CHAPTER 1

INTRODUCTION

PURPOSE

The purpose of the 1997 Revision to the Air Quality Management Plan (AQMP or Plan) for the South Coast Air Basin (Basin) and those portions of the Mojave Desert Air Basin and Salton Sea Air Basin under the South Coast Air Quality Management District (District) jurisdiction, is to set forth a comprehensive program that will lead these areas into compliance with all federal and state air quality planning requirements. Specifically, the 1997 AQMP Revision is designed to satisfy: 1) the State Implementation Plan requirements under Title I of the federal Clean Air Act (CAA) and 2) the California Clean Air Act (CCAA). These federal and state requirements are summarized briefly later in this chapter.

The 1997 AQMP sets forth programs which require the cooperation of all levels of government: local, regional, state, and federal. Each level is represented in the Plan by the appropriate agency or jurisdiction that has the authority over specific emissions sources. Accordingly, each agency or jurisdiction is assigned specific planning and implementation responsibilities.

At the federal level, the U.S. Environmental Protection Agency (EPA) is charged with regulation of on-road motor vehicle standards; trains, airplanes, and ships; non-road engines; and off-shore oil development. The Air Resources Board (ARB), representing the state level, also oversees on-road vehicle emission standards, fuel specifications, some off-road sources and consumer product standards. At the regional level, the District is responsible for stationary sources and some mobile sources. In addition, the District has lead responsibility for the development and adoption of the Plan. Lastly, at the local level, Associations of Governments have a dual role of leader and coordinator. In their leadership role, they, in cooperation with local jurisdictions and subregional associations, develop strategies for these jurisdictions to implement; as a coordinator, they facilitate the implementation of these strategies. For the South Coast Air Basin, the Southern California Association of Governments is the District's major partner in the preparation of the AQMP. Interagency commitment and cooperation are the keys to success of the AQMP.

Since air pollution physically transcends city and county boundaries, it is a regional problem. No one agency can design or implement the Plan alone, and the strategies in the Plan reflect this fact.

CONSTRAINTS IN ACHIEVING STANDARDS

The District is faced with a number of constraints or confounding circumstances to achieving clean air. These include the physical and meteorological setting, the large pollutant emissions burden of the Basin, and the rapid population growth of the area.

Setting

The South Coast Air Quality Management District has jurisdiction over approximately 12,000 square miles consisting of the four-county South Coast Air Basin and the Los Angeles county and Riverside county portions of what used to be under state classification the Southeast Desert Air Basin. Figure 1-1 shows the boundaries of the District; also shown are the federally designated ozone nonattainment areas. In May 1996, the boundaries of the South Coast Air Basin were changed by ARB to include the Beaumont-Banning area. In addition, the Southeast Desert Air Basin was separated into two areas and renamed as the Mojave Desert Air Basin and the Salton Sea Air Basin. The South Coast Air Basin is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. It includes all of Orange county and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The Los Angeles county portion of the Mojave Desert Air Basin (known as North county or Antelope Valley) is bounded by the San Gabriel Mountains to the south and west, the Los Angeles/Kern county border to the north, and the Los Angeles/San Bernardino county border to the east. In September 1996, AB 2666 (Knight) established the Antelope Valley Air Pollution Control District (AVAPCD) to be effective on July 1, 1997. In the interim, the Antelope Valley is considered part of the South Coast Air Quality Management District. As such, the planning requirements for the Antelope Valley are provided in this Plan. The Riverside county portion of the Salton Sea Air Basin and the Mojave Desert Air Basin is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley (Blythe).

While the state action redrew the boundaries of the desert regions of Southern California, the federal ozone nonattainment area is still called the Southeast Desert Modified Ozone Nonattainment Area and contains portions from all three air basins. The Salton Sea Air Basin portion of Riverside County east of the South Coast Air Basin (known as the Coachella Valley Planning Area) is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east.

The topography and climate of Southern California combine to make the Basin an area of high air pollution potential, and constrain the District's efforts to achieve clean air. During the summer months, a warm air mass frequently descends over the cool, moist marine layer produced by the interaction between the ocean's surface and the lowest layer of the atmosphere. The warm upper layer forms a cap over the cool marine layer and inhibits the pollutants in the marine layer from dispersing upward. In addition, light winds during the summer further limit ventilation. Furthermore, sunlight triggers the photochemical reactions which produce ozone, and this region experiences more days of sunlight than any other major urban area in the nation except Phoenix.

