ENVIRONMENTAL PROTECTION AGENCY

ANALYSIS OF THE AIR POLLUTION CONTROL STRATEGY FOR THE SACRAMENTO VALLEY INTRASTATE AIR QUALITY CONTROL REGION

July 1976

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I. INTRODUCTION

In 1971 the Environmental Protection Agency (EPA) established the National Ambient Air Quality Standards (NAAQS) to safeguard the health and welfare of the people of the United States. Two levels of standards were developed: (1) primary ambient air quality standards are those which allow an adequate margin of safety and are requisite to protect the public health, and (2) secondary standards are those which are requisite to protect the public welfare from adverse effects associated with the presence of air pollutants in the ambient air. The National Ambient Air Quality Standards are listed in Table I.

Section 110(a)(2)(H) of the Clean Air Act, as amended, requires that State Implementation Plans -- SIPs (enforceable State plans which provide for the attainment and maintenance of the national primary and secondary ambient air quality standards) -- provide "for revision, after public hearings, of such plans (i) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of achieving such primary or secondary standards; or (ii) whenever the Administrator finds on the basis of information available to him that the plan is substantially inadequate to achieve the national ambient air quality primary or secondary standard which it implements".

The Regional Administrator has the responsibility to identify any SIP which is substantially inadequate to attain and maintain national standards, priority attention shall be addressed to attainment of primary standards. Any plan revision for attainment of national standards shall also consider maintenance of such standards.

Requests for SIP revisions are to be publicly announced through a letter to the Governor and a notice in the Federal Register. The requests must specify the schedule for submission of revisions by the State. An SIP revision which requires the application of all achievable emission limitations to the extent necessary to meet national primary standards must be submitted by the State to EPA on or before July 1, 1977. The term "achievable" is intended to mean "reasonably available control technology" (RACT).

TABLE I

National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary Standard	Secondary Standard
Carbon Monoxide (CO):	10 mg/m^3 (9 ppm) 8-hour average concentration* and	Same
	40 mg/m^3 (35 ppm) 1-hour average concentration*	Same
Nitrogen Dioxide (NO_2):	100 ug/m^3 (0.05 ppm) annual arithmetic mean	Same
Photochemical Oxidants (O_x), measured as ozone:	160 ug/m^3 (0.08 ppm) 1-hour average concentration*	Same
Hydrocarbons (HC), measured as non-methane organics:	160 ug/m^3 (0.24 ppm) 3-hour (6 to 9 a.m.) average concentration*,**	Same
Sulfur Oxides (SO_x), measured as Sulfur Dioxide (SO_2):	80 ug/m^3 (0.03 ppm) annual arithmetic mean; and	1,300 ug/m^3 (0.5 ppm) 3-hour average concentration*
	365 ug/m^3 (0.14 ppm) 24-hour average concentration*	
Particulate Matter (PART), measured as Total Suspended Particulate (TSP):	75 ug/m^3 annual geometric mean; and	
	260 ug/m^3 24-hour average concentration*	150 ug/m^3 24-hour average concentration*

*Maximum value not to be exceeded more than once per year.

**To be used only as a guide in meeting the O_x standard.

An SIP revision which includes all other measures necessary to meet the national standards must be submitted by the State to EPA on or before July 1, 1978. These "other measures" should include items such as land use measures, transportation controls, transit improvements, zoning ordinances, building codes (such as to increase insulation), inspection/maintenance programs (for stationary and/or mobile sources), etc. These "other measures" are often incorrectly construed to be strictly "maintenance" measures; many are in fact effective for attainment also.

The SIP revisions must specify new primary standards attainment dates which are as expeditious as practicable. Although this term carries a presumption of no more than three years, in exceptional cases more than three years may be necessary. The SIP revisions must specify new secondary standards attainment dates which represent a "reasonable time". This term also carries a presumption of no more than three years, although additional flexibility is permitted in attainment of secondary standards.

The decision to request an SIP revision is based upon a summary of previous air quality analysis documents, an analysis of the present air quality, a projection of future air quality, a summary of the present control strategy, the status of enforcement activity, an analysis of the relative contribution of stationary point and non-point sources (i.e. major and minor sources) to the air pollution problem, and a comparison of the present control strategy with reasonably available control measures, for each air quality region (AQCR).

II. ANALYSIS

A. SUMMARY OF AIR QUALITY ANALYSIS DOCUMENT

Following is a summary of a document reviewed by EPA in assessing the air pollution problem in the Sacramento Valley Air Quality Control Region (AQCR):

Air Quality Implementation Plan Development for Critical California Regions: Sacramento Valley Intrastate AQCR, prepared by TRW, Inc. for EPA, August 1973.

This study was directed towards standard attainment for three pollutants: oxidants, carbon monoxide, and nitrogen oxides.

The study estimated that additional measures would be necessary to reduce 1972 emissions to reach ambient air quality standards by 1977. These measures include: gasoline evaporative controls, various organic solvent substitutions, burning controls, mandatory inspection/maintenance, catalytic converter retrofit, aircraft emission controls, and improved mass transit. An additional emissions rollback through a major reduction of VMT would be necessary to achieve ambient air quality standards according to the study.

B. SUMMARY OF AIR QUALITY DATA

The following ambient air quality data summary analysis for 1974 is an effort to identify the magnitude and extent of the air pollution problem in the Sacramento Valley Intrastate Air Quality Control Region (AQCR). The National Ambient Air Quality Standards (see Section I - Introduction) are the basis against which the air quality is judged.

The majority of the ambient air monitoring in the AQCR in 1974 was done by the California Air Resources Board (ARB) and the local air pollution control districts (APCD's), but EPA also operated air monitors in the region. The local APCD's routinely submit air quality data to the ARB which in turn submits both district and State data to EPA. The data are stored at the National level in the EPA National Aerometric Data Bank (NADB) in North Carolina. The data presented in this summary are for 1974, the most recent full year's data in NADB and also include additional data from ARB reports.

Table II displays the air quality standards violated in the Sacramento Valley AQCR in 1974. For standards with an averaging time of less than one year, the second highest concentration over the standard, the ratio of the second highest concentration to the standard, and the number of days (or percent of values) over the standard are presented for each station violating a standard. For the annual standards, the mean concentration and the ratio of the mean to the standard are presented. Air monitoring stations not violating a standard are not listed in Table II but are included on the map of station locations. The second highest concentration is used since one excursion over the standard per year is allowed. Oxidant values are corrected where appropriate by the ARB recommended oxidant calibration correction factors. The correction factors are 0.85 for the San Diego County APCD stations, and 0.80 for all other stations in California except the Los Angeles County APCD stations, for which no correction factor is necessary.

A map has been prepared for each standard violated in the AQCR illustrating the location of monitoring stations for which data has been reported by NADB and ARB, and indicating the stations where violations occurred during 1974 and the station with the maximum concentration (see Figures I through IV).

