2009
REGIONAL AIR QUALITY STRATEGY REVISION

April 22, 2009

SAN DIEGO COUNTY
AIR POLLUTION CONTROL DISTRICT
10124 Old Grove Road
San Diego, CA 92131

2009 Regional Air Quality Strategy Revision

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1. BACKGROUND

The California Clean Air Act (CCAA) of 1988 (California Health & Safety Code (H&SC) §39000 et seq.) requires areas that are designated nonattainment of State ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide to prepare and implement plans to attain the standards by the earliest practicable date (H&SC §40911(a)). Each of these standards has been attained in the San Diego Air Basin (which is "All of San Diego County"[1]) except State ozone standards,[2] for which the County is designated nonattainment. Accordingly, the San Diego Regional Air Quality Strategy (RAQS) was developed to identify feasible emission control measures and provide expeditious progress toward attaining the State ozone standards. The two pollutants addressed in the RAQS are volatile organic compounds (VOC) and oxides of nitrogen (NOx), which are precursors to the formation of ozone. Exposure to ground-level ozone, at levels exceeding the standards, impacts lung function by irritating and damaging the respiratory system. Ozone is also harmful to crops and vegetation and can damage rubber, plastic, and other materials.

The San Diego County Air Pollution Control District (the "District") is responsible for RAQS development and implementation. The RAQS control measures focus on emission sources under the District's authority, specifically stationary emission sources[3] and some area-wide sources.[4] However, the emission inventories and emission projections in the RAQS reflect the impact of all emission sources and all control measures, including those under the jurisdiction of the California Air Resources Board (ARB) (e.g., on-road motor vehicles, off-road vehicles and equipment, and consumer products) and the U. S. Environmental Protection Agency (EPA) (e.g., aircraft, ships, trains, and pre-empted off-road equipment). Thus, while legal authority to control various pollution sources is divided among agencies, the District is responsible for reflecting federal, State, and local measures in a single plan to achieve State ozone standards in San Diego County. Achieving the standards requires a cooperative partnership of governmental agencies at the federal, State, and local levels.

[1] The San Diego Air Basin is defined in the California Code of Regulations, Title 17, §60110 (17 CCR 60110) as "All of San Diego County."

[2] The State ozone standards are nine parts per hundred million (pphm) averaged over one hour, and 7.0 pphm averaged over eight hours. The standards are attained when each monitor in the region has no exceedances during the previous three calendar years, except for exceedances affected by highly irregular or infrequent events (as defined in Appendix 2 to California Code of Regulations, Title 17, §§70300-70306).

[3] Examples of stationary sources include power plants, manufacturing and industrial facilities, stationary internal combustion engines, gas stations, landfills, and solvent cleaning and surface coating operations.

[4] Area-wide emission sources are individually small and spread over a wide area. They are mostly residential sources, including water heaters, furnaces, architectural coatings, and consumer products.

State law requires the RAQS, when implemented, to achieve a 5% average annual reduction in countywide emissions of ozone precursors or, if that is not achievable, it must include an expeditious schedule for adopting every feasible emission control measure under air district purview (H&SC §40914). This RAQS Revision reflects expeditious adoption of feasible control measures, since neither San Diego County nor any nonattainment air district in the State has demonstrated a sustained 5% average annual reduction in ozone precursor emissions.

State law also requires annual and triennial progress reports regarding implementation of control measures, and triennial plan revisions, as necessary, to reflect and respond to changing circumstances (H&SC §40924 and §40925). A district may revise an emission reduction strategy if the district demonstrates to ARB, and the ARB finds, that the modified strategy is at least as effective in improving air quality as the strategy being replaced (H&SC §40925(b)).

The RAQS was initially adopted by the San Diego County Air Pollution Control Board on June 30, 1992, and amended on March 2, 1993, in response to ARB comments. The District Board further updated the RAQS on December 12, 1995; June 17, 1998; August 8, 2001, and July 28, 2004.

1.1 STATUTORY REQUIREMENTS

This RAQS Revision was prepared pursuant to ARB guidance and complies with all of the following applicable progress report and plan revision requirements of the CCAA:

- **Air Quality Improvement**. Assess the extent of ozone air quality improvement achieved during the preceding three years (H&SC §40924(b)(1)) (Addressed in Section 2);

- **Countywide Emission Reduction Rates**. Compare estimated rates of total countywide emission reductions over the preceding three years to the rates anticipated in the RAQS for that same period, and incorporate updated projections of population, industry, and vehicle-related emissions growth (H&SC §40925(a)) (Addressed in Section 3.1, Table 4);

- **Rule Adoption Dates**. Identify the proposed and actual dates for adopting and implementing each District control measure (H&SC §40924(a)) (Addressed in Section 4, Tables 7, 8, and 9);

- **Control Measure Emission Reductions**. Compare the expected emission reductions for each control measure to a newly revised estimate (H&SC §40924(b)(2)) (Addressed in Section 4, Tables 7, 8, and 9);

- **Control Measure Cost-Effectiveness**. Include an assessment of the cost-effectiveness of available and proposed control measures and contain a list which ranks the control measures from the least cost-effective to the most cost-effective (H&SC §40922(a)) (Addressed in Section 4, Tables 7 and 9);

- **Updated Rule Adoption Schedule**. Include an updated schedule for expeditiously adopting every feasible control measure for emission sources under District purview (H&SC §40914(b)(2)) (Addressed in Section 4, Table 9); and

- **Emission Offsets**. Determine whether the locally repealed State requirements for emission offsets should be reinstated to achieve and maintain State ozone standards by the earliest practicable date (H&SC §40918.6) (Addressed in Section 6.1).

Additionally, pursuant to the most recent ARB guidance ("2003 Triennial Assessment and Plan Revisions"), this RAQS Revision includes Section 5.1, summarizing existing financial incentive programs for reducing emissions.

1.2 RELATIONSHIP BETWEEN THE RAQS AND THE SUBSEQUENT RULE DEVELOPMENT PROCESS.

This RAQS Revision reflects the District's projection of future regulatory activity for purposes of providing expeditious progress toward attaining State ozone standards. As planned activities, the control measures are initial proposals based on currently available information, and are subject to the rule development process and Board consideration prior to implementation.

The rule development process includes many steps, including review of control measures and adopted rules in other regions, consultation with affected parties, development of draft rules, workshops with affected and interested parties, development of technical support documentation, and rule consideration and adoption by the Board at a public hearing. During rule development, new information may become available regarding the availability of control technologies, emission reduction potential, costs of measures, and other factors. Consequently, the scheduling of rule adoption or the estimated emission benefits may ultimately differ from that identified in the RAQS Revision.

2. AIR QUALITY IMPROVEMENT

2.1 OZONE AIR QUALITY TRENDS

State law requires a triennial assessment of ozone air quality improvement achieved during the preceding three years, based on ambient pollutant measurements and air quality indicators (statistically derived values based on monitored air quality data). Measurements of ambient air pollution, including ozone, are collected continuously throughout the region at numerous sites to identify the status and trend of ambient air quality in San Diego County. Despite continued growth in population and motor vehicle usage, San Diego County's air quality has substantially improved over the past two decades as a result of emission control efforts. In fact, San Diego County is among the most improved in the State for reducing exceedances of the State one-hour ozone standard.

A major air quality milestone was achieved in 2001 when the region attained the federal one-hour ozone standard.[1] EPA subsequently revoked the standard in 2005, after replacing it with an eight-hour average standard of 8 pphm[2] adopted in 1997. Also in 2005, ARB established a new, more stringent State eight-hour average standard at 7.0 pphm, while retaining the 9 pphm State one-hour ozone standard.

Ozone air quality continued to improve in 2004 and 2005, which were the cleanest years yet. However, a record-breaking heat wave in 2006 caused a considerable increase in exceedances of ozone standards that year. In 2007, ozone air quality was cleaner again, similar to 2005.

San Diego's historic ozone air quality trends are presented in Table 1 and Figure 1, which identify the number of days State and federal ozone standards were exceeded between 1977 (the earliest year with comparable data) and 2007. The State one-hour ozone standard was exceeded on 168 days in 1977, improving significantly to 21 days over that standard in 2007 (an 88% improvement). Over the same 30-year period (1977-2007), the region's population grew by 82% (from 1.7 million to 3.1 million) and daily motor vehicle mileage more than doubled (from 34 million to 84 million miles). This air quality improvement despite regional growth clearly shows emission control measures are working.

Notwithstanding this progress, State and federal ozone standards are not yet attained and continued emission reduction efforts are needed. Further, projected increases in motor vehicle usage, population and industrial growth[3] will continue creating challenges in controlling emissions to maintain and further improve air quality.

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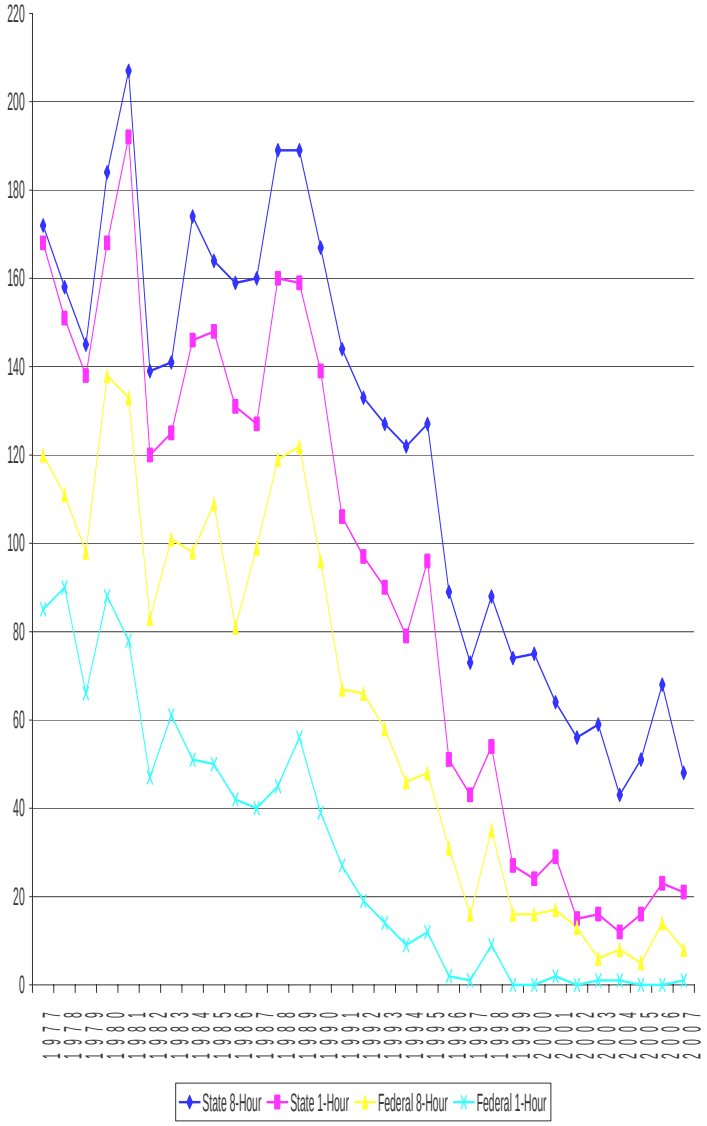
[1] The federal one-hour ozone standard was 12 pphm averaged over one hour. The standard was attained when each monitor in the region had no more than three exceedances over a three-year period. EPA redesignated San Diego County to an Attainment area for this standard, effective July 28, 2003.

[2] The federal eight-hour ozone standard is attained when the 3-year average of the annual 4th-highest daily maximum eight-hour average ozone concentration at each monitor in the region is less than or equal to 8 pphm.

[3] Between 2000 and 2030, countywide population is projected to increase 33% (from 3 million to 4 million) and employment 36% (from 1.4 million to 1.9 million) while vehicle miles traveled is projected to increase 58% (from 73 million to 115 million), according to the "2030 Regional Transportation Plan" (November 2007, San Diego Association of Governments).