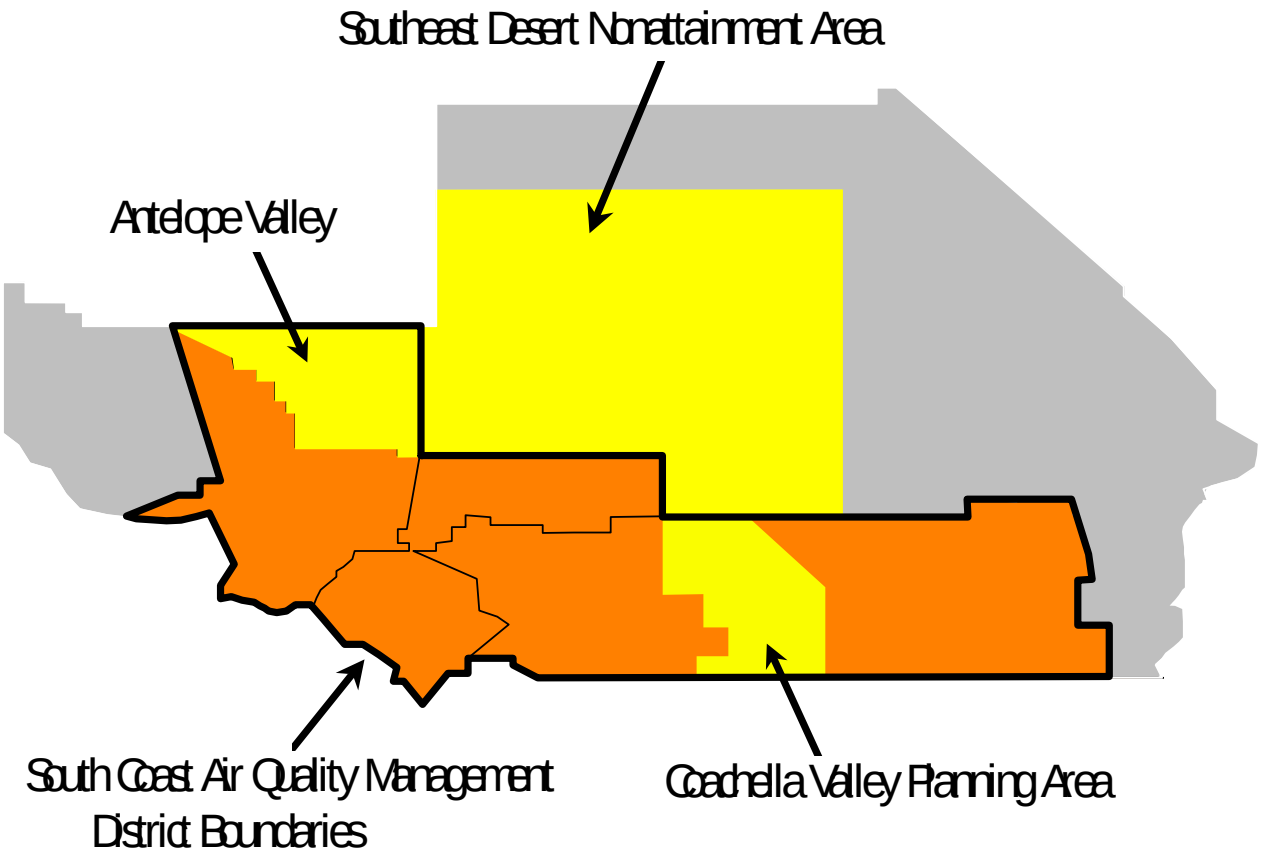

FIGURE 1-1

Boundaries of the South Coast Air Quality Management District
and Federal Planning Areas
[Note: A New District (Antelope Valley Air Pollution Control District) was Formed in September 1996 and Will Be Effective on July 1, 1997.]

The Basin's economic base is diverse. Historically, the four counties of the Basin have collectively comprised one of the fastest-growing local economies in the United States. Until recently, the aerospace and electronic industries accounted for about 20 percent of the Basin's employment. Significant changes have occurred in the composition of the industrial base of the region in the past ten years. As in many areas of the country, a large segment of heavy manufacturing, including steel and tire manufacturing and automobile assembly, has been phased down. The aerospace and electronics industries have been reduced in scale by cutbacks in defense spending. Small service industries and businesses resulting from growth in shipping and trade have replaced much of the heavy industry.

Both the Antelope Valley and the Coachella Valley Planning Area are impacted by pollutant transport from the South Coast Air Basin. In addition, pollutant transport occurs to the

Mojave Desert, Ventura county, and San Diego county. As part of this AQMP revision, transport issues relative to the Antelope Valley and the Coachella Planning Area are specifically addressed in Chapter 8 and Appendix V.

In summary, the diverse geographical characteristics of the Southern California region place a significant constraint on achieving air quality standards.

Emission Sources

The pollution burden of the Basin is substantial. It has been estimated from prior studies that emissions of volatile organic compounds, oxides of nitrogen, carbon monoxide, sulfur oxides, and direct primary particulates in the South Coast Air Basin must be reduced by over 50 percent to attain the federal air quality standards.

Air pollution forms either directly or indirectly from pollutants emitted from a variety of sources. These sources can be natural, such as oil seeps, vegetation, or windblown dust. Emissions may also result from combustion, as in automobile engines; from evaporation of organic liquids, such as those used in coating and cleaning processes; or through abrasion, such as from tires on roadways. The air pollution control strategy in the AQMP is directed almost entirely at controlling man-made sources. Where naturally occurring emissions can be mitigated, such as through windbreaks, they are included. Otherwise, natural emissions are accounted for in the background and initial conditions data used for the air quality modeling analysis described in Chapters 5 and 8 and Appendix V.

Population

Since the end of World War II, the Basin has experienced faster population growth than the rest of the nation. Although growth has slowed somewhat, the region's population is expected to increase significantly towards the end of the century and through 2020. Table 1-1 shows the projected growth based on SCAG's regional growth forecast.

Although per-capita emissions have been brought down substantially in the Basin through 40 years of implementing pollution controls, increases in the population over that time have made overall emission reductions more difficult. Many sources, such as automobiles, have been significantly controlled. However, increases in the number of sources, particularly those growing proportionally to population, reduce the potential air quality benefits of new controls. The net result is that unless significant steps are taken to further control air pollution, growth will overwhelm much of the improvements expected from the existing control program.

TABLE 1-1

Population Growth

Year	Population	Average Percent Increase Per Year Over the Period
1950	4.8 million	
1980	10.5 million	2.7
1990	13.0 million	2.2
2010	16.7 million	1.3
2020	18.9 million	1.2

CONTROL EFFORTS

History

The seriousness of the local air pollution problem was recognized in the early 1940s. In 1946, the Los Angeles County Board of Supervisors established the first air pollution control district in the nation to address the problems of industrial air pollution. In the mid-1950s, California established the first state agency to control motor vehicle emissions. Countywide or regional air pollution districts were required throughout the state by 1970. Many of the controls, originating in California, became the basis for the federal control program which began in the 1960s.

