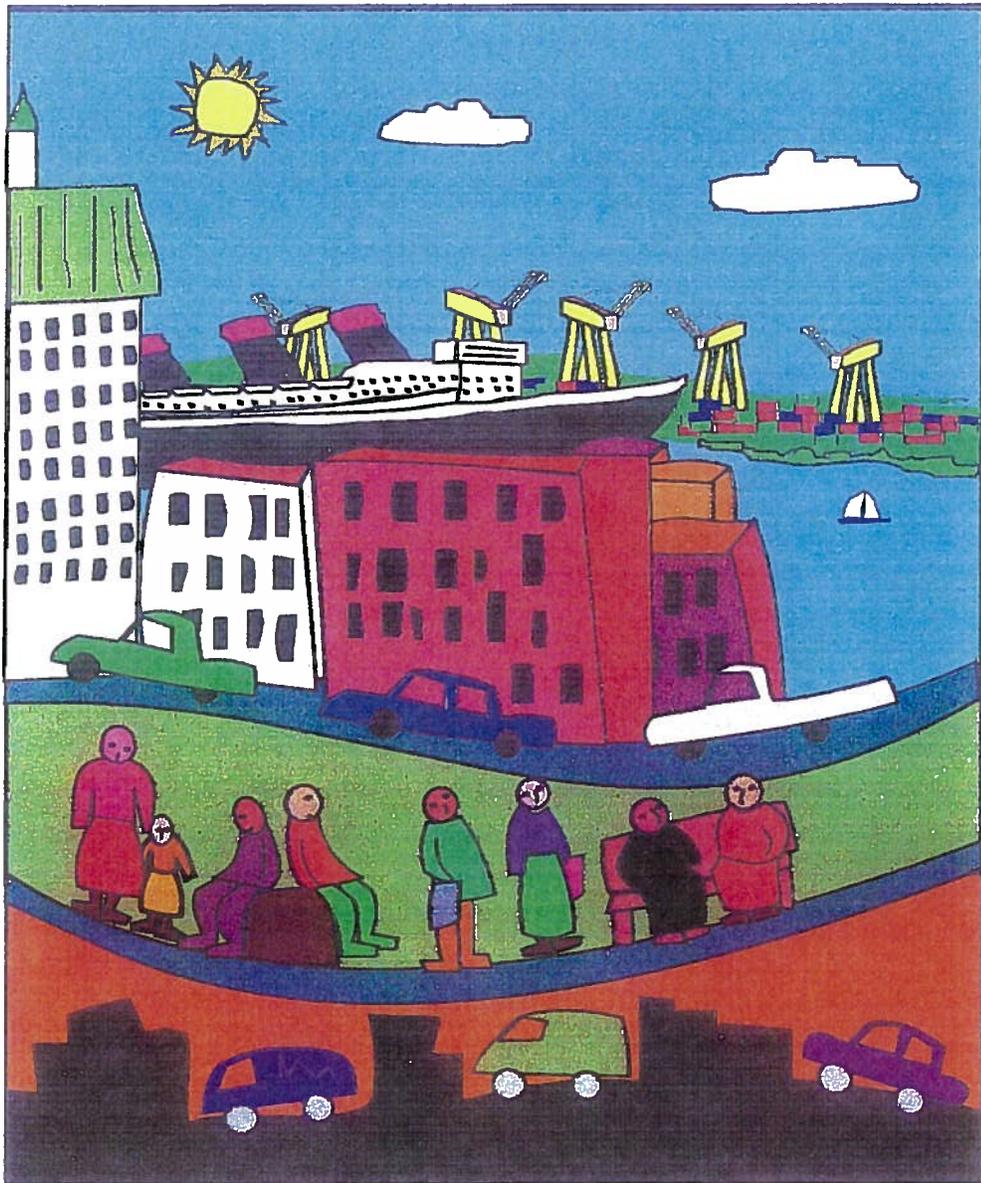


*City of Long Beach*  
*Air Quality Element*



*December, 1996*

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CITY OF LONG BEACH

# AIR QUALITY ELEMENT

An optional Element of the City's General Plan

Adopted on December 3, 1996  
Resolution Number 26119

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## EXECUTIVE SUMMARY

### LONG BEACH: A LEADER IN CLEAN AIR

Long Beach was the first California city to be designated a "Clean City" by the United States Department of Energy. With its own Gas Department and significant investment in providing and using Compressed Natural Gas (CNG) fuel, the City of Long Beach has been recognized as a leader in the fight to improve air quality in Southern California.

The City's efforts have not been confined to using cleaner fuels. Long Beach has also invested in a telebusiness center, where office space is available to businesses having employees living in the Greater Long Beach area who would benefit from a shorter commute to work. The City makes its CNG-powered rideshare vans available to employees of Downtown businesses. The City of Long Beach has an adopted Trip Reduction Ordinance and has promoted Transportation Demand Measures, such as the Downtown Parking Management Plan and the efforts of the Long Beach Airport Area Transportation Management Association (LBA2TRA).

Continuous efforts have been made by local elected officials since the early 1990s to address the issue of particulate pollution in the downtown area and Westside. A key victory occurred in 1994, when the Port of Los Angeles and the South Coast Air Quality Management District (SCAQMD or AQMD) agreed to implement a number of air quality control measures and to conduct perimeter monitoring for a proposed petroleum coke storage facility near the City of Long Beach within the Port of Los Angeles.

It is within this context of a history of clean air efforts that the City of Long Beach has prepared an *Air Quality Element*, an optional element of the City's *General Plan*.

### AIR QUALITY TRENDS

Although the air quality in the Los Angeles area has improved substantially over the past several decades, it remains the worst in the nation. The federal standards are exceeded more frequently in the South Coast Air Basin than in any other area of the United States. The combination of emissions from the second largest urban area in the United States with poor atmospheric ventilation results in the high levels of air pollution in our region.

Much of the improvements which have been made in air quality over the past decade and a half have occurred through technological advances, Transportation Control Measures (TCMs), and increased coordination of transportation, land use, and air quality planning. The Environmental Protection Agency and Federal Department of

Transportation reported that air quality, as measured in terms of carbon monoxide (CO), hydrocarbons, and oxides of nitrogen (NO<sub>x</sub>) emissions, substantially improved between 1982 and 1991. These reductions in emissions are almost entirely from automobiles, or mobile sources. The emissions improvements are attributable to improvements in technology, and occurred despite continued increases in vehicle travel. Stationary source emissions have increased for certain emissions during the same time period.

While the region relies on Federal, state and regional agencies to regulate industrial emissions and enforce stringent emission standards for vehicles, the local government can contribute through wise land use decisions and congestion management/trip reduction provisions for new development. Emissions from coastal areas contribute to air quality degradation of inland areas, as a result of off shore breezes. Future reductions in emissions from Long Beach, therefore, will provide health and economic benefits for the region as well as for the City.

### ENVIRONMENTAL SETTING

The South Coast Air Basin encompasses all of Orange County, most of Los Angeles and Riverside Counties, and the western portion of San Bernardino County. The South Coast Air Basin is subject to some of the worst air pollution in the county, attributable mainly to its topography, climate, meteorological conditions, a large population base, and highly dispersed urban land use patterns.

The climate of the South Coast Air Basin is generally characterized by mild, sunny winters with occasional rain, plus warm, dry summers. The basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant, with high mountains forming the remainder of the perimeter.

The Basin experiences inversion layers that strongly affect regional air quality. An inversion is a reversal of the usual temperature distribution in the atmosphere, where temperature normally decreases with height. Because of relatively cool surface air temperatures (the effect of an upswelling of cool ocean air at the coast) and warm, dry subsiding air aloft, inversions occur in about ninety percent of the days in the early morning hours.

Pollution is introduced into the inversion layer by the return flow from the mountains, and by emissions into the layer from tall stacks. As the day progresses, the surface layer is heated until it reaches the potential temperature of the inversion layer. The inversions cause air pollutants emitted into the surface air layer to increase in concentration resulting in photo-chemical smog episodes. The inversion eventually breaks, allowing greater vertical dispersion of pollutants.

Secondary pollutants are created by reactions taking place within the atmosphere rather than being emitted directly into the air. Periods of intense sunlight activate

photochemical mechanisms that produce secondary pollutants. One such secondary pollutant is ozone, which is formed via photochemical reactions driven by the sun and fed primarily by two precursor emissions, reactive organic gases (ROG) and oxides of nitrogen ( $\text{NO}_x$ ). Sunshine combined with a persistent shallow marine layer and light winds provide an ideal environment for the production of photochemical smog.

### CRITERIA POLLUTANTS

There are six "criteria pollutants" that are regulated by federal standards. Of these six, ozone, carbon monoxide and  $\text{PM}_{10}$  (particulates) were recorded at levels which exceeded federal standards. The federal standards for nitrogen dioxide, sulfur dioxide and lead concentrations were not exceeded in 1993. The state nitrogen dioxide standard, which is more stringent than the federal, was exceeded on one occasion in 1993.

Ozone ( $\text{O}_3$ ) is a pungent, colorless toxic gas which is produced through photochemical processes and is the main ingredient of smog. In the upper atmosphere a natural ozone layer screens us from harmful ultraviolet radiation, while ozone near the surface of the earth can impair our health. Photochemical smog is caused by complex atmospheric reactions involving oxides of nitrogen and reactive organic gases with ultraviolet energy from sunlight. Motor vehicles are the major source of oxides of nitrogen and reactive organic gases in the basin. The common manifestations of photochemical oxidants are damage to vegetation and cracking of untreated rubber. In high concentrations, they can also directly affect the lungs, causing respiratory irritation and possible changes in lung function.

Carbon Monoxide ( $\text{CO}$ ) is a colorless, odorless, toxic gas produced through the incomplete combustion of fossil fuels. Automobiles are the primary source, although various industrial processes also produce  $\text{CO}$  emissions.  $\text{CO}$  passes through the lungs directly to the blood stream and deprives sensitive tissues of oxygen.

Nitrogen Dioxide ( $\text{NO}_2$ ) is a reddish-brown gas and nitric oxide ( $\text{NO}$ ) is a colorless, odorless gas. Both Nitrogen Oxides ( $\text{NO}_x$ ) are formed from fuel combustion under high temperature and pressure.  $\text{NO}_x$  is an important air pollutant in the region because it is a primary receptor of ultraviolet light, which initiates the reactions producing photochemical smog.

$\text{PM}_{10}$ , particulate matter, is the overall category name for dirt, dust or soot in the air. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the air sacs deep in the lungs. Suspended particulate matter in the air has been associated with exacerbation of symptoms in people with respiratory illnesses, and a decline in lung function in sensitive populations including children.

Sulfur Dioxide ( $\text{SO}_2$ ) is a strong smelling, colorless gas that is formed by the combustion of fossil fuels. Power plants, which may use coal or oil high in sulfur content, can be

major sources of SO<sub>2</sub>. The SO<sub>2</sub> and other sulfur oxides contribute to the problem of acid deposition, and can also cause broncho-constriction with symptoms such as shortness of breath and chest tightness during exercise.

Lead (Pb), a heavy metal, can impair blood formation and nerve conduction. Lead in the air can be traced to gasoline additives, metal smelters, and other industrial sites such as battery plants. Lead concentrations have not exceeded state or federal standards at any regular monitoring station since 1982.

### LONG BEACH

The South Coast Air Quality Management District (SCAQMD) monitors ambient air quality in the South Coast Air Basin. The Long Beach air monitoring station monitors all of the six criteria pollutants: carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, suspended particulates and lead. The maximum levels of primary automotive exhaust pollutants such as carbon monoxide and nitrogen oxides minimally exceed allowable levels a few times each year in Long Beach. Ozone, a secondary pollutant, recorded the highest levels in the more inland areas with Long Beach monitoring lower levels and exceeding much fewer days. The maximum concentration of respirable particulates in Long Beach exceeded state standards but was below federal standards. Generally, Long Beach recorded relatively low levels of all pollutants due to its coastal proximity.

The SCAQMD monitoring station for Long Beach is located in North Long Beach. An increased number of monitoring stations in the future may yield more specific information regarding local air quality conditions, particularly in those areas of Long Beach impacted by port-related operations.

### AIR QUALITY ELEMENT

This *Air Quality Element* is an Element of the City's *General Plan*. It is one of several Elements or "chapters" which must be reviewed when new policies or regulations are being formulated, and when development applications that require discretionary approvals are being reviewed. The *Air Quality Element* identifies a series of policies, programs, and strategies that encourage fewer vehicle trips, increased opportunities for alternative transportation modes and fuels, and land use patterns that can be efficiently served by a diversified transportation system.

The purpose of the *Air Quality Element* is to promote healthful air for all residents of Long Beach. The *Air Quality Element* bridges the *Land Use* and *Transportation Elements* of the *General Plan*, to better recognize the relationship between land use patterns, transportation planning, and air quality. The *Air Quality Element* acknowledges the functions which are already performed by federal, state, and regional agencies, and strives to maximize the use of tools available to local governments to promote clean air.

The Long Beach *Air Quality Element* will serve several objectives, including:

- Establish policy that will guide future land use and transportation decisions in the city;
- Implement regional air quality plans;
- Heighten awareness of air quality efforts and impacts in the community.
- Promote greater collaboration among all levels of government to solve air quality problems, particularly with regard to interstate and international commerce.

The Air Quality policies include, but are not limited to:

- Eliminate vehicle trips;
- Reduce vehicle miles traveled;
- Promote the increased use of compressed natural gas (CNG), electric vehicles, and other alternative fuels;
- Regulate land use and promote development in a manner that will support established transit services and reduce the need for the automobile in daily trip-making;
- Minimize particulate emissions from the construction and operation of roads and buildings;
- Promote increased monitoring of local air quality conditions;
- Reduce emissions through reduced energy consumption;
- Educate City residents concerning air quality, energy, and congestion issues, and the need to modify present travel behavior and energy consumption patterns.

## FUTURE

The future air quality of the region will affect our economy, our ability to attract new residents and employers, the health of our elderly and young populations, and perhaps our own longevity. The adage of the early 1980s "Think Globally, Act Locally," could be modified for our regional air quality: "Plan for Air Quality with Local Actions." It will be through the combination of behavior modification and the aggressive pursuit of new technologies that we are able to continue to improve air quality in the region, while at the same time sustaining or increasing future economic growth.