Table 1 and Figure 1
Days Exceeding Air Quality Standards for Ozone
San Diego County, 1977-2007

	State		Federal	
Year	8-Hour	1-Hour	8-Hour	1-Hour
2007	48	21	8	1
2006	68	23	14	0
2005	51	16	5	0
2004	43	12	8	1
2003	59	23	6	1
2002	56	15	13	0
2001	64	29	17	2
2000	75	24	16	0
1999	74	27	16	0
1998	88	54	35	9
1997	73	43	16	1
1996	89	51	31	2
1995	127	96	48	12
1994	122	79	46	9
1993	127	90	58	14
1992	133	97	66	19
1991	144	106	67	27
1990	167	139	96	39
1989	189	159	122	56
1988	189	160	119	45
1987	160	127	99	40
1986	159	131	81	42
1985	164	148	109	50
1984	174	146	98	51
1983	141	125	101	61
1982	139	120	83	47
1981	207	192	133	78
1980	184	168	138	88
1979	145	138	98	66
1978	158	151	111	90
1977	172	168	120	85



Note: Basinwide exceedance days when any monitoring station in the County recorded an exceedance of the indicated standard.

2.2 AIR QUALITY INDICATORS

Three statistical indicators are used to assess air quality improvement for ozone based on the monitored air quality data. These are: (1) population-weighted ozone exposure, (2) area-weighted ozone exposure, and (3) the Expected Peak Day Concentration (EPDC). ARB computed each indicator for San Diego County based on monitored air quality data, illustrating changes from a three-year base period (1986-1988) to a three-year end period (2003-2005).[1] The indicators are averaged over three years to moderate the influence of year-to-year meteorology changes (over which the area has no control) and thus to better represent trends.

2.2.1 Exposure Indicators

Population-weighted ozone exposure reflects the potential[2] average outdoor exposure per person to concentrations above the State one-hour ozone standard. It is reported in terms of parts per million–hours (ppm-hours) for each year. Population-weighted ozone exposure is a good indicator of the extent and severity of the ozone problem for human health because it indicates whether relatively few people or many people are being exposed to unhealthful ozone levels, and for how long.

Area-weighted ozone exposure is similar except that it indicates whether relatively small areas of the region or large areas of the region are being exposed to ozone. The area-weighted exposure is intended to estimate the exposure of crops and vegetation to the damaging effects of ozone.

Population-weighted and area-weighted ozone exposure indicators are presented in Table 2. Both population and area-weighted exposure to unhealthy ozone levels were reduced by 99% between 1986-1988 and 2003-2005, indicating substantial improvement resulting from effective emission control measures.

Table 2
Ozone Exposure Indicators

Type of Exposure	Base Period 1986-1988	End Period 2003-2005	Difference (Base - End)	Percent Improvement
Population-weighted (ppm-hours)	1.090	0.010	1.080	99%
Area-weighted (ppm-hours)	3.997	0.033	3.964	99%

Additionally, the trends in annual and three-year rolling averages of the population-weighted and area-weighted ozone exposure indicators are presented in Figures 2 and 3, respectively. After a brief period of increase in the late 1980s, indicating the need for additional emission reductions,

[1] To date, indicators reflecting years 2006 and 2007 have not been computed by ARB, but will be computed in the future and included in the next triennial revision of the RAQS.

[2] The term "potential" is used because “actual” exposure depends on daily outdoor activity. For example, being indoors during peak ozone concentrations will decrease a person’s exposure to outdoor ozone concentrations.

exposure was rapidly reduced in the early 1990s with implementation of many new District stationary-source and area-source rules and State requirements for low-emission vehicles and cleaner-burning gasoline. Since 1996, as ozone levels have approached the State one-hour standard, improvement has continued more gradually.

Figure 2

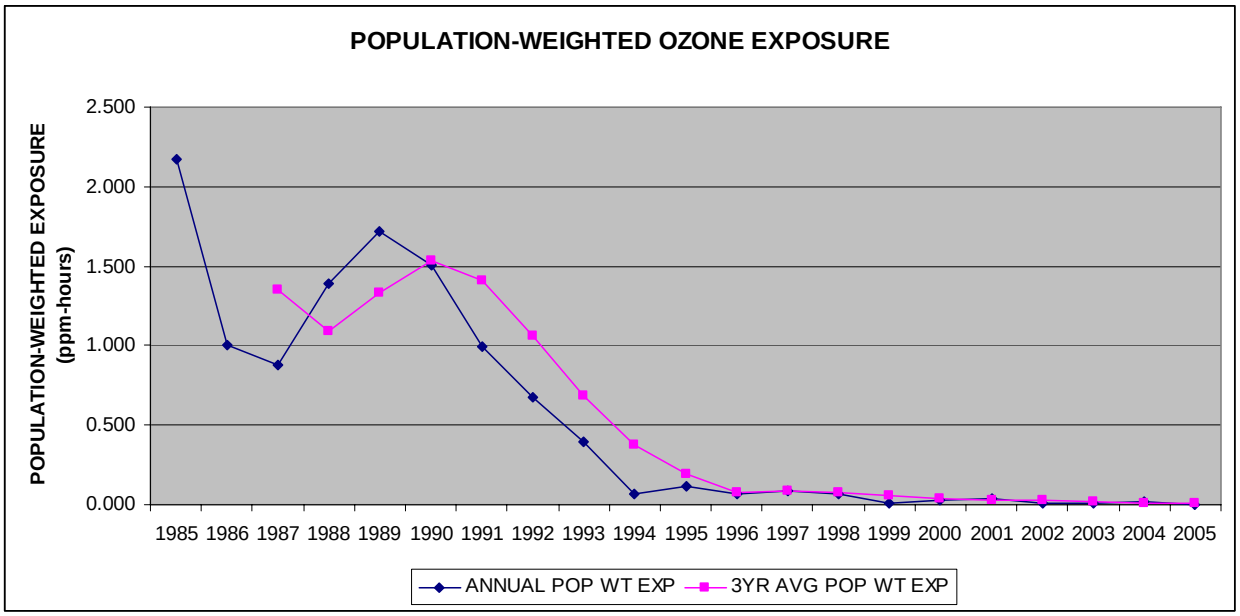
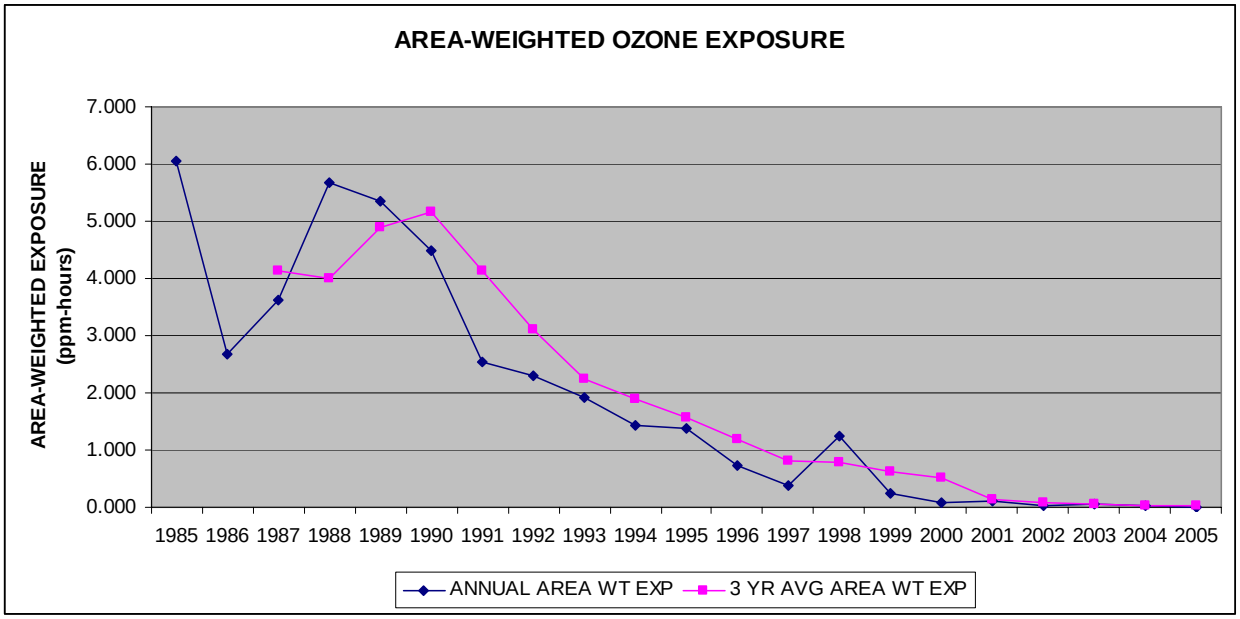


Figure 3



2.2.2 Expected Peak Day Concentration (EPDC)

The EPDC is used for tracking progress in reducing daily maximum one-hour ozone concentrations at each monitoring site. This indicator represents the potential worst-case for a one-hour exposure to ozone and associated acute adverse health impacts. The EPDC differs from the exposure indicators because it does not reflect whether relatively few people or many people are being exposed.

Progress in reducing the EPDC is displayed in Table 3 for the six monitoring sites in San Diego County that have been operating since the 1986-1988 base period. Three other sites that began operation after the base period and one site that has been discontinued are not included in this long-term trend analysis.

Table 3
Expected Peak Day Concentration of Ozone
(parts per hundred million, or pphm)

Site	Base Period 86-88	End Period 03-05	Difference (Base - End)	Percent Improvement
Alpine - Victoria Drive	16.7	10.9	5.8	35%
San Diego - Overland Avenue	15.5	9.7	5.8	37%
Escondido - East Valley Parkway	14.5	9.7	4.8	33%
El Cajon - Redwood Avenue	14.4	9.1	5.3	37%
Chula Vista - East J Street	13.8	8.7	5.1	37%
Del Mar - Mira Costa College	17.9	9.0	8.9	50%

The most substantial air quality improvements occurred at the Del Mar monitoring site, which had the highest ozone concentrations in the 1986-1988 base period. Peak ozone levels at that site decreased by 50% and are the second lowest among all sites in the 2003-2005 period. The reduction in peak ozone levels at coastal sites primarily reflects reduced pollution transported over the ocean from the South Coast Air Basin. The highest ozone levels for the 2003-2005 period occurred at the inland monitoring site in Alpine where there were less substantial, but still significant, reductions in peak ozone levels (35%).

Site-specific ozone EPDC trends at each of the six long-term monitoring sites are presented in Attachment I (Figures I-1 through I-6). The charts present data back to the first year for which data are available for each site, and show ongoing improvement at all sites, with the most substantial improvements occurring since 1990.

3. EMISSION REDUCTION PROGRESS

3.1 COUNTYWIDE EMISSION REDUCTION RATES

As shown in Table 4, based on updated emissions inventory data, the estimated VOC emission reduction rate over the 2003-2006 period narrowly exceeded that projected in the 2004 RAQS Revision, but the NOx emission reduction rate was less than previously projected. Previous estimates overestimated heavy-duty diesel truck travel in San Diego County, and thus had overestimated the anticipated NOx emission reductions from cleaner diesel trucks. Heavy-duty diesel trucks are a significant source of NOx emissions and reductions, but not so for VOC.

Countywide daily VOC emissions decreased 16 tons (194 tons to 178 tons) between 2003 and 2006, a 2.7% average annual reduction, while daily NOx emissions decreased 19 tons (226.5 tons to 207.5 tons), a 2.8% average annual reduction.

Table 4
Rates of Emission Reduction, VOC & NOx*,**
2003-2006 (tons/day)

	2003	2004	2005	2006	Annual Average Rate of Reduction 2003-2006	2004 RAQS Expected Rate of Reduction†
VOC Stationary	68.14	67.60	67.01	67.33		
% Reduction	--	-0.8%	-0.9%	0.5%	-0.4%	
VOC Mobile	125.87	124.84	117.03	110.74		
% Reduction	--	-0.8%	-6.3%	-5.4%	-4.0%	
VOC Total	194.01	192.44	184.04	178.07		
% Reduction	--	-0.8%	-4.4%	-3.2%	-2.7%	-2.6%
NOx Stationary	10.44	10.63	10.62	10.75		
% Reduction	--	1.9%	-0.1%	1.2%	1.0%	
NOx Mobile	216.04	204.85	203.26	196.79		
% Reduction	--	-5.2%	-0.8%	-3.2%	-3.0%	
NOx Total	226.47	215.48	213.88	207.54		
% Reduction	--	-4.9%	-0.7%	-3.0%	-2.8%	-3.2%

* Source: ARB's emissions inventory, Version 1.06, as adjusted by ARB to reflect recently adopted mobile source control measures not in Version 1.06.