Nearly all control programs developed to date have relied on the development and application of cleaner technology and add-on emission control devices. Industrial and vehicular sources have been significantly affected by this technology. Only recently have preventive efforts come to the forefront of the air pollution control program, [e.g., alternative materials, waste minimization, and maintenance procedures for industrial sources].

In the 1970s, it became apparent at both the state and federal levels that local programs were not enough to solve a problem that was regional in nature and did not stay within jurisdictional boundaries. Instead, air basins, defined by geographical boundaries, became the basis for regulatory programs.

In 1976, the California Legislature adopted the Lewis Air Quality Management Act which created the South Coast Air Quality Management District from a voluntary association of air pollution control districts in Los Angeles, Orange, Riverside, and San Bernardino counties. The new agency was charged with developing uniform plans and programs for the region to attain federal standards by the dates specified in federal law. The agency was also mandated to meet state standards by the earliest date achievable, using reasonably available control measures.

Rule development in the 1970s and 1980s resulted in dramatic improvement in Basin air quality (see Appendix II). However, the effort to impose incremental rule changes on the

thousands of stationary sources under District permits was laborious and time consuming. The District concluded it was possible that the limits of the command and control regulatory process were being reached. The 1991 AQMP introduced the concept of a Marketable Permits Program and outlined the skeleton of an idea that was forerunner to what is now known as the Regional Clean Air Incentives Market (RECLAIM).

A historical milestone occurred with the adoption of RECLAIM on October 15, 1993. RECLAIM is an alternative means of achieving further emission reductions from stationary sources, different from the traditional source-specific regulatory program. RECLAIM calls for declining mass emission limits on the total emissions from all sources within a facility. The facility can choose from a selection of methods for achieving the prescribed emission reductions: add-on controls, use of reformulated products, changes in production, purchase of excess emission reductions from other sources, and/or any other methods that would be enforceable and quantifiable. At the time of adoption, RECLAIM was estimated to affect approximately 390 and 41 of the largest emitters of oxides of nitrogen and oxides of sulfur in the Basin and is designed to reduce emissions of these pollutants by 80 and 14 tons/day, respectively, by July 1, 2004.[1]

Impact of Control

Past air quality programs have been effective in improving the Basin's air quality. Ozone levels have been reduced in half over the past 30 years, sulfur dioxide and lead standards have been met, and other criteria pollutant concentrations have significantly declined. And for the first time in 1992, the federal annual nitrogen dioxide standard was not exceeded in the Basin. However, the Basin still experiences exceedances of health-based standards for ozone, carbon monoxide, and particulate matter under ten microns (PM_{10}). Air quality summaries and health effects in the Basin are briefly discussed in Chapter 2; Appendix II provides an in-depth analysis of air quality as measured within the District's jurisdiction.

1994 AIR QUALITY MANAGEMENT PLAN

In September 1994, the District and SCAG adopted an Air Quality Management Plan for the Basin which revised the previous AQMPs. The 1994 AQMP continued an aggressive emission control program with primary emphasis on mobile sources. The control program consists of short- and intermediate-term control measures and long-term (or new technology) measures. The long-term control measures would be implemented after 2000 to achieve the federal ozone air quality standard by 2010. The 1994 AQMP proposed a comprehensive set of control measures that included market incentive approaches for stationary sources, introduction of market incentive concepts that could replace indirect

[1] RECLAIM, Volume I: Development Report and Proposed Rules; South Coast Air Quality Management District; October 1993.

source control measures, and the use of advanced technologies for stationary and mobile sources. The need to build the infrastructure for new mobile source technologies was also identified.

The 1994 AQMP addressed specific requirements of the 1990 federal Clean Air Act and the state Clean Air Act. Specifically, the 1994 AQMP provided an ozone attainment demonstration as required in the 1990 federal Clean Air Act and served as the triennial report update for the South Coast Air Basin as required under state law. Upon the adoption of the 1994 AQMP, the District Governing Board requested that only those control measures necessary to the federal ozone air quality standard be forwarded to the U.S. EPA as part of the ozone State Implementation Plan (SIP).

State and Federal Approval Actions on the 1994 AQMP

Subsequent to the adoption of the 1994 AQMP, the California Air Resources Board (ARB) took actions to approve the 1994 AQMP as part of the California Ozone SIP. In November 1994, the ARB approved the California Ozone SIP and replaced many of the AQMP mobile source control measures with statewide mobile measures. In addition, ARB replaced the AQMP consumer products and pesticide control measures with statewide measures. All of the statewide measures provide equivalent emission reductions to those replaced AQMP measures. The California Ozone SIP was forwarded to the U.S. EPA on November 15, 1994 and a completeness finding was made on April 18, 1995.

The U.S. EPA proposed two actions on the California Ozone SIP. The first action on August 21, 1995, approved several of the long-term new technology measures in the Ozone SIP and several of the statewide mobile source control measures. On March 8, 1996, the U.S. EPA proposed actions to approve the California Ozone SIP. The proposed actions were finalized on September 26,1996 and will be effective 30 days after publication in the Federal Register. As part of the final action, U.S. EPA will enter into a consultative process to further develop the assignment of emission reductions to federal transportation sources (locomotives, ships, and aircrafts) needed to achieve the federal ozone air quality standard in the South Coast Air Basin. The consultative process is anticipated to be completed by the summer of 1997 and if necessary, a revised ozone attainment demonstration would be submitted by the end of 1997.

Progress in Implementing the 1994 AQMP

Progress in implementing the 1994 AQMP can be measured by the number of control measures that have been adopted as rules and the resulting tons of pollutants targeted for reduction. Since 1994, nine control measures have been adopted by the District through September 30, 1996. Table 1-2 lists the District stationary and mobile source control measures from the 1994 AQMP that were adopted through September 30, 1996.