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# AIR QUALITY ELEMENT

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# INTRODUCTION



## INTRODUCTION

Air quality in Southern California is improving.

Between 1976 and 1993, the number of days the federal air quality standard was exceeded in the South Coast Air Basin decreased by forty-seven percent. Ozone levels have been reduced in half over the past thirty years, sulfur dioxide and lead standards have been met, and other criteria pollutant concentrations have significantly declined.

Air quality in Long Beach continues to be relatively healthy, primarily as a result of the on-shore breezes which continually push our pollutants inland.

Why did the City prepare an *Air Quality Element*? Don't the Environmental Protection Agency, California Air Resources Board, and South Coast Air Quality Management District already regulate emissions? What can local governments do?

Although the air quality in the Los Angeles area has improved substantially over the past several decades, our air quality remains the worst in the nation. The federal standards are exceeded more frequently in the South Coast Air Basin than in any other area of the United States. While the region relies on federal, state and regional agencies to regulate industrial emissions and enforce more stringent emission standards for vehicles, the local governments can contribute through wise land use decisions and congestion management/trip reduction provisions for new development.

The Long Beach *Air Quality Element* will serve several objectives:

- Establish policy that will guide future land use and transportation decisions in the city.
- Heighten awareness of air quality impacts and community efforts;
- Continue to encourage and support clean air efforts by local citizens, associations, and businesses;
- Promote efforts to increase monitoring of local air quality conditions and seek collaborative solutions through inter-agency co-ordination;
- Strengthen local grant applications for air quality-related funding;
- Provide leadership on a regional level to reduce pollutants which typically collect at the base of the mountains resulting in adverse inland air quality and unsightly "smog";

- Co-ordinate and integrate voluntary and mandated actions by City agencies; and
- Implement regional air quality plans.

#### *Purpose*

The purpose of the *Air Quality Element* is to promote healthful air for all residents of Long Beach. The *Air Quality Element* bridges the *Land Use* and *Transportation Elements* of the *General Plan* to better recognize the relationship between land use patterns, transportation planning, and air quality. The *Air Quality Element* acknowledges the functions which are already performed by federal, state, and regional agencies, and strives to maximize the use of tools available to local governments to promote clean air.

The *Air Quality Element* identifies a series of policies, programs, and strategies that encourage fewer vehicle trips, increased opportunities for alternative transportation modes and fuels, and land use patterns that can be efficiently served by a diversified transportation system. It is the intent of the City of Long Beach to participate fully in national, regional and sub-regional efforts for clean air.

#### *Principles*

The following principles are included to provide overall direction to the goals, policies, and programs of this Element.

1. Achieve air quality improvements in such a manner that sustains current economic development while encouraging future growth.
2. Improve the quality of life for our citizens by providing greater opportunities, convenience, and choices.
3. Reinforce local mobility goals by reducing peak-hour traffic congestion.
4. Foster behavior change through public information and education, incentives and pricing that reflects total societal costs for administration and enforcement.

The *Air Quality Element* is an optional Element of the *General Plan* as authorized by Section 65303 of the *Government Code*. Much of this *Element* consists of an inventory of existing air quality conditions, and current rules and regulatory agencies working toward improved air quality. This information is a "snapshot" in time of the air quality and the regulatory environment. Technologies intended to improve air quality are constantly evolving as a result of new information, revisions to laws, and changes in political leadership. While it is the intent of the Department of Planning and Building to regularly update the *Air Quality Element*, changes in the inventory conditions do not in and of themselves warrant immediate corrections to this *Element*.

The core of the *Air Quality Plan* is found in the Goals, Policies, and Actions section. The goals and policies reflect other adopted regional and City policies, as well as current and future efforts specific to Long Beach. These policies are designed to identify a broad range of actions that could contribute to cleaner air. Not all of the identified actions, however, may be undertaken.

The *Air Quality Element* is adopted on the local level by the City Council of Long Beach. The goals and policies are implemented through the review of discretionary projects, and through other city-wide programs, including the Capital Improvement Program, Trip Reduction Program, and other efforts.



# EXISTING AIR QUALITY



## EXISTING AIR QUALITY

### A. THE ENVIRONMENTAL SETTING

The quality of the air in the Los Angeles Basin is determined by a complex interaction of natural dispersion phenomena and atmospheric pollutants that derive mainly from human activities. These activities, combined with meteorological factors, produce unique local and regional air quality conditions.

Significant improvements have been made in air quality in the South Coast Air Basin. The number of days in which the federal standard was exceeded decreased by forty-seven percent between 1976 and 1993. Of the standards which were exceeded in 1993, the ozone standard was violated most frequently, followed by carbon monoxide and particulates.

Air quality levels continue to show improvement. In 1995, for example, ozone levels peaked at 0.26 parts per million, the lowest level since the district was established. The federal air quality standard for ozone was exceeded at one or more locations in the Basin on ninety-eight days. While this is the lowest number of days since record keeping began, it is still more frequent than any other area of the nation. Federal 24-hour standards for PM10 were exceeded on seven percent of the days sampled, while carbon monoxide exceeded federal standards on only four percent of the days.

The federal air quality standards are exceeded more frequently in the Basin than in any other area of the United States. Most federal standard exceedances in the Basin are caused by ozone. The Basin's most affected monitoring location (Glendora) exceeded the federal ozone standard on 118 days in 1992, compared to nine days of exceedances at the next highest area outside California (Houston, Texas). Southern California has the lowest summertime mean maximum mixing height (a measure of how effectively air pollutants will be dispersed vertically) in the United States.

The region receives abundant sunshine which can drive photochemical reactions that produce air pollutants such as ozone. Of the ten largest urban areas in the nation, the South Coast Air Basin has the lowest average wind speed. The combination of poor atmospheric ventilation and emissions from the second largest urban area in the U.S. give the South Coast Air Basin the worst air pollution problem in the nation. The Basin has the highest recorded concentrations of ozone, carbon monoxide, nitrogen dioxide, and PM10 in the country.

Much of the improvement that has been made in air quality over the past decade and a half, has occurred through technological advances, Transportation Control Measures



### *General Climate*

The City of Long Beach is located within the South Coast Air Basin, a 12,000 square mile basin encompassing all of Orange County, most of Los Angeles and Riverside Counties, and the western portion of San Bernardino County. (See Figure 1) The South Coast Air Basin is subject to some of the worst air pollution in the country, attributable mainly to its topography, climate, meteorological conditions, a large population base, and highly dispersed urban land use patterns.

The climate of the South Coast Air Basin is generally characterized by mild, sunny winters with occasional rain, plus warm, dry summers. The Basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant, with mountains forming the remainder of the perimeter.

The Pacific Ocean is the primary moderating influence on the weather patterns, but the coastal mountain ranges lying along the north and east sides of the Los Angeles Basin act as a buffer to the extreme summer heat and winter cold occurring in the interior desert and plateau areas. The region lies in the semi-permanent high pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. This usually mild climatological pattern is occasionally interrupted by periods of extremely hot weather, winter storms, and "Santa Ana winds." The annual average temperatures vary little throughout the Basin, averaging seventy-five degrees Fahrenheit, and generally increasing further inland. Although the Basin has a semi-arid climate, the air near the surface is moist because of the presence of the shallow marine layer. Annual average relative humidity is seventy percent at the coast.

The Los Angeles metropolitan area can experience pronounced differences in temperature, cloudiness, fog, rain, and sunshine over fairly short distances. Long Beach is located along the coast in southeast Los Angeles County. Its coolest months are November through March with a mean monthly minimum temperature of 46.4 degrees Fahrenheit. The warmest months are July through September, with a mean monthly maximum temperature of 83.1 degrees Fahrenheit. Mean annual precipitation for the 30 year period 1958-1987 was 10.94 inches. Ninety-nine percent of the annual precipitation occurs between September through May. Northeasterly winds and sea/land breezes are prevalent in the County, with dry Santa Ana winds intermittent from mid-October to March.

### Inversions

The Los Angeles Basin is subject to inversion layers which strongly affect regional air quality. An inversion is a reversal of the usual temperature distribution in the

atmosphere, where temperature normally decreases with height. Because of relatively cool surface air temperatures (the effect of an upwelling of cool ocean water at the coast) and warm, dry subsiding air aloft, inversions occur in about ninety percent of the days in the early morning hours.

Pollution is introduced into the inversion layer by the return flow from the mountains, and by emissions into the layer from tall stacks. As the day progresses, the surface layer is heated until it reaches the potential temperature of the inversion layer. The inversions cause air pollutants emitted into the surface air layer to increase in concentration resulting in photo-chemical smog episodes. The inversion eventually breaks, allowing greater vertical dispersion of pollutants.

Morning fog and low stratus clouds are common as a result of persistent low inversion and cool coastal ocean water. Nevertheless, seventy-three percent of the potentially available ultraviolet radiation reaches downtown Los Angeles. This is an important factor considering the necessary role of ultraviolet radiation in the process of producing photochemical smog, ninety percent of which is primarily ozone.

### Sunlight

Secondary pollutants are created by reactions taking place within the atmosphere rather than being emitted directly into the air. Periods of intense sunlight activate photochemical mechanisms that produce secondary pollutants. One such secondary pollutant is ozone, which is formed via photochemical reactions driven by the sun and fed primarily by two precursor emissions, reactive organic gases (ROG) and oxides of nitrogen (NO<sub>x</sub>).

Sunshine combined with a persistent shallow marine layer and light winds provide an ideal environment for the production of photochemical smog. Reactions between air molecules produce ozone when pollutants absorb ultraviolet radiation, and cause secondary reactions in the lower atmosphere. These reactions also can produce a brown cast to the sky, attributed to the absorption of light by nitrogen dioxide molecules. Oxidant levels for Long Beach and other coastal areas are relatively low, but emissions from these areas contribute to air quality degradation of inland areas.

### *Meteorology*

#### Temperature

Temperature is a critical meteorological parameter since the local sea and land breezes in the Basin are the product of temperature differentials between the constant ocean air temperature, and the uneven heating and cooling that takes place over the land. These sea and land breezes are the primary means of pollutant transport throughout the Basin.

Temperature also controls the extent of vertical mixing. This mixing, or upward dispersion, reduces the concentration of pollutants in the air layer next to the earth's surface. As the land is heated by the sun, updrafts are created that disperse the polluted air and dilute ambient surface air concentration levels. Temperature is therefore interrelated with many other factors in affecting the air quality of Southern California.

### Wind

Wind patterns limit the horizontal dispersion and transport of pollutants throughout the Basin. When wind speeds are low, as they are much of the time, pollutant levels can become very high. This is particularly so when air stagnation is combined with strong, persistent temperature inversions.

Light surface winds average less than six miles per hour in downtown Los Angeles. In the Long Beach area, predominant daily winds consist of morning on shore air flow from the southwest at a mean speed of 7.3 miles per hour, and afternoon and evening

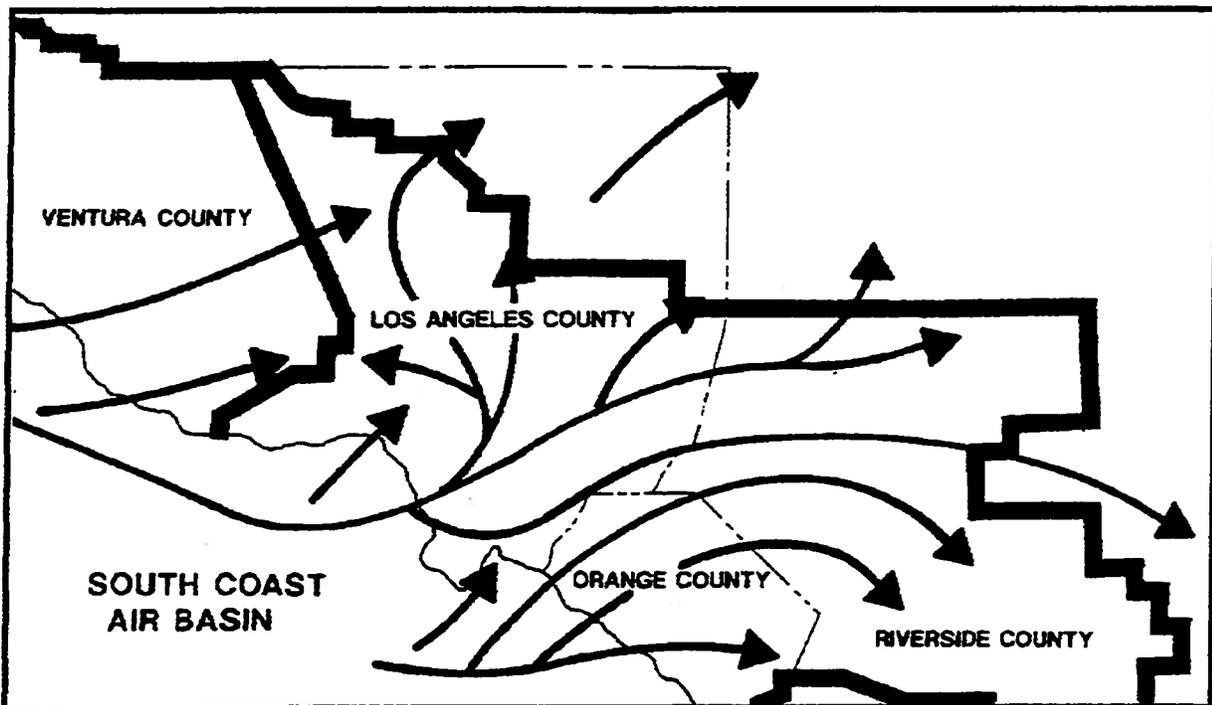


FIG. 2. PREDOMINANT WIND PATTERN

off-shore air flow from the northwest at 0.2 to 4.7 miles per hour with little variability between seasons. Summer wind speeds average slightly higher than winter wind speeds. The prevailing winds carry air contaminants northward and then eastward over Whittier, Covina, Pomona and Riverside during daylight hours.

The daytime sea breezes and nighttime land breezes or drainage flows dominate the wind patterns during the dry summer months, and can result in some pollution produced in the western area of the basin being pushed up against the San Gabriel and San Bernardino Mountains. Some of this pollution is trapped, and some is transported out through the mountain passes or lifted by the vertical currents produced by heating on the mountain slopes.

