority to implement.
TCM-157	Require a surcharge to be paid by drivers during the summer season based on the number of driving miles	Not Recommended – No authority to implement.

TCM-78	Emission-based registration fees	Not Recommended – No authority to implement.
TCM-192	Tailpipe emissions	Subset of TCM-78
TCM-36	Vehicle Smog Impact Fee	Subset of TCM-78
TCM-56	Increase gasoline sales tax in the Sacramento Federal Nonattainment Area	Not Recommended – No authority to implement.
TCM-200	Increase Gasoline	Subset of TCM-56
TCM-241	Fuel Tax During Summer Months	Subset of TCM-56
TCM-304	Increase the price of gasoline to pay for damage of pollutions, cost of global warming, and cost of petroleum dependency	Not Recommended – No authority to implement; not economically feasible.
TCM-39	Sell Clean Air License Plates to fund air quality programs	Not Recommended – No authority to implement.
Other Control Measures Considered – Traffic Calming Control Measures		
TCM-294	Implement traffic calming measures to reduce vehicle speed and encourage bicycle and pedestrian activity	Not Recommended – Not economically feasible.
TCM-169	Install traffic circles at intersections	Not Recommended – Not economically feasible.

Other Control Measures Considered – Traffic Expansion Control Measures		
TCM-111	Improve safety and security on public transit	Not Recommended – Not economically feasible.
TM-154	Implement public transit discounts and incentives for employees	Not Recommended – Not economically feasible.
TCM-185	Community-based shuttle system	Not Recommended – Not economically feasible.
TCM-187	Bus Traffic-Signal Pre-emption	Not Recommended – Not economically feasible.
TCM-368	Light Rail Access to Airport	Not Recommended – Not economically feasible.
TCM-84	Provide free public transit	Not Recommended – Not economically feasible.
TCM-146	Special RT fares for certain groups	Subset of TCM-84
TCM-89	Employers provide free transit passes to all employees	Subset of TCM-84
Other Control Measures Considered – Airport Control Measures		
TCM-83	Eliminate government employee airport parking reimbursement	Not Recommended – No authority to implement; not economically feasible; Regional Parking Regulation and incentives will be further analyzed through implementation of TCM RP-4.

Appendix E: Weight-of-Evidence Analyses

Attainment demonstrations based on photochemical modeling can be strengthened by supplemental evidence from additional modeling analyses and from considering modeling outputs other than the attainment test results. More diverse non-modeling and observational methods analyzing air quality, meteorological, and emissions data can also be used to corroborate the modeling predictions. EPA guidance[23] specifies that a comprehensive weight-of-evidence approach should be undertaken to support the modeled attainment demonstration.

The following information for the weight-of-evidence analyses in this appendix was provided by CARB and was summarized in Chapter 10 – Weight-of-Evidence Determination.

SACRAMENTO METRO AREA: OZONE

Introduction

The Sacramento Metro Area[24] is currently classified as a Serious nonattainment area for the federal 8-hour ozone standard and has a nominal attainment date of June 15, 2013. ARB staff completed photochemical modeling indicating the area will not attain the standard by the 2013 deadline. However, results show the area could reach attainment in 2018 with additional NOx emissions reductions resulting from State and local measures. Therefore, on February 14, 2008, ARB forwarded to U.S. EPA a request to reclassify the area from Serious to Severe-15, with an attainment date of June 15, 2019, as allowed by U.S. EPA. This action was approved by the governing boards of the five air districts, and U.S. EPA is expected to approve the request. The following sections contain the supplemental air quality and emissions analyses supporting the overall conclusion that Sacramento will attain the federal 8-hour standard by the 2019 deadline for Severe-15 ozone nonattainment areas.

U.S. EPA Attainment Demonstration Requirements

The attainment demonstration portion of a SIP consists of the analyses used to determine whether a proposed control strategy provides the reductions necessary to meet the federal standard by the attainment year. This attainment demonstration includes photochemical modeling, which predicts that projected new controls will result in an 8-hour ozone design value of less than 0.085 parts per million (ppm) for the Sacramento Metro Area in 2018. (note: because the design value is based on a

[23] "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze" (EPA, April 2007, p. 98-109).
[24] Sacramento Metro Area is the same region as the Sacramento federal nonattainment area as shown in Figure 1.

three-year average, an area must have a design value that meets the standard at the end of the year prior to the attainment year; for example, if an area has an attainment date of June 15, 2019, it must have a design value that meets the standard at the end of 2018). Because of the uncertainties inherent in photochemical modeling, the U.S. EPA allows states to supplement the modeling results with a "Weight of Evidence" (WOE) demonstration if the model predicts ozone levels of 0.082 ppm to 0.087 ppm.

The WOE assessment provides a set of complementary analyses that supplement the SIP-required modeling. These analyses can include consideration of measured air quality, emissions, and meteorological data, evaluation of other air quality indicators, and additional air quality modeling. Because all analysis methods have inherent strengths and weaknesses, examining an air quality problem in a variety of ways helps offset the limitations and uncertainties that are inherent in any particular method.

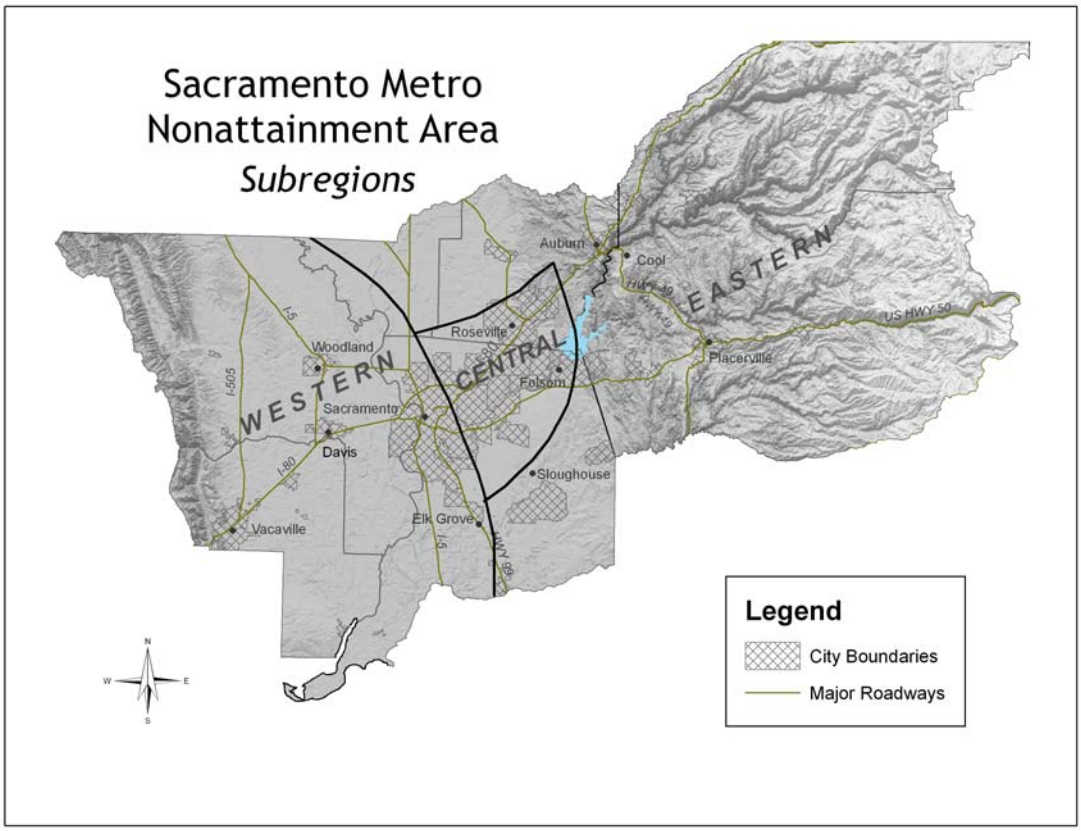
The scope of the WOE analysis is different for each nonattainment area. The level of detail appropriate for each area depends upon the complexity of the air quality problem, how far into the future the attainment deadline is, and the amount of data and modeling available. This document summarizes the analyses that comprise the WOE assessment for the Sacramento Metro Area.

Physical Context

The Sacramento Metro Area comprises all of Sacramento and Yolo counties, the eastern portion of Solano County, the southern portion of Sutter County, and the portions of El Dorado and Placer counties that are not part of the Lake Tahoe Air Basin. Geographically, the area occupies the southern portion of the Sacramento Valley, extending from the foothills of the Coast Ranges in the west to the Sierra Nevada in the east and from the Sacramento River delta in the south to the northern borders of Yolo and Placer counties.

There are no large emissions sources in the Sacramento Metro Area. Instead, the region is characterized by a number of smaller emissions sources that are widespread throughout the area. On-road motor vehicles and other mobile sources account for the majority of the area's ozone precursor emissions. To simplify the following analyses and better characterize ozone air quality, the Sacramento Metro Area is divided into three subregions: the "western" subregion, the "central" subregion, and the "eastern" subregion. Each subregion shares similar ozone air quality, source-receptor relationships, and geography (refer to Figure 1).

Figure 1: Sacramento Metro Area Subregions



As shown in Figure 1, the western subregion includes Yolo and Solano counties and the downtown Sacramento area. While ozone concentrations are low in the western subregion, prevailing winds during the summer ozone season generally flow from the south/southwest to the north/northeast. As a result, ozone and ozone precursor emissions from the western subregion can be transported to the other two subregions, contributing to problems in these areas.

The central subregion includes the suburban areas of Sacramento County that are east of downtown Sacramento, as well as the urbanized portions of Placer County. This area has experienced rapid growth over the last decade. In the central subregion, local emissions combine with emissions and pollutants transported from the western subregion to produce higher ozone concentrations.

Finally, the eastern subregion comprises the eastern portion of the Sacramento Metro Area and the areas to the north and south of the central subregion. The eastern subregion includes the Placer and El Dorado county foothill communities of Auburn, Cool, and Placerville, as well as the area around Sloughouse in southeastern Sacramento County. While not urban in nature, these communities are closely linked to downtown Sacramento by employment, housing, and travel patterns. In addition, the

eastern subregion is impacted by pollutants and emissions from both the western and central subregions. As a result, sites in this area generally have more severe ozone problems.

Historical Perspective

Ozone concentrations in the Sacramento Metro Area have posed a persistent problem over the years. However, evaluating historical progress is difficult, because long-term monitoring data are not available for several high sites. While long-term data for the high sites are not available, there are long-term data available for other sites representing the different subregions of the Sacramento Metro Area. Figures 2 and 3 show exceedance days and design values for four sites with long-term data: Sacramento-Del Paso Manor, Sacramento-T Street, and Folsom in Sacramento County, as well as Placerville in El Dorado County. The T Street site is located in downtown Sacramento, while the other three sites are located east of downtown (in the central and eastern subregions) where higher ozone concentrations typically occur.

The graphs in Figures 2 and 3 show three-year averages, because the annual values are quite variable, making it difficult to determine the general overall trends. Like many other areas of the State, the number of exceedance days at sites in the Sacramento Metro Area has decreased more rapidly than the design value. Overall, since the early 1990s, the number of exceedance days decreased about 60 percent at Del Paso Manor, 35 percent at Folsom, and 30 percent at Placerville (since 1994). The decrease at T Street, a site that meets the federal 8-hour standard, was much smaller (about 10 percent). In contrast, the decreases in design value have been more modest, between about 2 and 12 percent at all four sites. It is important to note that sites in the western subregion of the Sacramento Metro Area now meet the federal 8-hour standard, while sites in the central and eastern subregions still pose air quality challenges.

Figure 2: Federal 8-Hour Ozone Exceedance Days for Selected Long-Term Sacramento Metro Area Sites 1990 to 2006

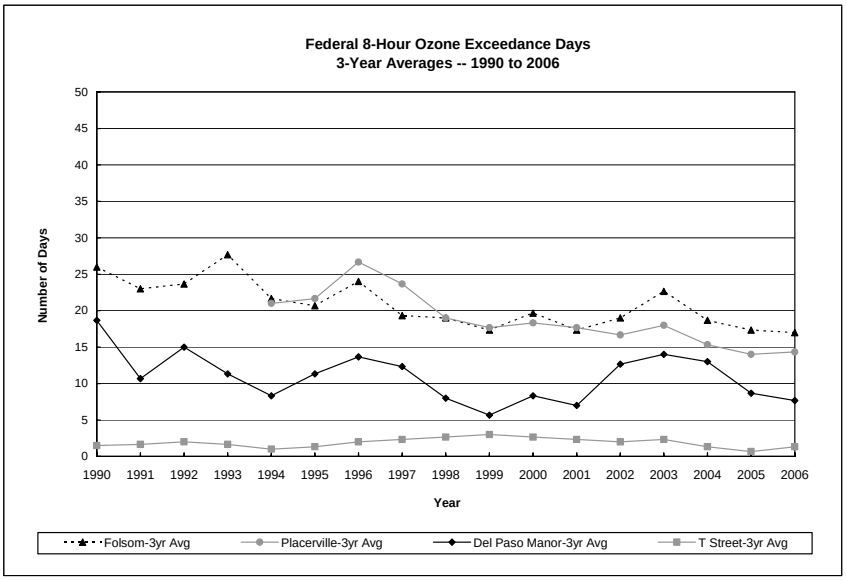
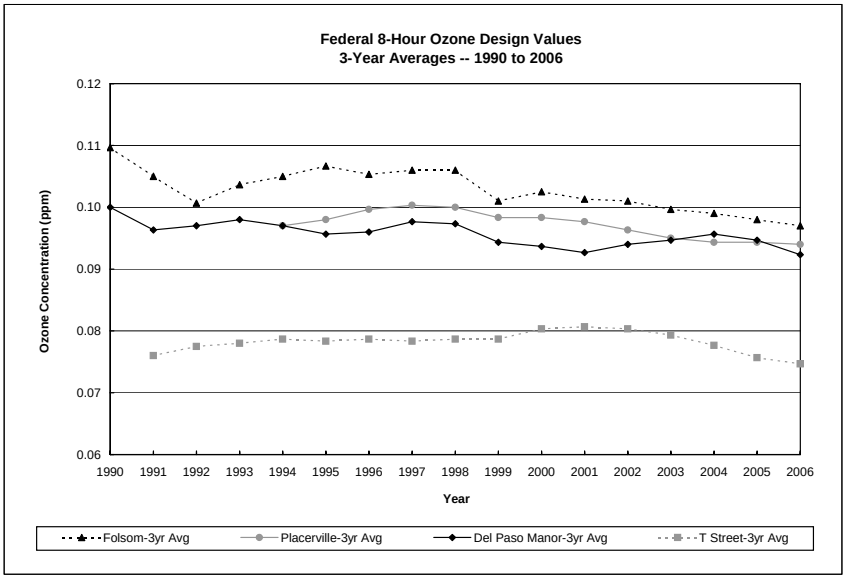


Figure 3: Federal 8-Hour Ozone Design Values for Selected Long-Term Sacramento Metro Area Sites 1990 to 2006



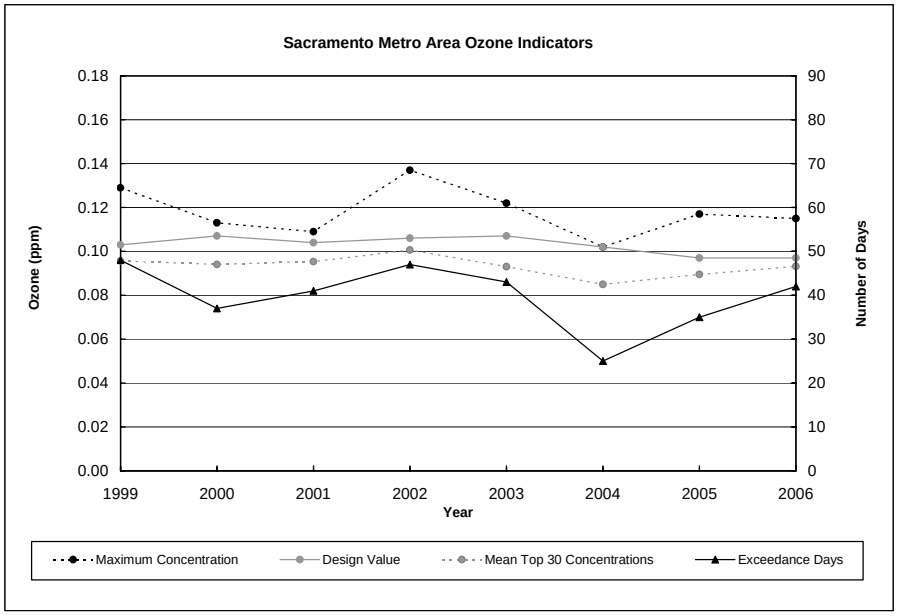
Assessment of Recent Air Quality Trends

General Areawide Perspective

Although a number of sites in the Sacramento Metro Area show long-term progress, many sites show progress over the more recent years, as well. When assessing air quality trends, it is important to include data for the high sites in an area. Until recently (2005 through 2007), the Cool site in El Dorado County had the highest design value in the Sacramento Metro Area. Therefore, it is important to include this site in any trends evaluation. Ozone monitoring began at Cool in 1996, and the site had its first valid design value in 1998, after three years of operation. Given this, as well as consideration of the completeness of data records for other sites in the Sacramento Metro Area, ARB staff selected 1999 as the start year for the evaluation of recent air quality trends.