The primary focus of the District's efforts had been the development of the VOC RECLAIM program since 1994. The VOC RECLAIM control measure (CTS-01) was put on hold by the District Governing Board in October 1995 due to lack of consensus on major policy issues. Concurrent actions by the Governing Board placed the substitution measures identified in the 1994 AQMP as the primary regulatory program. The District is currently developing regulations to implement the substitution measures and these measures are discussed in Chapters 4 and 7.

Additional rules have been adopted by the ARB to further reduce emissions from mobile sources and consumer products. In addition, the Phase 2 reformulated fuels program (known as California Cleaner Burning Gasoline) began in the spring of 1996 and is projected to further reduce Basin-wide emissions of volatile organic compounds, oxides of nitrogen, carbon monoxide, and oxides of sulfur.[1]

[1] Emission Benefits Analysis - Phase 2 Reformulated Gasoline; Air Resources Board; January 13, 1993.

TABLE 1-2

District Control Measures Adopted From
September 1994 Through September 1996

Control Measure	Rule	Pollutant	Title
CTS-05	1412[2]	VOC	Further Emissions Reductions from Perchloroethylene Dry Cleaning Operations
FUG-01	462	VOC	Emission Reductions from Organic Liquid Transfer and Loading
FUG-02	1176	VOC	Emission Reductions from Wastewater Systems (formerly titled "Emission Reductions from Active Draining of Liquid Products"
RFL-02	461	VOC	Further Control of Emissions from Gasoline Dispensing Facilities
CTS-C	1171	VOC	Emission Reductions from Solvent Cleaning Operations
MOF-03	1623	All	Emission Reduction Credits for Leaf Blowers
MOF-04	1620	All	Off-Road Mobile Source Emission Reduction Programs
MON-01	1612	All	Emission Reduction Credits for Low-Emissions Retrofit Fleet Vehicles
MON-05	1612	All	Emission Reduction Credits for Heavy-Duty Buses
MON-06	1612	All	Emission Reduction Credits for Heavy-Duty Trucks

[2] Perchloroethylene has been delisted as a VOC by the U.S. EPA since the adoption of Rule 1412 and is no longer reported in the VOC emissions inventory, however, it is still considered a toxic air contaminant.

Local governments can play an active role in reducing mobile source emissions through the implementation of specific actions. Since 1994, a task force jointly chaired by the District and SCAG has been working on possible on-road pricing market incentive approaches. The REACH (Reduce Emissions and Congestion on Highways) Task Force has developed several such approaches for further analysis. The status of the current efforts is discussed in Chapter 7 and in Appendix IV.

The Southern California Economic Partnership (The Partnership) was established in late 1994 and has been developing approaches to initiate the development of various infrastructures needed for alternative fuel programs. A discussion of the progress of the Partnership is provided in Chapter 7.

Global Warming and Stratospheric Ozone Depletion Policy

On April 6, 1990, the District adopted a "Policy on Global Warming and Stratospheric Ozone Depletion." The Policy commits the District to consider global impacts in rulemaking and in drafting revisions to the AQMP.

In March of 1992, the District's Governing Board reaffirmed this policy and adopted amendments to the policy to include the following directives:

- phase out the use and corresponding emissions of chlorofluorocarbons (CFCs), methyl chloroform (1,1,1-trichloroethane or TCA), carbon tetrachloride, and halons by December 1995;
- phase out the large quantity use and corresponding emissions of hydrochlorofluorocarbons (HCFCs) by the year 2000;
- develop recycling regulations for HCFCs;
- develop an emissions inventory and control strategy for methyl bromide; and
- support for the adoption of a California greenhouse gas emission reduction goal.

In support of these policies, the District Governing Board has adopted several rules to reduce ozone depleting compounds. Several other rules concurrently reduce global warming gases and criteria pollutants. In the future, these policies will be further implemented principally through federal actions.

Toxic Air Contaminant Control Programs

The District is also developing and implementing rules to control Hazardous Air Pollutants (HAPs). These control programs have been designed to meet federal and state requirements. The District is required to develop such programs under federal and state law.

At the federal level, Title III of the Clean Air Act provides a program for the control of 189 HAPs. The first stage of the program involves the promulgating of National Emission Standards for HAPs (NESHAPs) to reduce HAP emissions from new and existing sources. Major sources will be required to implement Maximum Available Control Technology (MACT). Area sources will be required to implement general achievable control technology

(GACT). This will be followed by a second phase in which residual risk will be evaluated and further controls considered.

The District will implement the NESHAPs MACT (including the standards) through its Title V permitting program for major sources or regular permitting for area sources (EPA has deferred Title V permitting for area sources for the next five years). The District continually evaluates its existing rules to determine whether they need to be amended to meet new MACT standards, or whether new rules need to be developed.

At the state level, the California state legislature has enacted several programs directed at toxic air contaminants (TACs). These programs include the Tanner Toxics Act (AB 1807), Air Toxics Hot Spots Assessment Program (AB 2588), Toxic Emissions Near Schools Program (AB 3205), and Disposal Site Air Monitoring Program (AB 3374). These programs are currently being implemented by the District either through the District rulemaking, permitting, monitoring or AB 2588 program.

The AB 1807 program, in particular, requires ARB to adopt air toxic control measures (ATCMs) to reduce levels of exposure and the risks associated with those levels. At present, the District has developed and is implementing eight rules that control emissions from specific sources of TACs. These rules meet and in some instances exceed the requirements set forth in the ATCM. The District will continue to implement this program through new rulemaking as ARB adopts additional ATCMs. Currently, under state law, the federal NESHAPs becomes an ATCM, unless ARB has already adopted an ATCM for the source category and the hazardous air pollutant(s).