TABLE II

List of Monitoring Stations Reporting Violations of National Ambient Air Quality Standards (1974)

CARBON MONOXIDE: 8-hour average; standard = 10 mg/m^3

Site	Second Highest Concentration (mg/m^3)	Ratio to Standard	Days Exceeding Standard
Chico	13.1	1.31	5

OXIDANTS: 1-hour average; standard = 160 ug/m^3

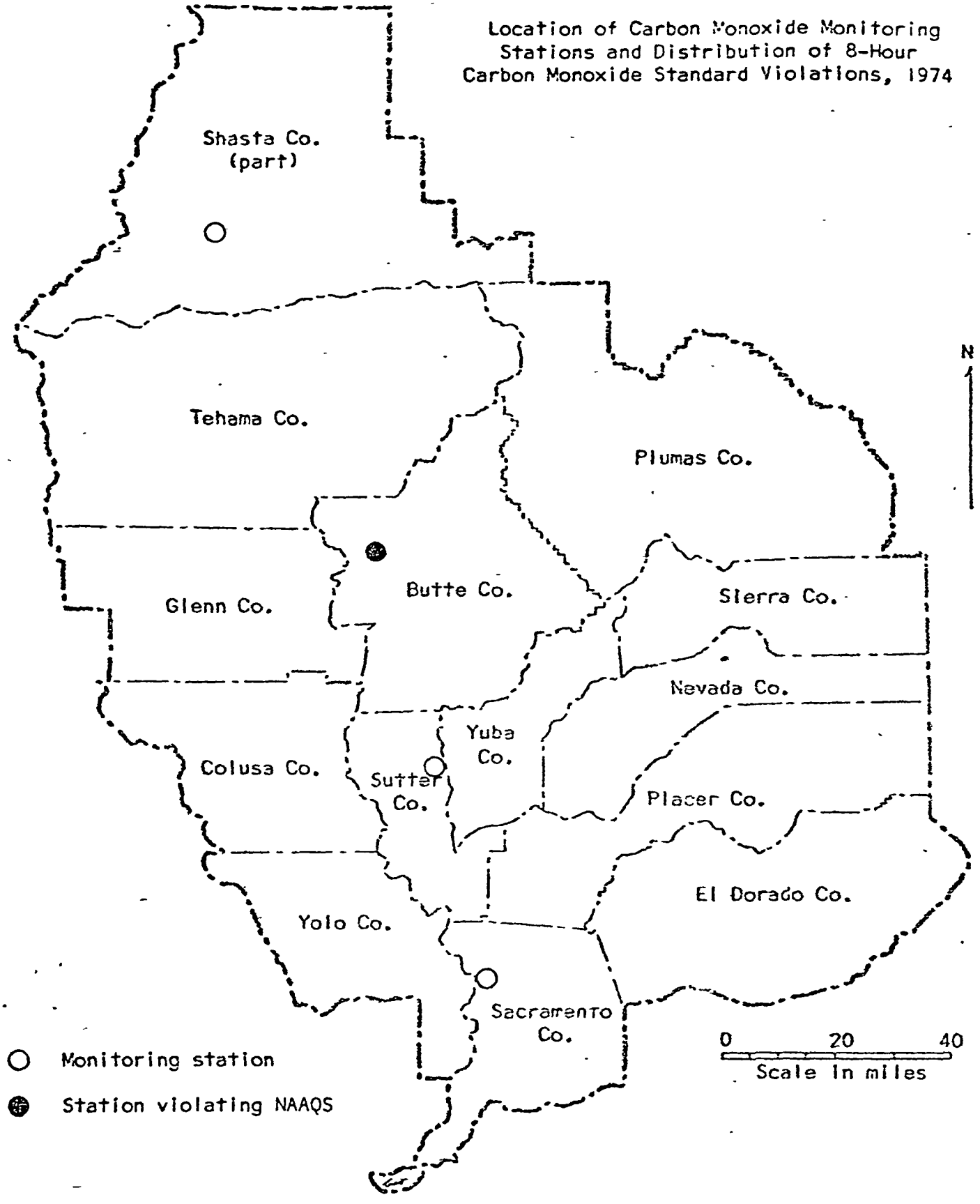
Site	Second Highest Concentration (ug/m^3)	Ratio to Standard	Days Exceeding Standard
Chico	219	1.37	32
Red Bluff	240	1.50	11
Redding	234	1.46	44
Sacramento	188	1.18	--
Sacramento	282	1.76	37
Yuba City	266	1.66	90

PARTICULATE MATTER: 24-hour average; secondary standard = 150 ug/m^3

Site	Second Highest Concentration (ug/m^3)	Ratio to Standard	Percent of Values Exceeding Standard
Chico	196	1.31	3.3
Davis	163	1.09	4.2
Live Oak	238	1.59	22.0
Manzanita	172	1.15	8.3
Nord	193	1.29	6.7
Pleasant Grove	177	1.18	5.9
Sacramento	162	1.08	10.3
Sacramento	183	1.22	3.4
Yuba City	197	1.31	6.7

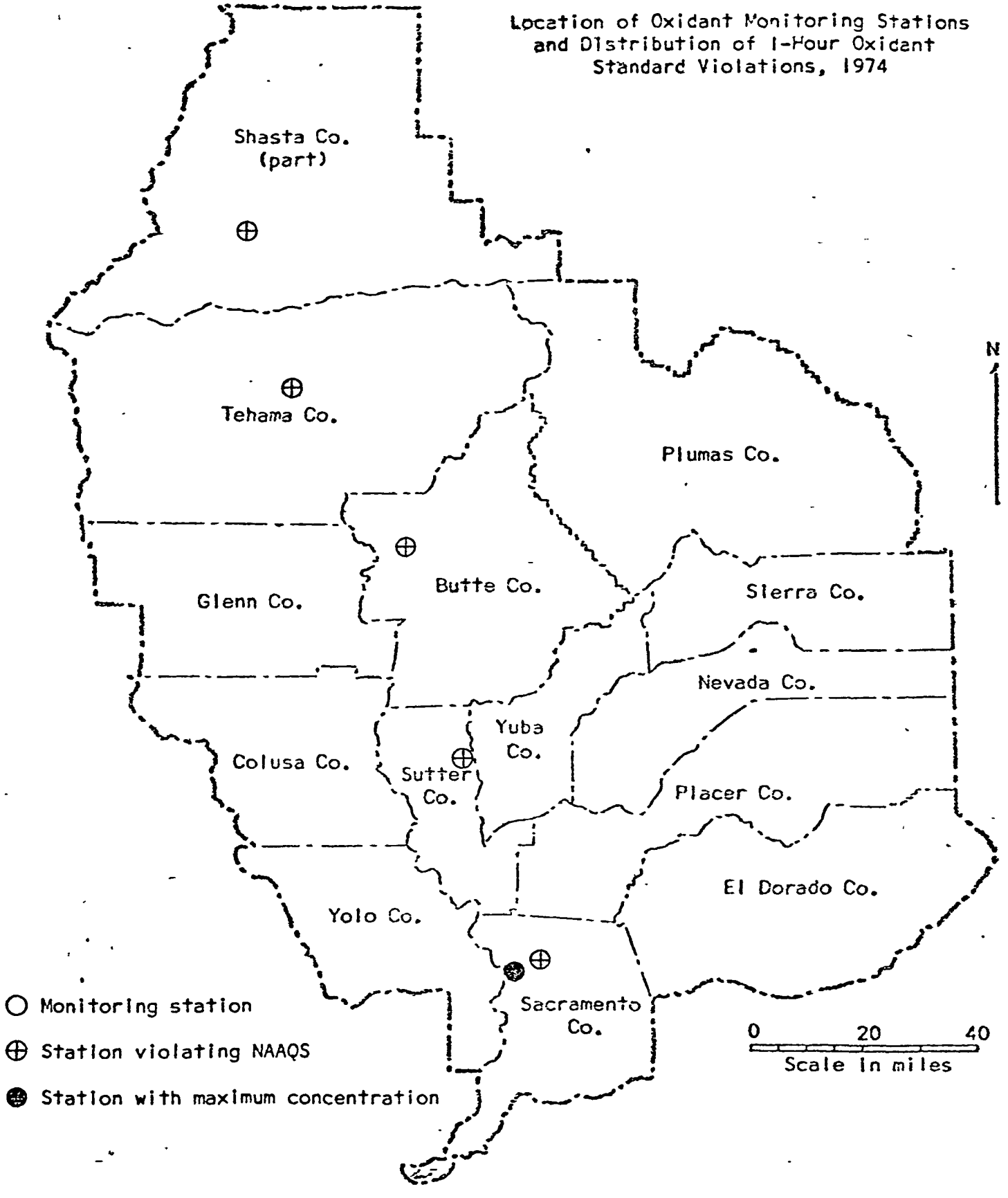
PARTICULATE MATTER: annual mean; standard = 75 ug/m^3