Figure 4 shows ozone trends for the Sacramento Metro Area for 1999 through 2006. The graph includes four air quality indicators: maximum 8-hour concentration, federal 8-hour design value, mean of the Top 30 concentrations each year, and number of federal 8-hour exceedance days. Over the last eight years, the decrease in the number of exceedance days has been similar to the decrease in the maximum concentration (a little more than 10 percent reduction in each). Because these two statistics reflect values for individual years, the trend lines are variable, reflecting year-to-year changes in meteorology. In contrast, the other two indicators, the mean of the Top 30 and the design value, are less variable because they are more robust. These more stable indicators show less change over the eight-year period, although they reflect modest reductions of about 3 to 6 percent from 1999 to 2006.

Figure 4: Sacramento Metro Area Ozone Indicators 1999 to 2006



The trend lines in Figure 4 all show some improvement. Another measure of improvement is that although a number of sites still exceed the standard in the central and eastern areas, more than 50 percent of the region's population lives in areas that have design values meeting the standard. This compares favorably to 1990, when only 35 percent of the people lived in clean areas. However, despite this progress in reducing population exposure, the overall rate of progress in reducing the design value has been modest. The current (2007) design value of 0.098 ppm is still about 15 percent above the level of the federal standard.

Ozone air quality during 2007 showed some improvement over 2006. Although the maximum concentration was slightly higher (0.122 ppm in 2007 compared with 0.115 ppm in 2006), the design value is comparable during both years (0.098 ppm in 2007 compared with 0.097 ppm in 2006). The largest change was in the number of exceedance days. During 2006, there were 42 areawide exceedance days, but only 16 during 2007. Despite the small increase in maximum concentration and design value, ozone indicator values for 2007 were still lower than during the early 2000s. While some portions of the Sacramento Metro Area already attain the standard, additional emissions reductions will be needed to attain the federal 8-hour ozone standard throughout the area.

Spatial Ozone Trends

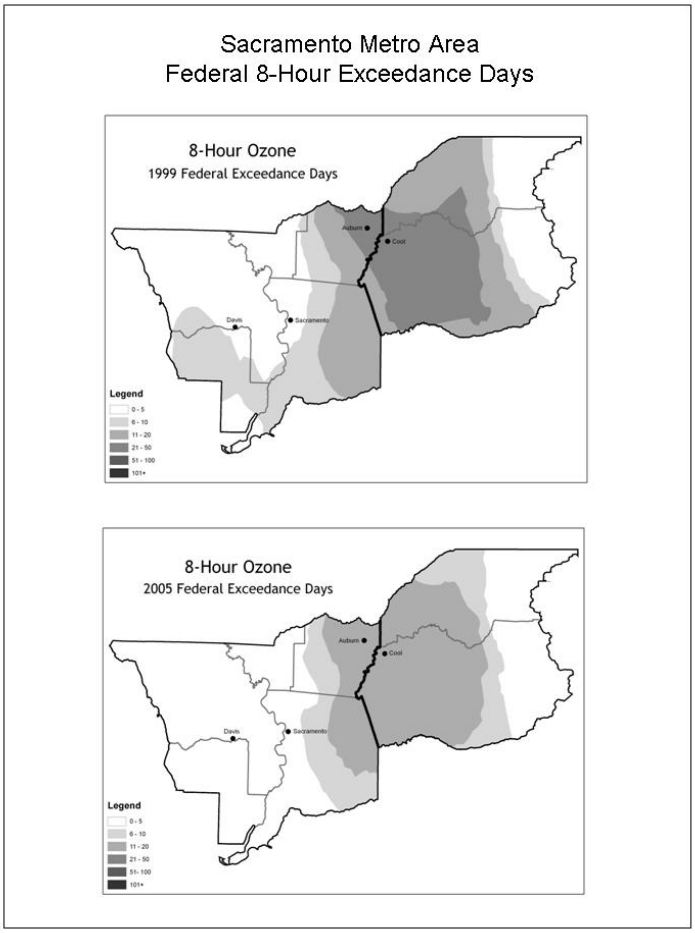
The trends described above represent an areawide perspective, and they generally reflect the worst sites in the Sacramento Metro Area. As a result, they do not show how air quality varies throughout the region. One way to assess the spatial change in ozone

air quality is to look at the change in the spatial extent of the ozone problem. The maps in Figure 5 provide an estimate of the number of exceedance days, based on available monitoring data. They show contour maps of federal 8-hour exceedance days in the Sacramento Metro Area during two different years -- 1999 and 2005. During this time period, the spatial extent of the “clean” areas increased substantially, while the size of the areas with the worst air quality decreased.

During 1999, about a third of the Sacramento Metro Area had five or fewer federal 8-hour exceedance days. These relatively clean areas were generally restricted to the northern portion of the western subregion (Yolo and southern Sutter counties and the central Sacramento downtown area), along with the mountainous portion of the eastern subregion that extends to the Lake Tahoe Air Basin. About half of the Sacramento Metro Area had at least 11 exceedance days. Finally, less than a fourth of the area had more than 21 exceedance days, with 35 days at Cool, the worst site in the region. The areas with the highest counts were located in the eastern subregion of the Sacramento Metro Area.

In contrast to the 1999 map, the 2005 map shows a fair amount of improvement. While most areas show improvement, the rate of improvement differs. The clean areas (those with five or fewer days) now cover a much larger extent. Although the clean area in the far eastern portion of the region is not much different in size, the clean area to the west now covers all of the western subregion, including Solano County. The maps show that the number of exceedance days in the central and eastern subregions also decreased, and the areas with the highest number of exceedance days now fall in the range of 11 to 20 days per year, compared with 21 to 50 days in 1999.

Figure 5: Sacramento Metro Area Change in Federal Exceedance Days 1999 to 2005



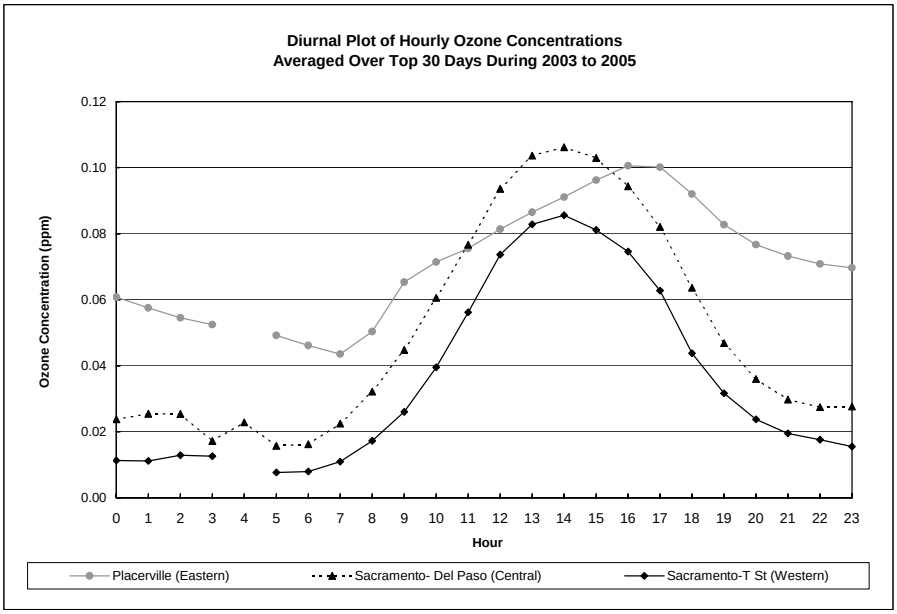
Regional Analysis

As described previously, the Sacramento Metro Area can be divided into three subregions: the western subegion, the central subregion, and the eastern subregion (refer to Figure 1). The western subregion includes sites in Vacaville, Davis, Woodland, Elk Grove, and downtown Sacramento. Ozone air quality at all of these sites is relatively clean, and 2006 design values are below the federal standard. A diurnal plot of hourly ozone concentrations at the Sacramento-T Street site shows a typical bell-shaped pattern, with concentrations peaking in the early afternoon (refer to Figure 6). This type of pattern is typical of sites in urban areas that are located close to emissions sources.

The central subregion lies to the east of downtown Sacramento and generally includes the suburban portions of Sacramento County and the urbanized portions of Placer County. Sites in this area include Del Paso Manor, North Highlands, Roseville,

and Folsom. 2006 design values for sites in this area were generally above the federal 8-hour standard, and the number of exceedance days ranged from 9 to 25, with an average of 14 days. Much of this subregion has seen substantial growth over the last decade, especially the Roseville/Rocklin and Folsom areas. Similar to the western subregion, hourly ozone concentrations for the central subregion show a bell-shaped diurnal pattern, but with a slightly longer duration of the peaks (refer to Figure 6).

Figure 6: Diurnal Plot of Hourly Ozone Concentrations



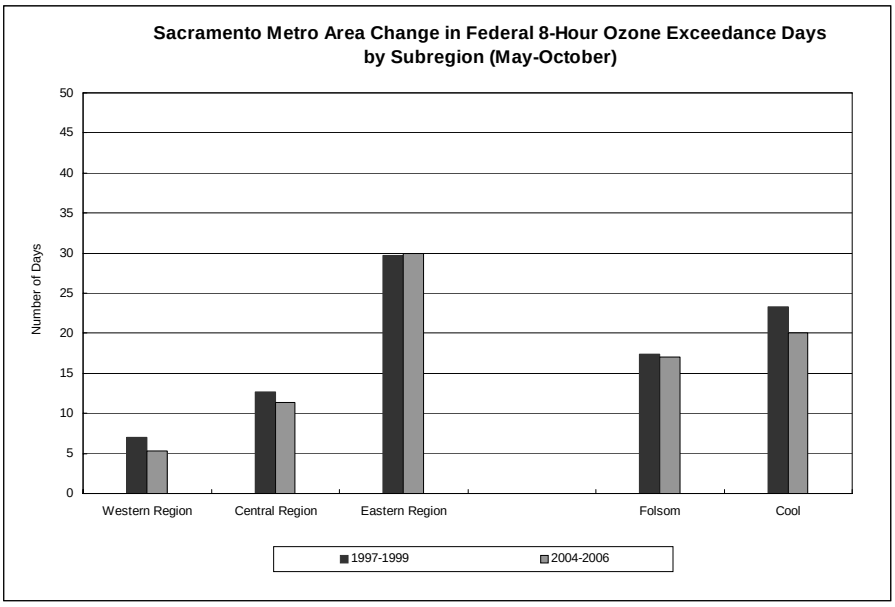
The eastern subregion of the Sacramento Metro Area includes sites in the foothill communities of Auburn, Colfax, Cool, Placerville, and Sloughouse, along with the Echo Summit site, which is located on the crest of the mountains separating the Sacramento Metro Area and the Lake Tahoe Air Basin. Ozone design values at all sites in the eastern subregion except Echo Summit are above the federal 8-hour standard. As shown in Figure 6, the hourly ozone concentrations in this subregion have a diurnal pattern that is characteristic of transport-impacted sites. Compared with the other two subregions, the 24-hour profile for the eastern subregion site (Placerville) shows a longer duration of high concentrations with the peak occurring later in the day. In addition, the overnight ozone concentrations remain elevated.

Figure 7 shows the number of federal 8-hour ozone exceedance days for each of the three subregions in the Sacramento Metro Area during 1999 and 2006. The graph is based on exceedance days during the May through October ozone season and uses three-year averages to help even out some of the year-to-year variation caused by meteorology. The high sites of Folsom and Cool are plotted separately, and values for these sites are not included in the subregional totals, which represent a composite of all

other sites in the respective areas. Although ozone data for the Sacramento Metro Area generally show considerable year-to-year variability, the area has made progress in reducing the number of exceedance days.

The greatest amount of progress occurred in the western subregion, where the number of exceedance days decreased 25 percent between 1999 and 2006. Sites in this subregion were relatively clean during 1999 and are even cleaner now. During 2006 and 2007, all sites in the western subregion had design values that met the standard.

Figure 7: Sacramento Metro Area Change in Number of Federal 8-Hour Exceedance Days by Subregion 1999 to 2006



There was also moderate improvement in the central region, with sites other than Folsom showing an overall decrease of 10 percent. In contrast, sites other than Cool in the eastern subregion showed little change, with about 30 exceedances during both years. Looking at the two high sites in the central and eastern subregions shows some difference between values for 1999 and 2006. Folsom, located at the eastern edge of the central subregion, continues to be the high site in that subregion and shows only a slight improvement when comparing 1999 and 2006. Given its location and growth rates in the central subregion over the last decade, the Folsom site is likely the most impacted by emissions within the central subregion, as well as by emissions and pollutants transported from the western subregion. The improvement at Cool was more substantial, with a 15 percent decrease in exceedance days from 1999 to 2006.

Like exceedance days, other ozone air quality indicators such as the mean of the Top 30, the 4th high concentration, and the design value show generally similar trends.

Between 1999 and 2006, ozone air quality improved in the western subregion, although there is some year-to-year variability in the indicator values. As mentioned previously, design values for sites in this subregion continue to be lower than the federal standard. In contrast, ozone indicators for the central subregion, including Folsom, have been relatively flat or show a slight increase since 1999. The eastern subregion, including Cool, still presents a substantial challenge, despite some improvement since 1999. At almost all sites in the Sacramento Metro Area, ozone indicators increased in 2005, following unusually low values in 2004. Many showed additional increases in 2006 and 2007. However, values for the last two years are still below levels during the early 2000s. Without additional analyses related to the amounts, as well as the spatial and temporal patterns of emissions, the mix of available precursor emissions, and meteorological conditions, it is difficult to evaluate the direction of the overall trend during the last several years. However, on a regional level, there has been progress.

In general, the modest improvement in ozone air quality in the Sacramento Metro Area since 1999 is accompanied by large year-to-year variations which reflect fluctuations in meteorological conditions. Most of the improvement in the ozone indicators has occurred since 2002. The areawide trend lines would appear to suggest that ozone has gotten worse over the last couple of years, but it is important to recognize that concentrations were uncharacteristically low during 2004. Although values for some indicators for 2005, 2006, and 2007 are higher when compared with the 2004 values, they are still generally lower than values for 2002 and 2003. Because ozone concentrations in the Sacramento Metro Area are much closer to the level of the federal standard than in other areas of the State such as the South Coast or San Joaquin Valley air basins, small changes in meteorology can result in substantial year-to-year changes in the air quality indicators. The next section examines trends after accounting for meteorological variability.

Meteorology and Air Quality Trends

Ozone in the ambient air is the result of several factors, two of the most important being pollutant emissions and meteorology. The meteorological and photochemical processes leading to ozone formation are complex, involving interactions both at the surface and in the upper air. However, they can be characterized in very general terms. In general, strong sunlight and weak dispersion generate relatively high ozone levels, while weak sunlight and strong dispersion generate relatively low ozone levels. Meteorology, or weather conditions, can vary widely, and these day-to-day conditions strongly influence ambient ozone concentrations.

The previous trends discussion looked at air quality as measured at ambient monitoring sites, without any consideration of or adjustment for meteorological variability. The following discussions consider trends that account in varying degrees for the meteorological conditions affecting ozone concentrations. These analyses advance our understanding of the impact of meteorology on ozone air quality and our ability to track

ozone improvements attributable to emissions reductions. Another goal of these analyses is to determine the role meteorology has played in the Sacramento Metro Area, where ozone improvement has been more modest than in other areas of the State. The following analyses show that after accounting for meteorological variability, real progress has occurred.

The analyses described below are based on air quality and meteorological data for 1996 through 2005. The meteorological data were drawn from the same statewide dataset used in the WOE analyses for the South Coast and San Joaquin Valley air basins. Although it would have been desirable to include data for 2006 and 2007, these data are still preliminary, and therefore not available for the analysis.

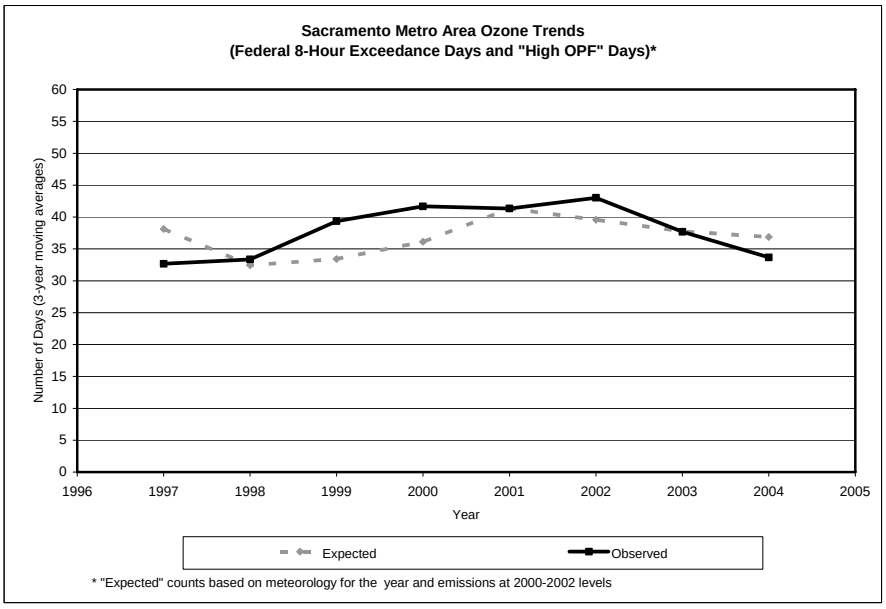
High Ozone Forming Potential

As one approach to help understand the types of meteorological conditions leading to high ozone concentrations, ARB staff completed an analysis of ozone and meteorology using Classification and Regression Tree (CART) techniques. The CART analysis determined rules that separated days into 14 groups with varying degrees of ozone forming potential (OFP), or the degree to which weather conditions favor ozone formation in the Sacramento Metro Area. The CART rules used daily data for surface air temperature, air temperature at 1500 meters[25], the speed and direction of surface winds, and other factors related to daily maximum 8-hour ozone concentrations. Three years, 2000 through 2002, were used to prepare the classification rules and determine the rate (percent) of exceedance days within each of the 14 groups. For the group with the lowest ozone forming potential (OFP), the rate of exceedance days was 0 percent. For the group with the highest OFP, the rate was 100 percent. On that basis, ARB staff calculated the expected number of days exceeding the federal 8-hour ozone standard for each year from 1996 through 2005. While this method is somewhat different from that used in the WOE analyses for the South Coast and San Joaquin Valley air basins, ARB staff believes it improves on the previous method.