1997 AQMP REVISION

As mentioned earlier in this chapter, this 1997 Revision to the AQMP is designed to satisfy the planning requirements of both the Federal Clean Air Act and the California Clean Air Act. The 1994 AQMP is the primary basis for the 1997 AQMP with many of the 1994 AQMP control measures carried into the 1997 AQMP. A majority of the 1994 AQMP control measures are updated in terms of the proposed adoption and implementation schedule.

Federal Clean Air Act Planning Requirements

In November 1990, Congress enacted a series of amendments to the Clean Air Act intended to intensify air pollution control efforts across the nation. One of the primary goals of the 1990 Clean Air Act Amendments was an overhaul of the planning provisions for those areas not currently meeting National Ambient Air Quality Standards (NAAQS). The CAA identifies specific emission reduction goals, requires both a demonstration of reasonable further progress and an attainment demonstration, and incorporates more stringent sanctions for failure to attain or to meet interim milestones. The discussion that follows briefly presents the general planning requirements of the CAA, lists previous State

Implementation Plan (SIP) submittals, and introduces CAA provisions that are addressed in the 1997 AQMP.

General Requirements

In general, the federal CAA does not necessitate significant changes in attainment planning for the Basin in 1997, except requiring an attainment plan for PM_{10}. The CAA requires plans to provide for the implementation of all reasonably available control measures "as expeditiously as practicable," including the adoption of reasonably available control technology for reducing emissions from existing sources. Emission control innovations in the form of market-based approaches are explicitly encouraged by the CAA. As mentioned earlier, the District is the first local agency in the country to adopt a market-based approach for controlling stationary source emissions of oxides of nitrogen and sulfur. The CAA also requires plans to include standards for reasonable further progress, which is defined as annual incremental reductions in emissions of relevant air pollutants needed to ensure attainment of the National Ambient Air Quality Standards (NAAQS) by the applicable date. A similar demonstration of progress was instituted in California with the passage of the California Clean Air Act in 1988. This is discussed further later in this chapter.

There are several sets of general planning requirements, both for nonattainment areas [Section 172(c)] and for implementation plans in general [Section 110(a)(2)]. These requirements are listed and very briefly described in Tables 1-3 and 1-4, respectively. The general provisions apply to all applicable pollutants unless superseded by pollutant-specific requirements.

Section 110(a)(2)(A) requires reasonable and enforceable control measures in plans. EPA has interpreted this requirement to imply that control measures in a plan be in regulatory form (i.e., adopted rules) at the time of the plan submittal. However, EPA has the authority to conditionally approve a plan revision based on a commitment to adopt specific enforceable measures by not later than one year after the date of conditional approval of the plan revision [Section 110(k)(4)].

TABLE 1-3

Nonattainment Plan Provisions [CAA Section 172(c)]

Requirement	Description
Reasonably available control measures	Implementation of all *reasonably available control measures* as expeditiously as practicable.
Reasonable further progress	Provision for *reasonable further progress* which is defined as "such annual incremental reductions in emissions of the relevant

	air pollutant as are required . . . for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date."
Inventory	Development and periodic revision of a comprehensive, accurate, *current inventory of actual emissions* from all sources.
Allowable emission levels	Identification and quantification of *allowable emission levels* for major new or modified stationary sources.
Permits for new and modified stationary sources	Permit requirements for the construction and operation of new or modified major stationary sources**.**
Other measures	Inclusion of all *enforceable emission limitations and control measures* as may be necessary to attain the standard by the applicable attainment deadline.
Contingency measures	Implementation of *contingency measures* to be undertaken in the event of failure to make reasonable further progress or to attain the NAAQS.

TABLE 1-4

General Requirements for Implementation Plans
[CAA Sections 110(b)(2), 182(c)(5), 187, and 189]

Requirement	Description
Ambient monitoring	An ambient air quality monitoring program.
Enforcement and regulation	A program for the enforcement of adopted control measures and emission limitations and regulation of the modification and construction of any stationary source to assure that the NAAQS are achieved.
Interstate transport	Adequate provisions to inhibit emissions that will contribute to nonattainment or interfere with maintenance of NAAQS or interfere with measures required to prevent significant deterioration of air quality or to protect visibility in any other state.
Adequate resources	Assurances that adequate personnel, funding, and authority are available to carry out the plan.
Source testing Monitoring	Requirements for emission monitoring and reporting by the source operators.
Plan revisions	Provisions for revising the air quality plan to incorporate changes in the standards or in the availability of improved control methods.
Other CAA requirements	Adequate provisions to meet applicable requirements relating to consultation, notification, and prevention of significant deterioration and visibility protection contained in other sections of the CAA.
Impact assessment	Appropriate air quality modeling to predict the effect of new source emissions on ambient air quality.
Permit fees	Provisions requiring major stationary sources to pay fees to cover reasonable costs for reviewing and acting on permit applications and for implementing and enforcing the permit conditions.
Local government participation	Provisions for consultation and participation by local political subdivisions affected by the plan.
Transportation control measures	Provisions requiring that serious and above nonattainment areas submit an implementation plan that includes transportation control measures considering at least the measures listed in Section 108(f).

EPA guidance[3] states that regulatory programs tend to be less than 100 percent effective for many source categories. Rule effectiveness reflects the ability of a regulatory program to achieve all the emission reductions that could be achieved by full compliance with the applicable regulations at all sources at all times. An effectiveness factor of 80 percent is required by EPA for all stationary source and non-tailpipe mobile source control measures for the future controlled scenarios. EPA, however, does allow exceptions to this rule if data exists to adequately demonstrate that the "real world" control percentage is higher. It should be noted that stationary point source controls are nearly 100 percent effective so an assumption of 80 percent rule effectiveness underestimates the expected emission reductions.