Site	Geometric Mean Concentration (ug/m^3)	Ratio to Standard
Chico	77	1.03
Live Oak	79	1.05
Yuba City	77	1.03
Placerville	83	1.11



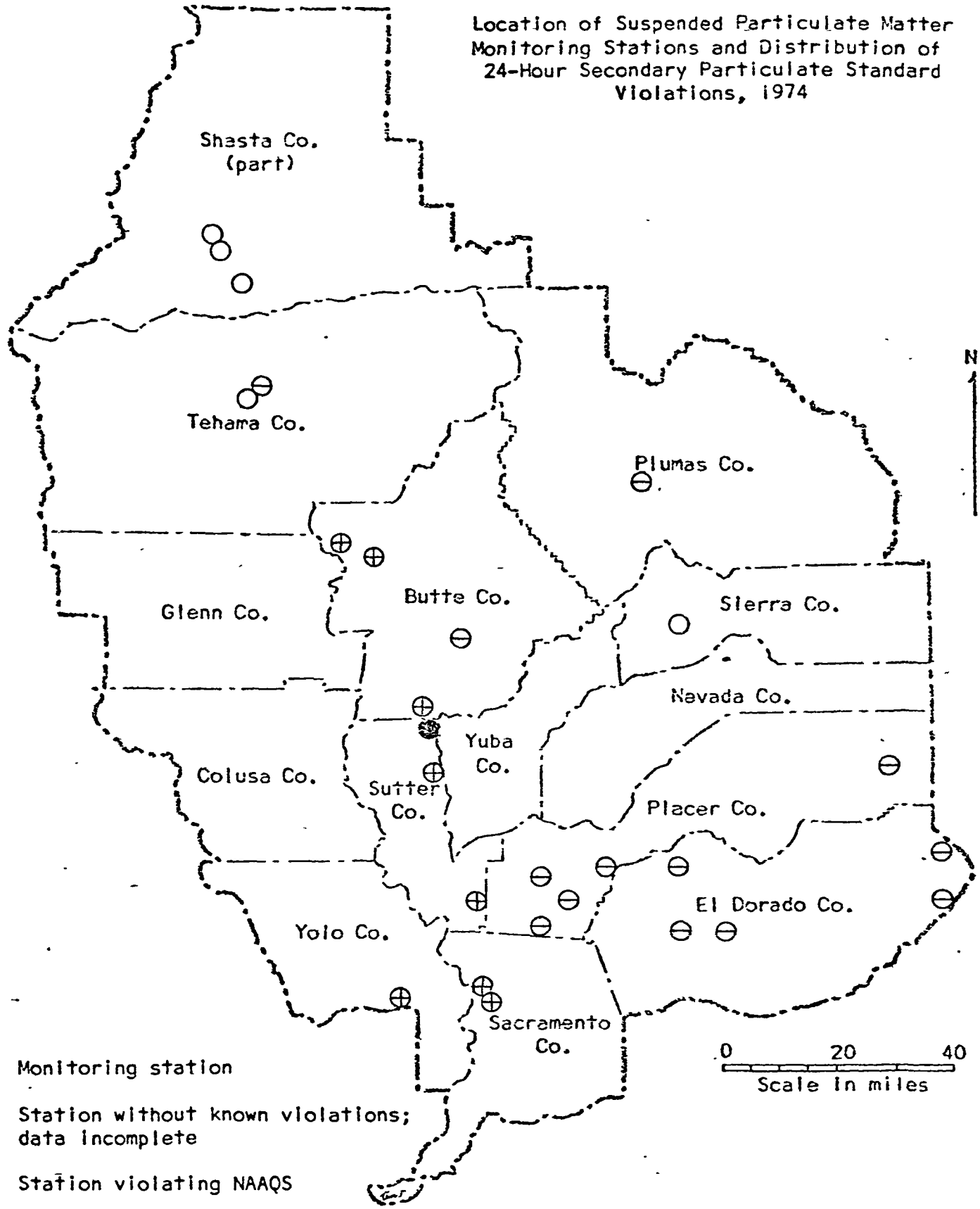
Sacramento Valley Intrastate AQCR

Figure I



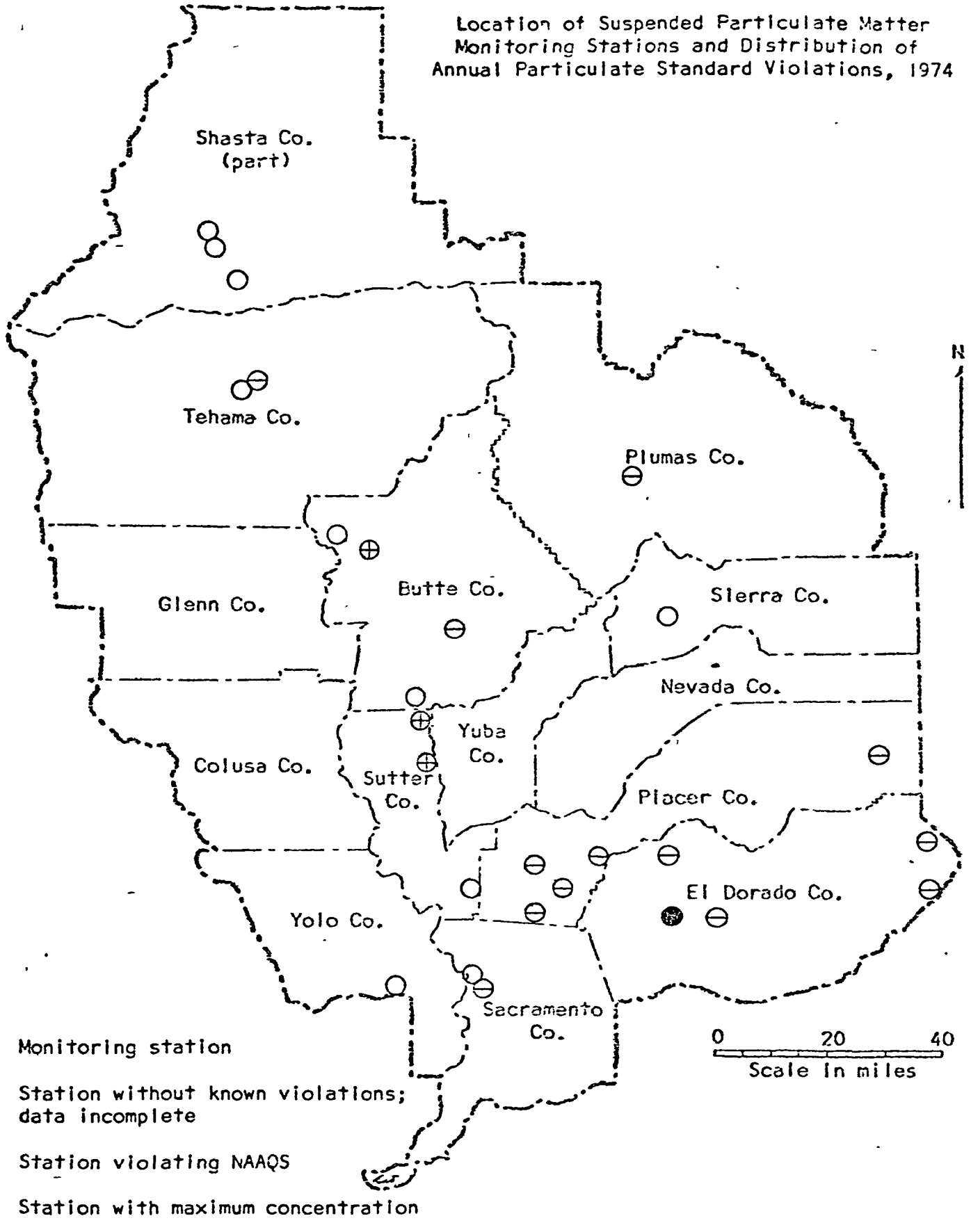
Sacramento Valley Intrastate AQCR

Figure II



Sacramento Valley Intrastate AQCR

Figure III



Sacramento Valley Intrastate AQCR

Figure IV

Following are brief discussions of the monitoring and the air quality for each pollutant:

Carbon Monoxide (CO):

There were four CO monitoring stations in the AQCR in 1974. No violations of the 1-hour CO air quality standard were reported. One station reported violations of the 8-hour standard. The maximum second highest concentration was 1.3 times the standard and the standard was exceeded on five days.

Nitrogen Dioxide (NO_2):

There were five NO_2 monitoring stations in the AQCR in 1974. None of the stations reported violations of the annual standard.

Photochemicals Oxidants or Oxidants (O_x):

Six stations monitored oxidants in the AQCR in 1974. All stations reported violations of the 1-hour oxidant standard. The maximum second highest concentration at any station was 1.8 times the standard, and the maximum number of days the standard was exceeded at any one station was 90.

Sulfur Dioxide (SO_2):

EPA had one SO_2 monitor in the AQCR in 1974. No violations of the 3-hour, 24-hour, or annual standards were reported.

Particulate Matter of Total Suspended Particulate (TSP):

There were 27 high volume samplers located throughout the AQCR in 1974. None of the stations violated the 24-hour primary TSP standard. The 24-hour secondary standard was violated at nine stations. The maximum second highest concentration at any one station was 1.6 times the standard, and the maximum percentage of values exceeding the standard at any one station was 22 percent.

The annual primary standard was violated at four stations. The maximum geometric mean concentration at any one station was 1.1 times the standard.

C. AIR QUALITY PROJECTIONS

The relationship between pollutant emissions and ambient pollutant concentrations must be determined from a known point or base year, for which air pollutant concentrations and the quantity of air pollutant emissions are known. A base year then, is a year for which: (1) the amount of emissions and the air quality concentrations are known, and (2) a specific relationship is determined to exist between emissions and air quality. Future air quality is assumed to have the same relationship to emissions in future years as that determined for the base year.

The base year (i.e., 1973) emission inventory used for this analysis is from a draft emission inventory developed by the California Air Resources Board for the Sacramento Valley Air Basin (see Table III). The Sacramento Valley Air Basin boundaries and emissions do not exactly coincide with those for the Sacramento Valley AQCR. Emission inventory growth factors for this AQCR, and therefore air quality projections, are developed from California ARB emission inventory projections. The California ARB was able to supply emission inventory growth projections for four years - 1980, 1985, 1990, and 1995. For the one pollutant, CO, Butte and Sacramento Counties are analyzed individually instead of on an AQCR wide basis.