** Negative percentages indicate emission reductions; positive percentages indicate increases.

† Derived from emissions data in 2004 RAQS Revision (in Attachment II of that document, Tables II-18 and 20).

NOTE: Columns may not sum to totals due to rounding.

3.2 COUNTYWIDE EMISSION TRENDS AND PROJECTIONS

VOC emission trends from 1990 through 2020 are presented in Table 5 and Figure 4; and NOx emission trends in Table 6 and Figure 5.[1] Projections of future emissions are based on currently adopted control measures and estimated growth forecasts, but do not reflect the emission benefits of rules that are not yet adopted (such as those scheduled in this RAQS Revision for adoption during the 2008–2010 period).

3.2.1 Overall Progress

Even without additional new emission controls, total VOC and NOx emissions are expected to continue to decrease through 2020 due to ongoing implementation of existing local, State, and federal regulations primarily associated with declining mobile source emissions. Between 2006 and 2009, total emissions are anticipated to be reduced at an average annual rate of 2.7% for VOC and 3.0% for NOx.

3.2.2 Impact of Federal Sources

A significant fraction of NOx emissions in San Diego County comes from ships, aircraft, and locomotives, which are exclusively under federal jurisdiction. (These sources are only minor contributors to VOC emissions.) As shown in Table 6 and Figure 5, NOx emissions from these federal-jurisdiction sources are projected to increase by 60% (22 tons per day) from 2005 levels by 2020, while other on-road and off-road mobile source emissions are projected to decline significantly due to existing federal or State regulations.

Without an adequate, fair-share level of reductions from sources under federal jurisdiction, timely attainment of air quality standards could be hampered. Effective EPA standards, retrofit requirements, and financial incentive programs are needed for these significant NOx sources under federal jurisdiction.

Progress is occurring. For example, EPA adopted regulations limiting NOx emissions from new aircraft in 2005 and for locomotives and commercial boats in May 2008. The International Maritime Organization adopted tighter emission limits for oceangoing ships in October 2008. Future emissions projections will reflect these new regulations.

3.2.3 Potential Impacts of Imported Liquefied Natural Gas (LNG)

In 2008, SEMPRA LNG completed construction of a liquefied natural gas (LNG) receipt terminal, "Energía Costa Azul," in Baja California, Mexico. Significant gas deliveries are expected to commence in 2009. The terminal gas will be drawn from fields in Indonesia and elsewhere, super-cooled to a liquid state for shipping aboard specialized tankers, and re-gasified for injection into conventional natural gas pipelines. Although some of the gas will be used in Mexico, the large majority will be exported to the United States, including into San Diego County.

[1] Source: ARB's emissions inventory, Version 1.06, as adjusted by ARB to reflect recently adopted mobile source control measures not in Version 1.06.

The LNG-derived natural gas will have a somewhat different chemical composition and higher heating value than natural gas currently used in the region, causing it to burn hotter than the gas to which power plant turbines, commercial boilers and heaters, home appliances, and natural-gas vehicles have been tuned. Because NOx formation is dependent on combustion temperature, there could be a potentially significant increase in NOx emissions, a key precursor to ozone and fine particle pollution. In addition to concerns about air quality impacts, there are concerns about the ability of combustion devices (boilers, for example) operating under a District permit to continue to meet NOx emission standards when fueled by LNG-derived natural gas.

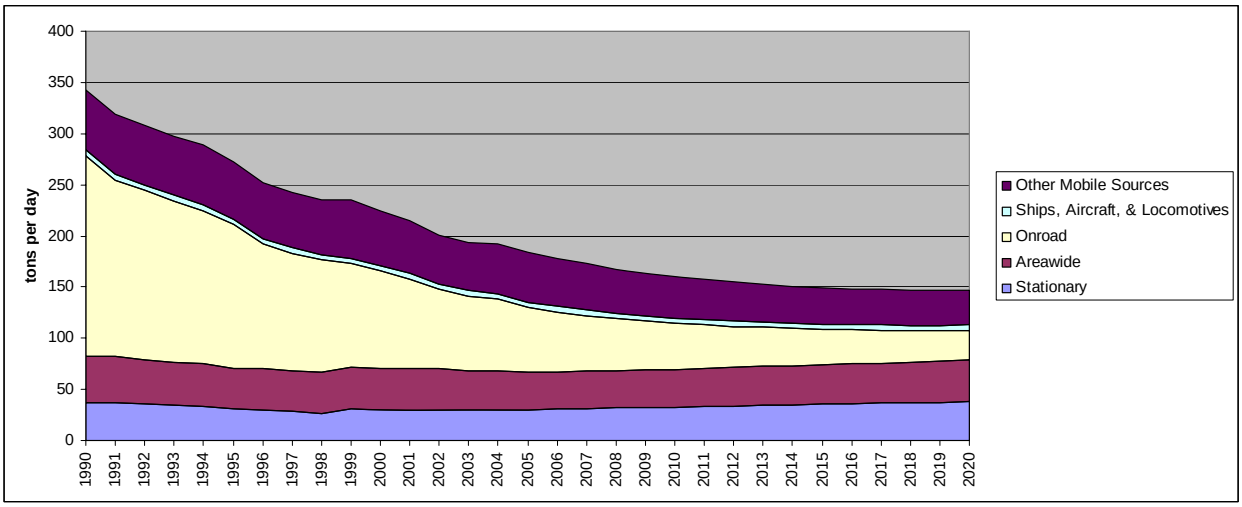
District staff is currently engaged in a series of meetings with staff from SEMPRA, San Diego Gas & Electric, and Southern California Gas in an effort to better define the extent of pollution effects in San Diego County, and whether and how they can be mitigated. Future updates to the emissions inventory will reflect any emission impacts.

Table 5
VOC Emission Trends[1]
(tons/day)

	1990	1995	2000	2005	2010	2015	2020
Stationary Sources	37	31	30	30	33	35	38
Area-Wide Sources	45	40	40	37	37	39	40
On-Road Motor Vehicles	196	141	96	63	45	35	29
Ships, Aircraft, & Locomotives	5	5	5	5	5	5	5
Other Mobile Sources	59	56	53	49	40	36	34
Total	343	272	225	184	160	150	147

NOTE: Columns may not sum to totals due to rounding.

Figure 4
VOC Emission Trends[1]
(tons/day)



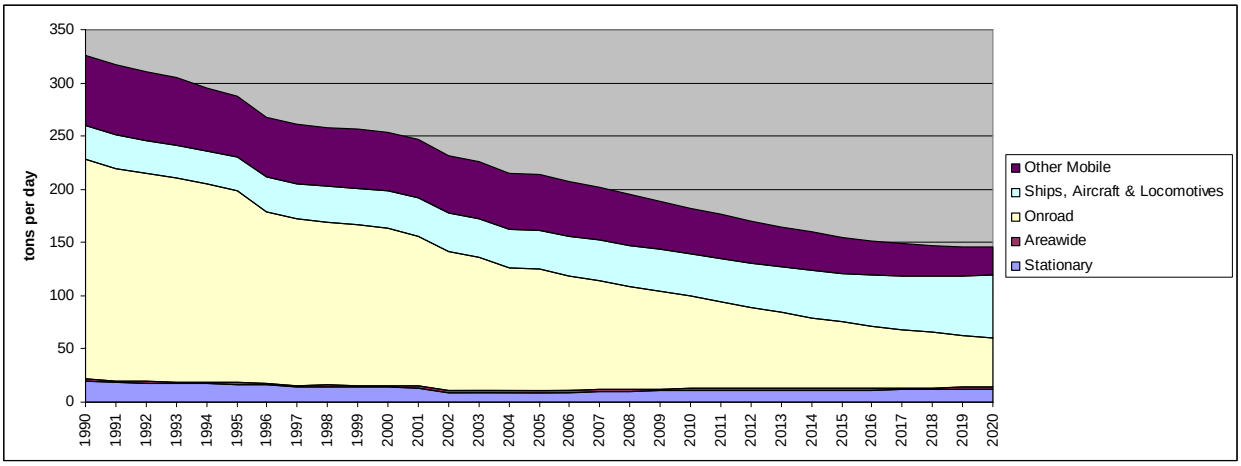
[1] Source: ARB's emissions inventory, Version 1.06, as adjusted by ARB to reflect recently adopted mobile source control measures not in Version 1.06.

Table 6
NOx Emission Trends[1]
(tons/day)

	1990	1995	2000	2005	2010	2015	2020
Stationary Sources	20	17	14	9	11	11	12
Area-Wide Sources	2	2	2	2	2	2	2
On-Road Motor Vehicles	206	180	148	114	87	62	46
Ships, Aircraft, & Locomotives	32	32	35	37	40	46	59
Other Mobile Sources	66	57	55	52	43	34	27
Total	326	287	253	214	182	155	146

NOTE: Columns may not sum to totals due to rounding.

Figure 5
NOx Emission Trends[1]
(tons/day)



[1] Source: ARB's emissions inventory, Version 1.06, as adjusted by ARB to reflect recently adopted mobile source control measures not in Version 1.06.

4. RE-EVALUATION OF ALL FEASIBLE MEASURES FOR STATIONARY SOURCES

The District previously adopted and continues to implement dozens of stringent VOC and NOx emission control rules addressing all significant stationary source categories in San Diego County. Nevertheless, additional feasible control measures eventually become available as regulatory programs move forward and control technologies improve or control costs are reduced. State law requires plan updates to include an updated schedule for expeditiously adopting feasible control measures for ozone-precursor emission sources under District purview.[1]

4.1 RAQS IMPLEMENTATION PROGRESS

The status of eight control measures identified in the 2004 RAQS Revision for adoption, if feasible, during the 2004 - 2007 planning cycle are summarized in Table 7. A detailed discussion of each measure and its status follows Table 7.

[1] "Feasible Measure" is not specifically defined in the CCAA. However, the statutory criteria for assessing a potential control measure include cost-effectiveness, technological feasibility, total emission reduction potential, the rate of emission reduction, public acceptability, and enforceability (H&SC §40922(a)). Similarly, transport mitigation regulations (17 CCR §§70600-01) define "all feasible measures" as "air pollution control measures, including but not limited to emissions standards and limitations, applicable to all air pollution source categories under a district's authority that are based on the maximum degree of reductions achievable for emissions of ozone precursors, taking into account technological, social, environmental, energy and economic factors, including cost-effectiveness."

TABLE 7
STATUS OF 2004-2007 SCHEDULED MEASURES

Pollutant/Control Measure	2004 RAQS Adoption Schedule	2009 RAQS Status	Year of Full Implementation	2004 RAQS Expected Emission Reductions (tons/day)*	2009 RAQS Revised Emission Reductions (tons/day)*	Estimated Cost-Effectiveness ($/lb)*
VOC/Enhanced Vapor Recovery (Adopt new Rules 61.3.1 and 61.4.1)	2004	Adopted 3/1/06	2009	2	2	5.24
VOC/Further Control of Solvent Cleaning (Replace Rule 67.6 with new Rules 67.6.1 and 67.6.2)	2005	Adopted 5/23/07	2008	0.9	1	5.26
NOx/Further Control of Stationary Combustion Turbines (Amend Rule 69.3.1)	2006	2009	2011	Not determined	0.19 avg 1.65 peak	To be determined
NOx/Further Control of Industrial and Commercial Boilers, Process Heaters and Steam Generators (Amend Rule 69.2)	2004	Not Feasible	--	0.1	0.1	12-24
NOx/Small and Medium Boilers, Steam Generators, and Process Heaters Between 600,000 and 5 million BTU/hour (Adopt new Rules 69.2.1 and 69.2.2)	2005	2009	2029	0.3**	0.4	1.76-4.04
NOx/Large Commercial Water Heaters Between 75,000 and 600,000 BTU/hour (Adopt new Rule 69.5.1)	2005	Not Feasible	Not determined	Not determined	0.05	10-23
NOx/Further Control of Residential Water Heaters Smaller Than 75,000 Btu/hour (Amend Rule 69.5)	2007	Delayed pending technology availability	10 years after adoption	1.5	0.7	10
NOx/Stationary Reciprocating Internal Combustion Engines BARCT† Update (Amend Rule 69.4.1)	2006	Not Necessary	Not determined	Not determined	Not determined	Not determined

* Estimated Emission Reductions and Cost-Effectiveness are subject to refinement during rule development.