During the winter rainy season, the sea-land regime is broken by wind flows associated with storms moving through the area from the northwest, and by Santa Ana wind conditions. Santa Ana conditions occur when a large high pressure system builds over the Great Basin, and the system pushes air southward over the San Gabriel and San Bernardino Mountains, into the Los Angeles Basin, and then out to sea. The air is warmed by compression as it descends the mountainsides into the basin. Sustained wind speeds of 10-60 miles per hour, with higher gusts, are not uncommon, resulting in increased pollution dispersion and transport out to sea.

Wind data taken throughout Southern California can be used to characterize horizontal airflow. Figure 2 shows the predominant wind flow patterns for the region.

## **B. BASELINE AIR QUALITY**

### *Ambient Air Quality Standards*

Both the federal government and the State of California have adopted air quality standards to protect the public from the detrimental effects of air pollution. Table 1 lists the state clean air standards and the National Ambient Air Quality Standards (NAAQS). The NAAQS are divided into two categories: primary and secondary. The primary standards are those that protect the public health, while the secondary standards are those that protect the public welfare. The state standards are more stringent than the NAAQS as they are designed to protect the public health with an additional margin of safety for sensitive populations (e.g., children, elderly, infirm). Sensitive populations are also known as "sensitive receptors."

### *Baseline Air Quality and Trends*

The South Coast Air Quality Management District (SCAQMD) is responsible for monitoring ambient air quality in the South Coast Air Basin (SCAB), and has divided its jurisdiction into thirty Source/Receptor Areas (SRAs). The communities within an SRA are expected to have similar climatology and subsequently, similar ambient air pollutant concentrations.

The SCAQMD operates four air quality monitoring stations within Southeast Los Angeles County: Long Beach (SRA 4), Whittier (SRA 5), Pico Rivera (SRA 11), and Lynwood (SRA 12). Figure 3 identifies the locations of the four air quality stations. Table 2 identifies the cities within each of these SRA's.

**TABLE 1  
AMBIENT AIR QUALITY STANDARDS**

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS	NATIONAL STANDARDS	
			PRIMARY	SECONDARY
Ozone	1 Hour	0.09 ppm (180 µg/m <sup>3</sup> )	0.12 ppm (235 µg/m <sup>3</sup> )	Same as Primary Std.
Carbon Monoxide	8 Hour	9.0 ppm (10 mg/m <sup>3</sup> )	9.0 ppm (10 mg/m <sup>3</sup> )	Same as Primary Stds.
	1 Hour	20 ppm (23 mg/m <sup>3</sup> )	35 ppm (100 µg/m <sup>3</sup> )	Same as Primary Stds.
Nitrogen Dioxide	Annual Average	-	0.053 ppm (100 µg/m <sup>3</sup> )	Same as Primary Stds.
	1 Hour	0.25 ppm (470 µg/m <sup>3</sup> )	-	Same as Primary Stds.
Sulfur Dioxide	Annual Average	-	80 ug/m <sup>3</sup> (0.03 ppm)	-
	24 Hour	0.05 ppm (131 µg/m <sup>3</sup> )	365 ug/m <sup>3</sup> (0.14 ppm)	-
	3 Hour	-	-	1300 ug/m <sup>3</sup> (0.5 ppm)
	1 Hour	0.25 ppm (655 µg/m <sup>3</sup> )	-	-
Suspended Particulate Matter (PM <sub>10</sub> )	Annual Geometric Mean	30 µg/m <sup>3</sup>	-	-
	24-Hour	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	Same as Primary Stds.
	Annual Arithmetic Mean	-	50 µg/m <sup>3</sup>	Same as Primary Stds.
Sulfates	24-Hour	25 µg/m <sup>3</sup>	-	-
Lead	30-Day Average	1.5 µg/m <sup>3</sup>	-	-
	Calendar Quarter	-	1.5 µg/m <sup>3</sup>	Same as Primary Std.
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m <sup>3</sup> )	-	-
Visibility Reducing Particles	8-Hour Average (9 am to 5pm)	In sufficient amount to reduce the visual range to less than 10 miles when the relative humidity is less than 70 percent		

Source: 1991 Air Quality Summary, ARB



TABLE 2  
SOUTHEAST LOS ANGELES COUNTY CITIES WITHIN  
THE SOURCE RECEPTOR AREAS

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Long Beach SRA 4	Whittier SRA 5	Pico Rivera SRA 11	Lynwood SRA 12
Long Beach	Montebello	Pico Rivera	Maywood
Lakewood	Bell Gardens	La Habra Heights	Bell
Signal Hill	Downey		South Gate
Artesia	Paramount		Lynwood
Cerritos	Bellflower		Compton
Hawaiian Gardens	Norwalk		
	Santa Fe Springs		
	La Mirada		

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which standards exist are considered local problems and are handled through the District's permitting process for stationary sources.

The maximum levels of primary automotive exhaust pollutants such as carbon monoxide (CO) and nitrogen oxides (NO<sub>x</sub>) minimally exceed allowable levels a few times each year in Long Beach, Whittier, and Pico Rivera. Ozone a secondary pollutant, recorded the highest levels in the more inland areas of Pico Rivera and Whittier, with Lynwood and Long Beach monitoring lower levels and exceeding much fewer days. Respirable particulates (PM<sub>10</sub>) were only measured in Long Beach, where the maximum concentration exceeded state standards but was below federal standards.

The Long Beach monitoring station recorded relatively low levels of all pollutants due to its coastal proximity. The SCAQMD monitoring station for Long Beach is located in the vicinity of the Long Beach Airport. An increased number of monitoring stations in the future may yield more specific information regarding local air quality conditions, particularly in those areas of the city impacted by Port-related operations

### Ozone

Ozone is a pungent, colorless toxic gas which is produced through photochemical processes. Photochemical smog is caused by complex atmospheric reactions involving oxides of nitrogen and reactive organic gases with ultraviolet energy from sunlight. Motor vehicles are the major source of oxides of nitrogen and reactive organic gases in the basin. The common manifestations of photochemical oxidants are damage to

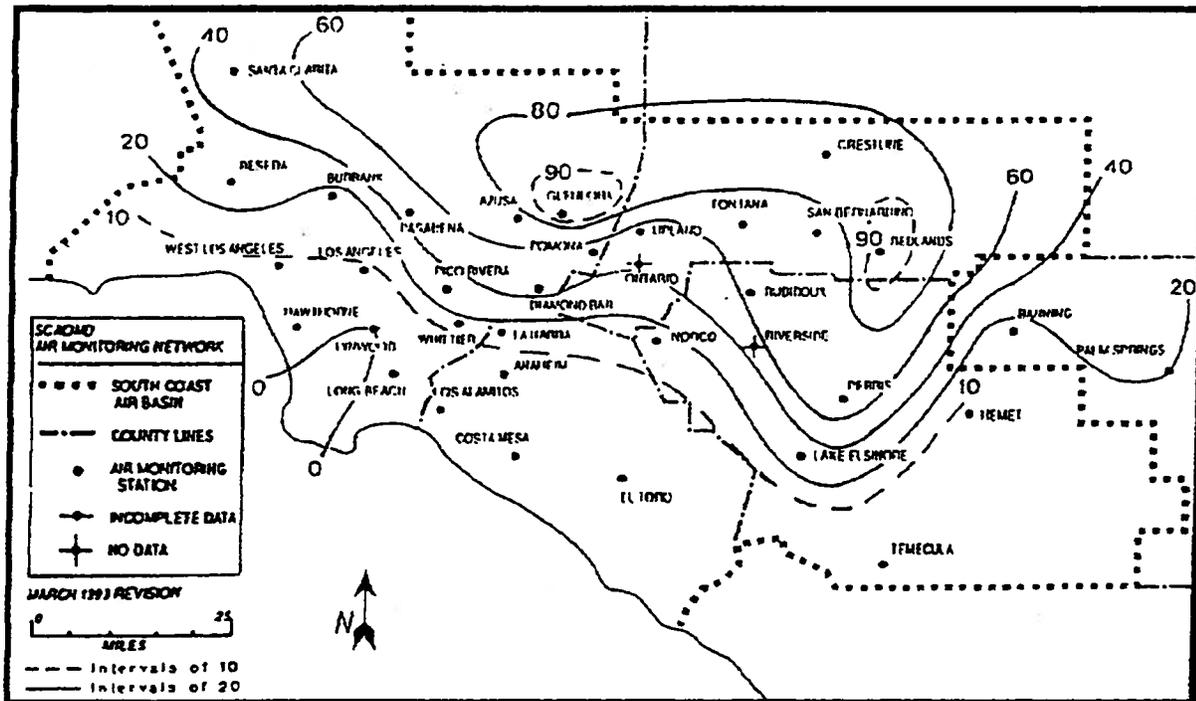


FIG. 4. OZONE: NUMBER OF DAYS EXCEEDING FEDERAL STANDARDS IN 1993

vegetation and cracking of untreated rubber. In high concentrations, they can also directly affect the lungs, causing respiratory irritation and possible changes in lung functions.

Ozone concentrations are highest in inland locations since it is formed through the photochemical combination of upwind precursor pollutants. As expected, the inland monitoring stations recorded the highest ozone levels. In 1993, SCAQMD monitored ozone at 35 sites. The federal standard was exceeded at all but one location (Lynwood). The state standard was exceeded at all locations. The Stage I Episode level (1-hour average ozone equal to or greater than 0.20 ppm) was exceeded at 13 location. The Long Beach monitoring station recorded one exceedance of federal standards, and 15 exceedances of state standards for ozone. No second or third stage episodes were called in Southeast Los Angeles County during the past several years.

### Carbon Monoxide

Carbon Monoxide (CO) is a colorless, odorless, toxic gas produced through the incomplete combustion of fossil fuels. Automobiles are the primary source, although various industrial processes also produce CO emissions. CO does not irritate the respiratory tract; it passes through the lungs directly to the blood stream and deprives sensitive tissues of oxygen.

**TABLE 3**  
**SOUTHEAST LOS ANGELES COUNTY**  
**AMBIENT AIR QUALITY SUMMARY, 1991**  
**(Days Standards Were Exceeded and Maximum Concentrations)**

POLLUTANT	STANDARD	LONG BEACH	WHITTIER	PICO RIVERA	LYNWOOD
Ozone	1-Hour > 0.09 ppm	4.0	59.0	86.0	20.0
	1-Hour > 0.12 ppm	0.0	23.0	48.0	1.0
	Max. 1-Hour Conc. (ppm)	0.11	0.19	0.26	0.16
Carbon Monoxide	1-Hour > 20. ppm	0.0	0.0	0.0	4.0
	8-Hour > 9.1 ppm	1.0	0.0	1.0	41.0
	Max. 1-Hour Conc. (ppm)	14.0	13.0	11.0	30.0
	Max. 8-Hour Conc. (ppm)	9.3	7.5	9.1	17.4
Nitrogen Dioxide	1-Hour > 0.25 ppm	2.0	0.0	0.0	2.0
	Max. 1-Hour Conc. (ppm)	0.28	0.22	0.25	0.26
Respirable Particulates (PM <sub>10</sub> )	24-Hour > 50 ug/m <sup>3</sup>	11.0*	NM	NM	NM
	24-Hour > 150 ug/m <sup>3</sup>	0.0*	NM	NM	NM
	Max. 24-Hour Conc. (ug/m <sup>3</sup> )	92.0*	NM	NM	NM

\*Data presented is valid, but incomplete.

NM = Not measured at this station.

Source: California Air Resources Board Annual Summary of 1991 Air Quality Data

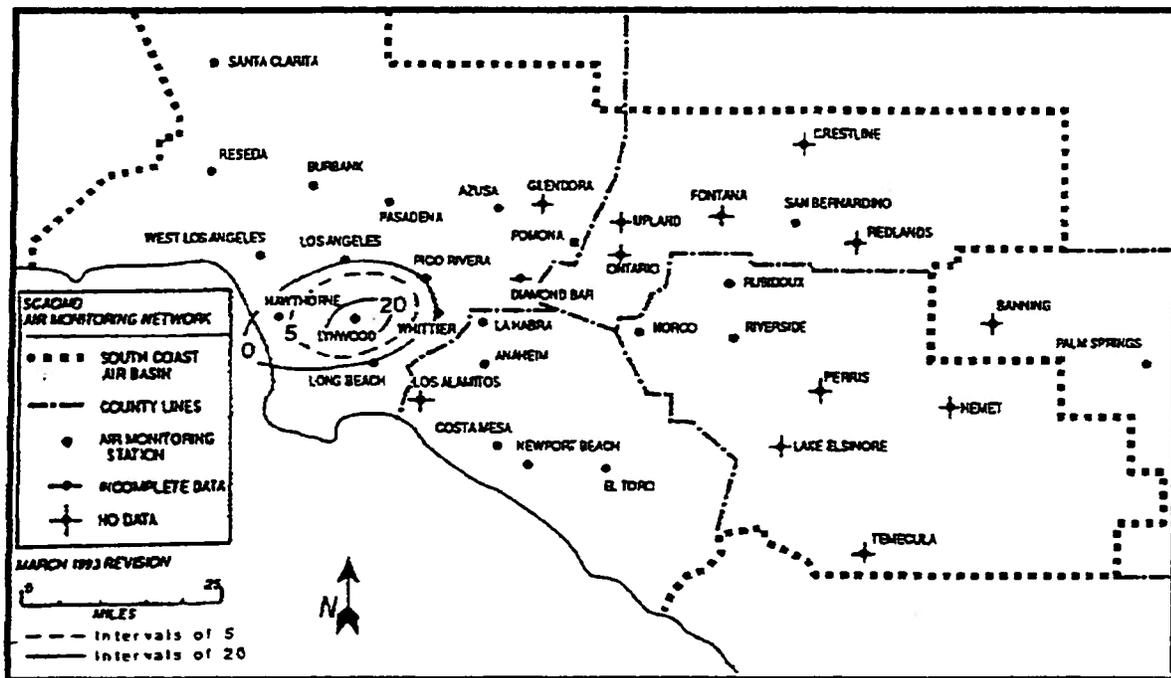
Whereas ozone is a regional pollutant with sources distant and upwind from their ultimate location, primary pollutants such as carbon monoxide are a better indicator of any change in pollutant emission distributions within a subregion. Ambient air quality standards for CO are most frequently exceeded in the winter due to weather patterns that inhibit the vertical dispersion of pollutants. However, because nocturnal winds are offshore when CO accumulates, inland communities generally have lower CO levels than along the ocean. The predominant factor for CO levels is proximity to automobile sources since on-road motor vehicles account for approximately ninety-eight percent of basin-wide CO emissions.