AQCR wide emission growth factors were developed by EPA for particulates, SO_x, NO_x, and oxidants. These emission growth factors were based on ARB growth projections for Yolo, Yuba, Sacramento, and Sutter Counties, those being the only data available.

The AQCR emission growth factors for CO were based on expected Sacramento and Butte County CO emission increases since the only CO excursions above the standard occurred in those counties. No growth factors were available for Butte County so neighboring counties with similar CO emission inventory distributions were used to predict Butte County emission growth.

The mobile source CO emission growth factor for Butte County was derived from combined Sutter and Yuba County emission growth projections. Growth in Butte County waste burning CO emissions was predicted from Sutter County. Both of these counties have rice stubble and orchard prunings as the primary source of waste burning CO emissions.

Growth in Butte County CO emissions from the combustion of fuels was predicted by population growth factors for Butte County made by the California Department of Finance.

Miscellaneous area sources contribute the final portion of Butte County CO emissions. Wild fire CO emissions were predicted to stay constant through 1995 based on projections for other counties. Other CO emissions from miscellaneous area sources were predicted to grow at the average rate of Sutter and Yuba Counties.

Sacramento County CO emission inventory growth projections were available and were used to derive growth factors for that county. (see Table V).

CO Projections were done for two locations because the station having the 1973 AQCR high, Sacramento -- 11.6 mg/m^3, does not show violations in 1974 and is not projected to have future violations, but the station having the second high 1973 ambient CO concentration, Butte County -- 11.5 mg/m^3, has the high 1974 CO concentration of 17.8 mg/m^3, and is projected to violate the CO standard in future years. Therefore, the choice of Butte County is appropriate for evaluating future CO ambient problems.

The growth factors reflect the implementation of only the presently adopted emission control measures.

The 1973 base year emission inventory for the six county area of the Sacramento Valley AQCR is shown in Table III, and the emission inventory growth factors are shown in Table IV. CO emissions and emissions growth factors for Butte County are shown in Table VI. A list of the 1973 highest and second highest ambient concentrations for various pollutants, as reported by the EPA-NADB, is shown in Table VII.

A direct proportional relationship is assumed to exist between sulfur oxides (SO_x) emissions and resulting SO_2 ambient concentrations, nitrogen oxides (NO_x) emissions and resulting NO_2 ambient concentrations, particulate emissions and resulting TSP ambient concentrations and total organic gas (TOG) emissions and resulting photochemical oxidant ambient concentrations. For instance, if in some future year, a pollutant emission rate is projected to double from that estimated for the base year, then the air quality in the future

TABLE III

Summary of the 1973 Emission Inventory
for the Sacramento Valley AQCR

Emissions Sources	Emissions (Tons/day) CO	NOx	TOG*	SOx	Part
Stationary	591	36	267	6.5	237
LDV & HDV	985	157	139	6.3	14
Other Mobile	241	51	43	8.9	8
Totals	1817	244	449	21.7	259

*Refers to "Total Organic Gas" emissions, which are a close approximation of non-methane organic gas emissions.