** 2004 RAQS Revision indicated 0.3 ton/day NOx reduction for a single measure covering units 1 to 5 million BTU/hour.

† Best Available Retrofit Control Technology.

4.1.1 Enhanced Vapor Recovery Program

The 2004 RAQS Revision included a commitment to develop two new District rules to incorporate the requirements of ARB's Enhanced Vapor Recovery (EVR) regulations for gasoline transfer and dispensing operations. Both District rules were adopted on March 1, 2006. New Rule 61.3.1 (Transfer of Gasoline into Stationary Underground Storage Tanks) further controls VOC emissions during gasoline transfers into underground storage tanks (Phase I Vapor Recovery). New Rule 61.4.1 (Transfer of Gasoline from Stationary Underground Storage Tanks into Vehicle Fuel Tanks) further controls emissions during gasoline dispensing into vehicle fuel tanks (Phase II Vapor Recovery). Both rules require all vapor recovery systems to comply with specified performance standards and to be certified by ARB. Additionally, both rules require gasoline dispensing facilities to follow an Inspection and Maintenance program to help ensure proper operation of vapor recovery systems and ongoing compliance. The new rules will reduce VOC emissions by approximately 2 tons per day, with an average cost-effectiveness of $5.24 per pound of VOC reduced.

4.1.2 Further Control of Solvent Cleaning

The Solvent Cleaning control measure addresses VOC emissions generated by the application of solvents (held in a tank or reservoir) to remove unwanted materials, such as dirt and oils, from a surface. On May 23, 2007, the District adopted two new Rules, 67.6.1 (Cold Solvent Cleaning and Stripping Operations) and 67.6.2 (Vapor Degreasing Operations) to replace existing Rule 67.6 (Solvent Cleaning Operations), which was repealed effective May 23, 2008.

New Rule 67.6.1 limits the VOC content of solvent utilized in cold solvent cleaning operations to 50 grams per liter of material or less, in addition to other requirements. As a result, daily VOC emissions from cold solvent cleaning decreased by about 1 ton per day by the end of 2008, relative to a 2002 baseline, with an average cost-effectiveness of $5.26 per pound of VOC reduced.

New Rule 67.6.2 applies to vapor degreasing operations. Its requirements are generally identical to those in former Rule 67.6 because more stringent requirements on vapor degreasers would have resulted in negligible emissions reductions.

4.1.3 Further Control of Stationary Combustion Turbines

The District evaluated the feasibility of new requirements to control high NOx emission rates from peaking power plants using older combustion turbines to produce electricity. These plants normally tend to operate during the hottest summer days, which are often days of peak ozone concentration. Peaking turbines are used to ensure reliability of the electrical grid and typically operate only on days of high electrical demand. Recently constructed peaking turbines have controlled emissions far below the current rule standards. However, under existing Rule 69.3.1, older peaking turbines which operate less than 877 hours per year are currently subject to a less stringent emission standard. Though these older peaking turbines do not operate for the majority of the year, the impact on air quality can be significant on the days they do operate. The District is proposing to revise Rule 69.3.1 to restrict aggregate daily NOx emissions from these turbines

on days with forecasted high ozone concentrations unless they comply with a more stringent NOx emission standard, or when there is an electrical grid emergency requiring their use. Upon full implementation, the estimated NOx emission reduction on days when the emission limit is invoked is 0.19 ton per day on average, and potentially as high as 1.65 ton per day on the peak day. Because the costs of achieving these reductions would be low, the proposed requirements are considered cost-effective Amendments to Rule 69.3.1 have been scheduled for Board adoption in early 2009.

4.1.4 Further Control of Industrial and Commercial Boilers, Process Heaters and Steam Generators

Rule 69.2 (Industrial and Commercial Boilers, Process Heaters and Steam Generators) regulates NOx emissions from boilers with rated heat input capacities of 5 million British Thermal Units (BTU) per hour or more. Currently, Rule 69.2 exempts from NOx emission standards any unit with an annual heat input of less than 220,000 therms (22×10^9 BTU) for units with a heat input rating of less than or equal to 50 million BTU per hour. These units are subject only to operational standards, such as unit maintenance, recordkeeping, and an annual boiler tune-up to minimize NOx emissions to the extent feasible. Facilities with annual heat inputs of 220,000 therms or more (or greater than 10% capacity factor for units with heat input ratings greater than 50 million BTU per hour) must comply with NOx emission standards of 30 ppmv for gas-fired units and 40 ppmv for oil-fired units. Estimated total NOx emissions from all boilers 5 million BTU/hr and bigger are about 69 tons per year with over 99% of the emissions from gas-fired units.

The District has evaluated the feasibility, cost-effectiveness and emissions reduction potential of amending Rule 69.2 to lower the exemption level to 90,000 therms per year (consistent with ARB's Reasonably Available Control Technology/Best Available Retrofit Control Technology (RACT/BARCT) Guidance Document for boilers) to determine whether the resulting emission reductions would be cost-effective. The District also evaluated the local feasibility of more stringent emission limits similar to those included in San Joaquin Valley Air Pollution Control District Rule (SJVAPCD) 4306, adopted on September 18, 2003.

To determine local feasibility of these measures, the District evaluated the cost-effectiveness for the following three cases for gas-fired boilers:

1. Lower Exemption Threshold/Retain Existing Emission Standards. Require that all boilers with annual heat input between 90,000 and 220,000 therms meet the 30-ppmv NOx standard of existing Rule 69.2, and retain the existing 30-ppmv NOx standard for higher usage boilers. This measure would apply to about 40 units with annual heat input between 90,000 and 220,000 therms, requiring installation of low NOx burners and/or flue gas recirculation to meet the 30-ppmv NOx standard.

2. Lower Exemption Threshold/Tighten Emission Standards. Require that all boilers with annual heat input of 90,000 therms or more meet more stringent standards of 15 ppmv NOx for units rated at less than or equal to 20 million BTU per hour heat input, and 9 ppmv NOx for units rated at greater than 20 million BTU per hour heat input. These NOx standards are consistent with those for SJVACPD Rule 4306. This measure would

require about 110 units with annual heat input of 90,000 therms or more to install emission controls such as ultra-low NOx burners and flue gas recirculation to meet the more stringent limits.

3. Retain Existing Exemption Threshold/Tighten Emission Standards. Require that boilers with annual heat input of 220,000 therms or more meet the more stringent (15 ppmv / 9 ppmv) NOx standards. Units with annual heat input rates of less than 220,000 therms would remain subject to the current exemption. This measure would require only the approximately 70 units with annual heat input of 220,000 therms or more to install additional or replacement emission controls to meet the more stringent limits.

For each case, cost-effectiveness values were estimated for each affected boiler. The potential emission reductions (averaged over 365 days of operation per year) and overall cost-effectiveness values for each of the three cases are summarized in the Table below.

Overall Cost-Effectiveness

Case	Potential NOx Emission Reductions (tons/day)	Overall Cost-Effectiveness ($/lb NOx reduced)
1	0.03	12
2	0.10	24
3	0.05	18

For all three cases, the estimated overall cost-effectiveness significantly exceeds (by 100% to 300%) the District's rule development cost-effectiveness reference level of $6 per pound of NOx emission reductions for BARCT for small sources. An investigation of whether there is any subset of units for which further controls would be cost-effective determined that none of the further control measures were cost-effective for any individual boiler. Based on the poor cost-effectiveness and small emission-reduction potential, none of these further control measure combinations are feasible and therefore none will be further considered at this time.

4.1.5 Small and Medium Boilers, Process Heaters and Steam Generators

Current Rule 69.2 regulates NOx emissions from boilers, heaters and steam generators with rated heat input capacities of 5 million BTU per hour and more. The 2004 RAQS Revision included a Small Boilers control measure applying to units with rated heat input capacities between 1 and 5 million BTU per hour. New units smaller than 2 million BTU per hour are certified by their manufacturers as to NOx emission rates, as required by some other California air districts, while larger units are not. Therefore, the District will address the measure by developing two separate rules. New Rule 69.2.1 will control NOx emissions from small units rated between 600,000 and 2 million BTU per hour. There are an estimated 800 boilers of that size range in San Diego County, cumulatively emitting an estimated 90 tons per year of NOx. Rule 69.2.1 will require

new and replacement units within this size range to be certified to emit no more than 30 ppmv for gas-fired units and 40 ppmv for oil-fired units. It is expected this can be achieved with use of low-NOx burners. New Rule 69.2.2 will apply to medium sized new and replacement units rated between 2 million and 5 million BTU per hour. There are an estimated 400 boilers of that size range in San Diego County, cumulatively emitting an estimated 100 tons per year of NOx. Rule 69.2.2 will have the same NOx emission limits as Rule 69.2.1 but will likely require a compliance demonstration via source testing rather than a certification by the manufacturer. Rules 69.2.1 and 69.2.2 are scheduled for adoption in 2009.

Basis for Determining Feasible Control Requirements

Control requirements can take three general forms: 1) requiring installation of retrofit control equipment; 2) requiring early replacement of existing units with new controlled units; or 3) focusing control requirements only on new and replacement units, and allowing new controlled units to gradually replace existing units at the end of each existing unit's useful life. The ultimate emissions reduction potential is the same for all three options. The advantage of the first two options is that the emissions reductions can be required to occur within a relatively short time period (about 2 years), whereas with the third option, the emissions reductions accumulate gradually over the useful life of the boilers. However, the first two options are considerably more costly.

Emission control feasibility and cost investigations concluded that requiring retrofitting boilers with low-NOx burners or early replacement would not be cost-effective for existing boilers in the less than 5 million BTU per hour size range. The estimated average cost-effectiveness to retrofit a 5 million BTU per hour boiler with low-NOx burners is approximately $10 per pound of NOx reduced, which substantially exceeds the District's rule development cost-effectiveness threshold of $6 per pound. The cost-effectiveness becomes increasingly unfavorable with decreasing boiler size, reaching over $30 per pound for a 1 million BTU per hour boiler. Consequently, a retrofit requirement for existing medium sized boilers will not be further pursued at this time.

The cost-effectiveness of requiring immediate replacement of small boilers with new low-NOx boilers is even more unfavorable. Consequently, an early replacement requirement for small boilers will not be further pursued at this time.

However, when existing small boilers are replaced at the end of their useful life, requiring low-NOx burners on replacement small boilers is more cost-effective. Preliminary cost-effectiveness analyses indicate that replacement at the end of the useful life may be cost-effective (up to $6 per pound of NOx reduced) for units down to a size of 600,000 BTU per hour.

Upon full implementation, when all current boilers are replaced at the end of their estimated 20 year average useful lifetimes, Rule 69.2.1 will reduce NOx emissions from small boilers by 64.6 tons per year, or 0.18 ton per day, with an average cost-effectiveness of $4.04 per pound of NOx emissions reduced. Rule 69.2.2 will reduce NOx emissions from medium sized boilers by 72.5 tons per year, or 0.20 ton per day, with an average cost-effectiveness of $1.76 per pound. Thus,

the combined NOx emission reduction potential for small and medium boilers would be 0.38 tons per day.

4.1.6 Large Commercial Water Heaters, and Small Boilers and Process Heaters

SCAQMD Rule 1146.2 imposes a NOx limit of 30 ppmv for replacement small boilers, process heaters, and water heaters with rated heat input capacities between 400,000 and 2 million BTU per hour, and 55 ppmv for units 75,000 to 400,000 BTU per hour. SCAQMD Rule 1146.2 further requires a technology-forcing NOx limit of 20 ppmv for new units greater than 400,000 BTU per hour beginning in 2010 and new units 400,000 BTU per hour or less beginning in 2012.