In 1992, Los Angeles County recorded more exceedances of the federal carbon monoxide standard than any other area of the United States. Exceedances of the federal standard in 1993 were limited to coastal/central Los Angeles County. Of the twenty-four monitoring locations for carbon monoxide, two locations recorded exceedances of federal and state 8-hour standards. The Long Beach station did not record any carbon monoxide exceedances in 311 days of monitoring in 1993.

**TABLE 4  
CARBON MONOXIDE:  
DAYS 8-HOUR CONCENTRATION EXCEEDED**

LOCATION	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Long Beach	3	6	7	4	6	5	1	2	2	1	1
Whittier	9	8	6	1	4	0	1	0	0	0	0
Pico Rivera	7	7	4	0	5	1	2	3	2	2	1
Lynwood	53	54	34	51	35	43	47	57	61	44	41

**FIG. 5. CARBON MONOXIDE: NUMBER OF DAYS EXCEEDING FEDERAL STANDARD**



IN 1993 (1-HOUR AVERAGE CONCENTRATION GREATER THAN 0.25 PPM)

Although air quality is improving, the combination of growing traffic volumes at lower speeds has generally offset the advantages of a cleaner vehicle fleet as mandated by state law. Table 5 shows the average daily maximum CO concentration (ppm) for 1982-86 compared to the 1987-90 period.

TABLE 5  
AVERAGE DAILY CARBON MONOXIDE CONCENTRATION COMPARISON

	LONG BEACH	WHITTIER	PICO RIVERA	LYNWOOD
1982-86	4.13	4.34	3.97	6.65
1987-90	3.62	3.82	4.05	7.07
Percent Change	-12.3	-12.0	+2.0	+6.3

Source: SCAQMD, Summary of 1981 through 1991 air quality data.

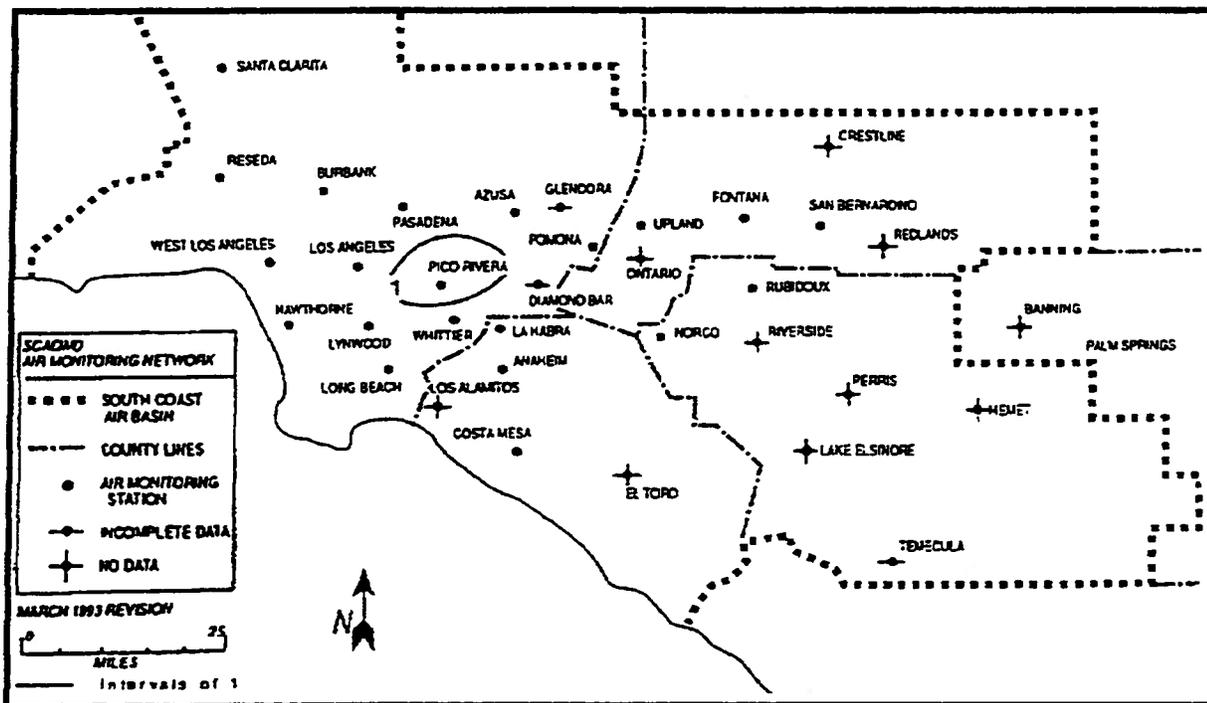


FIG. 6. NITROGEN DIOXIDE: NUMBER OF DAYS EXCEEDING STATE STANDARD IN 1993 (1-HOUR AVERAGE CONCENTRATION GREATER THAN 0.25 PPM)

Nitrogen Oxides (NO<sub>x</sub>)

Nitrogen dioxide, a reddish-brown gas (NO<sub>2</sub>), and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature and pressure. The compounds are referred to as nitrogen oxides or NO<sub>x</sub>. NO<sub>x</sub> is an important air pollutant in the region because it is a primary receptor of ultraviolet light, which initiates the reactions producing photochemical smog.

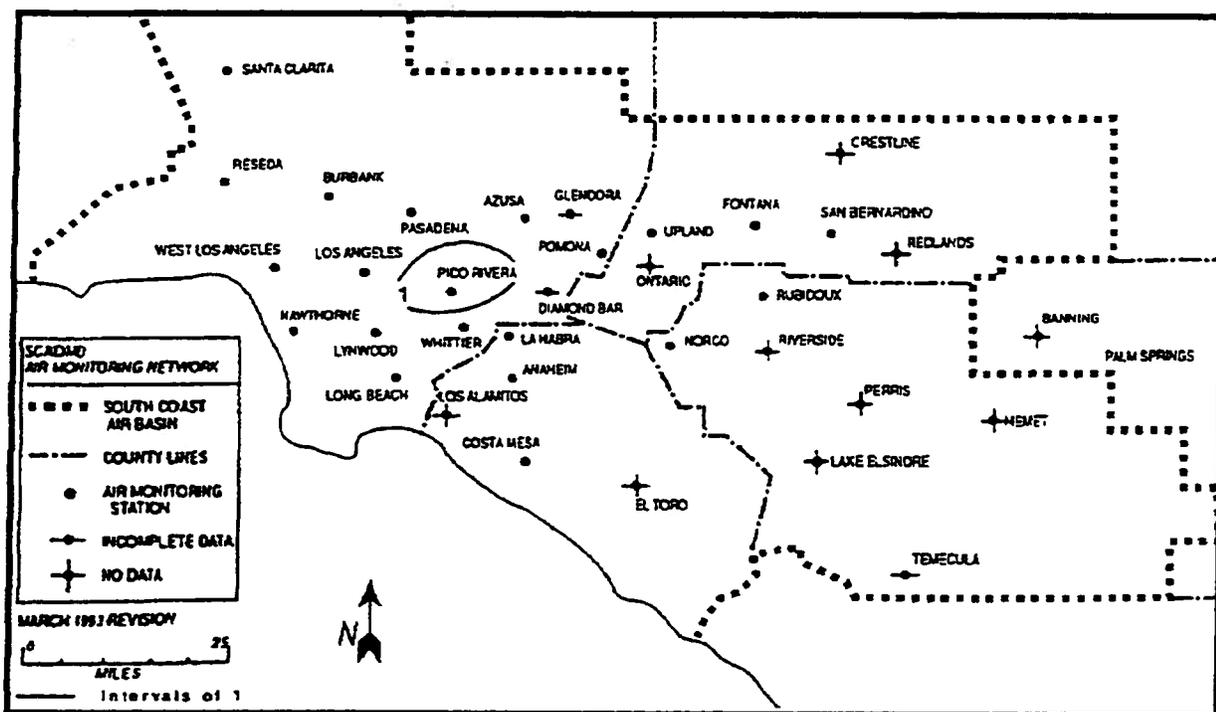


FIG. 7. PM<sub>10</sub>: 1993 ANNUAL AVERAGE CONCENTRATIONS COMPARED TO FEDERAL STANDARD (AVERAGE ARITHMETIC MEAN CONCENTRATION GREATER THAN 50 mg/m<sup>3</sup>)

Concentrations of nitrogen dioxide decreased over the period between 1976 and 1993. By 1991, exceedances of the federal standard were limited to one location in Los Angeles County, the only county in the country which still did not meet the federal nitrogen dioxide standard. In 1992 and 1993, no basin location exceeded the federal standard; however, the state standard continued to be exceeded.

The Long Beach air quality monitoring station is located in North Long Beach. Additional monitoring stations would be necessary in order to track conditions in specific subareas of the city. Downtown Long Beach and the City's west side are more directly impacted by particulate emissions relating to the activities at the Ports of Los Angeles and Long Beach. Particulate emissions can be the result of diesel trucks, ship engine exhaust, train engine exhaust, truck and car tire wear, entrained roadway dust, and the movement and storage of products such as coal and petroleum coke.

### PM<sub>10</sub>

In 1993, the federal standards for fine particles (PM<sub>10</sub>) were exceeded in many areas of the basin, and the more stringent state standards were exceeded in most areas.

Suspended particulate matter in the air has been associated with exacerbation of symptoms in people with respiratory illnesses, and in children, who may experience a decline in lung function.

Concentrations averaged lowest near the coast and highest in the inland valleys. At the Long Beach monitoring station, 19.7 percent of the samples taken in 1993 exceeded state standards. There were no samples that violated federal standards.

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### Sulfur Dioxide and Sulfates

Sulfur dioxide can cause broncho-constriction with symptoms such as shortness of breath and chest tightness during exercise. Although sulfur dioxide concentrations have been reduced to levels well below state and federal standards, further reductions in emissions of sulfur oxides are needed to attain compliance with standards for other pollutants, such as sulfates and PM<sub>10</sub>. Sulfur dioxide concentrations did not exceed federal or state standards in 1993.

In 1993, no Basin locations exceeded the state sulfates standard. Sulfate concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of sulfur dioxide and limits on the sulfur content of fuels.

### Lead

Lead concentrations once exceeded the state and federal standards by a wide margin, but have not exceeded state or federal standards at any regular monitoring station since 1982. Special monitoring sites immediately downwind of sources identified very localized violations of the state standard in 1993. Lead emissions can impair blood formation and nerve conduction.

### Visibility

The effect of air pollution on visibility is not limited to simply reducing the distance a person can see, but also includes negative aesthetic impacts on the color, form, and contrast of the scene being viewed. In 1993, the state visibility standard was violated by a significant margin. Visibility data were obtained for two locations in 1993, both of which violated the standard.

## C. POLLUTANT SOURCES AND EFFECTS

### *Local Sources of Air Contaminants*

Two general sources of air pollutants contribute to decreased air quality in the study area and the Basin as a whole, mobile sources and stationary sources. Stationary source emissions include those from point and area sources. A point source has one or more permitted pieces of equipment in a fixed, identified location (i.e., power plants, refinery boilers, etc.). Area sources consist of numerous small facilities (e.g., gasoline-dispensing facilities), pieces of equipment (e.g., residential water heaters), or other sources of emissions (e.g., architectural coatings), which are distributed across the region and whose emissions may be calculated using socio-economic data. Mobile sources are subdivided into "on-road vehicles" and "other mobile sources." The former includes automobiles, trucks, and motorcycles, while the latter includes trains, ships, aircraft, and mobile equipment.

Stationary source emissions result primarily from the combustion of fuels, evaporation of solvents or fuels, and processing of materials. The SCAQMD has identified almost one-thousand major source facilities within the Basin that generate twenty-five tons or more per year. These stationary sources include automotive services, dry cleaners, hospitals, waste management facilities, and industrial/manufacturing plants. Products manufactured include medical devices, home furnishings, business forms, semiconductors, and power generators.

On-road mobile sources generate a substantial amount of air pollution within the study area. Motor vehicle emissions generally decrease with increasing speeds. Therefore, the highest levels of mobile emissions are found near congested intersections.

As a percentage of regional emissions, on-road mobile sources currently contribute 41 percent of the ROG, 61 percent of the NO<sub>x</sub>, and 88 percent of the CO on a daily basis as shown in Figure 6. The emissions relate to 51 percent of the ozone precursor emissions. In comparison, stationary sources contribute 19 percent of the ROG, 17 percent of the NO<sub>x</sub> and one percent of the CO emissions. This constitutes 18 percent of the regional ozone precursor emissions.

The majority of control measures for off-road mobile sources focus on the EPA adoption of nationwide emission standards. For example, control measures proposing emission standards for new aircraft engines, new and rebuilt locomotive engines, diesel powered off-road industrial equipment and some types of industrial equipment, all fall to the EPA. A control measure proposing nationwide emission standards implemented by the U.S. EPA in conjunction with international standards, is also the most viable approach for reducing marine vessel emissions since many of these vessels are not based in California or the United States.

### ***Effects of Air Pollution***

The California Air Resource Board (ARB) has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over sixty-five years of age; children under fourteen years; athletes during athletic exercise; and people with cardiovascular and chronic respiratory diseases, such as asthma, emphysema, and bronchitis. These "sensitive receptors" represent over fifty percent of the total California population.

After exposure to air pollution, minor symptoms such as wheezing and sore throat begin to subside and eventually disappear. This occurrence has been viewed by some as an indication that the effects of exposure to air pollution are reversible and harmless. Recent studies, however, showed that minor responses to air pollution may be warnings of tissue injury that develops over a lifetime of repeated exposures.

In a 20-year study conducted by scientists at Loma Linda University in California, smog was recently linked to increased cancer risks, particularly among women. Men and women living in the Los Angeles Basin, the smoggiest in the nation, have more than twice the risk of getting lung cancer because of ozone pollution. The cancer study tracked 6,000 non-smoking people for a six year period. Two-thirds lived in the Los Angeles Basin, while the remainder was a control group living in less smoggy areas across the state. The study concluded that those living in the smoggiest areas had the highest rates of cancer.

Air pollution poses the greatest threat to people who already suffer from respiratory or heart diseases. That includes angina, emphysema, bronchitis and asthma. Demonstrated effects of specific air contaminants on health are briefly summarized below.