TABLE IV

Emission Inventory Growth Factors
Projected from Base Year 1973
Sacramento Air Basin*

Pollutant	Growth Factors/Year 1975	1980	1985	1990	1995
NOx	0.93	0.73	0.63	0.66	0.60
TOG	0.94	0.80	0.82	0.90	0.99
SOx	1.02	1.16	1.31	1.48	1.53
Part	1.08	1.18	1.31	1.45	1.59

*Growth Factors calculated from Emission Inventory projections for Sutter, Yuba, Yolo, and Sacramento Counties.

TABLE V

Sacramento County Carbon Monoxide
Emissions Inventory, Emission Projections,
and Emission Growth Factors

	Year 1973	1975	1980	1985	1990	1995
Total Emissions (tons/year)	569	508	349	303	326	330
Growth Factor	1.0	0.89	0.61	0.53	0.57	0.58

TABLE VI

Butte County Carbon Monoxide
Emission Inventory, Emission Projectons,
and Emission Growth Factors*

Stationary Emissions (tons/year):	Year					
	1973	1975	1980	1985	1990	1995
Waste Burning[1]	44.4	45.7	49.7	54.6	59.5	63.5
Combustion of Fuels[2]	10.2	10.4	10.9	11.7	12.8	13.7
Miscellaneous Area[3]	5.4	5.4	5.6	5.8	6.1	6.3
Total Stationary Sources	60	61.5	66.2	72.1	78.4	83.5
Total Mobile Sources[4]	104	97.8	77.0	75.0	79.0	87.4
Total Emissions	164	159.3	143.2	147.1	157.4	170.9
Overall Butte County Emission Growth Factors for Carbon Monoxide:	1.0	0.97	0.87	0.90	0.96	1.04

[1]"Waste burning" growth factor for Sutter County used for Butte County projections.

[2]"Combustion of fuels" growth factors derived from population growth factors for Butte County.

[3]"Miscellaneous area sources" growth factors for Sutter and Yuba Counties used for Butte County except that no growth was projected for wild fires.

[4]"Mobile source" growth factors for Sutter and Yuba Counties used to project Butte County emission.

*1975 and later emission inventory growth projections were not available for Butte County, and as a result EPA made growth projections based on analogies to neighboring counties for which projections were available.

TABLE VII

Summary of the 1973
Ambient Concentrations

Pollutant	Concentration	Units	High	2nd High
CO	8-hour average	mg/m^3	11.6	11.5
	1-hour average	mg/m^3	18.0	18.0
NO_2	annual arithmetic mean	ug/m^3	54.0	37.0
O_x	1-hour average	ug/m^3	376.0*	345.0*
SO_2	annual arithmetic mean	ug/m^3	No data	No data
	24-hour average	ug/m^3	9.0	9.0
	3-hour average	ug/m^3	No data	No data
TSP	annual geometric mean	ug/m^3	69.0	62.0
	24-hour average	ug/m^3	319.0	247.0

*These values corrected by California ARB recommended oxidant calibration correction factor of 0.8.

year is projected to deteriorate, or worsen, by a factor of 2 from that measured in the base year. Conversely, if in some future year a pollutant emission rate is projected to be only one half of that estimate for the base year, then the air quality in this future year is projected to improve and the air pollutant concentrations are estimated to be only one half as high as that measured in the base year. For all national air quality standard concentration reporting periods (e.g., 1-hour, 8-hour, and 24-hour average concentrations), the maximum yearly air pollutant concentrations are used for air quality projection purposes.

Using the assumptions and data discussed previously, air quality projections are estimated by using the following technique or equation:

(1973 Base Year Worst Case Air Quality) x (Year X Emission Inventory Growth Factor) = Projected Air Quality in Year X

Background pollutant emissions and concentrations (i.e., those emissions and concentrations not related to man-made activities) are difficult to quantify and are not considered in this technique. If the projected air quality in a future year X is greater than the national air quality standards listed in Section I - Introduction, then an air quality violation is predicted.

Using the technique just discussed, the following air quality projections and analyses are presented for those pollutants for which standards have been violated in the base year, or are projected to be violated in future years:

OXIDANT AIR QUALITY PROJECTIONS

The oxidant standard was violated in 1973 with a maximum 1-hour concentration of 376 ug/m^3, which is 2.4 times the standard. The emission inventory growth factors show a reduction in TOG emissions and therefore oxidant concentrations from 1973 to 1980. Starting in 1980, TOG emissions are expected to increase. The 1-hour oxidant concentration, projected from 1973 to 1980 by the air quality projection technique and the ARB growth factor, is as follows for 1980:

*376 ug/m^3 x .80 = 301 ug/m^3

*This value is corrected by the California ARB recommended oxidant calibration correction factor of 0.8.

The standard is thus projected to be exceeded in 1980 with the occurrence of a maximum 1-hour oxidant concentration which is 1.9 times the standard. A worsening trend is expected to follow.

CO AIR QUALITY PROJECTIONS

The 8-hour carbon monoxide standard (as opposed to the 1-hour standard) is the most seriously violated CO standard. This standard was violated in 1973 in Butte County, with a maximum 8-hour average concentration recorded of 11.5 mg/m^3, and in Sacramento County with a maximum 8-hour average recorded of 11.6 mg/m^3, which are 1.2 times the standard. CO emissions for Butte County and Sacramento County are projected to decline from 1973 to 1980. 1980 air quality estimated by the air quality projection technique and using the EPA derived growth factors is as follows:

Butte County 11.5 mg/m^3 x .87 = 10.0 mg/m^3

Sacramento County 11.6 mg/m^3 x .61 = 7.1 mg/m^3

In Sacramento County, therefore, in 1980 the CO ambient concentration is calculated to be below the standard by the projection technique, and, thereafter, maintenance of ambient air quality standards is expected to occur.

In Butte County the projected 1980 air quality is equal to the primary ambient air quality standard. However, a worsening trend is expected to follow with primary standard violations expected.

TSP AIR QUALITY PROJECTIONS

The annual TSP standard was not violated in 1973, but the primary and secondary 24-hour standards were violated in the 1973 base year. The question of future attainment of the standard is evaluated as follows, using the 1973 annual and 24-hour concentrations, the air quality projection technique and the year 1985:

69 ug/m^3 x 1.31 = 90 ug/m^3 annual geometric mean

319 ug/m^3 x 1.31 = 418 ug/m^3 24-hour average concentration

The national annual primary standard 75 ug/m^3, and the national 24-hour primary standard of 260 ug/m^3 are thus both projected to be exceeded in 1985. Particulate emissions began increasing 1975 primarily as a result of emissions increases in the mineral processing, the food and agricultural processing, and the wood processing industries. The national primary and secondary ambient 24-hour particulate standards were exceeded in 1973 and in 1974, and violations are expected to continue as a result of the projected increase in particulate emissions unless additional emission control measures are implemented.

D. SUMMARY OF PRESENT CONTROL STRATEGIES

Following are general descriptions of the present air pollutant emission control strategies for the six county area (Sutter, Yolo, Yuba, Placer, El Dorado, and Sacramento) studied by EPA.