The District investigated the feasibility of controlling NOx emissions from existing and new Large Commercial Water Heaters, and Small Boilers and Process Heaters, 75,000 BTU per hour to 1 million BTU per hour. The analysis determined that control is cost-effective (no more than $6 per pound of NOx reduced) for units rated 600,000 BTU per hour, but for not smaller units. Accordingly, units with heat input ratings of 600,000 BTU per hour and larger were included in Rule 69.2.1, as discussed above in the section on Small and Medium Boilers. The following summarizes the analysis leading to the determination that control of the smaller units is not cost-effective.

Standard retrofit low-NOx burners have not been developed for existing units in this size range, based on information provided by the South Coast Air Quality Management District (SCAQMD). Consequently, reducing emissions would require replacement of the units with new low-NOx units. The cost-effectiveness of requiring replacement units in the 400,000 to 600,000 BTU per hour size range to meet a NOx limit of 30 ppmv would be about $10 per pound and therefore is not recommended at this time. For units 75,000 to 400,000 BTU per hour, the cost-effectiveness of new and replacement units meeting a 55 ppmv standard would be $23 per pound, and therefore is also not feasible. The technology-forcing 20 ppmv future limits are not yet proven feasible, and will be evaluated during a future planning cycle. The District estimates that requiring control for commercial units smaller than 600,000 BTU per hour would have provided less than 0.05 ton per day of potential NOx emission reductions.

4.1.7 Further Control of Residential Water Heaters Smaller Than 75,000 BTU per hour

Existing District Rule 69.5 (Natural Gas-Fired Water Heaters), adopted in 1998, limits emissions from new residential-type water heaters in San Diego County to 40 nanograms per Joule (ng/J) of heat output. SCAQMD's Rule 1121 required most new water heaters sold in the South Coast region on or after January 1, 2006 (2007 for the 2% of units that are larger than 50 gallons), to meet a 10 ng/J NOx limit. For direct-vent, power-vent, and power direct-vent water heaters (4% of the market),[1] complying units are required in 2008. However, control technology did not develop as rapidly as expected, so manufacturers have obtained variances. Complying standard-

[1] Direct-Vent Gas Water Heaters draw all air needed for proper combustion from outside the home and vent products of combustion horizontally, through an outside wall. Power-Vent Water Heaters draw combustion air from indoors and use an electrically powered fan to assist venting of combustion gases vertically and/or horizontally. Power Direct-Vent Water-Heaters are a combination of the two.

vent units[1] up to 50 gallons in size just began to become available in late 2007. Other models will be further delayed. SCAQMD expects the complying units to cost about $60 more than current higher-emitting models.

Due to the uncertainty of the availability of complying units for all types and sizes of residential water heaters, rule development of this measure is being delayed until it has been determined that complying units are readily available. During the next triennial planning cycle, the District will assess the commercial availability in San Diego County, and the cost-effectiveness, of units complying with the 10 ng/J emissions limit of SCAQMD's rule. If and when sufficient complying units are found to be commercially available and cost-effective, then the District will propose amendment of Rule 69.5 to incorporate the 10 ng/J limit for new residential water heaters sold in San Diego County.

Assuming a ten-year useful life for residential water heaters, upon rule implementation it would take ten years for all the water heaters in the County to be replaced with units that comply with the tightened standard. Tightening the water heater NOx emissions limit from the current 40 ng/J to 10 ng/J is estimated to reduce San Diego County NOx emissions by approximately 0.7 ton per day. If complying units cost an additional $60, as estimated by SCAQMD, then their cost-effectiveness would be approximately $10 per pound of NOx reduced. These emission reduction and cost-effectiveness estimates are subject to refinement during future rule development.

4.1.8 Stationary Reciprocating Internal Combustion Engines BARCT Update

Rule 69.4.1, Stationary Reciprocating Internal Combustion Engines – BARCT, was adopted in 2000 and applies to both gas and liquid-fueled engines. In 2001, ARB issued BARCT requirements for spark-ignited (gas-fired) stationary reciprocating internal combustion engines. The District has compared the ARB BARCT provisions to Rule 69.4.1 and determined that Rule 69.4.1 is, overall, at least as stringent as the BARCT determination. Therefore, no rule amendments are proposed.

4.2 FURTHER STUDY MEASURES IDENTIFIED IN 2004 RAQS REVISION

To ensure that the RAQS continues to include every feasible control measure applicable to sources under the District's authority (as required by State law), the District previously reviewed adopted rules of other California air districts to determine if there are any other feasible control measures to incorporate into the RAQS. The District's preliminary analysis indicated that, for twelve additional source categories, other air districts have more stringent emission limits than corresponding District rules. Those were identified in the 2004 Triennial RAQS Revision as "Further Study Measures" to be assessed during the 2004-2007 period to determine whether the more stringent emission limits would be technologically feasible and cost-effective for San Diego's sources and would provide significant emission reductions beyond that achieved by the District's current rules.

[1] Standard-Vent Gas Water Heaters, also known as atmospheric vent, draw all air needed for proper burner operation from the indoor air around the water heater and vent products of combustion vertically, through the roof of the home.

The District has determined the emission reduction potential and prioritized the Further Study Measures accordingly (Table 8) for further evaluation and rule development, if warranted. The three measures with the highest emission reduction potential were assigned a high priority and have been adopted or scheduled for adoption. Four other measures were considered medium or low priority for further evaluation for future rule development. The other five Further Study Measures were determined to have insufficient emission reduction potential to warrant any further consideration. A discussion of the assessment of each Further Study Measure follows Table 8.

Table 8
Prioritization of Further Study Measures
For Further Evaluation

Control Measure	Other District Rule Number*	San Diego Rule Number	Estimated Emission Reduction Potential (Tons/Day)	Priority
Adhesive and Sealant Applications	SC 1168	67.21	1.56	High Adopted 5/14/2008
Automotive Refinishing	ARB SCM	67.20	0.6	High Adopt in 2009
Low-VOC Solvent Wipe Cleaning	SC 1171	Various Rules	0.57	High Adopt in 2009
Wood Products Coating Operations	SC 1136	67.11-67.11.1	0.25	Medium
Graphic Arts	SC 1130	67.16	0.23	Medium
High Emitting Spray Booth Facilities	SC 1132	Various Coating Rules	0.15	Low to Medium
Equipment Leaks	BA 8-18	Various Rules	Not Available	Low
Petroleum Storage Tanks	SC 1178	61.1	0.03	No Further Evaluation
Mobile Transport Tanks Loading	SJV 4621	61.2	0.02	No Further Evaluation
Food Products Manufacturing/Processing	SC 1131	No comparable rule	0.02	No Further Evaluation
Polyester Resins Operations	SC 1162	67.12	0.02	No Further Evaluation
Aerospace Manufacturing Operations	SC 1124	67.9	<0.01	No Further Evaluation

*SC = South Coast air district; BA = Bay Area air district; SJV = San Joaquin Valley air district.

4.2.1 Adhesive and Sealant Application Operations *(High Priority)*

On May 14 2008, the District amended District Rule 67.21 (Adhesive Material Application Operations) to incorporate more stringent VOC content limits for several adhesive categories, similar to those in SCAQMDRule 1168 (Adhesive and Sealant Applications). Total VOC emissions in San Diego County from this category are estimated at approximately 1285 tons per year. Because sources operating under a District permit emit only 36 tons per year, emission reductions from permitted sources are not anticipated to be significant. Nearly all of the emissions (1249 tons per year) and potential emission reductions (390 tons per year, or 1.56 tons per day) affected by the new Rule 67.21 requirements are from sources not subject to a District permit, such as building construction and related operations.

Although the estimated emission reductions are relatively large, the estimate does not account for penetration into the current San Diego market by low VOC adhesives sold in the SCAQMD. Information from adhesive suppliers indicates that they typically provide all of Southern California with the same products. Consequently, most of the emissions reductions may already have been achieved. Because complying adhesive materials cost no more than the previous noncomplying products, there is no net cost for adhesive and sealant users associated with this rule.

4.2.2 Automotive Refinishing *(High Priority)*

This source category is already regulated by District Rule 67.20 (Motor Vehicle and Mobile Equipment Refinishing Operations). Total VOC emissions from the 376 facilities in this source category (mostly small businesses) are about 300 tons per year, based on a 2004 District survey. The Further Study Measure identified in the 2004 RAQS Revision was based on SJVAPCD Rule 4602. However, on October 20, 2005, ARB adopted a Suggested Control Measure (SCM) for Automotive Coatings. ARB prepares SCMs to promote statewide consistency among districts in control requirements for source categories of statewide significance. Consequently, the District turned the focus of the control measure evaluation to consideration of the SCM.

The SCM has more stringent VOC limits than Rule 67.20 in several coating categories. These more stringent limits will likely result in the use of water-borne coatings for many topcoats, which have additional equipment, surface preparation, and application requirements compared to existing solvent-borne topcoats used in this industry.

This SCM has since been adopted by at least two California air districts, SCAQMD (Rule 1151) and SJVAPCD (Rule 4612). In accordance with a request from ARB, the District will proceed with rule development to amend Rule 67.20 in 2009 to incorporate the feasible and cost-effective requirements of the SCM. Daily VOC emissions will be reduced by an estimated 0.6 ton per day.

4.2.3 Low-VOC Solvent Wipe Cleaning *(High Priority)*

Solvent wipe cleaning (also called surface preparation or solvent cleaning) is a method of cleaning a surface by physically rubbing it with a material such as a rag wetted with solvent. It

does not include solvent cleaning operations conducted in tanks or other containers which are regulated by Rules 67.6.1 and 67.6.2.

Presently there are a variety of solvents used in San Diego County for cleaning and preparing surfaces for painting or for general maintenance cleaning. These solvents include isopropyl alcohol (IPA), methyl ethyl ketone (MEK), mineral spirits, xylene, lacquer thinner, etc. The VOC content of surface preparation and cleaning solvents are regulated under the District's source-specific coating Rules 67.3 (metal parts and products), 67.4 (can and coil), 67.5 (paper, film, and fabric), 67.9 (aerospace), 67.11 and 67.11.1 (wood), 67.12 (polyester resin), 67.16 (graphic arts) 67.18 (marine coating), 67.20 (automotive refinishing) and 67.21 (adhesives). These rules limit either the VOC content or vapor pressure (or boiling point) of solvents used for wipe cleaning operations. Those wipe cleaning operations that are not covered by source-specific rules are regulated by Rule 66 (organic solvents). Rule 66 does not limit the VOC content of solvents. Instead it requires the use of add-on control equipment for sources emitting certain quantities of specified organic solvents.

Based on available emission inventory data and, in some cases, District permit files, the total estimated VOC emissions from wipe cleaning operations are about 177 tons per year. The estimated VOC emissions from wipe cleaning operations subject to Rule 66 are about 48 tons per year. The estimated VOC emissions from wipe cleaning operations subject to the source-specific coating rules are approximately 128 tons per year. The bulk of the emissions from operations subject to source-specific coating rules (about 65%) are from marine coating operations (Rule 67.18). Some coating operations such as can and coil coating (Rule 67.4), paper, fabric and film coating (Rule 67.5), and adhesive material application operations (Rule 67.21) do not use significant amounts of cleaning solvents containing VOCs. In addition, emissions from aerospace coating operations (Rule 67.9) are not included in the total. Aerospace coating operations are specifically exempt from general wipe cleaning solvent limits in the rules of other districts and the standards for wipe-cleaning in District Rule 67.9 are consistent with the limits in SCAQMD Rule 1124 (Aerospace Assembly and Component Manufacturing Operations) for aerospace coating operations.

The estimated potential emission reductions for this source category are about 142 tons per year, or 0.57 tons per day, based on requiring use of wipe cleaning solvents with a VOC content of 50 grams per liter or less. This would be consistent with the standards for this source category in rules of several other air districts.