The Sacramento Metro Area analysis, presented in Figure 8, shows the expected number and the observed number of days exceeding the federal 8-hour ozone standard each year (three-year moving averages). The changes in exceedance days relative to changes in high OFP days helps distinguish the changes due to meteorology from changes due to other factors, such as emissions reductions. Progress is shown when the number of exceedance days decreases in relation to the number of high OFP days.

[25] Above sea level

Figure 8: Sacramento Metro Area Analysis of Observed and Expected* Exceedance Days (moving three-year means)

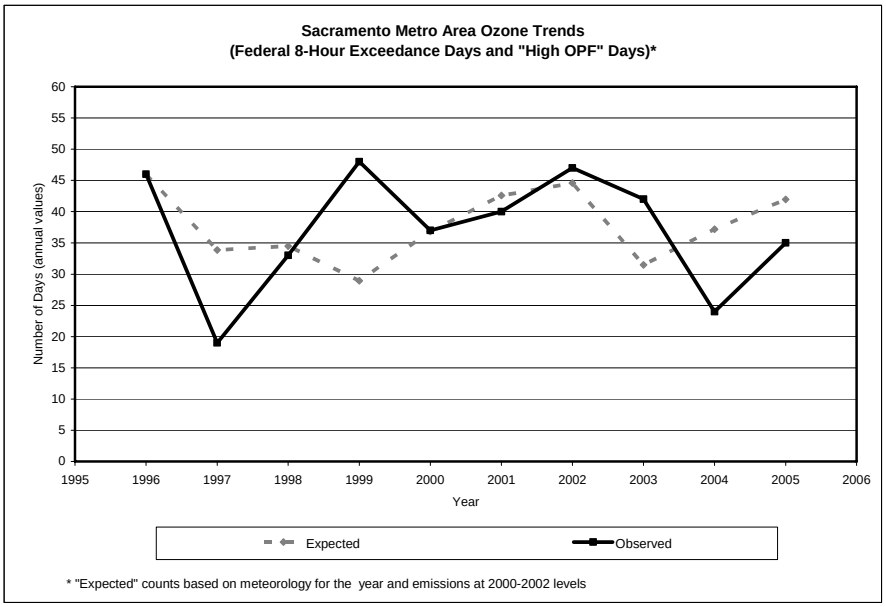


The two lines in Figure 8 generally track each other, indicating that year-to-year changes in exceedance days have been largely attributable to year-to-year changes in weather, rather than changes in emissions. The observed mean for 1996 to 1998 includes an extremely low value for 1997, especially with respect to the expected value -- 19 observed compared with 34 expected (refer to the annual values plotted in Figure 9). As a result, the beginning point on Figure 8 is questionable. It is important to note that Sloughouse, one of the high exceedance day sites in the Sacramento Metro Area, operated only during a portion of 1997, and this may explain, in part, the low 1997 value. Another possible reason for the low 1997 value is that it was an El Niño year, with likely greater than normal cloud cover and thus less solar radiation and solar heating, resulting in lower ozone concentrations. Regardless of the reason, because the 1997 observed value is questionable, we will focus our evaluation of trends on the 1998 through 2004 timeframe.

Although the subsequent changes (from 1998 through 2004) are not large, two patterns shown in Figure 8 are worth noting. From 1998 through 2002, observed exceedances increased by 10 (from 33 to 43), while expected exceedances increased by 8 (from 32 to 40). During these years, the observed increase generally coincides with the expected increase. However, from 2002 to 2004, observed exceedances decreased by 9 (from 43 to 34), while expected exceedances decreased by only 3 (from 40 to 37). During these years, the decrease in the observed exceedances is greater than the improved meteorology would lead one to expect, suggesting the improvement in ozone is attributable to emissions reductions. However, the difference is modest (only 6 days, 9 expected days versus 3 observed days).

Figure 9 shows the same trends as Figure 8, graphed as annual values, rather than three-year moving averages. It is interesting to note that the observed exceedances average 1.7 days more than expected from 1996 to 2003, but average 10.1 days less than expected for 2004 and 2005. Although ARB staff has not yet formally integrated 2006 and 2007 ozone and meteorological data, preliminary results indicate that the observed exceedances increased to 42 in 2006 before dropping to a new low of 16 in 2007. If these two years continue the recent trend of observed exceedances being lower than expected exceedances, it would more firmly establish a pattern of progress in the Sacramento Metro Area.

Figure 9: Sacramento Metro Area Analysis of Observed and Expected* Exceedance Days (annual values)



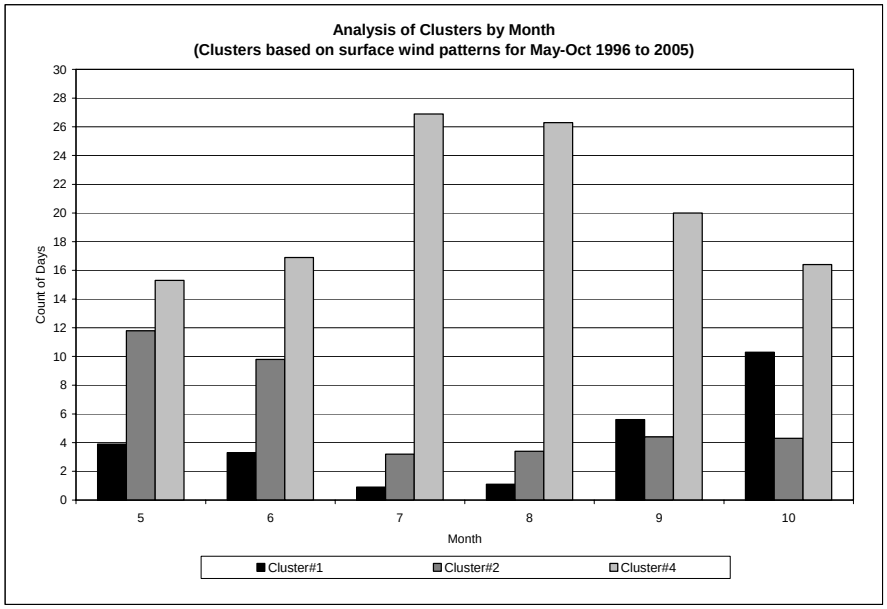
Meteorologically Adjusted Trends

As discussed above, meteorological parameters such as temperature and wind speed are correlated with sunlight and dispersion, which play a large role in determining daily ozone levels. As a second method to address the effects of meteorology on ozone, a statistical model that predicts daily maximum ozone on the basis of daily meteorological data was used to adjust daily ozone observations. Specifically, the model was used to predict daily maximum 8-hour ozone concentrations and then adjust the observed ozone concentrations to compensate for differences between the predicted values and a standard baseline for expected ozone levels throughout the ozone season.

First, a clustering procedure was used to assign days from the May through October ozone season for the years 1996 to 2005 to separate groups based on the daily speed and direction of surface winds at 14 stations in and around the Sacramento Metro Area.

Three groups of days were created. These three groups accounted for all but two of the 1840 days in the trend period. Figure 10 shows that the first group of days (Cluster #1) was weighted toward the months of September and October. The second group (Cluster #2) was weighted towards May and June. The third group (Cluster #4) was the most common throughout the ozone season, but was most prevalent for July and August (note that Cluster #3, which is not shown in Figure 10, accounted only 2 of the 1840 days, and therefore, was not significant to the analysis). Each of the clusters shown in Figure 10 represents different general source-receptor scenarios, based on wind summaries.[26]

Figure 10: Sacramento Metro Area Analysis of Clusters by Month (1996 to 2005)



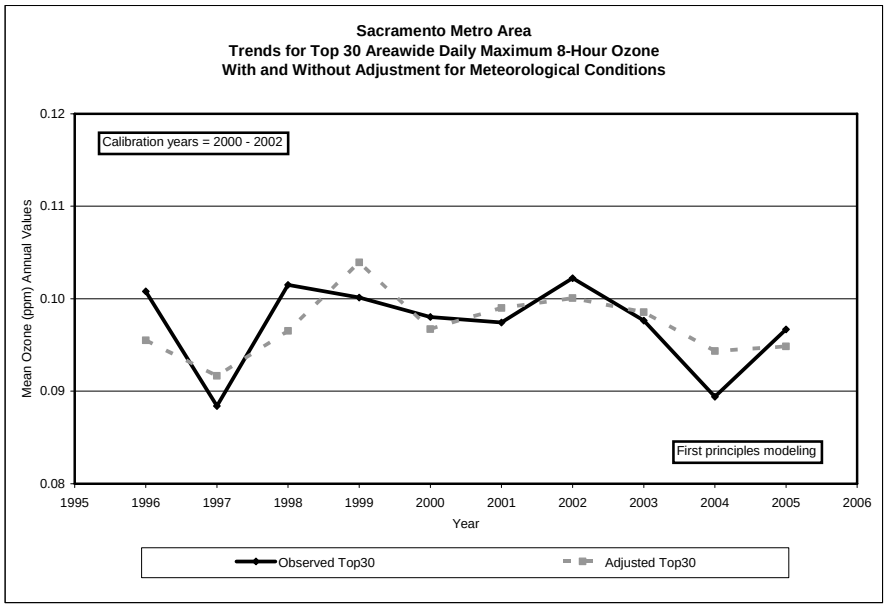
For each of the three clusters, ARB staff used data from 2000 through 2002 to calibrate a within-group model to predict daily maximum 8-hour ozone from daily weather data. A limited span of years was used for calibration so that when the model was applied to the meteorological data for all days from 1996 through 2005, it would provide a level playing field for meteorological effects, apart from the influence of changes in emissions.

Figure 11 shows observed and met-adjusted trends for the annual mean of the 30 highest daily maximum 8-hour ozone values (Top30; the top 16 percent).[27] Figure 12 shows the same trends as Figure 11, smoothed using a three-year moving average because the process of met-adjustment does not remove all meteorological effects perfectly, and other factors may affect the year-to-year changes. Similar to the

[26] North and east components of daily surface winds were averaged by subregion in and around the Sacramento Metro Area. The wind summaries show that the three different clusters shown in Figure 10 represent differences in generalized source-receptor scenarios.
[27] The May – October ozone season has 184 days, of which 30 is 16%.

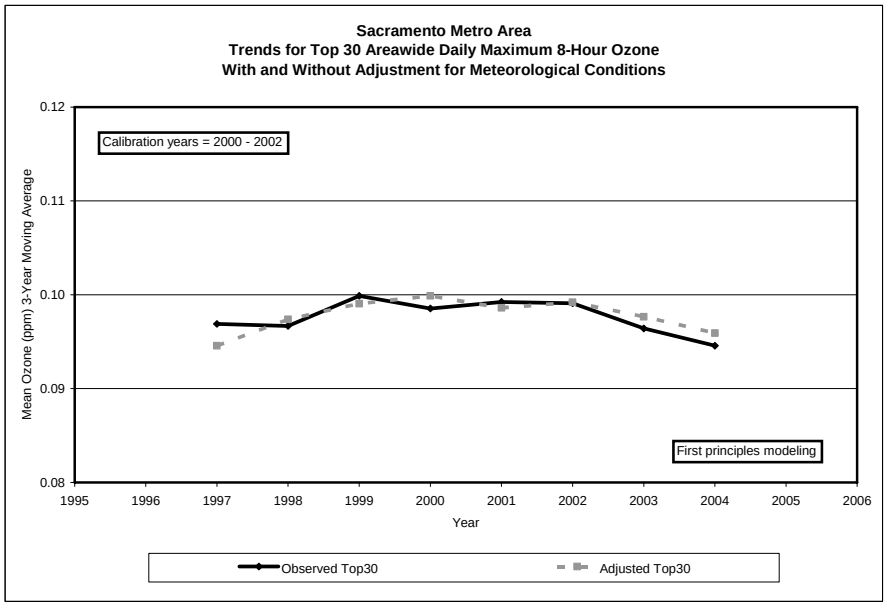
air quality trends discussed previously, the met-adjusted trend is downward since 2002. Although maximum concentrations and design values generally increased in 2007, compared with 2006, the mean of the Top 30, as well as the number of exceedance days, decreased. With respect to the met-adjusted analysis, which is based on the mean of the Top 30 ozone concentrations, the combined response for 2006 and 2007 would seem to be a net downturn in ozone concentrations. Therefore, results of these analyses suggest that the Sacramento Metro Area has made a moderate amount of progress over the last several years, and this progress should continue, given continued emissions reductions.

Figure 11: Sacramento Metro Area Analysis of Observed and Met-Adjusted Trends for the Mean of the Top 30 Concentrations (annual values)*



** see footnote under Figure 12.*

Figure 12: Sacramento Metro Area Analysis of Observed and Met-Adjusted Trends for the Mean of the Top 30 Concentrations (3-year moving averages)*



*As indicated on the graphs, Figures 11 and 12 are based on "first principles modeling" of the relationship between ozone and meteorology. A common alternative is to use stepwise model building methods in which the data during the calibration period determine which parameters are included and which are excluded. The ARB staff chose to work with 18 models, one for each combination of cluster and month (May-Oct). Each model was based on scientific first principles to determine its content. Therefore, temperatures at the surface and aloft were represented by linear and quadratic terms, with the inverse of the wind speed included as a linear term. When a cluster-month combination lacked sufficient data to fit a model reliably, a generic model for the ozone season was applied. In addition, additive offsets for Saturday and Sunday were included to account for potential "ozone weekend effects." The overall performance of this approach achieved an R^2 value greater than 80 percent.

Emissions and Precursor Trends

Reactive organic gases (ROG) and oxides of nitrogen (NOx) are precursors to ozone. Emissions controls have substantially reduced the amounts of these precursors in the ambient air, despite increases in population and the number of vehicle miles traveled each year. These reductions have resulted in improved ozone air quality. The following sections describe the ROG and NOx emissions trends in the Sacramento Metro Area since 1994, as well as the amounts of these precursors measured in the ambient air.

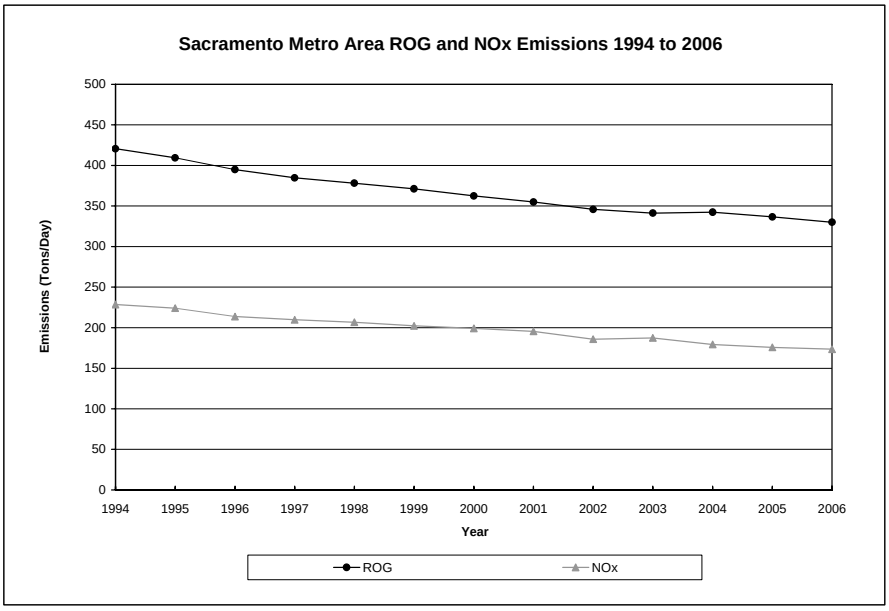
Emissions Trends

Population numbers have been increasing steadily in every county of the Sacramento Metro Area. With the exception of Placer County, the percent growth in each individual county ranges from 20 to 30 percent between 1994 and 2006. For example, the total population in Sacramento County increased from about 1.1 million in 1994 to about 1.4 million in 2006 (a 25 percent increase over the 13 years). The growth rate in Placer County was about twice the general rate – a 60 percent increase between 1994 and

2006. Furthermore, close to 95 percent of that growth occurred in the western portion of Placer County (in the central subregion), which is east of the Sacramento urban area.