NO_x Control

NO_x emission control for stationary combustion sources is accomplished primarily by lowering peak combustion flame temperature, by reducing the oxygen and nitrogen concentrations during the combustion processes, and by reducing the gas residence time at high temperatures. These concepts are appplied by the use of such techniques as exhaust gas recirculation, two-stage combustion, and low excess air. The techniques are primarily applied to the large stationary source combustion processes. Reducing NO_x emissions from new and in-use vehicle engines is primarily accomplished by lowering peak combustion flame temperatures through the use of ignition retard, and exhaust gas recirculation techniques.

The Sacramento AQCR counties have adopted regulations limiting NO_x emissions from new or modified fossil fuel burning steam generating equipment to 140 pounds per hour in Sutter, Placer, and El Dorado Counties. In the Yolo-Solano Unified APCD existing and new fossil fuel fired steam generating plants are limited to 140 pounds per hour of NO_x emissions. Sacramento and Yuba Counties have no regulations regarding NO_x.

SO_x Control

SO_x emission control is accomplished for mobile and stationary emission sources primarily by limiting the sulfur content of fuels. In addition, sulfur recovery and sulfuric acid plant emissions can be controlled by requiring the improved efficiency, sizing, and operation of plant equipment; and, in some cases, stack scrubbing can be employed. The Sacramento Valley AQCR counties have adopted SO_x emission control regulations that require a specific SO_x exhaust gas concentration limitation of 0.2 percent by volume, calculated as SO_2. In addition, El Dorado, Placer, and Sutter Counties require new or modified fossil fuel burning steam generating sources to limit SO_x emissions to 200 pounds per hour. Yolo-Solano APCD limits existing and new steam generating plants to 200 pounds per hour of SO_x emissions.

CO Control

Mobile source CO exhaust emission control is accomplished by using the following techniques: lowering CO emissions by converting them to harmless CO_2 gas as a result of improved engine combustion efficiency; oxidizing exhaust CO to CO_2 by the use of a catalyst device in the exhaust system; promoting the use of more volatile fuels (e.g., liquified petroleum gas and compressed natural gas) and thereby improving combustion efficiency; and implementing various transportation control measures such as bus and car pool lanes and transit service improvements, which reduce the amount of CO-producing activities.

There are no Sacramento Valley AQCR county regulations which require the control of CO emissions from stationary sources.

Ox Control

Ambient concentrations of photochemical oxidants (O_X) are reduced by controlling the emissions of the primary oxidant precursor, hydrocarbons (HC) (i.e., non-methane organics). Mobile source HC emissions result from fuel evaporation as well as engine exhaust. Fuel evaporation is controlled by enclosing the vehicle fuel tank and carburetor systems, and venting them through an HC collection system into the engine. Exhaust HC emissions control is accomplished by using the following techniques: venting crankcase HC emissions back into the engine for combustion; lowering engine HC emissions by improved combustion efficiency, thus converting the HC to harmless CO_2 and water; oxidizing exhaust HC to CO_2 and water by the use of a catalyst device in the exhaust system; promoting the use of more volatile fuels (e.g., liquified petroleum gas and compressed natural gas) and thereby improving combustion efficiency.

The control of HC emissions from stationary sources is accomplished through operational or process changes, substitution of non-HC materials for HC materials, and the installation of emission control equipment. The techniques used in control devices include incineration (after-burners to complete the oxidation of organic emissions), adsorption (collection of a gas on a special material or surface), absorption (transfer of a soluble gas to a non-volatile liquid absorbant), and condensation (collecting organic

emissions by lowering the gas stream temperature to the appropriate condensation point). The Sacramento Valley AQCR Counties have adopted regulations which control HC emissions from a range of stationary HC emissions sources.

Sacramento County and the Yolo-Solano Unified APCD have adopted gasoline vapor recovery regulations controlling storage tanks, service station underground tanks, and vehicle refueling. Placer, Sutter, El Dorado, and Yuba Counties require a floating roof or a vapor collection system on storage tanks in excess of 40,000 gallons capacity. Placer and Sutter Counties require submerged filling of 250 gallons capacity gasoline storage tanks.

The Yolo-Solano APCD and the Sutter, Sacramento, and Yuba County APCDs have adopted solvent emissions control regulations.

Particulate Control

Visible emissions -- Presently, Ringelmann Two (40% opacity) is the allowable density for smoke, used for evaluation of smoke plumes in the field. Any plume which obscures an inspector's view by more than 40 percent for longer than three minutes in an hour is in violation.

Open Burning -- All Sacramento AQCR Counties ban dump fires and back yard trash burning at other than single or dual family residences. They also subject agricultural burning to meteorological controls. Farmers are allowed to burn portions of their crop waste during specified seasons on ARB-approved "burn" days. Exempted from ARB's control are barbecues, recreational fires and fires approved for the purpose of disposing of diseased trees and brush, hazardous materials, fire training, range, forest and wildlife management, flood control, and the clearing of undergrowth in irrigation ditches.

Orchard Heaters -- All six Counties require that orchard heaters meet ARB emission limits of 1 gram per minute or that they be ARB-approved for use.

Incineration -- Emissions from incinerators are limited by the amount of reduction a multiple chamber incinerator would achieve, except in Yuba County where no regulation is in effect. Placer and El Dorado Counties additionally limit new or modified incinerators to 0.2 grains per cubic foot at standard conditions.

Fuel Burning -- In all six counties particulate emissions from a combustion operation are limited to 0.3 grains per standard cubic foot regardless of the size of the facility. New or modified sources (existing sources as of 1984) are limited to 0.1 grains per cubic foot at standard conditions in El Dorado and Placer Counties. New or modified fossil fuel fired steam generators in Placer and El Dorado Counties are limited to 10 pounds per hour of particulates derived from the fuel. Yolo-Solano Unified APCD limits existing and new steam generators to 40 pounds per hour of particulates.

General Processes -- Manufacturing processes are limited by two types of regulations in all six of the Sacramento AQCR Counties: process weight tables and a grain loading limitation of 0.3 grains per standard cubic foot. At a process weight rate of 3,000 pounds per hour, allowable emissions range from 5.1 pounds per hour in El Dorado and Sacramento Counties to 6.0 pounds per hour in the Yolo-Solano Unified APCD. At a process weight rate of 60,000 pounds per hour, all six counties limit particulate emissions to 40 pounds per hour.

New or modified asphalt batch plants in Placer County and the Yolo-Solano Unified APCD must limit emissions to 0.04 grains per dry standard cubic foot of existing gas flow.

Yolo-Solano Unified APCD additionally has a new source performance standard for electric arc furnaces and hazardous pollutant regulations for mercury and asbestos.

E. ENFORCEMENT STATUS AND ANALYSIS

Approximately 149 point sources (stationary sources which have potential emissions-emissions which would occur if no controls were applied-of greater than 100 tons/year) have been identified by the Sacramento Valley AQCR Counties for EPA's Compliance Data System (CDS) network in the AQCR. Additional point sources may exist in the AQCR but have not yet been identified. Data submitted by the ARB for the second quarter of 1976 indicate that 91 percent of the identified point sources are in compliance with all applicable portions of the State Implementation Plan. Of the remaining point sources 6 percent are on compliance schedules and 3 percent are either of unknown status or are in violation of an emission regulation and not yet on a compliance schedule.