This category was given a high priority for further rule development, and has been scheduled for adoption in 2009. Implementation will involve amending Rules 66 and 67.18, but could also include one or more of the other rules identified above.

4.2.4 Wood Products Coating Operations *(Medium Priority)*

This source category is regulated by District Rules 67.11 (Wood Products Coating Operations) and 67.11.1 (Large Coating Operations for Wood Products). Rule 67.11 applies to all sources while Rule 67.11.1 applies only to sources emitting more than 25 tons per year of VOCs. Rule 67.11 contains technology forcing VOC content limits for wood coatings that became effective

on July 1, 2005. Prior to implementation of the 2005 limits, total estimated VOC emissions from this source category were about 335 tons per year, of which 12 tons per year were from sources exempt from Rule 67.11. The projected emission reductions from implementation of the 2005 VOC limits were expected to be about 112 tons per year from current emission levels.

SCAQMD Rule 1136 (Wood Products Coatings) regulates this source category and has lower technology forcing VOC content limits than those in Rule 67.11 in several coating categories. These technology forcing limits were also implemented on July 1, 2005, and affect the following coating categories: conversion varnishes, fillers, high-solid stains, sealers and low-solids stains, toners or washcoats. If the lower limits in SCAQMD Rule 1136 were incorporated in Rule 67.11, the potential additional emission reductions would be about 57 tons per year.

In addition, SCAQMD Rule 1136 limits rule applicability to those sources using more than one gallon per day of wood coating (about 250 gallons per year) while Rule 67.11 limits rule applicability to those sources using 500 gallons per year or more of wood coatings. If Rule 67.11 were to apply to one gallon per day units, the estimated potential emission reductions would be 5.6 tons per year. Thus, the total estimated potential emission reductions would be 63 tons per year, or 0.25 tons per day. The District assigned this source category a medium priority for further evaluation for future rule development during the next triennial planning cycle.

4.2.5 Graphic Arts *(Medium Priority)*

This source category is regulated by District Rule 67.16 (Graphic Arts Operations). Total estimated VOC emissions from this source category are about 82 tons per year. The emissions result from the use of VOC-containing materials in printing or related coating processes.

SCAQMD Rule 1130 (Graphic Arts) has lower VOC limits than Rule 67.16 for fountain solutions. In addition, SCAQMD Rule 1171 (Solvent Cleaning Operations) has lower VOC limits than Rule 67.16 for solvents used to clean ink application equipment, for roller washes and general ink cleaning. If the SCAQMD Rule 1130 and Rule 1171 VOC limits were incorporated in Rule 67.16, the estimated potential VOC emission reductions would be about 57 tons per year, or 0.23 tons per day. Nearly all (about 98%) of the emission reductions would result from reducing the VOC content of cleaning materials. This assumes that the lower VOC content cleaning materials are as effective as the current cleaning materials and that increased usage is not required. Both SCAQMD Rules 1130 and 1171 also have lower VOC limits than Rule 67.16 in several specialty ink or solvent cleaning categories (for example, flexographic ink on porous substrates and flexographic printing cleanup) and for adhesives. However, none of these materials have been identified as being used in San Diego County.

The District assigned this category a medium priority for evaluation for future rule development during the next triennial planning cycle, including estimating cost-effectiveness and feasibility of more stringent standards. Because nearly all the emission reductions result from cleaning materials, the District may consider lowering VOC limits of cleaning operations as part of possible rule making for the wipe-cleaning operations described above in Section 4.2.3.

4.2.6 High Emitting Spray Booth Facilities *(Low to Medium Priority)*

SCAQMD Rule 1132 (Further Control of VOC Emissions from High-Emitting Spray Booth Facilities) applies to spray booths emitting more than 20 tons per year of VOCs. This rule requires a further 65% emission reduction of VOCs from these operations beyond that required by SCAQMD coating VOC content rules. The District currently has no comparable rule. District emission inventory information indicates that there are two operations in San Diego for which VOC emissions from one spray booth (or a combination of spray booths) exceed 20 tons per year. Emissions from the two facilities are about 59 tons per year combined. The estimated emission reduction potential of this measure (65% additional control) is about 39 tons per year, or 0.15 tons per day. The District views this as a low to medium priority measure for evaluation for possible future rule development.

4.2.7 Equipment Leaks *(Low Priority)*

Bay Area AQMD's Rule 8-18 (Equipment Leaks) establishes vapor and liquid leak standards to reduce emissions of volatile organic compounds from leaking equipment at refineries, bulk terminals, bulk plants and chemical plants. It exempts facilities with fewer than 100 valves or fewer than 10 pumps and compressors (Rule 8-22, Valves and Flanges at Chemical Plants, applies in these cases). It also exempts equipment handling organic liquids having initial boiling points above 302º F. It does not apply to connections between the loading racks at bulk terminals and bulk plants and the vehicle (mobile transports) being loaded. It sets inspection frequency criteria (daily visual, quarterly instrument checks for most components), repair requirements, and leak standards – 3 drops per minute for liquid leaks, 100 ppmv as methane for most vapor leaks, and 500 ppmv as methane for pumps, compressors and pressure relief devices.

The Rule 8-18 definition of chemical plants includes any facility engaged in producing organic or inorganic chemicals or the manufacturing of products by chemical processes and having "325" as the first three digits in the applicable NAICS code. This NAICS code applies to dozens of facilities in San Diego County but likely few would have 100 or more valves or 10 or more pumps or compressors in VOC service. San Diego County has no petroleum refineries that would be subject to such a rule. Possibly, a rule such as Rule 8-18 could apply to the major gasoline bulk terminals, some of the bulk plants, and two kelp-processing facilities. However, a valve, pump and compressor count would be needed to determine if the rule would apply to these facilities in San Diego.

Rule 8-18 establishes the same liquid leak standard (3 drops per minute) as San Diego rules applicable to gasoline bulk terminals and bulk plants (Rules 61.1, 61.2 and 61.7), kelp processing (Rule 67.10), coating and printing ink manufacturers (Rule 67.19), and pharmaceutical and cosmetics manufacturers (Rule 67.15). However, the District rules have a shorter allowable leak repair period than Rule 8-18 (0-3 days versus 7 days). Rule 8-18 has a more stringent vapor leak standard for equipment at bulk terminals and bulk plants than do District Rules 61.1 and 61.2 (100-500 ppmv @1.0 cm versus 1375 ppmv @1.3 cm as methane). However, District Rule 61.1 applies to the vapor transfer path including the connection to a mobile transport while Bay Area Rule 8-18 specifically exempts such connections. Inspectors in San Diego County generally do not find vapor leaks at the bulk terminals and bulk plants along

the hard-piped components. Typically, if vapor leaks are found, it is at the loading rack/mobile transport interface, and from the vapor fittings (e.g., drybreaks) on the mobile transport themselves (under ARB jurisdiction).

More detailed evaluation would be needed to determine the extent to which a rule such as Rule 8-18 would apply to local chemical plants and whether the standards for fugitive vapor leaks are technologically feasible and cost-effective. However, estimated emission reductions from bulk plants and bulk terminals would be expected to be far less than 10 tons per year. The most recent inventory of these sources showed approximately 13 tons per year total VOC emissions from loading rack operations, and fugitive vapor and liquid leak emissions from hard-piped components, pumps and compressors are likely to be far less than this amount. As to kelp processing facilities, most fugitive vapor emissions are not associated with equipment or piping leaks. Lines used to transport VOC/air streams are operated at only a few inches of water gauge pressure.

Based on this initial evaluation, it does not appear that there is a significant emission reduction potential and, therefore, this item should be given a low priority for evaluation for possible future rule development.

4.2.8 Petroleum Storage Tanks *(No Further Evaluation)*

This source category is regulated by District Rule 61.1 (Receiving and Storing Volatile Organic Compounds at Bulk Plants and Bulk Terminals), which is applicable to large storage tanks for gasoline and other high volatility motor vehicle fuels. Based on emission inventory information and updated equipment descriptions, estimated emissions from this source category are about 46 tons per year. Rule 61.1 has standards for fittings in internal floating roof tanks, external floating roof tanks, and fixed roof tanks and requires BACT for new or replacement rim seals in external and internal floating roof tanks.

SCAQMD Rule 1178 (Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities) has further control measures for this source category. This rule is applicable to above ground storage tanks at petroleum facilities emitting more than 20 tons per year of VOCs. The rule specifies rim seal types and fittings for external and internal floating roof tanks and fixed roof tanks. The rule also required all external floating roof tanks subject to the rule be domed by July 1, 2008.

San Diego County has two petroleum storage facilities that emit more than 20 tons per year. Examination of the existing rim seals and fittings for the storage tanks at these facilities indicates that most of the existing seals and fittings at these facilities would meet the standards in SCAQMD Rule 1178. Based on emission factors specified in the Rule 1178 staff report, if the standards of Rule 1178 were incorporated in Rule 61.1 the estimated emission reduction potential would be about 21 tons per year. About 40% of the emission reduction potential (9 tons) would result from upgrading rim seals. However, since BACT is required by Rule 61.1 for rim seal replacement, these emission reductions will be achieved over time by existing Rule 61.1. The remaining potential emission reduction benefit of the Rule 1178 standards would be approximately 12 tons per year, or 0.03 tons per day, from the more stringent requirements for fittings and the requirement for external floating roof tanks to be domed.

Based on this initial evaluation, the District does not plan future rule development for this source category because of the very limited VOC emission reduction potential.

4.2.9 Mobile Transport Tanks Loading *(No Further Evaluation)*

This source category is regulated by District Rule 61.2 (Transfer of Organic Compounds into Mobile Transport Tanks). Rule 61.2 controls VOC vapors displaced by loading of mobile transport tanks with gasoline and other high volatility fuels from bulk terminals, and by vapor and liquid leaks during the loading process. The primary standard of Rule 61.2 requires a 90% emission reduction for all VOC vapors displaced during the transport tank loading process. Total estimated VOC emissions in San Diego County due to vapor displacement at these sources are about 13 tons per year from four bulk terminal loading rack facilities. SJVAPCD Rule 4621 (Gasoline Transfer into Stationary Storage Containers, Delivery Vessels and Bulk Plants) requires a 95% emission reduction for displaced VOC vapors. Source testing data for the largest facility in San Diego County shows that it consistently achieves greater than 99% control of VOC vapors released in the loading process. The estimated emission reduction potential for the three remaining facilities is about 6.4 tons per year, or 0.02 tons per day, if they were required to meet a 95% control level instead of the 90% control level requirement in existing Rule 61.2.

Based on this initial evaluation, the District does not plan further evaluation for rule development for this source category at this time because of the very limited VOC emission reduction potential.

4.2.10 Food Products Manufacturing/Processing *(No Further Evaluation)*

This source category is regulated by SCAQMD Rule 1131 (Food Product Manufacturing and Processing Operations), which requires use of solvents with less than 120 grams per liter VOC or an 85% emission reduction for nonsterilization operations (emission reductions of about 75% are required for sterilization operations). The staff report for Rule 1131 indicates that the two solvents most often used for processing operations and sterilization processes in the food industry are hexane and IPA. Based on AB 2588 Hot Spots program information, total solvent use in San Diego County for facilities that manufacture or process food products is about 0.06 tons per year for hexane and 80 tons per year for IPA. However, more than 90% of these IPA emissions are from two kelp-processing facilities already regulated by District Rule 67.10 (Kelp Processing and Bio-Polymer Manufacturing Operations). Under Rule 67.10, the kelp processing facilities have reduced their VOC emissions by more than 90%. If a local rule incorporating SCAQMD Rule 1131 standards for VOC emissions from food processing facilities were adopted, estimated potential VOC emission reductions from the remaining unregulated IPA emissions would be about 5.9 tons per year, or 0.02 tons per day.

Based on this initial evaluation, the District does not plan further evaluation for rule development for this source category at this time because of the very limited VOC emission reduction potential.

4.2.11 Polyester Resins Operations *(No Further Evaluation)*

This source category is regulated by District Rule 67.12 (Polyester Resin Operations). Total estimated VOC emissions for this source category are 79 tons per year from resins and gel coats application.