Despite the rapid growth in population, ozone precursor emissions in the Sacramento Metro Area decreased from 1994 to 2006. Figure 13 shows the estimated areawide precursor emissions for an average summer day from 1994 to 2006. It is important to note that the ROG estimates include both anthropogenic (man-made) and biogenic emissions. While the anthropogenic portion changes from year-to-year, the biogenic portion is constant over the entire time period (194 tons/day during each year). On a percentage basis, biogenic emissions account for about 45 percent of the ROG emissions during 1994, increasing to about 60 percent in 2006. Based on the estimates in Figure 13, ROG emissions from anthropogenic and biogenic sources decreased 20 percent between 1994 and 2006 (for comparison, the reduction in only the anthropogenic portion of the ROG emissions was 40 percent). During the same time period, NOx emissions decreased about 25 percent. These ROG and NOx reductions occurred in all counties of the Sacramento Metro Area except Placer County, where ROG decreased over the time period, but there was little change in NOx. The ratio of total ROG to NOx is relatively constant over the entire time period, varying between 1.8 and 1.9. While ROG and NOx reductions are generally distributed throughout the Sacramento Metro Area, the anthropogenic emissions are dominated by sources in Sacramento County.

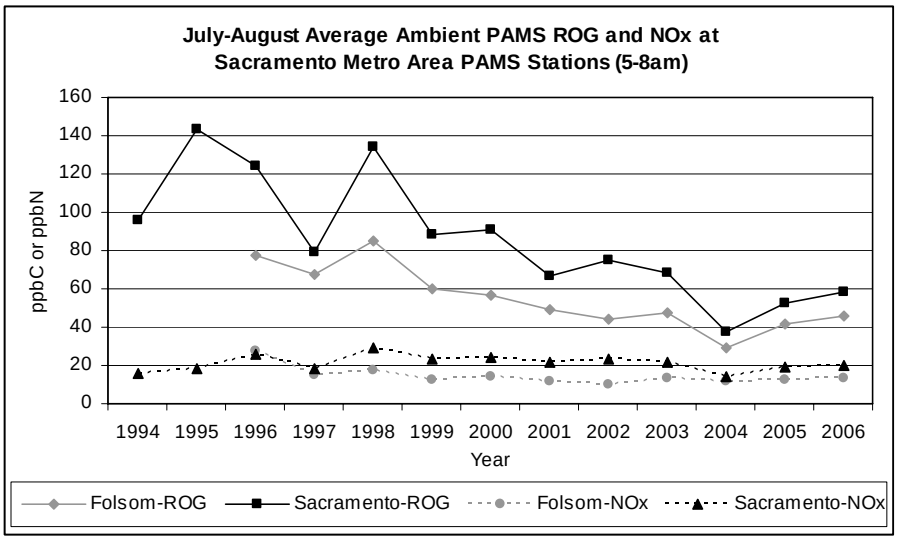
Figure 13: Sacramento Metro Area ROG and NOx Emissions Estimates 1994 to 2006



Precursor Trends

The decreases seen in the estimated emissions trends are supported by the ambient trends, as well. Figure 14 shows average levels of ROG and NOx measured in the ambient air at Sacramento-Del Paso Manor and Folsom-Natoma Street, two sites with relatively complete long-term measurement records for both precursors. The data plotted were collected from the Photochemical Assessment Monitoring Stations or PAMS sites, and they reflect measurements collected from 5 a.m. to 8 a.m. during July and August. The trend lines for both sites show overall reductions of about 40 percent, consistent with the decrease in estimated anthropogenic ROG emissions. Although not plotted, ROG reactivity also dropped over the time period, with a 50 percent decrease at each site. Ambient NOx at Folsom-Natoma Street also decreased 50 percent. In contrast, ambient NOx concentrations at Sacramento-Del Paso Manor show little change. Because the spatial and temporal scales of the trends are very dissimilar, it is difficult to resolve the differences between the emissions estimates and the ambient PAMS measurements. The important point is that the emissions trends and the ambient trends generally indicate that ROG and NOx precursors have decreased over time, and these decreases have resulted in improved ozone air quality.

Figure 14: Summer Morning Average ROG and NOx Measurements from Sacramento Metro Area PAMS Network Stations



Modeling Results

The ozone modeling domain for the Sacramento Metro Area is the same as that used for the San Joaquin Valley and is based on the domain defined for the year 2000 Central California Ozone Study or CCOS. This domain includes not only the Central Valley, but the San Francisco Bay area, as well. It comprises a grid measuring 185 by 185 cells, with a horizontal resolution of four kilometers. The required meteorological

fields were generated using the MM5 prognostic meteorological model, and the required emissions inventories were developed by ARB staff. The ozone air quality modeling utilized the Comprehensive Air Quality Model with Extensions (CAMx) air quality model, with initial and boundary conditions based on estimates of clean-air concentrations.

To support modeling for the Sacramento Metro Area and the San Joaquin Valley, ARB staff completed ozone modeling for two episode periods: one during July 1999 and the other during July/August 2000. During these episodes, 8-hour ozone concentrations exceeding the federal standard occurred throughout the region. Analysis of the model outputs included the estimation of 1-hour and 8-hour ozone concentrations for each ozone monitoring site within the domain, as well as statistical measures comparing observed and simulated ozone concentrations. These analyses were used to evaluate model performance by subregion within the domain.

As required by U.S. EPA guidance, a relative reduction factor (RRF) approach was used in projecting future year design values. The RRF reflects the ratio between the future year model prediction (in this case the end of 2018) and the reference year model prediction (in this case 2002). A reference year design value is then multiplied by the RRF to project a future year design value.

Results of the modeling analyses indicate that NOx reductions will be more effective than ROG reductions in reducing ozone concentrations in the Sacramento Metro Area. Because the magnitude of the ozone problem varies throughout the Sacramento Metro Area, the amounts of emissions reductions needed to reach attainment also vary. Overall, the attainment strategy relies on a 10 percent or more reduction in NOx that will bring the worst-case site, Cool, down to a level of less than 0.085 ppm at the end of 2018. Modeling results show Folsom, which had the highest design value in 2007, at a level of less than 0.083 ppm at the end of 2018, with the same level of control.

Summary

As allowed by U.S. EPA guidance, this weight of evidence (WOE) package comprises a set of complementary analyses that supplement the SIP-required modeling, thereby providing additional support for the attainment demonstration. Currently, the Sacramento Metro Area is classified as a Serious ozone nonattainment area with an attainment date of June 15, 2013. Photochemical modeling results indicate that reducing NOx emissions will be the most effective strategy for bringing the Sacramento Metro Area into attainment. These reductions will not be in place by the 2013 deadline. However, they should be implemented by 2018. Therefore, districts in the Sacramento Metro Area have approved reclassification, and ARB has requested that U.S. EPA reclassify the Sacramento Metro Area as Severe-15, with a required attainment date of June 15, 2019.

The ARB staff's modeling results indicate that NOx emissions reductions will be critical for bringing sites in the Sacramento Metro Area into attainment. Given the timeframe

over which these reductions are expected to occur, the Sacramento Metro Area should be attainment by June 15, 2019, with a 10 percent or more reduction in NOx emissions. Based on modeling, as well as supporting analyses included in this WOE evaluation, attainment by 2019 is anticipated because of the following factors:

- Since 1999, the number of areawide exceedance days decreased a little more than 10 percent. The maximum concentration and design value show more modest reductions, with decreases of about 10 and 5 percent, respectively, from 1999 to 2006. Because these are areawide numbers, they reflect the "worst case" sites. Although 2007 data show a slightly higher maximum concentration and a design value comparable with 2006, they show the number of areawide exceedance days at an all-time low of 16 days for the entire year.

- While the amount of progress varies on a subregional basis, there has been a substantial reduction in the number of exceedance days in the western subregion. Since 1999, exceedance days decreased 25 percent, and all sites in this subregion now attain the federal 8-hour ozone standard.

- Between 1999 and 2006, the central subregion shows a 10 percent decrease in the three-year average of exceedance days at all sites but Folsom, which shows only a slight reduction in days. Although progress at Folsom appears to have slowed over the last several years, the central subregion has demonstrated long-term progress. Sites with long-term data, including Folsom, show a 35 to 50 percent decrease in exceedance days since 1990, based on three-year averages. The decrease in design values has been more modest, averaging about 5 percent since 1990.

- Although sites in the eastern subregion still have some of the highest ozone concentrations, the three-year average of exceedance days at Cool, the worst site in this area, decreased about 15 percent between 1999 and 2006. Other sites in the subregion showed little change in the average number of exceedance days between 1999 and 2006.

- During the late-1990s, the ozone problem was more widespread throughout the Sacramento Metro Area. Since then, all areas have improved, although at differing rates. All of the western subregion and the easternmost portion of the eastern region now meet the federal standard. The ozone problem is now confined to the central subregion and the more urbanized portions of the eastern subregion. However, even at the worst sites in these subregions (Cool and Folsom), 60 to 65 percent of the days during the 2006 ozone season were below the more stringent State 8-hour ozone standard.

- Ozone indicator values for many sites in the Sacramento Metro Area were higher for 2005, 2006, and 2007 than for 2004. However, the 2004 values were uncharacteristically low. When compared with values for 2002 and 2003, the values for 2005 through 2007 are generally lower, indicating progress. The Sacramento Metro Area is much closer to attainment than other areas of the State, such as the South Coast and San Joaquin Valley air basins. Because the Sacramento Metro Area values are closer to the standard, small variations in meteorology can result in relatively large year-to-year changes in the trends. These variations can make it difficult to interpret the trends. However, in the Sacramento Metro Area, it appears there has been overall improvement, despite this variability.

- Analyses suggest that recent ozone improvements are linked to emissions reductions. The decline in the number of exceedance days relative to the number of days with a high potential for ozone formation indicates that the modest improvements in ozone over the last few years were related to emissions reductions rather than favorable meteorological conditions. A more detailed adjustment of ozone trends for the annual mean of the Top 30 produced similar results. Results of these analyses also indicate that increasingly adverse meteorological conditions are now needed to create ozone levels exceeding the federal 8-hour standard.

- Estimated ROG and NOx emissions trends, as well as ambient measurements, indicate reductions in both precursors since the mid-1990s. These reductions have resulted in modest ozone improvements. Emissions estimates indicate a continuing decline in ROG and NOx emissions. However, photochemical modeling results show that NOx reductions will be critical to attainment. As a result, a control strategy relying on a 10 percent or more reduction in NOx emissions is proposed as the most efficient path to attainment by June 15, 2019.

- Photochemical modeling results show a design value of less than 0.085 ppm with proposed new controls for the Sacramento Metro Area by the end of 2018. Many sites will reach attainment before this date. Coupled with the analyses completed for the WOE, it is reasonable to conclude that the entire Sacramento Metro Area will reach attainment within this timeframe, consistent with the June 15, 2019, attainment deadline.

Taken together, all of these factors indicate that the Sacramento Metro Area can expect to attain the federal 8-hour ozone standard by June 15, 2019, the required attainment date for a Severe-15 ozone nonattainment area.

Appendix F: Motor Vehicle Emissions Budgets

The motor vehicle emissions budgets (MVEB) for VOC and NOx were calculated for reasonable further progress (RFP) milestone years (2011, 2014, and 2017) and the 2018 attainment demonstration year. The MVEB were estimated by first applying SACOG VMT (MTP2035) to the CEFS v1.06 on-road motor vehicle emission forecasts to derive EMFAC2007 adjusted baseline forecasts. Then, the latest adjustments for recent ARB baseline controls were subtracted from the EMFAC2007 emissions. Finally, reductions from proposed new regional incentive measures (for all years) and state SIP control measures (for only 2018) affecting on-road motor vehicle emissions were subtracted. The resulting SIP control forecasted motor vehicle emissions were rounded up to whole numbers to get the MVEB.

Tables F-1, F-2, F-3, and F-4 document the MVEB calculations for 2011, 2014, 2017, and 2018, respectively. Table F-5 contains the SACOG and Bay Area's Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC) planning assumptions for human population forecasts and vehicle miles traveled by county areas that were used to derive motor vehicle emissions.

Table F-1

Sacramento Federal Nonattainment Area
Transportation Conformity Budgets for 8-hour Ozone
Summer Planning Emissions in Tons per Day

	2011	
	ROG	**NOx**
On-Road Emissions from EMFAC2007	**37.9**	**82.1**
Adjustments to Baseline*	**-0.1**	**-4.1**
Regional Strategy Reductions	**-0.1**	**-0.7**
Net Inventory	**37.7**	**77.3**
Conformity Budget**	**38**	**78**

* Reductions from adopted rules not reflected in EMFAC.
** Budget is obtained by rounding up to the nearest ton.

Table F-2

Sacramento Federal Nonattainment Area
Transportation Conformity Budgets for 8-hour Ozone
Summer Planning Emissions in Tons per Day

	2014	
	ROG	**NOx**
On-Road Emissions from EMFAC2007	**32.1**	**64.9**
Adjustments to Baseline*	**-0.2**	**-3.7**
Regional Strategy Reductions	**-0.1**	**-0.8**
Net Inventory	**31.8**	**60.4**
Conformity Budget**	**32**	**61**

* Reductions from adopted rules not reflected in EMFAC.
** Budget is obtained by rounding up to the nearest ton.

Table F-3

Sacramento Federal Nonattainment Area
Transportation Conformity Budgets for 8-hour Ozone
Summer Planning Emissions in Tons per Day

	2017	
	ROG	**NOx**
On-Road Emissions from EMFAC2007	**28.3**	**51.9**
Adjustments to Baseline*	**-0.2**	**-3.3**
Regional Strategy Reductions	**-<0.1**	**-0.9**
Net Inventory	**28.1**	**47.7**
Conformity Budget**	**29**	**48**

* Reductions from adopted rules not reflected in EMFAC.
** Budget is obtained by rounding up to the nearest ton.

Table F-4

Sacramento Federal Nonattainment Area
Transportation Conformity Budgets for 8-hour Ozone
Summer Planning Emissions in Tons per Day

	2018	
	ROG	**NOx**
On-Road Emissions from EMFAC2007	**27.3**	**48.4**
Adjustments to Baseline*	**-0.2**	**-3.2**
Regional Strategy Reductions	**-<0.1**	**-0.9**
State Strategy Reductions	**-3.4**	**-11.2**
Net Inventory	**23.7**	**33.1**
Conformity Budget**	**24**	**34**

* Reductions from adopted rules not reflected in EMFAC.
** Budget is obtained by rounding up to the nearest ton.

Table F-5
Population and Vehicle Miles Traveled (VMT) Forecasts
Sacramento Region

Population (Household only)	2005	2013	2018	2035
El Dorado County (MC)	154,428	182,087	194,832	225,032
Placer County (SV and MC)	298,147	393,043	424,439	570,599
Sacramento County	1,283,402	1,481,163	1,589,285	1,983,967
South Sutter	4,341	5,560	9,484	15,530
Yolo County	172,900	204,132	220,070	279,172
Solano (SV)	119,659	135,993	145,036	175,778
Regional Total	**2,032,877**	**2,401,978**	**2,583,146**	**3,250,078**
Sutter County	81,223	100,837	110,136	135,562
Solano County	389,896	443,122	472,584	572,754

Notes:
1. SACOG household population forecasts are from SACOG's Tina Glover 7-3-08 email. Data are derived from the December 2007 SACSIM travel model.
2. The population, dwelling unit and employment forecasts used in SACSIM travel model are based on SACOG's September 13, 2007 Board Action which adopted DOF July 2007 population projections for MTP interim-year projections (2013 and 2018). Note: SACOG's population is about 5% lower than DOF for 2005 and 3% higher than DOF for 2035.
3. El Dorado County and Placer County population data exclude the Tahoe Basin.
4. Solano County population is determined from ABAG Projection 2005 forecast series (email from MTC's Harold Brazil 8-21-07) using EXCEL Forecast function and assuming 92% is household population. (MTC's Solano population forecast: 2000 = 394542, 2005 = 423800, 2010 = 466100, 2015 = 504500, 2020 = 532400, 2025 = 558100, 2030 = 581800)
5. SV = Sacramento Valley portion, MC = Mountain Counties portion
6. Sacramento Nonattainment Area fraction for South Sutter is estimated at 6% of Sutter County.
7. Sacramento Valley fraction for North East Solano is estimated at 30.69% of Solano County.
8. Regional Total represents the Sacramento Nonattainment Area.

Daily VMT (1000)	2002	2011	2014	2017	2018	2035
El Dorado (MC)	3,976	4,546	4,754	4,971	5,046	5,820
Placer (MC)	1,547	1,713	1,772	1,833	1,854	2,306
Placer (SV)	6,956	8,735	9,424	10,167	10,427	13,668
Sacramento County	31,826	36,709	38,498	40,374	41,019	49,398
South Sutter	462	607	665	729	751	1,113
Yolo County	5,182	5,934	6,208	6,495	6,593	7,907
Solano (SV)	5,193	6,218	7,093	7,643	7,744	12,912
Regional Total	**55,142**	**64,462**	**68,414**	**72,212**	**73,434**	**93,124**

Notes:
1. VMT data (except Solano) are based on SACOG's MTP2035 submittal to ARB Feb 2008.
2. Solano VMT data are based on Bay Area MTC submittal to ARB Aug 2006.
3. SV = Sacramento Valley portion, MC = Mountain Counties portion
4. Regional Total represents the Sacramento Nonattainment Area.

Appendix G: Reasonable Further Progress Demonstrations

Pre-1990 Motor Vehicle Control Program Adjustments

Section 182(b)(1)(D) of the Clean Air Act stipulates that emission reductions stemming from the federal on-road motor vehicle control program as it existed in 1990 may not be used to help meet minimum emission reduction requirements for reasonable further progress (RFP) purposes. The Clean Air Act also prohibits states from taking credit for emission reductions resulting from using gasoline with a Reid vapor pressure limit specified by 1990. This precludes states from demonstrating satisfactory progress for ozone simply on the merit of the federal motor vehicle and fuels programs as they existed in 1990. States are required to adjust for the benefits of these federal programs in RFP calculations.