The available EPA-CDS data would indicate that air quality violations are not due to lack of enforcement.

Table VIII contains a list of point sources in violation of emission regulations and an explanation of their compliance status.

TABLE VIII

List and Compliance Status of Point Sources in Violation of Emission Regulations

Sources	Status
El Dorado County	
Golden W. Lumber Co.	U
Glenn County	
Louisiana Pacific, Elk Creek	S
Sacramento County	
Libby McNeil, Sacramento	S
Southern Pacific Pipelines, Sacramento	S
Standard Oil, Sacramento	S
Yolo County	
Adams, Schwab, and Adams, Woodland	S
Atlantic Richfield, West Sacramento	U
Dixon Dryer, Clarksburg	S
Yuba County	
Beale AFB, Marysville	V
Feather River Lumber Co., Camptonville	S
Shasta County	
John Stone Sandblast, Redding	U
Kimberly-Clark Corp., Anderson	S
Simpson Lee Paper Co.	S

Key

S = Not in compliance -- on a compliance schedule -- meeting the compliance schedule

U = Unknown compliance status

V = Not in compliance -- violation of an emission regulation

F. POINT/NON-POINT (I.E., MAJOR/MINOR) STATIONARY SOURCE ANALYSIS

EPA is concerned about the cumulative contribution that relatively small stationary sources make to total emissions, and therefore, the emphasis that should be placed on controlling such sources. EPA has called such relatively small sources "non-point sources", and has defined such a source as any stationary source that does not have potential emissions of 100 tons/year or more. Table IX contains the 1972 emissions data for point and non-point sources, as well as total emissions, as supplied to EPA by the California ARB.

Non-point particulate sources emit approximately 62 percent of all particulate emissions. Of these non-point emission sources, fugitive emissions, which include emissions from agricultural operations, construction and demolition, and unpaved road travel, contribute 66 tons/day or approximately 30 percent of total emissions; combustion of fuels and wood and mineral processing operations emit 12 tons/day or approximately 6 percent of total emissions; and fires set for forest management and agricultural waste burning emit 31 tons/day or approximately 14 percent of total emissions.

The primary particulate standard is violated at four stations. Continual violation of the primary standard is projected based on the present control strategy (see Sections II.B. and C.).

TABLE IX

Point/Non-Point Emission Data

Emissions (Tons/Day)

Pollutant	Non-Point Sources	Point Sources	Total Stationary Sources	Total Stationary and Mobile Sources
CO	Data not available			
NO_x	Data not available			
TOG	Data not available			
SO_x	Data not available			
Part	139	67	206	223

G. COMPARISON OF PRESENT CONTROL STRATEGY WITH MEASURES CONSIDERED RACT

Table X is a list of emission control measures that are considered by EPA to meet the definition of reasonably available control technology (RACT) (see discussion of RACT in Section I).

A comparison of the present control strategy with the list of RACT measures will be made in this Section for those pollutants for which national standards are violated in the base year, or are projected to be violated in some future year. Consequently no such comparison will be made for NO_x and SO_x emission control, because the NO_2 and SO_x air quality standards have not been violated in the base year and no violations are projected.

The primary oxidant standard, the primary carbon monoxide standard, and the primary and secondary particulate standards were violated in the base year and future violations are projected. Following are comparisons of the present CO, oxidant, and particulate control strategies with the RACT control measures listed for these pollutants.

CO -- RACT measures have been promulgated by EPA (November 12, 1973, California Transportation Control Plan), and by the State for the control of mobile source CO emissions through the application of transportation control measures and an Inspection/Maintenance program. There are no regulations controlling stationary sources of CO.

Ox -- The implementation plan submitted by the State and the EPA-promulgated plan employ the RACT measures listed in this Section for the control of non-methane organic emissions and, therefore, oxidants. There are specific areas where stationary source regulations can be strengthened or expanded. This possibility is being actively investigated by the State and EPA. However, it is determined that RACT measures are either being implemented or have been promulgated. This determination could, of course, be changed in the near future, based on the results of EPA and State studies.

TABLE X

List of Measures Considered Reasonably Available Control Technology

CO Emissions Control

Source Control Measures:

* Inspection/Maintenance for vehicle emissions control

* Petroleum refinery, chemical plant and other industry controls

Transportation Measures:

* Transit improvement

* Employer incentives

* Parking management/restrictions

* Traffic management/restraint

NOx Emissions Control

Combustion Modifications:

* Lower excess air

* Staged combustion

* Burner modification or replacement

* Flue gas recirculation (for gas or oil-fired boilers with recirculation provisions)

Control of NO_x emissions from nitric acid plants:

* Catalytic decomposition

Oxidants Control (Non-Methane organic gas emission control)

Source Control Measures:

* Inspection/Maintenance for vehicle emissions control

* Vapor controls for organic solvents

* Petroleum refinery, chemical plant and other industry controls

* Vapor controls for gasoline marketing

TABLE X (continued)

Transportation Control Measures:

* Transit improvement

* Employer incentives

* Parking management/restrictions

* Traffic management/restraint

SOx Emissions Control

* Combustion of natural low sulfur fuels

* Combustion of fuels with sulfur content lowered by technological removal processes

* Control of SO_x emissions from sulfur recovery and sulfuric acid plants

* Control of SO_x stack emissions from industrial processes by gas cleaning devices

Particulate Emissions Control

Section 2 of Appendix B, 40 CFR Part 51 (see below), lists measures considered by EPA to be RACT for particulates.

APPENDIX B—EXAMPLES OF EMISSION LIMITATIONS ATTAINABLE WITH REASONABLY AVAILABLE TECHNOLOGY

2.0 CONTROL OF PARTICULATE EMISSIONS

2.1 *Visible emissions.* The emission of visible air pollutants can be limited to a shade or density equal to but not darker than that designated as No. 1 on the Ringelmann chart or 20 percent opacity except for brief periods during such operations as soot blowing and startup. This limitation would generally eliminate visible pollutant emissions from stationary sources.

The emission of visible air pollutants from gasoline-powered motor vehicles can be eliminated except for periods not exceeding 5 consecutive seconds. The emission of visible air pollutants from diesel-powered motor vehicles can be limited to a shade or density equal to but not darker than that designated as No. 1 on the Ringelmann chart or 20 percent opacity except for periods not exceeding 5 consecutive seconds.

2.2 *Fugitive dust.* Reasonable precautions can be taken to prevent particulate matter from becoming airborne. Some of these reasonable precautions include the following:

(a) Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;

(b) Application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stockpiles, and other surfaces which can give rise to airborne dusts;

(c) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials. Adequate containment methods can be employed during sandblasting or other similar operations;

(d) Covering, at all times when in motion, open bodied trucks, transporting materials likely to give rise to airborne dusts;

(e) Conduct of agricultural practices such as tilling of land, application of fertilizers, etc., in such manner as to prevent dust from becoming airborne;

(f) The paving of roadways and their maintenance in a clean condition;

(g) The prompt removal of earth or other material from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water, or other means.