The CAA requires that most submitted plans include information on tracking plan implementation and milestone compliance. Requirements for these elements are described in Section 182(g) and Section 187(d) for ozone and carbon monoxide, respectively. Chapter 7 addresses these issues.

EPA also requires a public hearing on many of the required elements in SIP submittals before considering them officially submitted. The 1997 AQMP adoption process includes a public hearing on all of the required elements prior to submittal.

CAA Planning Requirements Addressed by the 1997 AQMP

Table 1-5 lists the CAA planning requirements addressed by the 1997 AQMP. The main submittal is a PM_{10} attainment demonstration SIP which is due to the U.S. EPA by February 8, 1997. The table lists the relevant CAA section and submittal deadline along with the AQMP document or chapter where the submittal is discussed. It may be used as a reference guide showing where each of the CAA planning requirements is addressed.

Besides the CAA requirements due prior to this plan revision (i.e., attainment demonstration plans for ozone, carbon monoxide, and nitrogen dioxide; 1996 Rate-of-Progress and Post-1996 Rate-of-Progress for ozone; and Best Available Control Measures (BACM) for PM_{10}), the CAA requires the District to develop a PM_{10} attainment demonstration, as given in Section 189.

As specified in Section 189(b)(1)(A) of the Act, the PM_{10} attainment demonstration is due no later than four years after reclassification of an area to "serious." The South Coast Air Basin and the Coachella Valley were reclassified from "moderate" to "serious" on February 8, 1993. As part of the attainment demonstration, the plan must also contain emission reduction milestones to be achieved every three years until the area is

[3] Emission Inventory Requirements for Carbon Monoxide State Implementation Plans; U.S. Environmental Protection Agency; OAQPS, Research Triangle Park, NC, March 1991.

redesignated attainment and the emission reductions must demonstrate reasonable further progress as defined under Section 171(l) of the Act. The 1997 AQMP is designed to satisfy the requirements of the CAA provisions for PM_{10}.

TABLE 1-5

CAA SIP Revisions and Submittals in the 1997 AQMP

Submittal	CAA Section	1997 AQMP Reference
PM_{10} Attainment Demonstration (Basin)	189(b)(1)(A)	Chapter 5 Appendix V
PM_{10} Attainment Demonstration/Maintenance Plan (Coachella Valley)	189(b)(1)(A)	Chapter 8 Separate Cover
PM_{10} Reasonable Further Progress Milestones	189(c)(1)	Chapter 6 Appendix V
Maintenance Plan for Nitrogen Dioxide	175A(a) and (d)	Chapter 5 and 6 Appendix V
Revision to the Ozone Attainment Demonstration (Basin)	182(c)(2)(A)	Chapter 5 Appendix V
Revision to the Ozone Attainment Demonstration, Mojave Desert Air Basin and Salton Sea Air Basin (under District jurisdiction)	182(c)(2)(A)	Chapter 8 Appendix V
Revision to the Post-1996 Rate-of-Progress Demonstration	182(c)(2)(B)	Chapter 6 Appendix V
Revision to the Carbon Monoxide Attainment Demonstration	187(b)(1)	Chapter 5 Appendix V
Growth Factors	--	Appendix III
Control Measure Documentation	--	Appendix IV

PM_{10} monitoring data in the Coachella Valley indicate that (with the exception of one measured PM_{10} exceedance due to a high-wind natural event) the area has attained the

federal PM_{10} air quality standard. The U.S. EPA recently released a natural events policy which exempts certain high wind events causing PM_{10} air quality exceedances as being counted as a violation. In applying this policy the Coachella Valley is now eligible for consideration by U.S. EPA as having attained the federal PM_{10} air quality standards. The Coachella Valley Maintenance Plan is provided under separate cover and discussed in Chapter 8 of this document. Certain portions of this 1997 AQMP will provide supporting documentation to that maintenance plan.

With new technical information on emissions estimates, the future-year baseline emissions projections changed, thereby requiring updates to previous SIP submittals. In particular, the emission budgets currently approved for federal conformity purposes must be updated and the California Ozone SIP for the South Coast Air Basin must be updated to reflect the best available technical information. In addition, the Carbon Monoxide Attainment Demonstration Plan must be revised. As such, the 1997 AQMP provides revisions to the previous SIP submittals.

The South Coast Air Basin is the only area in nonattainment of the federal nitrogen dioxide air quality standard and under the federal Clean Air Act was to attain the federal air quality standard by 1995. Monitoring data for the past three years have shown that the federal nitrogen dioxide concentrations were below the federal air quality standard. Accordingly, the 1997 AQMP will serve as the maintenance plan for nitrogen dioxide. As required under Section 175A(a), the plan must provide for maintenance of the air quality standard for at least 10 years after the area is redesignated to attainment. In addition, the plan must contain contingency measures to assure that any violations will be promptly corrected.

Section 181(a)(1) classifies the Basin as an extreme nonattainment area and states that the Basin must achieve the federal ozone standard by November 15, 2010. As such, an attainment demonstration for ozone was provided as part of the 1994 AQMP and the ozone portion of the 1994 AQMP is part of the 1994 California Ozone SIP. The ozone attainment demonstration followed U.S. EPA and ARB modeling guidelines and as such is based on the photochemical grid model called the Urban Airshed Model (UAM). The model evaluation and attainment demonstration are fully presented in Technical Report V-B and Appendix V-A of the 1994 AQMP, respectively. Based on new technical information, the 1994 AQMP ozone attainment demonstration is revised as part of the 1997 AQMP revision and the attainment demonstration is summarized in Chapters 5 and 6 and Appendix V.