SCAQMD Rule 1162 (Polyester Resins Operations) has slightly lower monomer content limits for some resins and gel coats than Rule 67.12. If the Rule 1162 monomer content limits were adopted in San Diego County, the estimated potential emission reduction would be about 5.7 tons per year or 0.02 tons per day, for resins and gel coats combined.

Based on this initial evaluation, the District does not plan further evaluation for rule development for this source category at this time because of the very limited VOC emission reduction potential.

4.2.12 Aerospace Manufacturing Operations *(No Further Evaluation)*

Emissions in this source category have greatly declined in San Diego County since 1990 due to implementation of District Rule 67.9 (Aerospace Coating Operations), the decline in government funding for aerospace operations and, in particular, the closing of one large facility. Total VOC emissions from this source category are now estimated to be only 35 tons per year.

SCAQMD Rule 1124 (Aerospace Assembly and Component Manufacturing Operations) has lower VOC limits in several coating categories: adhesive bonding primers, antichafe coatings, dry lubricative materials (nonfastener), form release coatings, fuel tank coatings, and sealants. In addition, Rule 1124 has a lower VOC limit for paint strippers. Total estimated VOC emissions in San Diego County for materials in these coating categories and for strippers that exceed the limits in Rule 1124 are less than two tons per year. Emission reductions from adopting Rule 1124 VOC limits in San Diego County have not been quantified but are estimated to be less than two tons per year, or less than 0.01 ton per day.

Based on this initial evaluation, the District does not plan further evaluation for rule development for this source category at this time because of the very limited VOC emission reduction potential.

4.2.13 Agricultural Sources

To reduce air contaminant emissions from agricultural sources, California enacted Senate Bill 700 (SB 200) in 2003. A key provision of SB 700 removed the restriction from State law that prevented air districts from requiring permits for agricultural sources. On April 25, 2007, the District amended Rule 11 – Exemptions from Rule 10 Permit Requirements, to limit the exemption for agricultural sources to those agricultural facilities where the aggregate actual emissions from all stationary emission units do not exceed 25 tons per year of each criteria pollutant and do not exceed 5 tons per year of any single hazardous air pollutant (HAP) or 12.5 tons per year of combined HAPs.

Most other requirements of SB 700 apply only to areas that are designated nonattainment—as of January 1, 2004—for federal particulate matter and ozone standards. Because San Diego County was not designated nonattainment for those federal standards as of that date, the only emissions control measure development requirement of SB 700 that would apply to San Diego is H&SC §40724.7, pertaining to large confined animal facilities.

VOC emissions from confined animal facilities are generated directly from the animals and their digestive processes, as well as from the decomposition and treatment of their wastes. As required by SB 700, ARB developed a definition of a "large confined animal facility," considering the emissions from such facilities and their potential impact on ambient air quality. Because no large confined animal facilities meeting ARB's definition exist in San Diego County, the District was not required to determine if large confined animal facilities would contribute to a violation of any State or federal ambient air quality standard, and the District was not required to adopt a rule by July 1, 2006, to reduce emissions from such facilities.

4.3 ADDITIONAL CONTROL MEASURE

4.3.1 Further Control of Architectural Coatings

District Rule 67.0 (Architectural Coatings) was last amended in 2001to reflect ARB's statewide SCM for Architectural Coatings. In October 2007, ARB updated its statewide SCM to reflect tighter VOC limits of SCAQMD Rule 1113. ARB's technical support document for the SCM indicates that implementing the SCM in the air districts other than the SCAQMD would reduce statewide VOC emissions by 15.2 tons per day, with a cost-effectiveness of $1.12 per pound of VOC reduced. Because San Diego County has 8.3% of the State's population, while the SCM applies to 53% of the State's population, emission reductions in San Diego County would be 2.25 tons per day. The District will proceed with rule development in 2010 to amend Rule 67.0 to incorporate the requirements of the SCM that the District determines to be feasible and cost-effective for implementation in San Diego County.

4.4 ADOPTION SCHEDULE FOR FEASIBLE CONTROL MEASURES

Table 9 presents the adoption schedule for the control measures that the District preliminarily considers feasible and are accordingly scheduled for rule development and adoption in 2008, 2009, and 2010. Table 9 includes the 2004 RAQS Revision control measures listed above in Tables 7 and 8 that are still scheduled for adoption, along with the Additional Control Measure (Architectural Coatings) identified in Section 4.3.1 above.

Table 9
Adoption Schedule for Feasible Control Measures

Control Measure	Adoption Schedule	Year of Full Implementation	Pollutant	Estimated Emission Reductions (tons/day)*	Estimated Cost-Effectiveness ($/lb)*
Further Control of Adhesive and Sealant Applications (Amend Rule 67.21)	Adopted 5/14/2008	2009	VOC	1.56	0
Further Control of Stationary Combustion Turbines (Amend Rule 69.3.1)	2009	2014	NO_X	0.19 avg 1.65 peak day	To be determined
Small Boilers, Steam Generators, and Process Heaters Between 600,000 and 2 million BTU/hour (Adopt new Rule 69.2.1)	2009	2029	NO_X	0.18	4.04
Medium Boilers, Steam Generators, and Process Heaters Between 2 million and 5 million BTU/hour (Adopt new Rule 69.2.2)	2009	2029	NO_X	0.20	1.76
Further Control of Automotive Refinishing (Amend Rule 67.20)	2009	2010	VOC	0.6	To be determined
Further Control of Architectural Coatings (Amend Rule 67.0)	2010	2011	VOC	2.25	1.12
Low-VOC Solvent Wipe Cleaning (Amend Rules 66 & 67.18)	2009	2010	VOC	0.57	5
Further Control of Residential Water Heaters Smaller Than 75,000 Btu/hour (Amend Rule 69.5)	Delayed pending technology availability	10 years after adoption	NOx	0.7	10

* Estimated Emission Reductions and Cost-Effectiveness are subject to refinement during rule development.

4.2 NEW FURTHER STUDY MEASURE

Indirect Source Rules (addressing vehicle trips, and associated emissions, attributed to new land developments) have been adopted by some other air districts, including San Joaquin Valley and Imperial County, and is being planned in the SCAQMD. These districts have differing approaches to their indirect source control requirements, and a detailed analysis will be necessary to better understand their requirements, evaluate the potential feasibility for San Diego's sources, and determine whether a local Indirect Source Rule would provide significant emission reductions beyond that achieved by the District's existing voluntary Indirect Source Program. That detailed analysis will require more time than was available for the preparation of this RAQS update. Therefore, this RAQS Revision includes a "further study" control measure for indirect sources. The District will evaluate the various approaches of other air districts and will determine which program elements, if any, are feasible for implementation in San Diego County. If an Indirect Source Rule is determined feasible for San Diego County, it will be scheduled for adoption in the subsequent Triennial RAQS Revision. District resources permitting, rule development may be pursued before then if resulting emission reductions would be significant.

5. MOBILE SOURCE PROGRAMS

The District operates three broad categories of emission control programs related to mobile sources: Incentive Programs, Transportation Control Measures, and Indirect Source Program. These are discussed in the following three sections.

5.1 INCENTIVE PROGRAMS

Financial incentive programs augment traditional control programs to further encourage technology development and provide cost-effective emission reductions not easily achieved by regulations. The incentive programs implemented in San Diego County are:

- Carl Moyer Memorial Air Quality Attainment Program;
- Vehicle Registration Fund Program;
- Lower Emission School Bus Replacement and Retrofit Program;
- Palomar Mitigation Funds Program; and
- Lawn Mower Exchange Program.

Table 10 summarizes the funds allocated by program between July 2003 and June 2007 and the estimated annual emission reductions that will be obtained over the lives of the funded projects. Local projects funded during the 2003-2007 period provided combined emission reductions of 0.2 ton/day (60 tons/year) of VOC, 2.9 tons/day (1042 tons/year) of NOx, 0.1 ton/day (33 tons/year) of carbon monoxide (CO), and 0.1 ton/day (42 tons/year) of inhalable particulate matter (PM10). A brief discussion of each program is presented after Table 10, describing its origin, funding sources, implementing agency, and the types of projects funded.

Table 10
Incentive Programs
Annual Funding Allocations and Emission Reductions

Program	Amount Funded	Annual Emission Reduction (tons/year)[1]			
		VOC	NOx	CO	PM_{10}
FY 2003-2004					
Carl Moyer	$2,336,719		144.10		6.10
School Bus	$987,500		0.66		0.47
Lawnmower	$96,000	0.50	0.10	8.80	
TOTAL:	3,420,219	0.50	144.86	8.80	6.57
FY 2004-2005					
Vehicle Registration Fund	$2,076,177	14.20	22.23		3.17
Carl Moyer	$1,797,608		270.10		8.48
School Bus	$797,700		0.35		0.88
Palomar Mitigation Fund	$334,000	0.23	1.87		0.29
TOTAL:	$5,005,485	14.43	294.55		12.82
FY 2005-2006					
Carl Moyer	$9,836,296	29.81	484.24		15.88
Lawnmower	$172,560	0.86	0.17	15.70	
TOTAL:	$10,008,856	30.67	484.41	15.70	15.88
FY 2006-2007					
Carl Moyer	$5,458.708	13.51	112.36		5.76
School Bus	$1,560,618				0.72
Palomar Mitigation Fund	$1,012,090	0.70	5.68		0.90
Lawnmower	$96,000	0.50	0.10	8.80	
TOTAL:	$8,127,416	14.71	118.14	8.80	7.38

[1]Annual emission reductions continue for the life of each project, which varies by project.

5.1.1 Carl Moyer Program

The Carl Moyer Memorial Air Quality Standards Attainment Program is a State-funded program codified in H&SC §44275 et seq.[1] The primary purpose is to reduce NOx emissions from heavy-duty diesel engines, although PM emission reductions resulting as a secondary benefit of the projects are also tracked. The program consists of seven categories of heavy-duty diesel applications: on-road, off-road, locomotive, marine, stationary agricultural irrigation pumps, forklifts, and airport ground support equipment. Within those categories, three types of projects are eligible for funding: new purchase, repowering (replacing an older diesel engine with a newer one in an existing piece of equipment), and retrofit (the addition of control equipment to reduce emissions from the existing engine). Examples of funded projects include the purchase of new compressed natural gas (CNG) transit buses, and repowering older on-road diesel trucks, earth moving equipment, and marine vessels.

The program has an overall cost-effectiveness requirement of no more than $14,300 per ton of NOx + PM(x20) + ROG (reactive organic gas) reductions, and each project type within each category has additional criteria. Funds are allocated by ARB to participating air districts based on a combination of population, air quality nonattainment problem, and the district's SIP commitment to heavy-duty vehicle emission reductions. Districts are required to match State funds with local district funds using a State developed formula based on historic allocations. State law requires 50% of the State funds in the program be allocated to "Environmental Justice Areas" (low-income communities or communities of color that are adversely impacted by air pollution).

5.1.2 Vehicle Registration Fund Program

The Vehicle Registration Fund (VRF) is a District program established pursuant to State law (H&SC 44220 et seq.), using a vehicle registration fee collected by the Department of Motor Vehicles to fund voluntary motor vehicle emission reductions. On December 11, 1990, the District Board established a $2 annual fee for every on-road motor vehicle registered in San Diego County. Until 2003 the District used a portion of those funds for its internal air quality planning and monitoring related to motor vehicle emissions, and biennially allocated the remaining funds to motor vehicle emission reduction projects sponsored by local cities, government agencies and private companies. All the projects are voluntary and cannot be required by any regulation, mandate, or binding agreement.

Since 2003, inflationary cost increases to the District's operations have reduced the excess VRF funds and no solicitation for projects has been made. The District continued to fund a vanpool program and commuter rail shuttle service operated by SANDAG through June 2008.