#### Ozone

The young and elderly, people that are predisposed to lung infections, and those who have an infection or immune system problem are most likely to be harmed by high levels of ozone. It is advisable for those who are most susceptible to stay indoors during ozone episodes. Those not in either of these categories are recommended to avoid exercise during ozone periods, particularly when combined with high temperatures.

The common effects of ozone are:

- Coughing, wheezing, chest pain or tightness, dry throat, headache, or nausea
- Shortness of breath or pain during deep breaths
- Lung damage
- Reduced resistance to infection
- Tired feeling
- Impaired athletic performance
- Linkage to increased cancer rates in women.

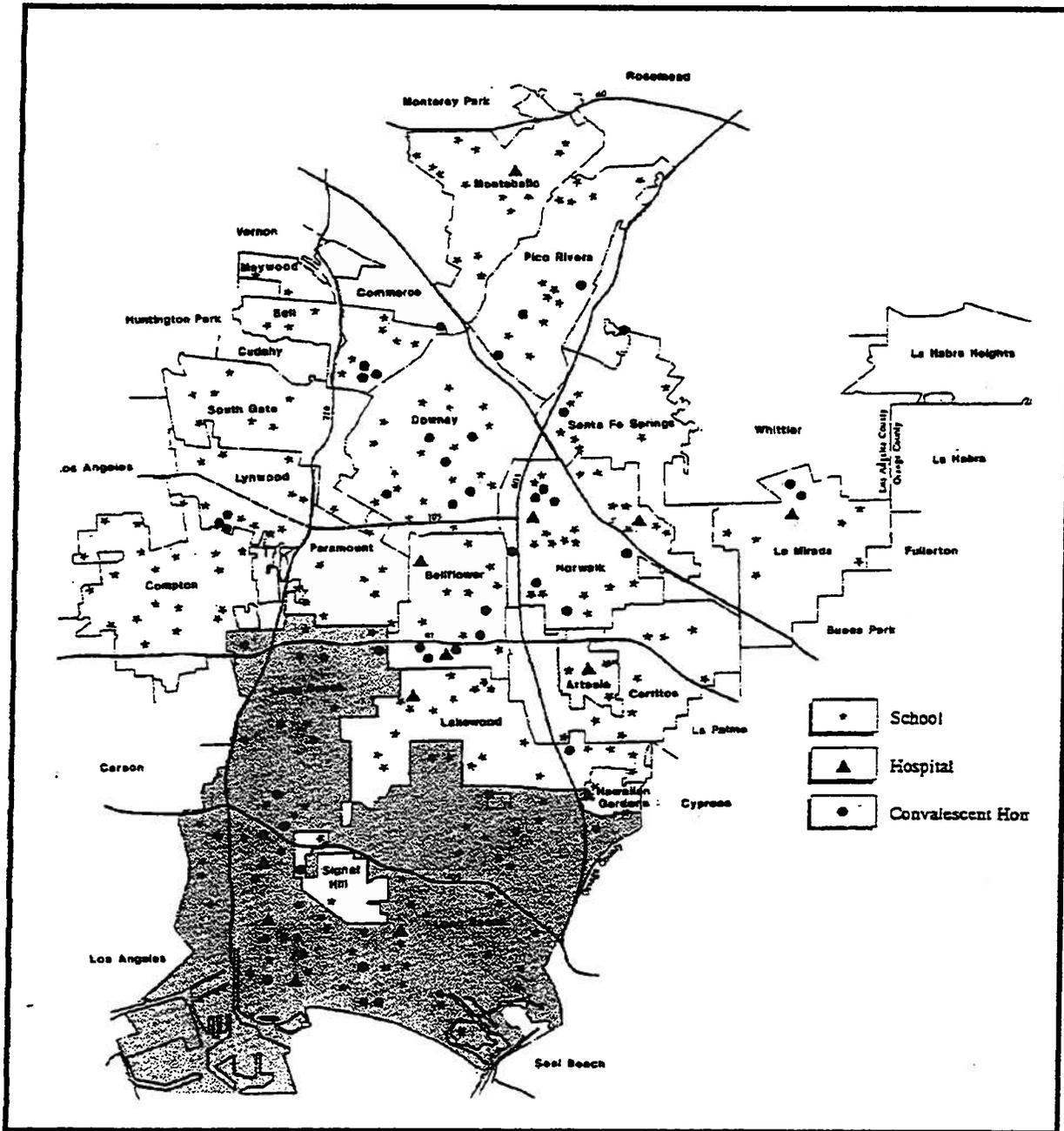


FIG. 8. SENSITIVE RECEPTOR LOCATIONS, SOUTHEAST LOS ANGELES COUNTY

### Carbon Monoxide

Individuals with deficient blood supply to the heart are more susceptible to the adverse effects of CO exposure. Exposure to carbon monoxide particularly endangers people with coronary artery disease, anemia or abnormal hemoglobin, fetuses or young infants, or people taking certain medicines, drinking alcoholic beverages or visiting high altitudes.

Carbon monoxide can cause:

- Reduced vigilance, visual perception, and manual dexterity
- Reduced exercise, learning, and driving ability
- More chest pain in angina patients
- Tired feeling

A nationwide study published in October, 1995, linked carbon monoxide to a rise of nearly 40 percent in cases of congestive heart failure among elderly Los Angeles County residents, on days when the air pollution reached peak levels (*Los Angeles Times*). Reduction in birth weight and impaired neurobehavioral development have been observed in animals chronically exposed to CO.

### Particulates

Fine particles (PM<sub>10</sub>) in the air may enter the lungs and cause breathing problems or pain, and potential lung damage. In recent years, some studies have reported an association between long-term exposure to air pollution dominated by fine particles and increased mortality, reduction in life-span, and the possibility of an increased incidence of cancer. A growing consensus exists among the scientific community that the fine fraction of PM<sub>10</sub> is relatively more toxic than the coarse fraction, and is responsible for the majority of PM<sub>10</sub> effects observed. The EPA has recommended additional PM<sub>2.5</sub> National Ambient Air Quality Standards.

### Nitrogen Dioxide

Populations-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children, is associated with long-term exposures to NO<sub>2</sub>. In animals, exposure to levels of NO<sub>2</sub> considerably higher than ambient concentrations results in increased susceptibility to infections, possible due to the observed changes in cells involved in maintaining immune functions.

### *Sensitive Receptors*

Local governments have the responsibility for determining the type of land uses and densities of use within jurisdictional boundaries. They also must insure land use

compatibility between air pollutant generators and new sources of sensitive receptors or appropriate locations for new stationary sources. The District establishes criteria for analyzing air quality impacts at sensitive receptor locations and developing mitigation to reduce impacts to insignificant levels. The local government, in turn, uses District criteria to assist in making land use decisions. The City of Long Beach identifies sensitive receptors through the environmental review process.

Figure 8 identifies the existing sensitive receptors within the study area. The sensitive receptors depicted include approximately 231 schools, 15 hospitals, and 40 convalescent homes. Residential areas, also considered sensitive, are scattered throughout Southeast Los Angeles County.

Sensitive receptors are especially affected by air pollution in areas where major sources (industry, freeway, etc.) are located upwind. The term "hotspot" has been utilized to identify localized areas of high pollutant levels proximate to major sources. As emission reductions occur at these source locations, the levels of air contaminants at the sensitive receptor will also be reduced.

#### **D. TOXIC AIR POLLUTANTS**

Toxic air pollutants are often termed "non-criteria" because ambient air standards have not been established for them. The effects of toxic pollutants tend to be local rather than regional, and they may cause or contribute to an increase in mortality or an increase in serious illness, or may pose a present or potential hazard to human health.

The regulatory approach used in controlling toxic air pollutant levels relies on a quantitative risk assessment process to determine allowable emissions from the source, rather than on ambient air concentrations. For carcinogenic air pollutants, there is no safe concentration in the atmosphere. Local concentrations can pose a significant health risk and are termed "toxic hot spots."

#### **E. BENEFITS FROM MEETING AIR QUALITY STANDARDS**

The purpose of the 1991, 1994 and 1997 Air Quality Management Plans for the South Coast Air Basin (SCAB) is to bring the Basin into compliance with the National Ambient Air Quality Standards and to meet California Clean Air Act Requirements. Since the basin exceeds ambient air quality standards on approximately seventy percent of the days, health benefits and others related to agriculture, visibility, building materials, traffic congestion and energy conservation would accrue through implementation of the AQMP. The following discussion focuses on the expected benefits through the implementation of measures to attain the NAAQS.

### Health Benefits

Significant health benefits would result from better regional air quality. In the Southeast Los Angeles County area where severe exceedances of CO and NO<sub>x</sub> occur, decreases in pollutant emissions are expected to reduce respiratory irritation and distress while increasing workers' productivity. It has been determined that achieving NAAQS for ozone and PM<sub>10</sub> throughout the SCAB would result in a health benefit valued at \$9.8 billion in 1990 dollars. This estimate was calculated based on the number of ozone related symptom occurrences (including cough, headache, eye irritation, sore throat, and chest congestion) and premature deaths attributed to PM<sub>10</sub> pollution. The study showed that about one sixth of the ozone related coughs, headaches, sore throat, and chest congestion, and about one twelfth of the eye irritation avoided would be in Los Angeles County. PM<sub>10</sub> related deaths were not discussed on an individual county basis.

A study released in May, 1996 by the Natural Resources Defense Council estimated that 5,873 people in the Los Angeles-Long Beach area are dying annually from breathing particulates. Particulates were blamed for shortening the lives of thousands of people in cities across the county by one to three years, with the greatest impacts affecting the elderly and people afflicted with asthma, angina, pneumonia or other lung and heart ailments. The six urban areas with the most severe particulate pollution were (all in California): Visalia, Riverside-San Bernardino, Bakersfield, Fresno, Stockton, and Los Angeles-Long Beach. The Anaheim-Santa Ana area ranked 12th worst in the nation. (*LA Times*, May 9, 1996)

Since carbon monoxide concentrations can vary greatly from site to site, studies of this pollutant would not necessarily be able to specify carbon monoxide (CO) exposures experienced by individuals. For example, a resident of Long Beach may work in Lynwood, thereby spending one third of his day in higher CO concentrations. As with nitrogen dioxide, a lack of data may hinder efforts to quantify benefits related to reductions of this pollutant. Since substantial concentrations of CO and NO<sub>2</sub> are present in Southeast Los Angeles County, however, a reduction in local emissions of this pollutant should result in increased learning potential and productivity and resistance to infection within sensitive populations.

### Agricultural Benefits

Ozone damage has been quantitatively assessed for certain crops, including grapes, oranges, lemons, limes, beans, corn, melons, potatoes, spinach, tomatoes, turnips, cotton, grass hay, alfalfa, wheat, avocados, and grapefruits. Meeting federal ozone standards by the year 2010 could lead to approximately \$0.7 million (1987 dollars) in increased yields in Los Angeles County and \$88.1 million Basin-wide. Several other categories of crops and decorative plants have been demonstrated to visibly improve when ozone levels are reduced; however, quantitative estimates of these improvements are not yet

available. In addition, unquantified benefits to livestock production, as well as wildlife and the natural environment, are also likely.

### Visibility Benefits

The haze in the air above the Los Angeles area results from ozone, NO<sub>x</sub> and particulates. The NO<sub>x</sub> levels in particular, result in the reddish-brown color common to the Los Angeles skyline. The SCAQMD has analyzed visibility benefits of air quality improvement using the public's willingness to pay as estimated through housing prices. This study determined that Los Angeles County would experience a benefit of approximately \$1,478 million through the implementation of Tier I controls identified in the 1991 AQMP, and approximately \$250 million additional benefit through the implementation of Tier II controls.

### Materials Benefits

Man-made materials can also be damaged by air pollutants. Ozone and sulfur dioxide have been linked to premature paint erosion, metal deterioration, and paint soiling on stationary surfaces. Damage also occurs to surfaces such as glass, concrete, brick, rubber, and tile. In the 1960s and 1970s when ozone reached its highest local levels, rubber on tires, around windows, and on buildings was notably oxidized, sharply decreasing the lifespan of these items. The benefits of reduced damage to these materials that would occur from reducing air pollutant concentrations have not yet been quantified.

### Traffic Congestion Relief

As measures are enacted to reduce pollutant emissions from motor vehicles, vehicle trips and vehicle miles traveled should correspondingly decrease. Especially during peak hour conditions, these reductions will decrease congestion and increase average vehicle speeds on the regional transportation network. A SCAQMD study has estimated that compliance with SCAG's transportation control measures will result in \$127 million (in 1987 dollars) of benefits in congestion relief throughout the South Coast Air Basin by the year 2010. This estimate is based on a savings of 14.6 million vehicle hours traveled and 65.2 million vehicle miles traveled, and includes both the value of time and motor vehicle maintenance and gas savings.

# **INTERGOVERNMENTAL REQUIREMENTS**



## INTER-GOVERNMENTAL REQUIREMENTS

### A. Requirement for Action

The quality of the air in the Los Angeles area had deteriorated so significantly by the end of World War II, that the hospitalization and premature deaths of thousands of Southern California residents was attributed to the ozone concentrations from severe inversion patterns. The first Air Pollution Control District was created by the County Board of Supervisors in 1946. Since then, multiple agencies at the federal, state, regional, district, and local level have devoted significant efforts to the regulation of air pollution and the improvement of air quality in Southern California.

#### *Federal Clean Air Act*

The first Federal Clean Air Act (FCAA or CAA) was adopted in 1955 in response to worsening air quality in the nation's cities. While the Air Pollution Control District created almost a decade earlier had focused on the visible soot, smoke, and dustfall from industry, by the mid-1950s the automobile was also recognized as a major contributor to air pollution. The Clean Air Act was updated in 1977, 1987, and in 1990, and identifies specific emission reduction goals, requires both a demonstration of reasonable further progress and attainment, and incorporates more stringent sanctions for failure to attain or to meet interim milestones.

The U.S. Environmental Protection Agency (EPA) is responsible for ensuring that air quality requirements are met. Review and approval of State Implementation Plans (SIPs), adoption of rules and regulations, and promulgation of national standards are all within EPA's purview.

Under the Clean Air Act, the SIP is the means by which a state monitors, controls, maintains, and enforces compliance with the National Ambient Air Quality Standards, or NAAQS. The SIP is intended to set realistic numerical goals for each emissions sector and enforceable measures to attain them with input from those responsible for development of emission reduction plans, as well as implementation of those plans.