According to Section 182(c)(2)(B), the District must demonstrate how the Basin will achieve actual volatile organic compound emission reductions of at least three percent

per year averaged over each consecutive three-year period beginning from November 15, 1996 and ending November 15, 2010 (i.e., the Basin's attainment date). The rate-of-progress milestone years for the Basin are 1999, 2002, 2005, 2008, and 2010. Section 182(c)(9) requires that the post-1996 rate-of-progress demonstration must contain a set of contingency measures, that is, additional control measures which would be implemented in the event of a milestone or attainment failure. Appendix V contains the detailed calculations of the post-1996 rate-of-progress demonstration. Chapter 6 provides an estimation of the emission levels at each of the milestone years compared to the CAA target levels. Contingency measures are given in Chapter 9.

State Law Requirements

The California Clean Air Act (CCAA) was signed into law on September 30, 1988, became effective on January 1, 1989, and was amended in 1992. Also known as the Sher Bill (AB 2595), the CCAA established a legal mandate to achieve health-based state air quality standards at the earliest practicable date. The Lewis Presley Act provides that the plan must also contain deadlines for compliance with all state ambient air quality standards and the federally mandated primary ambient air quality standards [Health and Safety Code (H&SC) 40462(a)]. In September 1996, AB 3048 (Olberg) amended Sections 40716, 40717.5, 40914, 40916, 40918, 40919, 40920, 40920.5, and 44241, and repealed Sections 40457, 40717.1, 40925, and 44246 of the Health and Safety Code relating to air pollution. The amendments to the Health and Safety Code will become effective January 1, 1997. As such, this plan revision reflects the new state planning requirements as they pertain to the South Coast Air Quality Management District. Through its many requirements, the CCAA serves as the centerpiece of the Basin's attainment planning efforts since it is generally more stringent than the federal Clean Air Act.

Based on pollutant levels, the CCAA divides nonattainment areas into categories with progressively more stringent requirements (H&SC 40918-40920). The categories are outlined in Table 1-6. The state nonattainment designations are on a county basis. The entire Basin is an extreme nonattainment area for ozone. Los Angeles County is the only county considered as a serious nonattainment area for carbon monoxide. Although PM_{10} is not explicitly addressed in the CCAA, it is governed by the Lewis Presley Act. The plan therefore provides achieving all federal ambient air quality standards by their applicable date and state ambient air quality standards as early as possible.

TABLE 1-6

California Clean Air Act Nonattainment
Area Classifications (H&SC 40921.5)

	Concentration Level (ppm)	
Category	Ozone	Carbon Monoxide

Moderate	0.09 to 0.12*	9.0 to 12.7*
Serious	0.13 to 0.15*	> 12.7
Severe	0.16 to 0.20*	--
Extreme	> 0.20	--

* Inclusive range.

Serious and above nonattainment areas are required to revise their air quality management plan to include specified emission reduction strategies, and to meet milestones in implementing emission controls and achieving more healthful air quality. The key planning requirements are provided in Table 1-7. Some of these requirements are discussed in further detail in the next section. Chapter 6 addresses how these requirements are met in the Basin. The CCAA also includes some additional requirements that can significantly affect control strategy selection. These requirements are provided in Table 1-8. All of these mandates have either already been met through District regulations or are included/considered in the preparation of the 1997 AQMP.

Plan Effectiveness

The CCAA requires, beginning on December 31, 1994 and every three years thereafter, that each district demonstrate the overall effectiveness of its air quality program. For those areas that do not attain state air quality standards by 2000, a comprehensive plan update is required to be submitted by December 31, 1997. In addition, Section 40925 of the Health and Safety Code requires that the plan incorporate new data or projections including, but not limited to, the quantity of emission reductions actually achieved in the preceding three-year period and the rates of population-related, industry-related, and vehicle-related emissions growth actually experienced in the district and projected for the future. The 1997 AQMP serves as the comprehensive plan update for the South Coast Air Basin.

TABLE 1-7

California Clean Air Act Planning Requirements

Requirement	Description
Indirect and area source controls	An indirect and area source control program [H&SC 40918(a)(4)],
Best available retrofit	Best available retrofit control technology (BARCT) for existing

control technology	sources [H&SC 40918(a)(2))],
New source review	A program to mitigate all emissions from new and modified permitted sources [H&SC 40918(a)(1))],
Pollutant transport	Assessment of relative upwind emissions contributions to downwind ozone levels [H&SC 39610(b)],
Transportation control measures	Transportation control measures as needed to meet plan requirements [H&SC 40918(a)(3))], and
Clean fleet vehicle programs	Significant use of low-emission vehicles by fleet operators [H&SC 40919(a)(4)].

TABLE 1-8

California Clean Air Act Requirements for Control Strategy Development

Requirement	Description
Rate-of-progress	Reducing pollutants contributing to nonattainment by five percent per year (H&SC 40914) or all feasible control measures and an expeditious adoption schedule,
Public education programs	Public education programs [H&SC 40918(a)(6)],
Per-capita exposure	Reducing per-capita population exposure to severe nonattainment pollutants according to a prescribed schedule [H&SC 40920(c)],
Any other feasible controls	Any of the feasible controls that can be implemented or for which implementation can begin, within 10 years of adoption date [H&SC 40920.5(c)], and
Control measure ranking	Ranking control measures by cost-effectiveness and implementation priority (H&SC 40922).

The Act suggests a number of air quality indicators, including actual emission reductions, ozone and carbon monoxide design value improvements, population exposure reductions, and pollutant concentration hours. In Chapter 6, plan effectiveness is illustrated by trends in the following indicators:

- volatile organic compound, oxides of nitrogen, and carbon monoxide emissions,
- nitrogen dioxide, carbon monoxide, and ozone air quality (i.e., exceedance days), and
- nitrogen dioxide, carbon monoxide, and ozone populational exposure above air quality standards.