5.1.3 Lower-Emission School Bus Program

The Lower-Emission School Bus Replacement and Retrofit Program reduces the exposure of school children to cancer-causing and smog-forming diesel school bus emissions through a

[1] The incentive program is named in honor of the late scientist Dr. Carl Moyer (1937-1997), in recognition of his work in the air quality field and his efforts in bringing about this incentive.

combined approach of replacing and retrofitting older high-polluting school buses. School districts with pre-1987 model year buses can replace those buses with either new CNG buses or new lower-emission diesel buses by contributing 25% of the cost, up to a maximum of $25,000. The program pays for the remainder. School districts that purchase CNG buses are eligible to receive an additional 10% of their award for CNG fueling infrastructure expenses. The second component of the program is funding to retrofit existing school buses with particulate matter (PM) filters. Retrofit devices must be certified by ARB as reducing PM emissions by 85%. The program pays the full cost of the filter plus installation.

The Lower-Emission School Bus Program was instituted statewide in fiscal year 2000-01 with a $50 million dollar budget allocation from the Governor. Those funds were spread over two years and allocated to air districts based on the district's share of all pre-1987 model year buses. Since then ARB has allocated Lower-Emission School Bus funds annually. As in the Carl Moyer Program, 50% of the funds must be expended in Environmental Justice Areas. Since its inception, the Lower-Emission School Bus Program funding in San Diego County has provided for the purchase of 50 CNG replacement buses, 54 diesel replacement buses, and retrofitting 600 existing diesel buses with PM filters.

5.1.4 Palomar Mitigation Funds Program

As part of the California Energy Commission (CEC) Power Plant Site approval process, the CEC conditioned approval of the Palomar Energy Project, in Escondido, to provide a $1.2 million particulate matter (PM) mitigation fund in response to community concerns over PM. That fund is being administered by the District and has funded PM reduction projects in the vicinity of the power plant. Projects include replacing old school buses in Escondido with new low-emitting ones, retrofitting local municipal fleet trucks and equipment with diesel particulate filters, and repowering older trucks and equipment with new low-emitting engines.

5.1.5 Lawn Mower Exchange Program

The District's Lawn Mower Exchange Program is an annual one-day, first-come, first-served event for San Diego County residents. It allows County residents to exchange a working gasoline-powered lawn mower for a voucher to purchase a new non-polluting electric lawn mower at a substantially reduced price. The cordless rechargeable electric mower has a typical retail price of between $450 and $500. With the voucher, the price is reduced to $150. Participants purchase the new electric mower at the venue to take home. The gas-powered mowers are disposed at a metal recycling facility.

The Lawn Mower Exchange Program is funded by the District with penalties collected from violators of air quality requirements, with additional financial support provided by ARB. The program has been popular with the public and provides an innovative means to participate in an air quality improvement program. To date, the program has replaced about 4,000 gasoline-powered mowers with nonpolluting electric mowers in San Diego County.

5.2 TRANSPORTATION CONTROL MEASURES STATUS

Implementation continues for the six Transportation Control Measures contained in the RAQS, consistent with program commitments made in the 2007 Regional Transportation Plan (RTP) and the 2006 Regional Transportation Improvement Program (RTIP) adopted and implemented by SANDAG. The six RAQS Transportation Control Measures are: (1) Transit Improvements; (2) Vanpools; (3) High-Occupancy Vehicle (HOV) Lanes; (4) Park-and-Ride Facilities; (5) Bicycle Facilities; and (6) Traffic Signal Improvements.

5.2.1 Transit Improvement and Expansion Program

The District's Vehicle Registration Fund Program and the State Carl Moyer Program (locally administered by the District) have been utilized to fund the incremental cost of replacing diesel-fueled public transit buses with compressed natural gas (CNG) transit buses. Currently, 65% of all transit buses in the county (412 of 635 total) are fueled by CNG. All four of the transit providers in the San Diego region have chosen to adopt the alternative-fuel path of ARB's Transit Bus Fleet Rule and will purchase CNG buses exclusively in the future.

Additionally, bus revenue miles[1] in San Diego County have increased nine percent since Fiscal Year 1997 to 27 million miles in 2006. Further, rail transit services, including the San Diego Trolley[2] and the Coaster commuter rail service,[3] have grown 57% since 1997 to reach over 9.6 million revenue car miles in 2006. The 6-mile extension of the San Diego Trolley from Qualcomm Stadium in Mission Valley to San Diego State University and to La Mesa opened in July 2005. Additionally, the 22-mile Sprinter Rail Line, connecting Oceanside to Escondido, began service in January 2008.

5.2.2 Vanpool Program

SANDAG operates a Regional Vanpool Program. As of September 2007, 579 vanpools were operating in the San Diego region, carrying 4,765 passengers, a 28% increase over 2005 levels. Additional vanpools are anticipated as funding becomes available.

5.2.3 HOV Lanes

Currently, there are two freeways in the San Diego region with HOV lanes: Interstate (I) 5 (San Diego Freeway) and I-15 (Escondido Freeway). Additional HOV lanes are currently under construction on I-5, I-15, and I-805.

The I-5 HOV lane (northbound only) extends 5.8 miles from the I-5/I-805 junction to Via de la Valle. The I-15 Express Lanes are a two-lane reversible HOV facility in the median of I-15, extending 7.5 miles from SR 163 to SR 56. Access is available only at the north and south ends.

[1] Revenue (car) miles are the total distance that a fleet travels while available for passenger service.

[2] The San Diego Trolley is a 54-mile light rail transit system serving southern San Diego County.

[3] The Coaster is a 42-mile passenger rail line between Oceanside and Downtown San Diego that began service in FY 1996.

Vehicles with two or more occupants, buses, and motorcycles may use the I-15 Express Lanes for free, and solo drivers participating in the FasTrak® Program may use the Express Lanes for a per-trip toll. Finally, it is also worth noting that there is a buses-only northbound lane on SR 163, extending 0.4 miles from A Street in downtown San Diego to I-5, enabling buses to bypass general purpose traffic when entering SR 163.

Metered Ramps. HOV preferential lanes are provided at 176 (62%) of the 283 metered ramps on the region's freeways. The HOV preferential lanes do not bypass the meters but they do have a shorter queue, reducing travel time.

I-15 Managed Lanes. The region has committed over $500 million to the I-15 Managed Lanes project to ease traffic congestion in the I-15 corridor from SR 163 to SR 78 in Escondido. Construction began in November 2003 and is scheduled for completion in 2012. The middle segment of the I-15 Managed Lanes will be open in 2009.

The project will include four lanes with a moveable barrier in the median of I-15 to accommodate two to three lanes in the peak direction and one to two lanes in the opposite direction. The Managed Lanes facility will provide priority to HOVs such as carpools and vanpools, regular transit services, and a Bus Rapid Transit (BRT) System. Excess capacity in these lanes will be "sold" to solo drivers for a fee, as is the case with the FasTrak® program. The Managed Lanes will be separated from the general purpose lanes by a barrier with access provided at several locations through openings in the barrier.

I-5 North Coast Managed Lanes. This project will be modeled after the I-15 Managed Lanes project. The I-5 North Coast Managed Lanes will feature multiple access points to/from the facility to the general purpose lanes and direct access ramps that connect local arterials directly to the Managed Lanes facility. A number of project alternatives are being studied as part of the environmental document that Caltrans is developing. Numerous technical studies also are being developed for this project, including a study to examine the feasibility of value pricing on the I-5 North Coast Managed Lanes.

Managed Lanes/HOV Network. SANDAG's 2007 Regional Transportation Plan (RTP) will develop a robust Managed Lanes/HOV network. Shared by highway and transit users, the Managed Lanes/HOV system will be expanded from the current 13 miles to 143 miles in the future. The 2007 RTP includes:

- Managed lane facilities on I-5, I-15, I-805, and SR 52 with value pricing;[1]
- One HOV lane in each direction on I-5, SR 52, SR 78, SR 94, and SR 125; and
- Direct HOV to HOV connectors.

5.2.4 Park-and-Ride Facilities

Currently, there are 69 park-and-ride lots in the region, with 4,099 spaces available. More lots are anticipated as funding becomes available.

1 Variable tolls for solo drivers based on traffic congestion in the general lanes.

5.2.5 Bicycle Facilities

The bikeway system currently includes 1,136 miles of bikeways in the San Diego region, consisting of Class I (exclusive bicycle path separated from roadway), Class II (striped on-street bicycle lane), and Class III (shared with motor vehicles) facilities. Front-mounted bike racks are available on nearly all transit buses. SANDAG maintains a system of over 560 bike locker spaces available throughout the region at most Trolley stations, all COASTER stations, and select Park-and-Ride locations. Currently, 78 spaces are electronic, on-demand spaces. All remaining locker spaces will be converted to electronic, on-demand spaces over the next 4 years. Unlike conventional lockers assigned to a single user, the converted spaces are available any time they are not in use to anyone participating in the bike locker program. Consequently, each converted space will serve 3 to 5 times as many commuters as a non-converted unit.

5.2.6 Traffic Signal Improvements

The 2006 RTIP includes three State funded projects as well as six locally funded traffic signal improvements.

5.3 INDIRECT SOURCE PROGRAM STATUS

The District's Indirect Source Program, adopted by the District Board in December 1997, consists of ongoing outreach and assistance to local governments, land developers, and neighborhood groups to reduce vehicle trips and associated emissions through voluntary land use and street design improvements (i.e., "smart growth"). District efforts during 2005-2007 included:

- Ongoing technical assistance to the San Diego Association of Governments (SANDAG) on programs to encourage smart growth. These SANDAG programs included implementation of the 2004 Regional Comprehensive Plan (RCP) and allocation of the successful 2004 TransNet half-cent sales tax ballot measure to include smart growth incentives and funding for walking, bicycling, transit, and neighborhood traffic safety programs.

- Technical assistance to both the City of San Diego and the County of San Diego in revising their respective General Plans, to reflect greater reliance on transit and non-motorized transportation modes.

- Technical assistance to the Cities of San Diego and Chula Vista in preparing Pedestrian Master Plans and Traffic Calming Programs.

- Workshops/presentations for city planning staffs, traffic engineers, developers, merchant organizations, neighborhood groups, and others working to improve conditions for walking, bicycling, and transit.

- Distributing, and giving neighborhood presentations on a traffic calming "best practices" manual developed by District staff to help communities provide a safe pedestrian and bike environment while reducing automobile traffic.

- Technical assistance to a regional pedestrian advocacy group (WalkSanDiego) and coordination with affiliated State and national groups (California Walks and America Walks, respectively), as well as the San Diego County Bicycle Coalition.

- Technical assistance to Move San Diego, promoting transportation projects to support smart growth. Focus during 2005-2007 was developing an alternative Bus Rapid Transit (BRT)-based vision for use by the San Diego Association of Governments. A portion of the BRT system was incorporated into SANDAG's 2007 Regional Transportation Plan.

6. CONCLUSIONS

6.1 EMISSION OFFSETS

Amendments to New Source Review Rules 20.1-20.4 were adopted on November 4, 1998, repealing State emission offset requirements as authorized by State law (Assembly Bill 3319, 1996 Statutes). Attachment II to this RAQS Revision contains a detailed reassessment and reaffirmation—prepared pursuant to State law and ARB guidance—that State emission offset requirements (beyond current federal offset requirements in the New Source Review rules) are not necessary in San Diego County to attain and maintain State ambient air quality standards for ozone by the earliest practicable date.

6.2 NET IMPACTS OF STRATEGY REVISIONS

Pursuant to State law, a revised control strategy must be at least as effective in improving air quality as the control strategy being replaced (H&SC §40925(b)). One NOx control measure[1] originally scheduled in the 2004 RAQS Revision, which would have provided only about 0.1 ton per day reduction, has been determined not to be feasible due to unacceptable cost-effectiveness. However, four new VOC control measures[2] have been scheduled in this RAQS Revision for development and consideration of adoption during the 2008-2010 period. These four measures will potentially provide about 5 tons per day additional reductions in VOC emissions. Consequently, this RAQS Revision will provide additional reductions of ozone precursor emissions and, therefore, is more effective in improving air quality.

[1] Further Control of Industrial and Commercial Boilers, Process Heaters and Steam Generators

[2] The four new measures reflected herein are (1) Further Control of Adhesive and Sealant Applications, (2) Further Control of Automotive Refinishing, (3) Further Control of Architectural Coatings, and (4) Low-VOC Solvent Wipe Cleaning.