Over the years, various methods have been used to estimate the benefits of the pre-1990 federal motor vehicle program. In 2005, the U.S. Environmental Protection Agency (U.S. EPA) released guidance on this subject in Appendix A to the preamble to Phase 2 of the 8-hour ozone implementation rule. Appendix A was written for all 50 states and explains how to calculate the benefits of the 49-state pre-1990 program.

The one-size-fits-all approach found in Appendix A is problematic for California. California's pioneering efforts to set emission standards from motor vehicles resulted in nationwide emission standards adopted by U.S. EPA. In general, California's auto emission standards have been, and still are, more stringent than federal standards, particularly for passenger vehicles. California Air Resources Board (ARB) staff has held ongoing discussions with U.S. EPA staff about the most appropriate way to calculate the benefits of the motor vehicle and fuels control program as it existed in 1990. It was clear to ARB staff that U.S. EPA guidance in Appendix A did not recognize the maturity of California's program in 1990 or provide California a workable means to estimate the benefits of the pre-1990 motor vehicle program.

In September 2007, in response to issues raised by ARB staff, U.S. EPA staff proposed an alternative calculation methodology specifically for use in California. This alternative would allow calculating the benefits from the pre-1990 California program in lieu of those from the pre-1990 49-state federal program. By ARB staff's accounting, using the alternative U.S. EPA method would still result in an underestimation of the progress produced by California's program, although to a lesser extent than would Appendix A. This is due to an overestimation of the residual benefits of the pre-1990 California motor vehicle program. Nevertheless, ARB staff has estimated the benefits of California's pre-1990 motor vehicle program for the Sacramento Metro nonattainment area according to the U.S. EPA-approved alternative methodology (see Table G-1).

X:\2007-2008 SIPs\Reasonable Further Progress\Key RFP documents\SCFNAA Correspondence\CaMVCP writeup for Sac.doc

Table G-1

Summary of Inventory Adjustments for Statewide (TPD) – Using Statewide Muriel Ratios

1990 Technology Fractions
1990 I/M
2002 Population by Vehicle Class
7.8 psi Fuel RVP
1990 Fuels (gasoline + diesel)
Federal/State Emission Standards with 2002 Vehicle Class Distributions

Subregional EMFAC - Calculated FMVAC Using USEPA Methodology

ROG		**Statewide**	**Sac FNAA**
2002 Actual Baseline MV Inventory		993.06	63.89
CAMVCP for	**2002**	0.00	0.00
CAMVCP for	**2008**	135.69	8.73
CAMVCP for	**2013**	217.47	13.99
CAMVCP for	**2018**	253.33	16.30
CAMVCP for	**2023**	267.97	17.24
CAMVCP for	**2011**	184.76	11.89
CAMVCP for	**2014**	224.64	14.45
CAMVCP for	**2017**	246.16	15.84
CAMVCP for	**2020**	259.19	16.68

NOx		**Statewide**	**Sac FNAA**
2002 Actual Baseline MV Inventory		1869.57	115.27
CAMVCP for	**2002**	0.00	0.00
CAMVCP for	**2008**	169.34	10.44
CAMVCP for	**2013**	238.23	14.69
CAMVCP for	**2018**	266.78	16.45
CAMVCP for	**2023**	282.18	17.40
CAMVCP for	**2011**	210.67	12.99
CAMVCP for	**2014**	243.94	15.04
CAMVCP for	**2017**	261.07	16.10
CAMVCP for	**2020**	272.94	16.83

Data source: Pre-1990 Motor Vehicle Control Program Adjustments provided by CARB.

Appendix H – Reasonably Available Control Measure Analysis

RACM requirements

Section 172(c)(1) of the Clean Air Act requires a nonattainment plan 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."

In addition, EPA's final 8-hour ozone implementation rule in 40 CFR 51.912(d) pursuant to section 172(c)(1) of the CAA requires the attainment SIP submittal to include "a SIP revision demonstrating that it has adopted all RACM necessary to demonstrate attainment as expeditiously as practicable and to meet any RFP requirements."

EPA's RACM policy[28,29] indicates that areas should consider all candidate measures that are potentially reasonably available. Sources of potentially reasonable measures include measures adopted in other nonattainment areas, measures that the EPA has identified in guidelines or other documents, and any measures that have been suggested for the particular nonattainment area during a public comment period.

Areas should consider all reasonably available measures for implementation in light of local circumstances. However, areas need only to adopt measures if they are both economically and technologically feasible and cumulatively will advance the attainment date (by one year or more) or are necessary for RFP. "EPA does not believe that Congress intended the RACM requirement to compel the adoption of measures that are absurd, unenforceable, or impracticable."[30]

Process of identifying RACM

To identify all RACM, district staff conducted internal reviews, consulted with California Air Resources Board staff, solicited ideas from technical consultants and, attended a technology forum summit at the South Coast Air Quality Management District. In addition, district staff reviewed the following documents:

- "Final 2007 Air Quality Management Plan", South Coast Air Quality Management District, June 2007

[28] "Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard – Phase 2" (Federal Register, November 29, 2005, p. 71659-71661).
[29] "Guidance on the Reasonably Available Control Measures (RACM) Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas" (EPA, December 1999).
[30] "General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990" (57 FR 13498, April 16, 1992).

- "2007 Ozone Plan", San Joaquin Valley Air Pollution control District, April 30, 2007
- "Bay Area 2005 Ozone Strategy- Appendix C, Stationary and Mobile Source Control Measure Descriptions", Bay Area Air Quality Management District, January 4, 2006

District staff compared adopted rules in the following air districts to requirements in place in the Sacramento region; South Coast Air Quality Management District, Bay Area Air Quality Management District, Ventura County Air Pollution Control District, and San Joaquin Valley Air Pollution control District. Each of the five air districts was responsible for preparing the RACM analysis for the stationary measures in its jurisdiction. The regional mobile source and land use measures were evaluated by technical consultants for the Sacramento Air District on behalf of the region.

From these analyses, staff compiled the proposed control measures, "Sacramento Regional 8-hour Ozone Attainment Plan - Control Measures:, Draft, October 2006. District staff conducted public workshops at four locations throughout the Sacramento region. The purposes of the workshops were:

1. to solicit comments on the proposed control measures, and
2. to solicit ideas for additional control measures to be considered.

Feather River Air Quality Management District
Yuba City, CA - October 31, 2006

Sacramento Metropolitan and Yolo Solano Air Quality Management Districts
West Sacramento, CA - October 31, 2006

Placer County Air Pollution Control District
Auburn, CA - November 1, 2006

El Dorado County Air Quality Management District
Placerville, CA - November 1, 2006

Following the public workshops, staff evaluated public comments and suggestions, reviewed the final plan documents noted above, and compiled the proposed control measures included in this plan.

Conclusion

The following is a summary of the districts staff's findings:

1. District staff has evaluated and analyzed all reasonable control measures that were currently available for inclusion in this plan.
2. District staff has identified new or amended stationary control measures, and mobile source and land use control measures that are included in this plan.
3. This plan includes all RACM provided by the public and experts.
4. The available control measures that are not included collectively would not advance the attainment date or contribute to RFP for the Sacramento region because of the

insignificant or non-quantifiable amount of emissions reductions that they may potentially generate. Tables H-1 through H-6 contain a list of the measures and a brief discussion of the conclusions.

5. The RACM demonstration for transportation control measures was prepared by the Sacramento Area Council of Governments (SACOG) and is discussed separately in Appendix D – Transportation Control Measures.

Regional

Mobile/Land Use Source Control Measure RACM Analysis

Table H-1
Mobile and Land Use Control Measures Considered

Control Measure Number	Control Measure Title and Strategy Type	Conclusion
IS-1	Construction Mitigation	Control Measure - Also see conclusions for each district in Tables H-2 – H-6
IS-2	Operational Indirect Source	Control Measure - Also see conclusions for each district in Tables H-2 – H-6
MISC-31	Use emulsified diesel fuel in all diesel-burning heavy duty vehicles	Not Recommended – Technology is no longer available
MISC-51	Education to Improve Fueling Practices	Not Recommended – High cost
M-TRAN-1	Employer Based Trip Reduction	Not Recommended – No authority and high cost
OFMS12	Preconditioning of diesel engines to eliminate engine cold start emissions	Not Recommended – Evaluated for Attainment Advancement
OFMS13	Limiting pleasure watercraft and off-road vehicle use during spare the air days	Further Study – Combined in Episodic Controls Further Study Measure
OFMS16	Restricted use of diesel agricultural water pumps to nighttime on Spare The Air Days	Further Study – Combined in Episodic Controls Further Study Measure
OFMS19	Restrict Use of HD Off-Road Construction Equipment -- > 50hp to 4 hours per day	Further Study – Combined in Episodic Controls Further Study Measure
OFMS20	Restrict use of portable engines on Spare The Air Days	Further Study – Combined in Episodic Controls Further Study Measure
OFMS21	Ban or restrict use of recreational vehicles on Spare The Air Days	Further Study – Combined in Episodic Controls Further Study Measure
OFMS24	Limiting pleasure craft/vehicle use on days where the temperature is above 100°F	Further Study – Combined in Episodic Controls Further Study Measure
OFMS32	Reduced idling for Locomotive Emission Reductions	Not Recommended – No Authority, Federally Regulated Source. Implemented as incentive and ARB MOU.
OFMS39	Prohibit 2-stroke off-road engines	Not Recommended – High Cost
OFMS42	Lawn and garden care restrictions – ban commercial mowing on Spare The Air days	Further Study – Combined in Episodic Controls Further Study Measure
OFMS45	Identify and offer incentives for applications where on-road engines can be used in place of off-road certified engines	Not Recommended – No enforceable reductions due to differences in certification procedures
OFMS48	Raise fuel prices	Not Recommended – High Cost, No Authority

Table H-1
Mobile and Land Use Control Measures Considered

Control Measure Number	Control Measure Title and Strategy Type	Conclusion
OFMS66	Encourage faster turnover of locomotive engines to lower emitting engines under new US Tier 0 standards	Control Measure - part of SMAQMD OFMS-HD-1 and State SIP
OFMS68	Require retrofits – NOx Control Technologies – Locomotives	Not Recommended – No Authority
OFMS8	Ban all off-road construction equipment on spare the air days	Further Study – Combined in Episodic Controls Further Study Measure
OFMS-92	Change existing landscaping to xeriscaping and promotes the installation of xeriscaping in new developments	Not Recommended – High cost
ONMS-176	Develop a station car/low emission vehicle share program.	Not Recommended – High Cost
ONMS-181	Develop and fund a program for neighborhood electric vehicle	Not Recommended – High Cost
ONMS-38	Use remote sensors and license plate photos to identify smoking vehicles	Not Recommended – Evaluated for Attainment Advancement
ONMS-69	Provide free replacement caps to light and medium duty vehicle owners at special events, county fairs, etc.	Not Recommended - Already required as part of SMOG Check program
SMAQMD OFMS-HD-1	Off-road CI Incentive Program	Control Measure
SMAQMD OFMS-SI-1	Zero Emission Lawn and Garden Incentive (Residential)	Control Measure
SMAQMD ONMS-HD-1	SECAT Like Program	Control Measure
SMAQMD ONMS-LD-1	Light Duty Early Retirement	Control Measure
SMAQMD-1	Urban Forest Air Quality Development Program	Control Measure
State SOON Program	Retrofits, repowers, and fleet modernization for off road equipment	Not Recommended – Equivalent or better requirements in place
TCM-ONMS-ED-1	Spare The Air Program – Notification for Spare The Air Days	Control Measure
Further Study-1	Urban Heat Island Mitigation	Further Study
Further Study-2	Alternative Energy	Further Study
Further Study-3	Energy Conservation	Further Study

Table H-1
Mobile and Land Use Control Measures Considered

Control Measure Number	Control Measure Title and Strategy Type	Conclusion
Further Study-6	Episodic Controls (Combination of OFMS8, OFMS13, OFMS16, OFMS19, OFMS20, OFMS21, OFMS24, OFMS42)	Further Study

Sacramento Metropolitan Air Quality Management District

Stationary/Area Source Control Measure Control Measures Considered

Table H-2
SMAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
460	Adhesives and Sealants	VOC limits on adhesives and sealants	Reduce VOC limits on adhesives and sealants to limits used in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
442	Architectural Coatings	VOC limits on coatings	Reduce the VOC limits on the coatings consistent with the SCM	Control Measure
454/466	Degreasing/ Solvent Cleaning	VOC limits on solvents	Reduce the VOC limits on the solvents to limits adopted by SCAQMD. Including all coating rules with solvent limits.	Control Measure
440	Unspecified Coatings	None	Establish VOC limits on coatings.	Not Recommended - Evaluated for Attainment Advancement
459	Automotive Refinishing	VOC limits on coatings	Reduce the VOC limits on the coatings consistent with the SCM	Control Measure
	Paper, Fabric, and Film Coating	None	Establish VOC limits on coatings.	Not Recommended - No sources
411	Boilers and Steam Generators	NOx limits on boiler/steam generators with rated heat input capacity of 1 mmBtu/hr or greater; 1-5 mmBTU/hr 30 ppm, 5-20 mmBTU/hr 15 ppm, >20 mmBTU/hr 9 ppm	Already adopted	Control Measure
411	Boilers and Steam Generators	NOx limits on boiler/steam generators with rated heat input capacity of 1 mmBtu/hr or greater; 1-5 mmBTU/hr 30 ppm, 5-20 mmBTU/hr 15 ppm, >20 9 ppm	Reduce Nox limit to 6 ppm for >20 mmBTU/hr	Not Recommended - Evaluated for Attainment Advancement
412	IC Engines	NOx limits on IC Engines located at major stationary source	Require NOx limits all IC Engines, not just those at major stationary sources of NOx.	Control Measure
446	Storage Tanks	Requires use of a pressure tank or use of tank with vapor loss control device	Lower applicability threshold; additional control on fixed roof tank	Not Recommended - Evaluated for Attainment Advancement
	Cap and Trade	None	Establish CAP and Trade Emission Reduction Program similar to SCAQMD's RECLAIM Program	Not Recommended - Evaluated for Attainment Advancement
418	Commercial Cooking	None	Establish standards to control VOC emissions for Commercial Cooking (i.e. char boilers)	Not Recommended - Evaluated for Attainment Advancement
496	Livestock Waste	Implement several practice from a list	Lower applicability threshold; Increase number of practices and control efficiency	Control Measure
496	Livestock Waste	Implement several practices from a list	Lower applicability threshold; Increase	Not Recommended - Evaluated for

Table H-2
SMAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
			number of practices and control efficiency	Attainment Advancement
	Wineries	None	Establish standards to reduce evaporative VOC emissions from the fermentation process at wineries	Not Recommended - Evaluated for Attainment Advancement
463	Wood Products Coatings	VOC limits on coatings and strippers	Reduce VOC limits for high solid stains, sealers, strippers and lower the applicability limit to 20 gal/year	Not Recommended - Evaluated for Attainment Advancement
461	Natural Gas Production and Processing	None	Establish requirements to inspect and maintain equipment to reduce fugitive VOC emissions	Control Measure
471	Asphalted Concrete	None	Require limits for NOx emissions similar to a control measure adopted by SJVUAPCD	Control Measure
	Dryers and Ovens	None	Require limits for NOx emissions that achieve 50 - 75% reduction similar to proposed measure in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
465	Polyester Resin/Plastic Product Manufacturing	Limits monomer content and use of vapor suppressants	Reduce monomer limits to standards adopted by SCAQMD	Not Recommended - Evaluated for Attainment Advancement
485	Landfills	Collect and control ROG emissions from landfills containing approximately 4 million tons of waste or more	Lower applicability threshold to landfills containing approximately 0.5 million tons of waste or more	Not Recommended - Evaluated for Attainment Advancement
414	Water Heaters	NOx limits on water heaters with rated heat input capacity less than 75,000 Btu/hr	Require NOx limits on water heaters/boilers with rated heat input capacity between 75,000 Btu/hr and 1,000,000 Btu/hr, and reduce current NOx limits from 55 ppm to 15 ppm.	Control Measure
	Roofing Kettles	None	Establish VOC limits from roofing kettles	Not Recommended - Evaluated for Attainment Advancement
	Reactivity Based Standards	None	Require VOC limit of coatings to be based on a reactivity limit instead of a mass-balance limit	Not Recommended - Overlaps with Control Measure 442
	Using Greener Consumer Products	None	Promote the use of Low-VOC Consumer Product especially on Spare-the-Air Day	Not Recommended - Evaluated for Attainment Advancement