The EPA reviews plans from each state that must demonstrate in turn how each region of the state will achieve the federal air quality standards. The Clean Air Act requires the EPA to implement its own measures, or Federal Implementation Plan (FIP), in regions failing to demonstrate attainment of clean air by certain target dates. This lack of attainment occurred in the Southern California region in 1982. Continuing battles between EPA, environmentalists, and industries in Southern California delayed the adoption of a final FIP.





On February 14, 1994, the EPA Administrator signed the draft FIP for the South Coast region. The FIP was prepared by the EPA under a court order that required EPA to promulgate a plan to demonstrate compliance with the Clean Air Act's ozone and carbon monoxide standards.

The FIP was re-released in February of 1995, in a somewhat diluted form. The EPA had dropped many controversial requirements, including: the proposed fees on ships that dock at the Ports of Los Angeles and Long Beach, a one-stop limit on out-of-state trucks in the Los Angeles Basin, a thirty-five to forty-five percent reduction in emissions from commercial airlines, a mandate that Ventura County and Sacramento industries cut emissions forty-five percent, and weekly "no-drive days" on Sacramento highways. Several other sources of pollution, including small aircraft, boats, and dairy farms, were not required to address air pollution because officials could not develop or agree upon economic ways to curb their emissions.

The federal government rescinded the FIP in the Spring of 1995, effectively restricting the EPA's review authority regarding air quality measures and attainment demonstration methods to the SIP. The EPA is currently reviewing the SIP, which includes the Air Quality Management Plans from each of the Air Districts. In light of new epidemiological and other health data, the EPA is currently reevaluating the federal standards for particulate matter and ozone. It is expected that new standards will be promulgated in 1997.

#### *Intermodal Surface Transportation Efficiency Act*

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) has substantially increased the coordination requirements for transportation and air quality decision making. The federal Clean Air Act and ISTEA provide complementary approaches to decreasing transportation-related emission. The CAA and its amendments bring transportation decision-making into the context of achieving and maintaining cleaner air. It establishes air quality requirements and milestones, mandates further improvements to vehicles and fuels, requires greater integration of transportation and air quality planning procedures, and establishes penalties for failing to meet its requirements. The ISTEA, on the other hand, provides increased funding levels and the flexibility to use the funding to improve air quality through the development of a balanced transportation program.

The Congestion Mitigation and Air Quality Improvement (CMAQ) Program is an innovative \$6 billion program established by ISTEA, which allocates funds to states that may use them for transportation control measures (TCMs) and programs designed to help states implement their transportation/air quality plan. State programs may be eligible to receive CMAQ funds for conversion of public fleet vehicles to alternative fuels, including electricity.

*Energy Policy Act of 1992*

The Energy Policy Act of 1992 imposes mandatory requirements for the acquisition of alternatively-fueled vehicles (AFVs) by federal fleets, state government fleets, and fleets operated by "providers" of alternative fuels. The Energy Policy Act also provides tax incentives for the purchase of electric vehicles (EVs) and the installation of refueling property.

*California Clean Air Act*

The California Clean Air Act (CCAA), adopted in 1988, requires each region of the state to adopt a plan to attain state standards for clean air, that are generally higher than federal standards. The California Clean Air Act is generally more stringent than the corresponding National Ambient Air Quality Standards (NAAQS) adopted in the 1990 federal Clean Air Act Amendments, and also incorporates additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles.

The California Air Resources Board (ARB) is responsible for preparing the State air quality plan, which consists of a compilation of regional air quality plans. The South Coast Air Quality Management District (SCAQMD) and Southern California Association of Governments (SCAG) are responsible for preparing the Air Quality Management Plan (AQMP) for Southern California. The goal of the AQMP is to bring the region into compliance with federal clean air standards by the end of the year 2007.

The Air Resources Board regulates mobile emissions and oversees the activities of county Air Pollution Control Districts (APCDs) and regional Air Quality Management Districts (AQMDs) in California. The Air Resources Board has designated six basins within the state based on similar meteorological and geographic conditions. The City of Long Beach is located within the South Coast Air Basin (SCAB), which is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The latter entity was created by the California Legislature in 1976, for the purpose of promoting comprehensive air pollution control within the South Coast Air Basin.

The Board also reviews regional plans for compliance with state law, in the areas of toxic air emissions, global warming, and ozone depletion in addition to clean air standards. The Air Resources Board is also responsible for overseeing statewide vehicle emission standards, fuel specifications, and standards for consumer products such as gasoline lawnmowers, paints, etc. The ARB had required that, beginning in 1998, two percent (approximately 20,000) of the vehicles offered for sale in the state by manufacturers with volumes over 35,000 (the seven largest) be Zero Emission Vehicles (ZEVs). Currently, only Electric Vehicles (EVs) qualify as zero-emission. The ZEV requirement was scheduled to apply to ten percent of all vehicles offered for sale in the

state by 2003. The short-term requirements for Zero Emission Vehicles have since been postponed, but the ten percent standard by 2003 remains in effect.

## **B. Intergovernmental responsibilities**

### *Regional Agencies*

The South Coast Air Quality Management District prepares the Air Quality Management Plan (AQMP) for the region in conjunction with SCAG. It also implements regulations to achieve federal and state clean air standards, maintains a network of over thirty air monitoring stations, keeps the public informed of pollution levels and potential health effects, and responds to air pollution nuisances identified through citizen complaints. The District is also noted for its important role in the research and assessment of new technologies. Although the SCAQMD was originally authorized to regulate only stationary emission sources, in 1978 the state granted the District the ability to regulate mobile and area sources of air pollution as well. For example, Rule 1501, the District's first mobile source regulation, required employers of 100 or more persons to offer an incentive rideshare program to reduce commute trips, thereby reducing vehicle emissions.

The state legislature recently replaced Rule 1501 with Rule 2202 (SB 772). With this new rule, employers are required to submit an emission reduction plan as opposed to a trip reduction plan. Incentive rideshare programs are one of several options available to employers. Other choices include vehicle scrapping programs and remote sensing programs that identify gross polluting vehicles. The Air Quality Districts are currently refining the implementation of the new law.

The Clean Air Act requires that the plans, programs, and projects contained in regional transportation plans and improvement programs "conform" to the purpose of the SIP. Transportation plans and programs must ensure that the transportation sector contributes its planned share of emission reductions. If they fail to do so, either they must be modified or the SIP must be modified to offset the disparity in projected emissions. The Southern California Association of Governments determines conformity with national air quality standards, a function necessary for final project approval by the federal government or release of federal funds. SCAG also develops the Regional Transportation Improvement Program (RTIP), a seven-year multimodal program of regional transportation improvements for highways and transit, and prepares the Regional Mobility Element (RME) that serves as the federal and state-required long-range transportation plan for the six-county region through the year 2015.

The Metropolitan Transportation Authority (MTA) provides another layer of regional involvement in regional air quality through the regional Congestion Management Plan (CMP). The MTA implements a "deficiency" plan for eighty-eight local jurisdictions,

whereby congestion created by new development is required to be offset by congestion-reducing strategies, improvements or programs. Congestion relief is one of many strategies in the AQMP to attain healthful air in the region. For example, by reducing congestion, reactive organic gases and carbon monoxide from idling vehicles can be reduced. The majority of AQMP transportation control measures, however, are directed toward strategies that reduce miles traveled. The CMP focuses on the Level of Service of streets, whereas the AQMP emphasizes vehicle miles traveled, vehicle trips, increased vehicle occupancy rates, and emission reductions.

*Air Resources Board*

One of the most important functions of the Air Resources Board is the establishment of rules for motor vehicle fuels. The ARB has mandated that a minimum percent of cars sold by major manufacturers be exhaust-free, culminating in a minimum of 10 percent of annual sales by 2003. General Motors Corporation has announced that it will produce and market a sporty two-seat electric car called EV-1 for sale in the Fall of 1996. EV-1 will have a range of 70-90 miles between charges, and will be available for lease. Although manufacturers will market EVs to individual consumers, it's expected that most of the cars will first be used by fleet and transit operators, where routes are easy to predict. Some electric school buses are currently in service in the Santa Barbara school district, and other models which will be available will include vans, pickups, transit buses, and off-road vehicles. Continuing advances in battery technology, particularly with regard to range before requiring a recharge, will make electric vehicles more viable for consumers.

The Air Resources Board issued a rule in 1991 requiring California's ten oil companies to manufacture cleaner blends of gasoline. California refineries began producing the new gasoline on March 1, 1996, and service stations converted entirely by June 1, 1996. The new gasoline reformulation is expected to be twice as clean as the low-benzene gasoline required by the Environmental Protection Agency last year, and should remove 215 tons of hydrocarbons and nitrogen oxides from California skies. The combination of the two measures is predicted to reduce smog-causing gases from autos by fifteen percent, cut sulfur emissions by eighty percent, and lower the risk of human cancer posed by gasoline fumes by half.

*Air Quality Management Plan (AQMP)*

The purpose of the Air Quality Management Plan is to promote a comprehensive program which will result in compliance with all federal and state air quality standards. The AQMP sets forth programs requiring the cooperation of all levels of government, and each agency or jurisdiction has specific planning and implementation responsibilities.

The Federal Clean Air Act prohibits federal agencies, or the local Metropolitan Planning

Organization (MPO), which for this region is SCAG, from supporting or approving any activity that does not conform to the AQMP. If a project is consistent with the AQMP regarding air pollution, then the project is considered to be in "conformity" with the Federal Clean Air Act.

The South Coast Air Basin and the Los Angeles County Sub-area exceeds the National Ambient Air Quality Standards (NAAQS), and are designated as "non-attainment areas" for ozone, carbon monoxide, nitrogen dioxide, and fine particulate matter. The EPA has required a regional AQMP to address the non-attainment areas. The SCAQMD and SCAG adopted an Air Quality Management Plan (AQMP) in March 1989. The AQMP was later updated and revised in 1991 and in 1994, to comply with the California Clean Air Act (CCAA).

The District's existing rules and regulations apply to all stationary (non-vehicular) sources of pollution to reduce emissions from that source. Each regulation is broken down into a number of rules, detailing a specific topic. For instance, Regulation II deals with permits, while Rules 201 through 221 pertain to specific types of permits, how they are granted and administered, and their impact on emissions reductions.

#### *Carbon Monoxide Plan*

The South Coast Air Quality Management District developed a Carbon Monoxide federal clean air standards attainment plan in 1992. The plan focuses on the removal of 264 daily tons of carbon monoxide by the year 2000. Since ninety-six percent of carbon monoxide emissions originate from mobile sources, and eighty-seven percent from on-road vehicles, the core of the plan was the reduction of vehicle trips, including the local adoption of Trip Reduction Ordinances. Trip Reduction Ordinances were adopted by of the 143 cities and four counties in the South Coast Air Basin, with a total target goal of reducing 365,000 daily trips.

#### *Local Government Requirements and Options Under the AQMP*

Local governments are in a unique position to promote clean air through the use of comprehensive planning and land use regulation. The optional *Air Quality Element* of a city's *General Plan* can be used to promote Transportation Demand Management strategies, encourage the reduction of energy use in public buildings, and encourage land use planning strategies that contribute to the reduction of air pollution. Implementing ordinances can be used to codify certain measures, such as transportation demand measures for new, large-scale developments, incentives for mixed use and high density development near rail stations, and specific operating procedures for the local government that set an example for citizens in the area of energy conservation.

Other steps that local governments can take to improve air quality include:

- Participate in regional and sub-regional planning efforts.
- Set an example as an employer, operators of equipment, and vehicle fleet managers.
- Provide incentives to the private sector through grants and business license tax credits.
- Work with other governmental agencies on the regional, state and federal level to promote activities and legislation to address key air quality concerns.
- Increase awareness of air quality issues through public outreach efforts.
- Set an example for other cities through pro-active emission reduction programs.
- Review and update the *Air Quality Element* to reflect changing conditions, technologies, and programs.

### C. *General Plan Consistency*

The City of Long Beach adopted its most recent *Land Use Element* of the *General Plan* in 1989, and the *Transportation Element* in 1991. The *Air Quality Element* has been found to be consistent with the goals and policies of both the *Land Use Element* and *Transportation Element*.

Specifically, the *Air Quality Element* is congruous with the following goals of the *Land Use Element*:

- **Managed Growth:** Long Beach accepts the population and economic growth anticipated through the Year 2000, and intends to guide that growth to have an overall beneficial impact upon the city's quality of life.
- **Economic Development:** Long Beach will pursue economic development focusing on international trade, while maintaining and expanding its historic economic strengths in aerospace, bio-medicine, and tourism.
- **Functional Transportation:** Long Beach will maintain or improve the current ability to move people and goods to and from development centers while preserving and protecting residential neighborhoods.
- **Citizen Participation:** Long Beach will pursue increased opportunities for citizen participation in public decision-making, and will encourage voluntary efforts to provide and improve local facilities and services.

### Growth Management

Managed growth is the key to balancing the benefits of increased population and economic activity while preserving the unique quality of life in Southern California. In particular, the enjoyment of the outdoors in Long Beach is enhanced by its coastal location which provides both recreational opportunities and cleaner air as a result of coastal breezes. On clear days, residents enjoy ocean views of Catalina Island and mountain views of the San Gabriel and San Bernardino Mountains. Reduced emissions in the Long Beach area not only improve visibility in the inland areas, but help to improve basin-wide air quality and restore regional views.

### Economic Development

The primary reasons for fostering economic development are to create employment opportunities for our population and tax revenues for our city. These ends should not be realized at the expense of environmental quality with regard to air and water pollution, industrial hazards, and unmitigated traffic impacts.

As an operational goal, the *Land Use Element* seeks to provide at least 1.35 jobs for every household in the City. This favorable balance of jobs to households will assure residents a reasonable opportunity to find employment within Long Beach, thereby minimizing long commutes. Reduced home to work travel will also have regional benefits in terms of reduced air pollution, freeway congestion, and energy consumption.

### Functional Transportation

It is the goal of the *General Plan* that arterial streets should continue to operate in peak hours at Level of Service D or better. Reduced congestion and the more efficient flow of traffic reduces emissions overall.