2.3 *Incineration.* The emission of particulate matter from any incinerator can be limited to 0.20 pound per 100 pounds (2 gm/kg.) of refuse charged. This emission limitation is based on the source test method for stationary sources of particulate emissions which will be published by the Administrator. This method includes both a dry filter and wet impingers and represents particulate matter of 70° F. and 1.0 atmosphere pressure.

2.4 *Fuel burning equipment.* The emission of particulate matter from fuel burning equipment burning solid fuel can be limited to 0.30 pound per million B.t.u. (0.54 gm/10⁶ gm-cal) of heat input. This emission limitation is based on the source test method for stationary sources of particulate emissions which will be published by the Administrator. This method includes both a dry filter and wet impingers and represents particulate matter of 70° F. and 1.0 atmosphere pressure.

2.5 *Process industries—general.* The emission of particulate matter for any process source can be limited in a manner such as in table I. Process weight per hour means the total weight of all materials introduced into any specific process that may cause any emission of particulate matter. Solid fuels charged are considered as part of the process weight, but liquid and gaseous fuels and combustion air are not. For a cyclical or batch operation, the process weight per hour is derived by dividing the total process weight by the number of hours in one complete operation from the beginning of any given process to the completion thereof, excluding any time during which the equipment is idle. For a continuous operation, the process weight per hour is derived by dividing the process weight for a typical period of time.

TABLE I

Process weight rate (lbs./hr.)	*Emission rate (lbs./hr.)*
50	0.86
100	0.55
500	1.53
1,000	2.25
5,000	6.34
10,000	9.73
20,000	14.99
60,000	29.60
80,000	31.19
120,000	33.28
160,000	34.65
200,000	36.11
400,000	40.35
1,000,000	46.72

Interpolation of the data in table I for the process weight rates up to 60,000 lbs./hr. shall be accomplished by the use of the equation:

$$E = 3.59\,P^{0.62} \quad P \leq 30 \text{ tons/hr.}$$

and interpolation and extrapolation of the data for process weight rates in excess of 60,000 lbs./hr. shall be accomplished by use of the equation:

$$E = 17.31\,P^{0.16} \quad P > 30 \text{ tons/hr.}$$

Where: E = Emissions in pounds per hour.
P = Process weight rate in tons per hour.

Application of mass emission limitations on the basis of all similar units at a plant is recommended in order to avoid unequal application of this type of limitation to plants with the same total emission potential but different size units.

Particulate -- The implementation plan submitted by the State does not contain a source specific fugitive dust regulation for this area. At present, fugitive dust is controlled by the local enforcement of a nuisance regulation. The adoption of source specific fugitive dust regulations may prove beneficial in accomplishing more effective particulate control.

The Ringelmann-opacity regulations in these six counties of the Sacramento AQCR limit emissions to a density of 40 percent opacity or #2 Ringelmann. More stringent opacity regulations should be adopted for the Sacramento Valley AQCR.

Process weight-emission rate tables for these six counties are not exactly equivalent to RACT (Appendix B allowable emission rates) and should be reviewed by the ARB to determine if it is necessary to require a greater degree of control.

III. SUMMARY AND CONCLUSION

For some pollutants, air quality standards violations occurred during the base year and future violations are projected. A summary of the control strategy deficiencies is presented, and a conclusion reached concerning the need to call for an SIP revision. EPA must request an SIP revision from the State in cases where air quality violations are indicated and where RACT measures are not required either as a result of State or EPA regulations.

Oxidants/Non-methane Organics -- The oxidant standard is being violated, and standard attainment is not anticipated. EPA's California Transportation Control Plan requires implementation of RACT and other control measures (e.g., gasoline rationing) for reducing non-methane organic emission sources in order to meet the oxidant standard by 1977. Certain elements of the Transportation Control Plan were challenged by the Air Resources Board and others in Federal court, and this issue is currently being reviewed by the Supreme Court. Implementation of many of the measures required under the EPA Transportation Control Plan for the Sacramento Valley AQCR, and not under court challenge and review, are various EPA enforced stationary source organic vapor control programs. Upon review of the regulations in the Sacramento Valley EPA has noted that some deficiencies still exist. Therefore, EPA will continue to enforce its organic emissions control regulations.

While EPA has determined that a major deficiency in the State submitted oxidant control strategy exists at this time (i.e., Inspection/Maintenance), EPA is not requesting a revision to the State Implementation Plan, because an Inspection/Maintenance program as well as other RACT measures are contained in the EPA Transportation Control Plan that is presently under Supreme Court review.

Since the EPA oxidant control plan is under court review and oxidant standard attainment is not being projected, the Air Quality Maintenance Area (AQMA) planning process should address the problem of standard attainment, as well as maintenance. EPA has designated areas nation-wide which are not expected to attain, or once attained would not maintain, certain of the National Ambient Air Quality Standards during the 1975-1985 time frame. In such instances, EPA is

encouraging local governments with assistance from the State to develop locally acceptable plans for the attainment and maintenance of the NAAQS for the specified pollutants, including but not limited to land use and transportation controls. Such plans are expected to be submitted as formal revisions to the State Implementation Plans. In the Sacramento Valley the planning effort is being guided by an AQMP policy task force which has recommended that the Sacramento Area Regional Planning Commission undertake AQMP development. This effort is being coordinated with a recent designation of SRAPC to perform Areawide Wastewater Management Planning (FWPCA §208) as well.

Carbon Monoxide -- The carbon monoxide standard is being violated, and will continue to be violated until 1980 when a worsening trend will begin.

EPA's California Transportation Control Plan, promulgated on November 12, 1973, requires implementation of vehicle Inspection/Maintenance and various transportation related measures in order to control CO emissions from mobile sources. Certain elements of the Transportation Control Plan were challenged by the Air Resources Board and others in Federal court, and this issue is currently being reviewed by the Supreme Court. A major deficiency exists in the present State submitted CO control strategy because of the lack of a vehicle emission Inspection/Maintenance program. EPA, though, is not requesting a revision to the State Implementation Plan on this basis at this time because an Inspection/Maintenance program as well as other RACT measures are contained in the EPA Transportation Control Plan that is presently under Supreme Court review.

The Sacramento Valley AQCR counties do not have stationary source CO regulations although RACT measures exist to control emissions from some CO sources.

Therefore, EPA is requesting a SIP revision to correct this deficiency. Since this AQCR has been designated an AQMA for carbon monoxide, a plan will be developed through this process for maintaining the standards through 1985.

Particulate Matter -- The primary and secondary particulate standards have been violated in this AQCR. Estimate of future emissions and air quality indicate that the primary standards will be violated continually through 1995. The Sacramento Valley AQCR presently controls fugitive dust emissions through the provisions of a nuisance regulation. Adoption of a source specific, and, therefore, more effective fugitive dust regulation appears needed; and the adoption of more stringent particulate controls for industrial process equipment will be needed in the future.

Since the standard violations appear to be significantly affected by fugitive dust emissions which are not controlled by RACT, EPA is requesting a SIP revision to correct this deficiency through the adoption of source specific fugitive dust regulations that could better control emissions from such non-agricultural activities as earth moving, demolition, and construction.

The six counties in the Sacramento AQCR limit visible emissions to 40 percent while RACT would require a limitation of 20 percent. Therefore, EPA is requesting a SIP revision to correct this deficiency and facilitate attainment of the ambient air quality standards. Maintenance of particulate air quality will be addressed by the AQMA process.