Table H-2
SMAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Semiconductor Manufacturing	None	Establish VOC limits for semiconductor manufacturing	Not Recommended - No sources
452	Can Coating	VOC limits on coatings	Reduce VOC limits to be as stringent as SJVUAPCD	Not Recommended - Equivalent or better requirements in place
456	Aerospace Assembly and Component	VOC limits on coatings	Require VOC limits on additional coating categories associated with Aerospace Coating	Not Recommended - Evaluated for Attainment Advancement
444	Petroleum Dry Cleaning	VOC limits on solvents used or use of emission control device	Remove applicability threshold to include all dry cleaning solvents except for perchloroethylene and ban the use of open transfer systems	Not Recommended - Evaluated for Attainment Advancement
451	Metal Parts and Products Coating	VOC limits on coatings, strippers and solvent cleaner	Reduce VOC limits for coatings used in some "baked" applications and coatings considered "specialty coatings"	Not Recommended - Evaluated for Attainment Advancement
450	Graphic Arts	VOC limits on inks, coatings, adhesives or use of emission control system	Reduce VOC limits for ink categories in flexographic for porous substrate, extreme performance, and metallic ink to be as stringent as SCAQMD	Not Recommended - Evaluated for Attainment Advancement
413	Gas Turbines	NOx limits on stationary gas turbines; 0.3 - 2.9 MW 42 ppmv, >= 2.9 and <877 hours 42 ppmv, 2.9 - 10 MW and >= 877 hours, 25 ppmv, >=10 MW with no SCR and >= 877 hours 15 ppmv, >=10 MW with SCR and >= hours 9 ppmv	Reduce NOx limits to be as stringent as SCAQMD; 0.3-2.9 MW 25 ppmv, 2.9-10 MW 9 ppmv, 2.9-10 MW with no scar 15 ppmv, 10 MW and over 9 ppmv , 10 MW and over with no SCR 12 ppmv	Not Recommended - Equivalent or better requirements in place
408	Incinerators	Multiple-chamber incinerator or APCO-approved equipment	Require all incinerators demonstrate NOx emissions of less than 60 lb/mmscf	Not Recommended - Evaluated for Attainment Advancement
	Food and Ag Processing	None	Require VOC limits to be as stringent as a rule adopted in SCAQMD which required the use of low-VOC sterilizing products or controlled by an emission control device	Not Recommended - Overlaps with Control Measure 454/466
458	Bakeries	Control efficiency of at least 95%	Lower applicability threshold	Not Recommended - Evaluated for Attainment Advancement

Table H-2
SMAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
447	Organic Liquid Loading	VOC limits from loading of organic liquids	Require VOC limits to be as stringent as BAAQMD; require leak inspection requirement and repair time requirement similar to the requirements adopted in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
448/449	Gasoline Transfer - Phase I/II	Phase I requires submerged fill pipe & ARB certified systems, pressure relief valve. Phase II requires ARB certified system, periodic self maintenance, periodic inspection	Evaluate SJV proposal	Not Recommended - Already implemented
Further Study - 4	Gasoline Transfer Phase I/II	Phase I requires submerged fill pipe & ARB certified systems, pressure relief valve. Phase II requires ARB certified system, periodic self maintenance, periodic inspection	Improve compliance rates by requiring ISD to provide earlier warning signal at lower degradation rate; change ISD warning and gross failure rates; disallow ISD reset button until fixed; require installation of shut down sensor	Further Study Needed - Current info inadequate
	Storage Tank Degassing	Maintenance/replacement not allowed May - October	Reduce emissions by requiring enhanced control technology, increased control efficiency, establishing concentration limits	Not Recommended - Evaluated for Attainment Advancement
	Aviation Fuel Transfer	None	Reduce VOC from spillage and vapor displacement during Phase 1 operations and from venting through relief valves	Not Recommended - Evaluated for Attainment Advancement
	Marine Coatings	None	Establish VOC limits for marine coatings.	Not Recommended - No sources
	Enhanced Compliance	None	Evaluate permit program change to assess opportunities for further emission reductions; include adjusting permit exemption level, conduct additional inspections and survey to identify potential sources, adding conditions to non-Title V Sources and improving accuracy and enforceability of existing permit	Not Recommended - Evaluated for Attainment Advancement
	Flares	None	Establish standard of NOx emissions for flares	Not Recommended - Evaluated for Attainment Advancement

Table H-2
SMAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Polystyrene/ Poly Foam Blowing/Other	None	Require reduction of VOC emission from EPS molding by vented the emissions to an emission control device such as a thermal oxidizer	Not Recommended - No sources
	Production of Wood/paper products	None	Require VOC limits for manufacturing wood/paper products.	Not Recommended - No sources
	Industrial Wastewater	None	Require VOC limits and control system from wastewater system	Not Recommended - Evaluated for Attainment Advancement
	Wastewater at Sewage Treatment Plants	None	Require VOC limits and control system for wastewater sewage treatment plant	Not Recommended - Evaluated for Attainment Advancement
201	Lower permit exemption	Permit exemptions and thresholds	Lower permit threshold to bring more sources and equipment under permit program	Not Recommended - Evaluated for Attainment Advancement
	Green Waste Composting	None	Establish VOC limits similar to the rule adopted by SJVUAPCD	Not Recommended - Evaluated for Attainment Advancement
	Co-Composting and Biosolids	None	Establish VOC reducing requirements equivalent to SJVUAPCD/SCAQMD	Not Recommended - Evaluated for Attainment Advancement
	Glass Furnaces	None	Establish NOx limits for glass furnaces	Not Recommended - No sources
	Central Furnaces	None	Establish NOx limits for central furnaces	Not Recommended - Evaluated for Attainment Advancement
IS-1	ISR Construction	None	Implement construction mitigation rule to reduce off-road construction NOx emissions associated with new land use development	Control Measure
IS-1	ISR Construction	None	Implement construction mitigation rule to reduce off-road construction VOC emissions associated with new land use development	Not Recommended - Evaluated for Attainment Advancement
IS-2	ISR Operational	None	Mitigate increased emissions associated with new land use/development projects	Control Measure
501	Agricultural Burning/Open Burning	Conditions under which burning must be conducted, when allowed, to minimize smoke; Burning is not allowed on days declared No-Burn Day	Prohibit burning of waste	Not Recommended - Evaluated for Attainment Advancement

Table H-2
SMAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Glycol Dehydration Systems	None	Control VOC emissions from glycol regenerator vents used in natural gas production to remove water vapor	Not Recommended - Evaluated for Attainment Advancement
Further Study - 5	Lubricants	None	Establish VOC limits for lubricant formulations	Further Study Needed - Current info inadequate
	Facility Modernization	None - new equipment with PTE greater than 10 lbs/day install BACT	Establish a pre-determined life span of when equipment would need to be replaced and would then trigger BACT limits	Not Recommended - Evaluated for Attainment Advancement

El Dorado County Air Quality Management District

Stationary/Area Source Control Measures Considered

Table H-3
EDCAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
236	Adhesives and Sealants	VOC limits on coatings	Reduce VOC limits on adhesives and sealants to limits used in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
215	Architectural Coatings	VOC limits on coatings	Reduce the VOC limits on the coatings consistent with the SCM	Control measure
225/235	Degreasing/ Solvent Cleaning	VOC limits on solvents	Reduce the VOC limits on the solvents	Control measure
	Unspecified Coatings	None	Establish VOC limits on coatings.	Not Recommended - Evaluated for Attainment Advancement
230	Automotive Refinishing	VOC limits on coatings	Reduce the VOC limits on the coatings consistent with the SCM	Not Recommended - Evaluated for Attainment Advancement
	Paper, Fabric, and Film Coating	None	Establish VOC limits on coatings.	Not Recommended - No sources
229	Boilers and Steam Generators	NOx limits on boiler/steam generators with rated heat input capacity of 5,000,000 Btu/hr or greater; 30 ppm,	Lower NOx limits on boiler/steam generators with rated heat input capacity of 1,000,000 Btu/hr or greater; 1-5 mmBTU/hr 30 ppm, 5-20 mmBTU/hr 15 ppm, >20 mmBTU/hr 9 ppm	Not Recommended - High Cost
231, 232, 233, 241	Boilers and Steam Generators	NOx limits on boiler/steam generators with rated heat input capacity of 5,000,000 Btu/hr or greater; 30 ppm,	Reduce NOx limit to 6-8 ppm for >20 mmBTU/hr	Not Recommended - High Cost
233	IC Engines	NOx limits on internal combustion engines	Reduce NOx limit	Not Recommended - High Cost
244	Storage Tanks	Work practices	Lower applicability threshold: additional control on fixed roof tank	Not Recommended - No sources
	Cap and Trade	None	Establish CAP and Trade Emission Reduction Program similar to SCAQMD's RECLAIM Program	Not Recommended - Evaluated for Attainment Advancement
	Commercial Cooking	None	Establish standards to control VOC emissions for Commercial Cooking (i.e. char boilers)	Not Recommended - Evaluated for Attainment Advancement
	Livestock Waste	None	Lower applicability threshold: increase number of practices and control efficiency	Not Recommended - Evaluated for Attainment Advancement
	Wineries	None	Establish standards to reduce evaporative VOC emissions from the fermentation process at wineries	Not Recommended - Evaluated for Attainment Advancement

Table H-3
EDCAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
237	Wood Products Coatings	VOC limits on coatings	Reduce VOC limits for high solid stains, sealers, strippers and lower the applicability limit to 20 gal/year	Not Recommended - Evaluated for Attainment Advancement
	Natural Gas Production and Processing	None	Establish requirements to inspect and maintain equipment to reduce fugitive VOC emissions	Not Recommended - No sources
	Asphaltic Concrete	None	Require limits for NOx emissions similar to a control measure adopted by SJVUAPCD	Not Recommended - No sources
	Other Dryers and Ovens	None	Require limits for NOx emissions that achieve 50 - 75% reduction similar to proposed measure in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
	Polyester Resin/Plastic Product Manufacturing	None	Reduce monomer limits to standards adopted by SCAQMD	Not Recommended - Evaluated for Attainment Advancement
	Landfills	None	Establish rule for landfills	Not Recommended - Evaluated for Attainment Advancement
239	Water Heaters	NOx limits on water heaters with rated heat input capacity less than 75,000 Btu/hr	Require NOx limits on water heaters/boilers with rated heat input capacity between 75,000 Btu/hr and 1,000,000 Btu/hr, and reduce current NOx limits from 55 ppm to 15 ppm.	Control measure
	Roofing Kettles	None	Establish VOC limits from roofing kettles	Not Recommended - Evaluated for Attainment Advancement
	Reactivity Based Standards	None	Require VOC limit of coatings to be based on a reactivity limit instead of a mass-balance limit	Not Recommended - Overlaps with Control Measure 218
	Using Greener Consumer Products	None	Promote the use of Low-VOC Consumer Product especially on Spare-the-Air Day	Not Recommended - Evaluated for Attainment Advancement
	Semiconductor Manufacturing	None	Establish VOC limits for semiconductor manufacturing.	Not Recommended - No sources
	Can Coating	None	Establish VOC limits	Not Recommended - No sources
	Aerospace Coating	None	Establish VOC limits	Not Recommended - No sources
	Petroleum Dry Cleaning	None	Establish VOC limits on solvents used or require use of an emission control device	Not Recommended - Evaluated for Attainment Advancement

Table H-3
EDCAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
246	Metal Parts and Products	None	Establish VOC limits	Control measure
231	Graphic Arts	VOC limits on graphic arts materials	Require VOC limits for ink products in flexographic for porous substrate, extreme performance, and metallic ink to be as stringent as SCAQMD	Not Recommended - Evaluated for Attainment Advancement
	Gas Turbines	None	Reduce NOx limits to be as stringent as SCAQMD; 0.3-2.9 MW 25 ppmv, 2.9-10 MW 9 ppmv, 2.9-10 MW with no scar 15 ppmv, 10 MW and over 9 ppmv , 10 MW and over with no SCR 12 ppmv	Not Recommended - No sources
	Incinerators	None	Require all incinerators demonstrate NOx emissions of less than 60 lb/mmscf	Not Recommended - No sources
	Food and Ag Processing	None	Require VOC limits to be as stringent as a rule adopted in SCAQMD which required the use of low-VOC sterilizing products or controlled by an emission control device	Not Recommended - No sources
	Bakeries	None	Establish VOC limits for bakeries	Not Recommended - No sources
	Terminal/Bulk Plants	VOC limits from loading of organic liquids	Require VOC limits to be as stringent as BAAQMD; require leak inspection requirement and repair time requirement similar to the requirements adopted in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
238/244	Gasoline Dispensing Phase I/II	Phase I requires submerged fill pipe & ARB certified systems, pressure relief valve. Phase II requires ARB certified system, periodic self maintenance, periodic inspection	Evaluate SJV proposal to include mobile fuelers, increase inspection frequency, lower allowable vapor leak threshold	Not Recommended - Evaluated for Attainment Advancement
238/244	Gasoline Dispensing Phase I/II	Phase I requires submerged fill pipe & ARB certified systems, pressure relief valve. Phase II requires ARB certified system, periodic self maintenance, periodic inspection	Improve compliance rates by requiring ISD to provide earlier warning signal at lower degradation rate; change ISD warning and gross failure rates; disallow ISD reset button until fixed; require installation of shut down sensor	Not Recommended - Evaluated for Attainment Advancement

Table H-3
EDCAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Storage Tank Degassing	None	Reduce emissions by requiring enhanced control technology, increased control efficiency, establishing concentration limits	Not Recommended - Evaluated for Attainment Advancement
	Aviation Fuel Transfer	None	Reduce VOC from spillage and vapor displacement during Phase 1 operations and from venting through relief valves	Not Recommended - Evaluated for Attainment Advancement
	Marine Coatings	None	Establish VOC limits for marine coatings.	Not Recommended - No sources
	Enhanced Compliance	None	Evaluate permit program change to assess opportunities for further emission reductions; include adjusting permit exemption level, conduct additional inspections and survey to identify potential sources, adding conditions to non-Title V Sources and improving accuracy and enforceability of existing permit	Not Recommended - Evaluated for Attainment Advancement
	Flares	None	Establish standard of NOx emissions for flares	Not Recommended - Evaluated for Attainment Advancement
	Polystyrene/ Poly Foam Blowing/Other	None	Require reduction of VOC emission from EPS molding by vented the emissions to an emission control device such as a thermal oxidizer	Not Recommended - No sources
	Production of Wood/paper products	None	Require VOC limits for manufacturing wood/paper products.	Not Recommended - No sources
	Industrial Wastewater	None	Require VOC limits and control system from wastewater system	Not Recommended - No sources
	Wastewater Sewage Treatment	None	Require VOC limits and control system for wastewater sewage treatment plant	Not Recommended - No sources
	Lower permit exemption	None	Lower permit threshold to bring more sources and equipment under permit program	Not Recommended - Evaluated for Attainment Advancement
	Composting Green Waste	None	Establish VOC limits similar to the rule adopted by SJVUAPCD	Not Recommended - Evaluated for Attainment Advancement

Table H-3
EDCAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Composting and Biosolids	None	Establish VOC reducing requirements equivalent to SJVUAPCD/SCAQMD	Not Recommended - No sources
	Glass Furnaces	None	Establish NOx limits for glass furnaces	Not Recommended - No sources
	Central Furnaces	None	Establish NOx limits for central furnaces	Not Recommended - Evaluated for Attainment Advancement
IS-1	ISR Construction	None	Implement construction mitigation rule to reduce off-road construction emissions associated with new land use development	Not Recommended - Evaluated for Attainment Advancement
IS-2	ISR Operational	None	Mitigate increased emissions associated with new land use/development projects	Not Recommended - Evaluated for Attainment Advancement
300	Agricultural Burning/Open Burning	Conditions under which burning must be conducted, when allowed, to minimize smoke; Burning is not allowed on days declared No-Burn Day	Prohibit burning of waste	Not Recommended - Evaluated for Attainment Advancement
	Glycol Dehydration Systems	None	Control VOC emissions from glycol regenerator vents used in natural gas production to remove water vapor	Not Recommended - Evaluated for Attainment Advancement
	Lubricants	None	Establish VOC limits for lubricant formulations	Not Recommended - Evaluated for Attainment Advancement
	Facility Modernization	None	Establish a pre-determined life span of when equipment would need to be replaced and would then trigger BACT limits	Not Recommended - Evaluated for Attainment Advancement

Feather River Air Quality Management District

Stationary/Area Source Control Measures Considered

Table H-4
FRAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
1	Adhesives and Sealants	None	Establish VOC limits on adhesives and sealants similar to limits used in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
3.15	Architectural Coatings	VOC limits on coatings	Reduce the VOC limits on the coatings consistent with the SCM	Control Measure
3.14	Degreasing/ Solvent Cleaning	Keep lid close on tanks greater than 55 gallons.	Require VOC limits on degreasing/solvent cleaning process.	Control Measure
2	Unspecified Coatings	None	Establish VOC limits on coatings that have not been established in another rule.	Not Recommended - Evaluated for Attainment Advancement
3.19	Automotive Refinishing	VOC limits on coatings	Reduce the VOC limits on the coatings consistent with the SCM	Control Measure
	Paper, Fabric, and Film Coating	None	Establish VOC limits on coatings.	Not Recommended - No sources
3.21	Boilers and Steam Generators	NOx limits on boiler/steam generators with rated heat input capacity of 1 mmBtu/hr or greater; 1-5 mmBTU/hr Annual Tune Up, >5 mmBTU/hr using gaseous fuel 30 ppm, >5 mmBTU/hr using non-gaseous fuel 40 ppm	Require Nox limits for boiler between 1-5 mmBtu/hr, and reduce Nox limit for boiler >5 mmBtu/hr	Not Recommended - Evaluated for Attainment Advancement
3.21	Boilers and Steam Generators	NOx limits on boiler/steam generators with rated heat input capacity of 1 mmBtu/hr or greater; 1-5 mmBTU/hr Annual Tune Up, >5 mmBTU/hr using gaseous fuel 30 ppm, >5 mmBTU/hr using non-gaseous fuel 40 ppm	Reduce Nox limit to 6 ppm for >20 mmBTU/hr	Not Recommended – No Sources
3.22	IC Engines	None	Establish Nox limits on engines.	Control Measure
3.8/3.9	Storage Tanks	Requires use of a floating roof or vapor loss control device	Lower applicability threshold	Not Recommended - Evaluated for Attainment Advancement
	Cap and Trade	None	Establish CAP and Trade Emission Reduction Program similar to SCAQMD's RECLAIM Program	Not Recommended - Evaluated for Attainment Advancement
	Commercial Cooking	None	Establish standards to control VOC emissions for Commercial Cooking (i.e. char boilers)	Not Recommended - Evaluated for Attainment Advancement
	Livestock Waste	None	Lower applicability threshold	Not Recommended – No Sources
	Wineries	None	Establish standards to reduce evaporative VOC emissions from the fermentation process at wineries	Not Recommended - Evaluated for Attainment Advancement