Emission Reductions

According to the CCAA, districts must design their air quality management plan to achieve a reduction in basinwide emissions of five percent or more per year (or 15 percent or more in a three-year period) for each nonattainment pollutant or its precursors (H&SC 40914). However, an air basin may use an alternative emission reduction strategy which achieves a reduction of less than 5 percent per year if it can be demonstrated that either of the following applies:

- The alternative emission reduction strategy is equal to or more effective than the 5 percent per year control approach in improving air quality; or

- That despite the inclusion of every feasible measure, and an expeditious adoption schedule, the air basin is unable to achieve the 5 percent per year reduction in emissions.

For emission reduction accounting purposes, the ARB has established a seven-year initial reporting period from January 1, 1988, to December 31, 1994 (Section 70701 of the California Code of Regulations). The reporting intervals after this initial period occur every three years (i.e., 1997, 2000, etc.). Therefore, the 1997 AQMP must seek to achieve a 35 percent emissions reduction for the initial reporting period and a 15 percent additional reduction for every subsequent interval.

Population Exposure

The CCAA also requires that the 1997 AQMP control measures reduce overall population exposure to criteria pollutants. Specifically, exposure to severe nonattainment pollutants above standards must be reduced from 1986 through 1988 levels by at least 25 percent by December 31, 1994; 40 percent by December 31, 1997; and 50 percent by December 31, 2000. Reductions are to be calculated based on per-capita exposure and the severity of exceedances. This provision is applicable to ozone, carbon monoxide, and nitrogen dioxide in the Basin [H&SC 40920(c)]. The definition of exposure is the number of persons exposed to a specific pollutant concentration level above the state standard times the number of hours. The per-capita exposure is the population exposure (units of pphm-persons-hours) divided by the total population.

Control Measure Ranking

The CCAA requires the District Governing Board to determine that the AQMP is a cost-effective strategy that will achieve attainment of the state standards by the earliest practicable date (H&SC 40913). In addition, the Plan must include an assessment of the cost-effectiveness of available and proposed measures and a list of the measures ranked from the least cost-effective to the most cost-effective [H&SC 40922(a)].

In addition to the relative cost-effectiveness of the measures, the District must consider other factors as well in developing an adoption and implementation schedule [H&SC 40922(b)]. The other factors noted in the CCAA include technological feasibility, emission reduction potential, rate of reduction, public acceptability, and enforceability. Efficiency, equity, and legal authority have also been included in the 1997 AQMP for prioritization purposes because of their importance. The results of the prioritization are given in Chapter 6.

Pollutant Transport

The South Coast Air Basin both transports to and receives air pollutants from the coastal portions of Ventura and Santa Barbara counties in the South Central Coast Air Basin. The South Coast Air Basin also receives air pollutants from oil and gas development operations on the outer continental shelf. The 1997 AQMP does not specifically address the control requirements for these adjacent areas. However, the control measures in this Plan meet both the CAA and CCAA transport requirements and will assist downwind areas in complying with the federal ozone air quality standard.

The Antelope Valley and the Coachella Valley are both classified as "severe-17" ozone nonattainment areas under the CAA. The San Bernardino county portion of the Mojave Desert is under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD) and is also classified as "severe-17." These areas must comply with the federal ozone air quality standard by 2007. The CAA requires separate attainment and post-1996 rate-of-progress demonstrations for each severe air basin under the District's jurisdiction. These were provided separately for the Antelope Valley and the Coachella-San Jacinto Planning Area in the 1994 AQMP Appendices I-A and I-B, respectively. Revisions to the attainment demonstration for these areas are provided in Chapter 8 and Appendix V.

Areas upwind of the South Coast Air Basin (primarily Ventura county, but also including Santa Barbara county and the outer continental shelf) will need to reduce emissions to allow those areas to come into compliance with all air quality standards. If the South Coast Air Basin is to comply, sources in these upwind areas may need to reduce emissions further (i.e., reduce emissions beyond what may be required to achieve the standards in these areas).

FORMAT OF THIS DOCUMENT

This document is organized into eight chapters, each addressing a specific topic. Each of the remaining chapters are summarized below.

Chapter 2, "Air Quality and Health Effects," discusses the Basin's air quality in comparison with the federal and state air pollution standards.

Chapter 3, "Base Year and Future Emissions," summarizes recent updates to the emissions inventories, estimates current emissions by source and pollutant, and projects future emissions with and without controls.

Chapter 4, "AQMP Control Strategy," presents the attainment strategies.

Chapter 5, "Future Air Quality," describes the modeling approach used in the AQMP and summarizes the Basin's future air quality projections with and without controls.

Chapter 6, “Clean Air Act Requirements,” discusses specific federal and state requirements as they pertain to the 1997 AQMP.

Chapter 7, “Implementation,” presents the implementation schedule of the various control measures and delineates each agency’s area of responsibility.

Chapter 8, “Future Air Quality - Desert Nonattainment Areas,” describes the future air quality in the Antelope Valley and the Coachella Valley Planning Area.

Chapter 9, “Contingency Measures,” presents contingency measures as required by the federal CAA, and measures for further consideration or deletion.

Chapter 10, “Looking Beyond Current Requirements”, examines the basis for and the implications of possible new federal standards for ozone and particulate matter; and provides a first look at an ozone air quality analysis for the year 2020. This chapter also presents a discussion on uncertainties associated with the technical analysis used to develop the 1997 AQMP, including air quality modeling.

For convenience, a “Glossary” is provided at the end of the document, presenting definitions of commonly used terms found in the 1997 AQMP.