### Citizen Participation

Three public meetings on the new *Air Quality Element*, combined with input from the Business Advisory Committee and the Interdepartmental Air Quality Committee, have provided staff with valuable input from citizens. Public hearings before the Planning Commission and the City Council were noticed in accordance with state and local Codes.

The goal statement for the *Transportation Element* is:

The City of Long Beach is to maintain or improve our current ability to move people and goods to and from activity centers while reinforcing the quality of life in our neighborhoods.

The recommendations of the *Air Quality Element* support the goal statement of the *Transportation Element*, and the recommendations in the *Air Quality Element* incorporate appropriate policies from the *Transportation Element*.

The *Air Quality Element* is also consistent with, or will further the goals of, other City Council-adopted policies and ordinances, such as the Local Implementation Report of the Congestion Management Plan, and the Trip Reduction and Travel Demand Measures Ordinance. Furthermore, City policies and operations with regard to energy savings, the Trip Reduction Incentive Program, and telecommuting policies, reinforce the goals of the *Air Quality Element*.



# **AIR QUALITY PLANNING**



## AIR QUALITY PLANNING

### A. Air Quality Planning in Long Beach

#### *Multi-Jurisdictional Context*

A multi-level partnership of governmental agencies at the federal, state, regional, and local levels has responsibility for implementing control measures identified in the AQMP. The EPA and other agencies at the federal level are charged with reducing emissions from federally controlled sources such as airplanes, ships and trains, establishing federal standards for air quality, and setting targets for improvement in non-attainment areas. At the state level is principally the Air Resources Board (ARB) which is responsible for motor vehicle emissions and fuels. The SCAQMD works at the regional level towards the overall development and implementation of the AQMP, as well as reducing emissions from industries, and some mobile sources and consumer products. The Southern California Association of Government (SCAG) contributes to the development of the AQMP and the implementation of the Regional Transportation Improvement Plan (RTIP). Local governments are responsible for implementing the transportation and land use measures in the AQMP, retaining local authority for these areas. SCAG provides assessments for conformity of regionally significant projects with the AQMP and adopts the annual Regional Transportation Improvement Program.

Each government agency is empowered with unique authority, and, as such may be the only feasible party to implement a measure. A summary of responsibilities for implementing control measures is provided in Table 7. The breakdown of emission reduction responsibility is provided below for the four primary agencies: EPA, ARB, SCAQMD and local governments. Local government actions account for eight percent of the emissions reductions identified in the 1991 AQMP. To meet the NAAQS at the earliest date feasible, all agencies will need to meet the identified reduction targets.

Local governments are primarily responsible for reducing emissions in the areas of energy conservation, dust control, and trip reduction. The AQMP requires local governments to implement new regulatory ordinances, administer changes to the project review process, assist with enforcement and data collection for monitoring effectiveness, forge new partnerships with other governmental agencies to develop energy conservation standards, and seek administrative changes in the way they operate. The burden of successful implementation of most land use and transportation control strategies is also on local government.

**TABLE 6**  
**IMPLEMENTING CONTROL MEASURE RESPONSIBILITIES**

AGENCY	RESPONSIBILITIES
EPA	<ul style="list-style-type: none"> <li>• Forty-nine state mobile vehicle emission standards;</li> <li>• Airplanes, trains, and ships;</li> <li>• Construction &amp; farm equipment; and</li> <li>• Off-shore oil development.</li> </ul>
ARB	<ul style="list-style-type: none"> <li>• On-road/Off-road vehicles;</li> <li>• Motor vehicle fuels; and</li> <li>• Consumer Products.</li> </ul>
SCAQMD	<ul style="list-style-type: none"> <li>• Stationary (industry/commerce) &amp; area sources;</li> <li>• Some mobile sources;</li> <li>• Some consumer products; and</li> <li>• Indirect sources &amp; TCM's.</li> </ul>
SCAG/Local Government/ CTCs	<ul style="list-style-type: none"> <li>• AQMP conformity assessment;</li> <li>• Adoption of Regional Transportation Improvement Program;</li> <li>• Transportation and land use measures; and</li> <li>• Transportation facilities.</li> </ul>

Source: Final 1991 Air Quality Management Plan.

### *Congestion Management*

The Congestion Management Program (CMP) is a state-mandated program enacted by the state legislature in order to address the negative impacts of increasing urban congestion on the state's economic vitality and quality of life. The CMP statute became effective with voter approval of Proposition 111 in June, 1990, which increased the state gas tax by nine cents per gallon. The CMP requires that cities address increased traffic and air pollution created as a result of new development, before receiving their share of the Proposition 111 statewide gas tax funds. In order to demonstrate compliance with the CMP, each city prepares an annual Local Implementation Report. Compliance is required for continued receipt of gas tax revenue from the state and for Federal Intermodal Surface Transportation Efficiency Act (ISTEA) allocations, as well as other state congestion and traffic funds.

The Metropolitan Transportation Authority (MTA) is the designated Congestion Management Agency for Los Angeles County, and has the responsibility of preparing and updating the CMP. By utilizing a regional approach, the Congestion Management Program seeks to maximize the effectiveness of local efforts to reduce congestion and air pollution. In addition to the quality of life issues, the region's economy may suffer increasingly severe federal sanctions unless air quality targets are achieved.

The goals of the CMP are to:

1. Link land use, transportation and air quality decisions;
2. Develop a partnership among transportation decision makers to devise appropriate transportation solutions that include all modes of travel; and
3. Propose transportation projects which are eligible to compete for state gas tax funds.

The CMP is one of many important tools used to address transportation needs throughout Los Angeles County. Other planning efforts include the Long Range Transportation Plan (MTA), the Congested Corridor Progress Report (MTA), the Regional Mobility Element of the Regional Comprehensive Plan and Guidelines (SCAG), the Air Quality Management Plan (SCAQMD), and the Long Beach Transit Short Range Transit Plan.

The City of Long Beach has been active in the Congestion Management Program since its inception. In 1992, the City submitted traffic counts and Level of Service (LOS) determinations for selected arterial intersections on the CMP system. In 1993, the Trip Reduction and Travel Demand Measures Ordinance was adopted to encourage carpooling, vanpooling, transit ridership, and non-motorized transportation. A Land Use Analysis Program (LUAP) was also submitted in 1993, which analyzes the impacts of new development on the CMP system. And finally, the City of Long Beach submitted its first Local Implementation Report in 1994.

The 1995 Local Implementation Report was the first under the 1993 CMP to include a "deficiency plan," prepared by tracking new development activity and reporting mitigation efforts implemented. Under the deficiency plan, local jurisdictions accrue "debits" when they issue new building permits, and earn "credits" for implementing projects, programs and strategies that improve transportation. The CMP contains standard debit values for 12 land use categories, and standard credit values for over 50 transportation improvement strategies.

The City of Long Beach established a large credit bank of 212,974 credits, as a result of a five year report submitted last year and approved by the Metropolitan Transportation Authority this year. These credits result from a five-year compilation of congestion reducing projects including traffic signal synchronization, grade separations, parking

restrictions, and increased transit frequency, and vanpool programs, among others. These credits establish a substantial "credit bank" for the City to draw upon for future development projects.

Long Beach is in the enviable position of having substantially more CMP credits than we expect to need over the immediate future. The City has been able to maintain a balance of over 200,000 credits; a large number of credits compared to most other cities in Southern California. For reference purposes, major planned development projects, such as the 605 Power Retail Center and the Queensway Bay Plan, have been estimated to result in approximately 10,000 to 15,000 debits after mitigation measures have been implemented.

#### *Southern California Economic Partnership*

The Southern California Economic Partnership (The Partnership) is a six county regional, non-profit organization with a 26 member Board of Directors representing both the public and private sectors. The mission of The Partnership is to accelerate the use of advanced transportation technologies (ATT), including zero-emission vehicles and infrastructure, alternative fuel vehicles and infrastructure, intelligent transportation systems, advance (smart) shuttle transit, and TeleCommute/TeleServices.

Since mobile source exhaust emissions are the largest contributor to air pollution within the South Coast Air District, The Partnership has focused much of its efforts on promoting electric vehicles. Electric vehicles (EVs) emit no tailpipe pollutants. In addition to air quality benefits, the electricity needed to charge EVs is abundant if off-peak charging is utilized. The nation's current use of petroleum products requires large oil imports that add \$40 to \$50 billion annually to the trade deficit.

Electric vehicles are considered consumer friendly for several reasons. The majority of the electric battery charging is expected to occur at the location where the vehicle is routinely used, such as the residential garage, parking areas of shopping malls, theater complexes, and some Metrolink stations. Residential customers would charge a vehicle during the night, which would be more appealing than making trips to a service station. In the long-term future, it is expected that commercial stations will provide convenient, fast-charging service.

Persistent research to advance the battery technology should provide improved range of approximately 150-200 miles. General Motors, for example, has invested in a joint manufacturing venture with Delco Battery Company to produce a nickel-metal hydride battery, which can drive small cars twice the distance of lead-acid batteries before recharging. Currently it costs two cents per mile at offpeak rates to "fuel" a car with electricity as compared to gasoline which costs four cents per mile. When EVs are mass produced, they may have lower life cycle costs than gasoline cars, requiring fewer tune-ups and less maintenance.

An added benefit for the Southern California region is the opportunity to stake out and to retain a leadership role in the new technology needed to produce electric vehicles. Job creation would include the areas of research and development, components manufacturing, and vehicle assembly, and export.

Opportunities for local involvement in the promotion of electric vehicles include modifications to building codes to require that every new residential building provide for a future electric vehicle charging unit by providing a  $\frac{3}{4}$ -inch raceway from the service panel to a 2-gang box located in the garage, and by participating in EV corridor planning for the I-405 Freeway, whereby a public charging infrastructure would be installed.

## **B. Previous City Efforts**

### *Clean Cities*

Long Beach was the first California city to achieve a "Clean Cities" designation under a program sponsored by the U.S. Department of Energy. Clean Cities is a voluntary program designed to accelerate and expand the use of alternative fuel vehicles (AFV) in communities throughout the country, and to provide refueling and maintenance facilities for their operation. The program encourages local governments and organizations to form public/private partnerships in developing markets for AFVs. A Clean Cities community brings fleet owners, fuel suppliers, local utilities, auto manufacturers and government together to make commitments to the creation of a viable alternative fuels market.

The Clean Cities program focuses on transportation fuels and the City's aggressive commitment to Compressed Natural Gas fueled vehicles has been the cornerstone of its Clean Cities program. Recent growth in the number of vehicles and miles driven in the U.S. has resulted in transportation's share of carbon emissions rising to approximately one-third of all carbon emissions in the country. In compliance with several federal legislative and executive directives, the Clean Cities program objectives are: to displace conventional transportation fuels with domestically produced alternative fuels; increase the acquisition of AFVs; develop the alternative fuel supply infrastructure; develop AFV conversion, maintenance and service industries; and improve air quality.

### *-CNG Conversions*

The City of Long Beach reduces air pollution and the cost to operate its motor vehicles by converting existing and buying new, dedicated natural gas vehicles. Since natural gas burns cleaner than other fuels, it provides longer engine life and lower maintenance costs. Natural gas fuel typically costs 40 cents to 65 cents per equivalent gallon less than gasoline.

In 1996, there are 317 vehicles in the City's fleet that are either dual Compressed Natural Gas (CNG) and gasoline fueled, or dedicated CNG vehicles. The fleet includes eight

trash trucks, one street sweeper, several dump trucks, and a large number of pick-up trucks, light duty trucks automobiles, and police cruisers. There are four existing CNG fueling stations, located at the Gas Department, the Police Department, at the Southeast Resource Recovery Facility (S.E.R.R.F.), and at El Dorado Park on Studebaker Road. The City plans to increase the number of dedicated CNG fueled vehicles over time as a wider variety of models become available. The Gas Department also sells fuel to companies with CNG fueled fleets, including a major Airport shuttle company.

### *Air Quality Monitoring*

The current SCAQMD monitoring station for Long Beach is located near the Airport. The City Council has supported an increased number of monitoring stations in the future, located throughout the City, to obtain better information regarding local air quality. The Downtown, Westside, and North Long Beach experience Port-related impacts, including rail, truck, and (for Downtown) ship emissions. Fugitive dust and larger airborne particulates consist mainly of roadway dust, rubber tire fragments, and coke dust. Other areas of the City may also be experiencing high levels of pollutants as a result of proximity to freeways or other sources.

On August 13, 1996, the City Council unanimously voted to request that the South Coast Air Quality Management District evaluate air quality in Long Beach. The discussion preceding the vote focused on numerous examples of black soot, or "fall out," in the air in the Downtown area. Banners flown at the Convention Center are supposed to last for five to eight years, yet are replaced every 18 months. Other speakers living in the downtown spoke of being exposed to a dirty film covering furniture both outdoors and indoors on a regular basis. Boat owners had similar experiences with their boats in the Downtown marina.

The Council will pursue additional monitoring locations in Long Beach, analyses of particulate samples, and risk assessment studies from the AQMD. The Council has requested that the AQMD conduct a study that will identify the composition of the particulate matter, determine its nature, and determine if it constitutes a health hazard and/or property nuisance. The study should also determine the sources of the particulate pollution, so that mitigation can be effectively sought.

### *City Council Efforts to Mitigate Effects of New Port of Los Angeles LAXT-Pier 300*

In 1993 the Port of Los Angeles released a draft Environmental Impact Report (EIR) for the construction and operation of the Los Angeles Export Terminal (LAXT) dry bulk material facility at Pier 300. The new facility was planned for based in the increase in demand for coal and petroleum coke in Pacific Rim countries, and will consolidate existing petroleum coke storage facilities while allowing for better train staging. The draft EIR identified internal combustion engines, including ships, trucks, trains and mobile equipment, and the single largest source of Particulate Matter pollution as a result of the project. The draft EIR did not include, however, mitigation measures for

fugitive dust emissions which would be generated through the receiving, handling, storage and ship loading of dry bulk products, including coal and petroleum coke, for export.

The City Council of Long Beach challenged the EIR and ultimately reached a settlement agreement to address these issues. The 1994 agreement included the provision that control measures would be utilized to limit emissions, and that a comprehensive perimeter monitoring system would be implemented to ensure that no visible fugitive dust from the project shall enter into Long Beach. Construction of the dry bulk facility began in August 1995, and is expected to be completed in the Summer of 1997.