Table H-4
FRAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
3.20	Wood Products Coatings	VOC limits on coatings and strippers	Reduce VOC limits for high solid stains, sealers, strippers and lower the applicability limit to 20 gal/year	Not Recommended - Evaluated for Attainment Advancement
	Natural Gas Production and Processing	None	Establish requirements to inspect and maintain equipment to reduce fugitive VOC emissions	Not Recommended - Evaluated for Attainment Advancement
	Asphaltic Concrete	None	Require limits for NOx emissions	Not Recommended - No sources
	Other Dryers and Ovens	None	Require limits for NOx emissions that achieve 50 - 75% reduction similar to proposed measure in SCAQMD	Not Recommended – No Sources
	Polyester Resin/Plastic Product Manufacturing	None	Require monomer content limit and use of vapor suppressant	Not Recommended - No sources
3.18	Landfills	Collect and control ROG emissions from landfills	Lower applicability threshold to landfills containing approximately 0.5 million tons of waste or more	Not Recommended - No sources
3.23	Water Heaters	None	Require limits for Nox emissions for water heaters < 1 mmBtu/hr	Control Measure
	Roofing Kettles	None	Establish VOC limits from roofing kettles	Not Recommended - Evaluated for Attainment Advancement
	Reactivity Based Standards	None	Require VOC limit of coatings to be based on a reactivity limit instead of a mass-balance limit	Not Recommended - Overlaps with Control Measure 3.15
	Using Greener Consumer Products	None	Promote the use of Low-VOC Consumer Product especially on Spare-the-Air Day	Not Recommended - Evaluated for Attainment Advancement
	Semiconductor Manufacturing	None	Establish VOC limits for semiconductor manufacturing	Not Recommended - No sources
	Can Coating	None	Establish VOC limits for can coating	Not Recommended - No sources
	Aerospace Coating	None	Establish VOC limits for aerospace coating	Not Recommended - No sources
	Petroleum Dry Cleaning	None	Establish VOC limits on solvents used or use of control device	Not Recommended - No sources
	Metal Parts and Products	None	Require VOC limits on coatings for metal parts and products	Not Recommended - Evaluated for Attainment Advancement

Table H-4
FRAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Graphic Arts	None	Require VOC limits on inks, coatings, adhesives or use of emission control system	Not Recommended - No sources
	Gas Turbines	None	Establish Nox limits on stationary gas turbines	Not Recommended - No sources
	Incinerators	None	Establish Nox limits on incinerators	Not Recommended - No sources
	Food and Ag Processing	None	Require VOC limits to be as stringent as a rule adopted in SCAQMD which required the use of low-VOC sterilizing products or controlled by an emission control device	Not Recommended - Evaluated for Attainment Advancement
	Bakeries	None	Require control device with efficiency of at least 95%	Not Recommended - No sources
	Terminal/Bulk Plants	None	Require VOC limits from loading of organic liquids	Not Recommended - No sources
3.8/3.12	Gasoline Transfer - Phase I/II	Phase I requires submerged fill pipe & ARB certified systems. Phase II requires ARB certified system, periodic self maintenance, periodic inspection	Evaluate SJV proposal to include mobile fuelers, increase inspection frequency, lower allowable vapor leak threshold	Not Recommended - Evaluated for Attainment Advancement
3.8/3.12	Gasoline Transfer - Phase I/II	Phase I requires submerged fill pipe & ARB certified systems. Phase II requires ARB certified system, periodic self maintenance, periodic inspection	Improve compliance rates by requiring ISD to provide earlier warning signal at lower degradation rate; change ISD warning and gross failure rates; disallow ISD reset button until fixed; require installation of shut down sensor	Not Recommended - Evaluated for Attainment Advancement
	Storage Tank Degassing	None	Reduce emissions by requiring enhanced control technology, increased control efficiency, establishing concentration limits	Not Recommended - No sources
	Aviation Fuel Transfer	None	Reduce VOC from spillage and vapor displacement during Phase 1 operations and from venting through relief valves	Not Recommended - No sources
	Marine Coatings	None	Establish VOC limits for marine coatings.	Not Recommended - No sources

Table H-4
FRAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Enhanced Compliance	None	Evaluate permit program change to assess opportunities for further emission reductions; include adjusting permit exemption level, conduct additional inspections and survey to identify potential sources, adding conditions to non-Title V Sources and improving accuracy and enforceability of existing permit	Not Recommended - Evaluated for Attainment Advancement
	Flares	None	Establish standard of NOx emissions for flares	Not Recommended - No sources
	Polystyrene/ Poly Foam Blowing/Other	None	Require reduction of VOC emission from EPS molding by vented the emissions to an emission control device such as a thermal oxidizer	Not Recommended - No sources
	Production of Wood/paper products	None	Require VOC limits for manufacturing wood/paper products.	Not Recommended - No sources
	Industrial Wastewater	None	Require VOC limits and control system from wastewater system	Not Recommended - No sources
	Wastewater Sewage Treatment	None	Require VOC limits and control system for wastewater sewage treatment plant	Not Recommended - No sources
4.3	Lower permit exemption	Permit exemptions and thresholds	Lower permit threshold to bring more sources and equipment under permit program	Not Recommended - Evaluated for Attainment Advancement
	Composting Green Waste	None	Establish VOC limits	Not Recommended - No sources
	Composting and Biosolids	None	Establish VOC reducing requirements equivalent to SJVUAPCD/SCAQMD	Not Recommended - No sources
	Glass Furnaces	None	Establish NOx limits for glass furnaces	Not Recommended - No sources
	Central Furnaces	None	Establish NOx limits for central furnaces	Not Recommended - Evaluated for Attainment Advancement
IS-1	ISR Construction	None	Implement construction mitigation rule to reduce off-road construction NOx emissions associated with new land use development	Control measure

Table H-4
FRAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
IS-1	ISR Construction	None	Implement construction mitigation rule to reduce off-road construction VOC emissions associated with new land use development	Not Recommended - Evaluated for Attainment Advancement
IS-2	ISR Operational	None	Mitigate increased emissions associated with new land use/development projects	Not Recommended - Evaluated for Attainment Advancement
2.0	Agricultural Burning/Open Burning	Conditions under which burning must be conducted, when allowed, to minimize smoke; Burning is not allowed on days declared No-Burn Day	Prohibit burning of waste	Not Recommended - Evaluated for Attainment Advancement
	Glycol Dehydration Systems	None	Control VOC emissions from glycol regenerator vents used in natural gas production to remove water vapor	Not Recommended - Evaluated for Attainment Advancement
	Lubricants	None	Establish VOC limits for lubricant formulations	Not Recommended - Evaluated for Attainment Advancement
	Facility Modernization	None - new equipment with PTE greater than 10 lbs/day install BACT	Establish a pre-determined life span of when equipment would need to be replaced and would then trigger BACT limits	Not Recommended - Evaluated for Attainment Advancement

Placer County Air Pollution Control District

Stationary/Area Source Control Measures Considered

Table H-5
PCAPCD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
235	Adhesives and Sealants	VOC limits on adhesives and sealants	Reduce VOC limits on adhesives and sealants to limits used in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
218	Architectural Coatings	VOC limits on coatings	Reduce the VOC limits on the coatings consistent with the SCM	Control Measure
216, 240	Degreasing/ Solvent Cleaning	VOC limits on solvent	Reduce the VOC limits on the solvents to limits adopted by SCAQMD. Including all coating rules with solvent limits.	Not Recommended - Evaluated for Attainment Advancement
	Unspecified Coatings	None	Establish VOC limits on coatings.	Not Recommended - Evaluated for Attainment Advancement
234	Automotive Refinishing	VOC limits on coatings	Reduce the VOC limits on the coatings consistent with the SCM	Control Measure
	Paper, Fabric, and Film Coating	None	Establish VOC limits on coatings.	Not Recommended - No sources
231, 232, 233, 241	Boilers and Steam Generators	Required NOx limits 30 ppm on boiler/steam generators with rated heat input capacity of 5MMBtu/hr or greater;	Lower NOx limits on boiler/steam generators with rated heat input capacity of 1,000,000 Btu/hr or greater; 1-5 mmBTU/hr 30 ppm, 5-20 mmBTU/hr 15 ppm, >20 mmBTU/hr 9 ppm	Not Recommended - High Cost due to the portion of boilers >5 mmBtu/hr in the county
231, 232, 233, 241	Boilers and Steam Generators	Required NOx limits 30 ppm on boiler/steam generators with rated heat input capacity of 5,000,000 Btu/hr or greater;	Reduce Nox limit to 6-8 ppm for >20 mmBTU/hr	Not Recommended - High cost due to the portion of boilers > 5 mmBtu/hr in the county
242	IC Engines	NOx limits on IC Engines located at stationary sources	Lower NOx limits on all non-ag stationary engines 25 ppm for rich burn, 65 ppm for lean burn, 80 ppm for diesel	Not Recommended - Evaluated for Attainment Advancement
212	Storage Tanks	Requires use of a pressure tank or use of tank with vapor loss control device	Lower applicability threshold; additional control on fixed roof tank	Not Recommended - Evaluated for Attainment Advancement
	Cap and Trade	None	Establish CAP and Trade Emission Reduction Program similar to SCAQMD's RECLAIM Program	Not Recommended - Evaluated for Attainment Advancement
	Commercial Cooking	None	Establish standards to control VOC emissions for Commercial Cooking (i.e. char boilers)	Not Recommended - Evaluated for Attainment Advancement

Table H-5
PCAPCD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Livestock Waste	None	Lower applicability threshold; Increase number of practices and control efficiency	Not Recommended - Evaluated for Attainment Advancement
	Wineries	None	Establish standards to reduce evaporative VOC emissions from the fermentation process at wineries	Not Recommended - Evaluated for Attainment Advancement
236	Wood Products Coatings	VOC limits on coatings and strippers	Reduce VOC limits for high solid stains, sealers, strippers and lower the applicability limit to 20 gal/year	Not Recommended - Evaluated for Attainment Advancement
	Natural Gas Production and Processing	None	Establish requirements to inspect and maintain equipment to reduce fugitive VOC emissions	Not Recommended - No sources
CM1	Asphaltic Concrete	None	Require limits for NOx emissions similar to a control measure adopted by SJVUAPCD	Control Measure
	Other Dryers and Ovens	None	Require limits for NOx emissions that achieve 50 - 75% reduction similar to proposed measure in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
243	Polyester Resin/Plastic Product Manufacturing	Limits monomer content and use of vapor suppressants	Reduce monomer limits to standards adopted by SCAQMD	Not Recommended - Evaluated for Attainment Advancement
237	Landfills	Collect and control ROG emissions from landfills containing approximately 2.75 million tons of waste or more	Lower applicability threshold to landfills containing approximately 0.5 million tons of waste or more	Not Recommended - Evaluated for Attainment Advancement
CM2/246	Water Heaters	NOx limits on water heaters with rated heat input capacity less than 75,000 Btu/hr	Require NOx limits on water heaters/boilers with rated heat input capacity between 75,000 Btu/hr and 1,000,000 Btu/hr, and reduce current NOx limits from 55 ppm to 15 ppm.	Control Measure
	Roofing Kettles	None	Establish VOC limits from roofing kettles	Not Recommended - Evaluated for Attainment Advancement
	Reactivity Based Standards	None	Require VOC limit of coatings to be based on a reactivity limit instead of a mass-balance limit	Not Recommended - Overlaps with Control Measure 218
	Using Greener Consumer Products	None	Promote the use of Low-VOC Consumer Product especially on Spare-the-Air Day	Not Recommended - Evaluated for Attainment Advancement

Table H-5
PCAPCD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
244	Semiconductor Manufacturing	Limit VOC emissions from negative photoresist operations and solvent cleaning processes	Establish VOC limits for semiconductor manufacturing	Not Recommended - Evaluated for Attainment Advancement
233	Can Coating	Limit VOC emissions form coating	Reduce VOC limits to be as stringent as SJVUAPCD	Not Recommended - Evaluated for Attainment Advancement
	Aerospace Coating	None	Establish VOC limits	Not Recommended - No sources
227	Petroleum Dry Cleaning	VOC limits on solvents used or use of emission control device	Remove applicability threshold to include all dry cleaning solvents except for perchloroethylene and ban the use of open transfer systems	Not Recommended - Evaluated for Attainment Advancement
CM3/245	Metal Parts and Products	None	Establish VOC limits	Control Measure
239	Graphic Arts	VOC limits on inks, coatings, adhesives or use of emission control system	Reduce VOC limits for ink categories in flexographic for porous substrate, extreme performance, and metallic ink to be as stringent as SCAQMD	Not Recommended - Evaluated for Attainment Advancement
250	Gas Turbines	NOx limits on stationary gas turbines; 0.3 - 2.9 MW 42 ppmv, >= 2.9 and <877 hours 42 ppmv, 2.9 - 10 MW and >= 877 hours, 25 ppmv, >=10 MW with no SCR and >= 877 hours 15 ppmv, >=10 MW with SCR and >= hours 9 ppmv	Reduce NOx limits to be as stringent as SCAQMD; 0.3-2.9 MW 25 ppmv, 2.9-10 MW 9 ppmv, 2.9-10 MW with no scar 15 ppmv, 10 MW and over 9 ppmv , 10 MW and over with no SCR 12 ppmv	Not Recommended - Already implemented
206	Incinerators	Limit NOx, SO2, CO, PM, THC, and HCL emissions from an incinerator	Require all incinerators demonstrate NOx emissions of less than 60 lb/mmscf	Not Recommended - Evaluated for Attainment Advancement
	Food and Ag Processing	None	Require VOC limits to be as stringent as a rule adopted in SCAQMD which required the use of low-VOC sterilizing products or controlled by an emission control device	Not Recommended - Evaluated for Attainment Advancement
	Bakeries	None	Lower applicability threshold	Not Recommended - Evaluated for Attainment Advancement

Table H-5
PCAPCD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
213, 215	Terminal/Bulk Plants	VOC limits from loading of organic liquids	Require VOC limits to be as stringent as BAAQMD; require leak inspection requirement and repair time requirement similar to the requirements adopted in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
Further Study – 4	Gasoline Dispensing Phase I/II	Require new and existing retail service stations being in compliance with State ATCM by its deadline	Evaluate SJV proposal to include mobile fuelers, increase inspection frequency, lower allowable vapor leak threshold	Further Study - Current information inadequate to quality benefits and cost effectiveness
Further Study – 4	Gasoline Dispensing Phase I/II	Require new and existing retail service stations being in compliance with State ATCM by its deadline	Improve compliance rates by requiring ISD to provide earlier warning signal at lower degradation rate; change ISD warning and gross failure rates; disallow ISD reset button until fixed; require installation of shut down sensor	Further Study - Current information inadequate to quality benefits and cost effectiveness
	Storage Tank Degassing	None	Reduce emissions by requiring enhanced control technology, increased control efficiency, establishing concentration limits	Not Recommended - Evaluated for Attainment Advancement
	Aviation Fuel Transfer	None	Reduce VOC from spillage and vapor displacement during Phase 1 operations and from venting through relief valves	Not Recommended - Evaluated for Attainment Advancement
	Marine Coatings	None	Establish VOC limits for marine coatings.	Not Recommended - No sources
	Enhanced Compliance	None	Evaluate permit program change to assess opportunities for further emission reductions; include adjusting permit exemption level, conduct additional inspections and survey to identify potential sources, adding conditions to non-Title V Sources and improving accuracy and enforceability of existing permit	Not Recommended - Evaluated for Attainment Advancement
	Flares	None	Establish standard of NOx emissions for flares	Not Recommended - No sources

Table H-5
PCAPCD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Polystyrene/ Poly Foam Blowing/Other	None	Require reduction of VOC emission from EPS molding by vented the emissions to an emission control device such as a thermal oxidizer	Not Recommended - No sources
229, 238	Production of Wood/paper products	Limit coatings and inks which contain 250 grams or less of VOC per liter	Require VOC limits for manufacturing wood/paper products.	Not recommended - already implemented
	Industrial Wastewater	None	Require VOC limits and control system from wastewater system	Not Recommended - No sources
	Wastewater Sewage Treatment	None	Require VOC limits and control system for wastewater sewage treatment plant	Not Recommended - No sources
	Lower permit exemption	Permit exemptions and thresholds	Lower permit threshold to bring more sources and equipment under permit program	Not Recommended - Evaluated for Attainment Advancement
	Composting Green Waste	None	Establish VOC limits similar to the rule adopted by SJVUAPCD	Not Recommended - Evaluated for Attainment Advancement
	Composting and Biosolids	None	Establish VOC reducing requirements equivalent to SJVUAPCD/SCAQMD	Not Recommended - Evaluated for Attainment Advancement
	Glass Furnaces	None	Establish NOx limits for glass furnaces	Not Recommended - No sources
	Central Furnaces	None	Establish NOx limits for central furnaces	Not Recommended - Evaluated for Attainment Advancement
IS-1	ISR Construction	None	Implement construction mitigation rule to reduce off-road construction Nox emissions associated with new land use development	Control Measure
IS-1	ISR Construction	None	Implement construction mitigation rule to reduce off-road construction emissions associated with new land use development	Not Recommended - Evaluated for Attainment Advancement
IS-2	ISR Operational	None	Mitigate increased emissions associated with new land use/development projects	Control measure

Table H-5
PCAPCD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Agricultural Burning/Open Burning	Conditions under which burning must be conducted, when allowed, to minimize smoke; Burning is not allowed on days declared No-Burn Day, Areas may have more restricted controls based on its Municipal Advisory Councils decision	Prohibit burning of waste	Not Recommended - Evaluated for Attainment Advancement
	Glycol Dehydration Systems	None	Control VOC emissions from glycol regenerator vents used in natural gas production to remove water vapor	Not Recommended - No sources
Further Study – 5	Lubricants	None	Establish VOC limits for lubricant formulations	Further Study - Current information incomplete to quantify benefits and cost effectiveness
	Facility Modernization	None	Establish a pre-determined life span of when equipment would need to be replaced and would then trigger BACT limits	Not Recommended - Evaluated for Attainment Advancement

Yolo-Solano Air Quality Management District

Stationary/Area Source Control Measures Considered

Table H-6
YSAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Adhesives and Sealants	VOC limits on adhesives and sealants	Reduce VOC limits on adhesives and sealants to limits used in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
2.14	Architectural Coatings	VOC limits on coatings	Reduce the VOC limits on the coatings consistent with the SCM	Control Measure
2.24/2.31	Degreasing/ Solvent Cleaning	VOC limits on solvents	Reduce the VOC limits on the solvents to limits adopted by SCAQMD.	Control measure
	Unspecified Coatings	None	Establish VOC limits on coatings.	Not Recommended - No sources
2.26	Automotive Refinishing	VOC limits on coatings	Reduce the VOC limits on the coatings consistent with the SCM	Control measure
	Paper, Fabric, and Film Coating	None	Establish VOC limits on coatings.	Not Recommended - No sources
	Boilers and Steam Generators, <5.0 mmBTU/hr	NOx limits on boiler/steam generators with rated heat input capacity of 1 mmBTU/hr 30 ppm	Establish Nox limits on boiler/steam generators with rated heat input capacity of 1-5 mmBTU/hr 30 ppm	Not Recommended - High cost
2.27	Boilers and Steam Generators, >4.9 mmBTU/hr	NOx limits on boiler/steam generators with rated heat input capacity of 1 mmBTU/hr 30 ppm	Lower NOx limits on boiler/steam generators with rated heat input capacity of 5-20 mmBTU/hr and >20 mmBTU/hr	Control Measure
231, 232, 233, 241	Boilers and Steam Generators	NOx limits on boiler/steam generators with rated heat input capacity of 1 mmBTU/hr 30 ppm	Reduce NOx limit to 6-8 ppm for >20 mmBTU/hr	Not Recommended - Evaluated for Attainment Advancement
2.32	IC Engines	Rich burn Nox limit at 90 ppm. Lean burn Nox limit for engines > 100 BHP at 150 ppm and Nox limit for engines > 100 BHP at 300 ppm	Reduce NOx emission limit for rich burn, lean burn > 100 BHP, and lean burn engines < 100 BHP.	Control measure
2.21	Storage Tanks	Requires use of a pressure tank or use of tank with vapor loss control device	Lower applicability threshold; additional control on fixed roof tank	Not Recommended - Evaluated for Attainment Advancement
	Cap and Trade	None	Establish CAP and Trade Emission Reduction Program similar to SCAQMD's RECLAIM Program	Not Recommended - Evaluated for Attainment Advancement
	Commercial Cooking	None	Establish standards to control VOC emissions for Commercial Cooking (i.e. char boilers)	Not Recommended - Evaluated for Attainment Advancement

Table H-6
YSAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Livestock Waste	Best Available Control Technology	Lower applicability threshold; Increase number of practices to control emissions and improve control efficiency	Not Recommended - Evaluated for Attainment Advancement
	Wineries	None	Establish standards to reduce evaporative VOC emissions from the fermentation process at wineries	Not Recommended - Evaluated for Attainment Advancement
	Wood Products Coatings	VOC limits on wood coatings, application equipment requirements	Reduce VOC limits for high solid stains, sealers, strippers and lower the applicability limit to 20 gal/year	Not Recommended - Evaluated for Attainment Advancement
	Natural Gas Production and Processing	Inspections of seals and pressure relief devices, control of fugitive emissions	Establish requirements to inspect and maintain equipment to reduce fugitive VOC emissions	Not recommended - Already implemented
	Asphaltic Concrete	None	Require limits for NOx emissions similar to a control measure adopted by SJVUAPCD	Not Recommended - Evaluated for Attainment Advancement
	Other Dryers and Ovens	None	Require limits for NOx emissions that achieve 50 - 75% reduction similar to proposed measure in SCAQMD	Not Recommended - Evaluated for Attainment Advancement
	Polyester Resin/Plastic Product Manufacturing	VOC limits on polyester resin materials, requirements for application equipment	Reduce monomer limits to standards adopted by SCAQMD	Not Recommended - Evaluated for Attainment Advancement
	Landfills	Compliance with EPA requirements	Lower applicability threshold to landfills containing approximately 0.5 million tons of waste or more	Not Recommended - Evaluated for Attainment Advancement
2.37	Water Heaters	40 nanogram Nox limit for natural gas-fired water heaters	Require rating specific Nox limits on water heaters/boilers with rated heat input capacity between 75,000 BTU/hr and 1,000,000 BTU/hr	Control measure
	Roofing Kettles	None	Establish VOC limits from roofing kettles	Not Recommended - Evaluated for Attainment Advancement
	Reactivity Based Standards	None	Require VOC limit of coatings to be based on a reactivity limit instead of a mass-balance limit	Not recommended - Overlaps with Control Measure 2.14
	Using Greener Consumer Products	None	Promote the use of Low-VOC Consumer Product especially on Spare-the-Air Day	Not Recommended - Evaluated for Attainment Advancement

Table H-6
YSAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Semiconductor Manufacturing	None	Establish VOC limits for semiconductor manufacturing	Not Recommended - Evaluated for Attainment Advancement
	Can Coating	None	Reduce VOC limits to be as stringent as SJVUAPCD	Not Recommended - No sources
	Aerospace Coating	None	Establish VOC limits	Not Recommended - No sources
	Petroleum Dry Cleaning	VOC limits on solvents used or use of emission control device	Remove applicability threshold to include all dry cleaning solvents except for perchloroethylene and ban the use of open transfer systems	Not Recommended - No sources
	Metal Parts and Products	VOC limits on metal parts coatings, application methods	Reduce VOC limits for coatings used in some "baked" applications and coatings considered "specialty coatings"	Not Recommended - Evaluated for Attainment Advancement
2.29	Graphic Arts	VOC limits on graphic arts products	Lower rule exemption limit to 60 pounds per month. Revise cleaning solvent ROG limits to match current SMAQMD standards.	Control Measure
	Gas Turbines	Nox limits on gas turbines	Reduce NOx limits to be as stringent as SCAQMD; 0.3-2.9 MW 25 ppmv, 2.9-10 MW 9 ppmv, 2.9-10 MW with no scar 15 ppmv, 10 MW and over 9 ppmv , 10 MW and over with no SCR 12 ppmv	Not Recommended - Already implemented
	Incinerators		Require all incinerators demonstrate NOx emissions of less than 60 lb/mmscf	Not Recommended - Evaluated for Attainment Advancement
	Food and Ag Processing	None	Require VOC limits to be as stringent as a rule adopted in SCAQMD which required the use of low-VOC sterilizing products or controlled by an emission control device	Not Recommended - Evaluated for Attainment Advancement
	Bakeries	None	Lower applicability threshold	Not Recommended - Evaluated for Attainment Advancement

Table H-6
YSAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Terminal/Bulk Plants	Pressure tank or vapor-loss control device required	Require VOC limits to be as stringent as BAAQMD; require leak inspection requirement and repair time requirement similar to the requirements adopted in SCAQMD	Not Recommended - Already implemented
	Gasoline Dispensing Phase I/II	Phase I requires submerged fill pipe and ARB certified systems. Phase II requires ARB certified system, replacement of balance-system nozzle boots once per year	Evaluate SJV proposal to include mobile fuelers, increase inspection frequency, lower allowable vapor leak threshold	Not recommended - Already implemented
Further Study – 4	Gasoline Dispensing Phase I/II	Phase I requires submerged fill pipe and ARB certified systems. Phase II requires ARB certified system, replacement of balance-system nozzle boots once per year	Improve compliance rates by requiring ISD to provide earlier warning signal at lower degradation rate; change ISD warning and gross failure rates; disallow ISD reset button until fixed; require installation of shut down sensor	Further Study Needed - Current information inadequate to quantify benefits or assess cost/feasibility
	Storage Tank Degassing		Reduce emissions by requiring enhanced control technology, increased control efficiency, establishing concentration limits	Not Recommended - Evaluated for Attainment Advancement
	Aviation Fuel Transfer	None	Reduce VOC from spillage and vapor displacement during Phase 1 operations and from venting through relief valves	Not Recommended - Evaluated for Attainment Advancement
	Marine Coatings	None	Establish VOC limits for marine coatings.	Not Recommended - Evaluated for Attainment Advancement
	Enhanced Compliance	None	Evaluate permit program change to assess opportunities for further emission reductions; include adjusting permit exemption level, conduct additional inspections and survey to identify potential sources, adding conditions to non-Title V Sources and improving accuracy and enforceability of existing permit	Not Recommended - Evaluated for Attainment Advancement
	Flares	None	Establish standard of NOx emissions for flares	Not Recommended - Evaluated for Attainment Advancement

Table H-6
YSAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
	Polystyrene/ Poly Foam Blowing/Other	None	Require reduction of VOC emission from EPS molding by vented the emissions to an emission control device such as a thermal oxidizer	Not Recommended - Equivalent or better requirements in place
	Production of Wood/paper products	None	Require VOC limits for manufacturing of wood/paper products	Not Recommended - No sources
	Industrial Wastewater	None	Require VOC limits and control system from wastewater system	Not Recommended - Evaluated for Attainment Advancement
	Wastewater Sewage Treatment	None	Require VOC limits and control system for wastewater sewage treatment plant	Not Recommended - Evaluated for Attainment Advancement
	Lower permit exemption	None	Lower permit threshold to bring more sources and equipment under permit program	Not Recommended - Evaluated for Attainment Advancement
	Composting Green Waste	None	Establish VOC limits similar to the rule adopted by SJVUAPCD	Not Recommended - Evaluated for Attainment Advancement
	Composting and Biosolids	None	Establish VOC reducing requirements equivalent to SJVUAPCD/SCAQMD	Not Recommended - No sources
	Glass Furnaces	None	Establish NOx limits for glass furnaces	Not Recommended - No sources
	Central Furnaces	None	Establish NOx limits for central furnaces	Not Recommended - Evaluated for Attainment Advancement
IS – 1	ISR Construction	None	Implement construction mitigation rule to reduce off-road construction emissions associated with new land use development	Not Recommended - Evaluated for Attainment Advancement
IS – 2	ISR Operational	None	Mitigate increased emissions associated with new land use/development projects	Not Recommended - Evaluated for Attainment Advancement
	Agricultural Burning/Open Burning	Burning dependent of meteorology, no burning allowed on no-burn days	Prohibit burning of waste	Not Recommended - Evaluated for Attainment Advancement
	Glycol Dehydration Systems	None	Control VOC emissions from glycol regenerator vents used in natural gas production to remove water vapor	Not Recommended - Evaluated for Attainment Advancement

Table H-6
YSAQMD Stationary/Area Source Control Measures Considered

Measure No.	Title	Current Requirements	Opportunity for Strengthening	Conclusion
Further Study – 5	Lubricants	None	Establish VOC limits for lubricant formulations	Further Study Needed - Current information inadequate to quantify benefits or assess cost/feasibility
	Facility Modernization	New equipment with PTE > 10 lbs/day install BACT	Establish a pre-determined life span of when equipment would need to be replaced and would then trigger BACT limits	Not Recommended - Evaluated for Attainment Advancement

Appendix I: Federal Clean Air Act Requirements

Table I-1
General Nonattainment Plan Requirements

Required Plan Element	Description	Location in Plan
Reasonably Available Control Measures (RACM) [Section 172(c)(1)	The plan should provide for the implementation of all reasonably available control measures as expeditiously as practicable, including reduction in emissions from existing sources through the adoption of reasonably available control technology.	Chapter 7 (proposed control measures) Appendix H (RACM analysis)
Reasonable Further Progress [Section 172(c)(2)]	The plan requires reasonable further progress in emission reduction.	Chapter 13 (RFP demonstration)
Inventory [Section 172(c)(3)]	The plan should include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in such area, including periodic revisions as the Administrator may determine necessary to assure that the requirements of this part are met.	Chapter 5 (emissions inventory) Appendix A (emissions inventory)
Identification and Quantification [Section 172(c)(4)]	The plan should identify and quantify the emissions, if any, of any such pollutant or pollutants, which will be allowed, in accordance with section 173(a)(1)(B), from the construction and operation of major new or modified stationary sources in each such area. The plan shall demonstrate to the satisfaction of the EPA that the emissions quantified for this purpose will be consistent with the achievement of reasonable further progress and will not interfere with attainment of the applicable national ambient air quality standard by the applicable attainment date.	Chapter 5, Sections 5.5 and 5.6 (emissions forecasts) Chapter 8 (attainment demonstration) Chapter13 (RFP demonstration)
Permits for new and modified stationary sources [Section 172(c)(5)]	Such plan provisions shall require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area, in accordance with section 173.	Chapter 3, Section 3.3 (NSR permitting requirements)

Table I-1 (cont.)
General Nonattainment Plan Requirements

Required Plan Element	Description	Location in Plan
Other Measures [Section 172(c)(6)]	Such plan provisions shall include enforceable emission limitations, and such other control measures, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emission rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment by the applicable date.	Chapter 7 (proposed control measures)
Compliance with Section 110(a)(2) [Section 172(c)(7)]	Compliance with section 110(a)(2).- Such plan provisions shall also meet the applicable provisions of section 110(a)(2). Section 110(a)(2) – includes reasonable notice and public hearing requirements for plan adoptions.	Chapters 2, 4, 6, 7, 8
Equivalent Techniques [Section 172(c)(8)]	Upon application by any State, the EPA may allow the use of equivalent modeling, emission inventory, and planning procedures, unless the EPA determines that the proposed techniques are, in the aggregate, less effective than the methods specified by the EPA.	Chapter 5 (emissions inventory) Chapter 6 (air quality modeling)
Contingency Measures [Section 172(c)(9)]	The plan should include specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the applicable attainment. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the EPA	Chapter 7, Section 7.20 (contingency measures) Chapter 8, Section 8.4 Chapter 13, Section 13.3

Table I-2
Severe Area Plan Requirements for Ozone Nonattainment Areas

Required Plan Element	Description	Location in Plan
Inventory [Section 182(a)(1)]	Submit a comprehensive, accurate, current inventory of actual emissions from all sources	Chapter 5 (emissions inventory) Appendix A (emissions inventory)
General Offset requirements [Section 182(d)(2)]	The ratio of total emission reductions of volatile organic compounds (VOCs) to total increased emissions of such air pollutant shall be at least 1.3 to 1, except that if the State plan requires all existing major sources in a nonattainment area to use best available control technology for the control of VOCs, the ratio shall be at least 1.2 to 1.	Chapter 3, Section 3.3 (NSR permitting requirements)
Reasonably available control technology [Section 182(b)(2)]	Implementation of control technologies for VOC sources covered by control technique guidelines (CTG) documents and all other major stationary sources of VOCs that are located in the area	Chapter 3, Section 3.4 (RACT requirements)
Attainment demonstration [Section 172(c)(1) and 182(c)(2)(A)]	A demonstration that the plan will provide for attainment of the national ambient air quality standard as expeditiously as practicable by the applicable attainment date. The demonstration must be based on photochemical grid modeling.	Chapter 6 (air quality modeling) Chapter 8 (attainment demonstration) Appendix B (photochemical modeling)
Reasonable Further Progress (RFP) demonstration [Section 182(c)(2)(B) and (C)]	A demonstration that the plan will result in VOC emissions (and/or NOx emissions) reductions from the baseline emissions of an average of at least three percent each year.	Chapter 13 (RFP demonstration)
Enhanced vehicle inspection and maintenance program [Section 182(c)(3)]	The State shall provide for an enhanced program to reduce hydrocarbon emissions and NOx emissions from in-use motor vehicles registered in each urbanized area	Chapter 5, Section 5.3.3 (on-road motor vehicle emissions EMFAC2007)
Contingency Provisions [Section 182(c)(9)]	The plan shall provide for the implementation of specific measures to be undertaken if the area fails to meet any applicable milestone. Such measures shall take effect without further action by the State or the EPA upon a failure to meet the applicable milestone.	Chapter 7, Section 7.20 (contingency measures) Chapter 8, Section 8.4 Chapter 13, Section 13.3
Vehicle Miles Traveled [Section 182(d)(1)]	Transportation control strategies/Transportation control measures	Chapter 7, Section 7.9 (TCMs) Appendix D (TCMs)
Milestones [Section 182(g)]	Provide a report every three years after the designation to determine whether the nonattainment area has achieved a reduction in emissions during the preceding interval equivalent to the total emission reductions required to be achieved by the attainment date given in the plan.	Chapter 14, Section 14.13 (milestone reports)