The control measures include, but are not limited to, the following:

- Trucks will be bottom dumped inside an enclosed facility.
- Dust control sheeting will be placed at the entrance and exit of the building.
- Fog sprays will be installed at the entrance and exit of the building. Water sprays will also be used during actual dumping to control fugitive dust.
- The transfer point for truck and train unloading will be located below ground.
- All trucks leaving the facility will be required to pass through a truck wash station.
- Access and exit roads will be swept and vacuumed.
- Wherever possible conveyor systems shall be completely enclosed. Where the conveyor system must interact with stacking equipment, the conveyor will be protected by wind covers and/or gallery enclosures.
- Water sprays will be used at all transfer points along the conveyor system.
- The ship loader will be capable of directional telescoping during ship loading operations. This will eliminate the need for on-board equipment (i.e. bulldozers) to distribute product in the holds.
- All mobile equipment within the storage area will maintain speeds at or below fifteen miles per hour.
- If visible dust emissions are observed, the volume of water to the sprays will be increased. If appropriate, wetting agent will be added to the sprays and additional dust control sheeting will be employed. If none of these measures eliminate emissions of visible fugitive dust beyond the property boundary, the operations will be stopped until the problem can be corrected.

LAXT agreed to request approval by SCAQMD of an emissions control plan pursuant to Rule 403(e), and agreed that each and every emissions control plan submitted to

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SCAQMD for the project will include perimeter PM10 and other emissions monitoring. It was agreed that the emissions control plan submitted for the project shall include perimeter upwind and downwind PM10 at the project site, and the use of perimeter samples to be conducted regularly during all three operational phases of the project.

All monitoring results submitted to SCAQMD will also be sent to the City of Long Beach. In addition, the emissions control plan must be resubmitted annually by LAXT to SCAQMD, and a copy of each control plan filed with SCAQMD will be sent to Long Beach. Control measures and monitoring requirements in the emissions control plan may be made more stringent during the annual review by SCAQMD to insure that emissions from the project will meet all applicable air quality rules and regulations.

LAXT agreed that each emission control plan submitted to SCAQMD will include the operation of a meteorological monitoring station at the project to record wind speed and direction, temperature, humidity, and precipitation, which will assist SCAQMD staff to compile meteorological conditions for use in air quality modeling. In the event complaints are received regarding fugitive dust from the project or visible airborne dust is observed beyond the project boundaries, the SCAQMD may require LAXT to collect and analyze simultaneous upwind and downwind PM10 samples.

The monitoring plan for the LAXT terminal will include both upwind and downwind monitoring locations. The comprehensive monitoring will provide accurate data with regard to the contribution made by the operation of this facility towards the total particulate environment. Increased monitoring is an important tool for gathering detailed information which can be used to ensure compliance.

#### *Rideshare*

The City of Long Beach promotes ridesharing as a major employer through its Trip Reduction Program (TRIP), using an on-line access to Southern California Rideshare's database. This program provides match lists for potential commuters based on their home location, work destination, and work schedule. Bi-monthly luncheons and prize drawings are held for participants who rideshare a minimum of twelve days per month. Employees walking, jogging, or bicycling to work a minimum of eight days per month are also eligible for an additional bi-monthly prize drawing. The City also provides bicycles from the Police Department's recovered property section for employees committing to cycling to work a minimum of eight days per month. The TRIP program also provides a vanpool program for City employees and other individuals employed within the City of Long Beach. In 1996, the vanpool program had eighty-five participants and operated thirteen dedicated CNG vehicles.

Other elements of the program include rideshare and transit incentives such as preferred parking for pool vehicles; bicycle storage, locker and shower facilities; and free bus passes.

*Planning and Zoning*

The *Transportation Element* of the *General Plan* was revised in December, 1991, and reflects many of the recommendations in the 1991 Air Quality Management Plan (AQMP). Trip reduction and other related policies in the *Transportation Element* are incorporated into the *Air Quality Element*.

The City of Long Beach adopted a Transportation Demand and Trip Reduction Ordinance in 1993 (Ordinance No. C-7092). The ordinance requires a variety of transportation demand management measures at new development projects of 25,000 square feet or more, ranging from the availability of ridesharing materials and bicycle route information, to preferential carpool/vanpool parking, and bus stop improvements.

A Transportation Impact Fee Ordinance was adopted by City Council in November, 1990. The ordinance requires every new development to pay a fee to mitigate the proposed project's effect on the traffic level of service standard. The fees are collected and used for future traffic improvements.

The Community and Environmental Planning Division of the Department of Planning and Building performs virtually all of the required environmental reviews for development within the City. The Environmental Planners evaluate potential conflicts between emission sources and sensitive receptors in all non-exempt reviews. Land use impacts on air quality will continue to be a critical factor in the evaluation of new development proposals.

The Department of Planning and Building and the Department of Community Development are currently working together to create a specific Planned Development ordinance for the Downtown area. The Downtown area contains the most diverse mix of land uses in the City, and offers a number of opportunities for alternative modes of transportation. The Planning Bureau is also rewriting the *Open Space Element* of the *General Plan*, which provides an opportunity to identify "green" corridors where it would be beneficial to emphasize the planting of broadleaf trees, which help to purify the air.

Other efforts include amendments to the Zoning Code to include requirements for pedestrian and bicycle-friendly access, and generous provisions for reasonable home occupations. The Building Bureau will evaluate new efforts in construction regulations and renovation methods which could help to minimize harmful emissions. Building Bureau staff also monitor changes in the State building codes, particularly with regard to the standards for residential retrofit for electrical vehicle charging.

*Transportation Demand Measures*

Parking and transportation management are concepts which are promoted by the City through a number of efforts. In 1993, the Downtown Parking Management Plan was

adopted by the Redevelopment Agency and the Planning Commission. It effectively reduces the parking requirement for participating businesses by using a shared parking arrangement managed by the Redevelopment Bureau. Participation in the plan is voluntary, but has proven popular since the spaces are provided at a fraction of the development costs needed to create new parking spaces. The Long Beach Airport Area Transportation Management Association (LBA2TRA) serves employers in the Airport area, pooling resources to provide alternative transportation options for area users, as well as needed transportation improvements.

### *Long Beach Airport*

Commercial airliners operating at the Long Beach Airport are required to be the quieter, most fuel efficient Stage III aircraft. The fleet of General Aviation planes is also becoming cleaner and more efficient over time. Recent changes in laws concerning insurance and liability have led to a resurgence in the manufacturing of General Aviation aircraft and new advances in engine technology. There are a number of ground vehicles which are dual fuel, Compressed Natural Gas (CNG) and gasoline powered, and a street sweeper which is a dedicated CNG vehicle. Continued conversion of ground vehicles, including the use of electric vehicles, will be pursued in the coming years.

The restoration of the number of daily airline flights to forty-one will significantly reduce vehicle miles traveled by local origin and destination trips to other, more distant airports in the region.

The Long Beach Airport Area Transportation Management Association (LBA2TRA) received funding for over \$20 million in improvements during 1991-1992, to improve the level-of-service and to reduce dwell times.

### *Alternative Modes*

The Long Beach Transit Company provides bus service throughout the city, connecting schools, shopping centers, hotels, hospitals, major employers and major entertainment attractions. In fiscal year 1995-1996, the Transit Company served over 23.5 million passengers. In addition to providing intra- and inter-city bus service, Long Beach Transit operates a "Runabout" shuttle in the downtown area which links the Long Beach Plaza mall, the transit mall, the Queen Mary, and a number of hotels. The Runabout runs every six minutes during its operating hours seven days a week. The City has introduced a similar shuttle to the Belmont Shore/Second Street area.

Public bus transportation is provided by Long Beach Transit over thirty-six routes and via the downtown circulator shuttle, the Runabout. Over ninety percent of the City's residents live within one-quarter mile of a Long Beach Transit route.

Long Beach Transit covers a ninety-six square mile service area with some 574,000 residents in the southeast portion of Los Angeles County. A 1996 passenger survey indicated that approximately forty-eight percent of the bus passengers did not own a car and listed Long Beach Transit as their main mode of travel.

Additional public transit services are provided by the Los Angeles County Metropolitan Transportation Authority (LACMTA or MTA), Torrance Transit, Orange County Transportation Authority (OCTA), and the Los Angeles City Department of Transportation. The MTA operates the "Blue Line" light rail service from downtown Los Angeles. Long Beach Transit currently acts as a direct support to regional rail on the Blue Line, and also has plans for supporting service on the Green Line when additional funds become available.

The Capital Improvement Program calls for the annual improvement of bike routes through reconstruction, and striping and signing techniques at locations determined by the *Transportation Element* of the *General Plan*. The City currently has an extensive bike route system of fifty-two completed miles. Bicycles can also be accommodated on the Blue Line light rail transit system, which links downtown Los Angeles with downtown Long Beach. The First Street Transit Center provides for easy transit access, transfers, and information. A bicycle rental, storage, and repair demonstration project has been built at the Transit Center later this year at First Street and the Promenade, to serve both commuters and tourists. Bikestations, Inc. and LBA2TRA are currently developing an electronic Advance Traveler Information kiosk to be installed at the Bike Station. Features such as personalized transit itineraries, bicycle routes, carpool and vanpool matching, and other information about the City and its businesses will be included in the system.

Traffic flow in Long Beach has been improved through the comprehensive Traffic System Management Program. This program calls for the installation of a traffic signal coordination system to automatically alter timing and sequencing of signals to move traffic as smoothly as possible through the City. The program also includes signing, striping, intersection channelization, parking control, bike paths, and bus pull-out bays for roadway improvements and the better utilization of City streets.

#### *The Port of Long Beach*

The Port of Long Beach is one of the busiest port complexes in the United States, and is the largest with regard to number of containers processed. Located in the South Coast Air Basin, the port complex is also a source of motor vehicle activity, including trains, trucks, automobiles, ocean vessels, and mobile equipment for the movement of heavy lift cargoes.

The Port is an administrative department of the City of Long Beach. Under the authority vested in the Board of Harbor Commissioners, the Port of Long Beach has the responsibility of managing the public resources within the Long Beach Harbor District.

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The Port of Long Beach, as a landlord port, has some input in determining how private companies must operate facilities that are leased from the Port.

Under the responsibility of the Port's Planning Division, the goals and objectives of environmental management and master planning ensure that Port operations conform to the highest standards of local, state, and federal regulatory agencies. Many of the development projects within the Port of Long Beach require a commentary review by the South Coast Air Quality Management District, as well as the issuance of a Harbor Development Permit by the Long Beach Harbor Department. The Harbor Development Permit ensures that air emissions from both mobile and stationary sources are in compliance with the Air Quality Management Plan (AQMP).

### Cargo handling equipment

Various types of diesel-powered cargo handling equipment are currently in operation at the Port of Long Beach. Several of these types of equipment were considered for alternative fuel operation. These include the following: yard hostlers, a type of semi-tractor used for moving containerized cargo within the marine terminal, typically between the ocean vessel and the container stacks; rubber-tired gantry cranes, mobile equipment used for repositioning stacked containers; and side loaders, a type of motorized fork lift vehicle used to lift 40-foot containers from the yard hostlers and container stacks.

Among the various types of diesel-powered cargo handling equipment, the yard hostlers offer the best potential for substantial reductions in criteria pollutants. There are about 175 to 200 of the yard hostlers, which have an average useful life of twelve years. At the Port of Long Beach, the average age of this equipment is about seven years. The equipment inventory for Port tenants also includes approximately thirty-five to forty rubber-tired gantry cranes and about forty to forty-five side loaders.

In October 1993, Associated Diesel in San Bernardino, California began repowering three diesel-fueled Ottawa Model 30 yard hostlers by replacing their existing diesel engines with methanol engines. The three methanol yard hostlers went into service at the Maersk terminal at the beginning of 1994. In addition to monitoring the operation of the methanol vehicles, Acurex Environmental Corporation is recording data for a diesel yard hostler selected as a control vehicle.

This project resulted in a net reduction of air emissions due to lower net emissions from methanol-fueled yard hostlers compared to their diesel counterparts. Over a one-year period, the methanol hostlers prevented the emission of 101 pounds of NO<sub>x</sub>, 70 pounds of CO, 17 pounds of PM<sub>10</sub>, and 29 pounds of HC.

### Ships

The marine vessel fleet is powered by diesel engines, steam turbines, or gas turbines. The emissions inventory for the 1990 State Implementation Plan represents twenty-four tons per day of NO<sub>x</sub> from ocean-going marine vessels and six tons per day of NO<sub>x</sub> from other vessels. The ARB and the U.S. EPA currently have no emission standards or operational control measures for these sources, although some operational controls have been implemented by local districts.

Many ocean-going vessels are registered in foreign countries, and most use engines produced outside the U.S. Emissions from new engines used in these vessels can be most effectively reduced by establishing international emission standards, and the U.S. EPA and the International Maritime Organization have begun to address appropriate requirements. The proposed control measures would reduce NO<sub>x</sub> emissions from new diesel engines in ocean-going vessels by 30 percent. Assuming a 30-year life span for ocean-going ships, the proposed international standards would result in an overall NO<sub>x</sub> emission reduction of 10 percent for ocean-going ships in 2010.

Commercial ship traffic control measures can be utilized to further reduce ocean-going ship emissions. Relocation of the Southern California shipping channel to outside the Channel Islands would reduce the impact of ship emissions in both the Ventura and South Coast Basins. A reduction in ship speeds may also reduce ship emissions.

### Surface Transportation

Trucks and trains provide the link between the ships at the ports of Los Angeles and Long Beach with the network of American shippers and destinations. Railroad companies provide the power, the right-of-way and the space for the transportation of goods. Railroad cars may be owned by the railroad or by the individual shippers. Air pollution issues relating to trains include the emission of diesel exhaust, the additional impact of emissions from trains which idle on sidings adjacent to west side neighborhoods, and particulates from the product the trains carry such as coal, often in uncovered cars.

Section 213 of the federal Clean Air Act directs the EPA to adopt emission standards applicable to new locomotives and new engines used in locomotives. A proposed rulemaking is expected to be published in 1997. The ARB, as reported in the Draft 1997 AQMP, expects that the national emission standards adopted by EPA will be the most stringent standards feasible, and that the emission reductions will be met primarily through the use of diesel fuel and the transfer of emission control technologies from clean truck engines. The control technology needed to achieve these reductions has not yet been developed commercially. The technology may include diesel engine modifications, electronic fuel injection, improved cooling, and/or aftertreatment.