South Coast Air Basin Air Quality Information

Ozone (O_3)

The most pervasive air quality problem in the South Coast Air Basin is high O_3 concentrations. O_3 is the principal component of smog and is formed in the atmosphere through a complex series of photochemical reactions involving reactive organic compounds (ROC) and nitrogen oxides (NO_x), which are commonly referred to as precursors of O_3 and are both considered critical in O_3 formation. NO_x includes various combinations of nitrogen and oxygen, including nitric oxide (NO), NO_2, and nitrogen trioxide (NO_3). Significant O_3 production generally requires about three hours in a stable atmosphere with strong sunlight. O_3 is a regional air pollutant because it is transported and diffused by wind concurrent with the photochemical reaction process. Motor vehicles are the major source of O_3 precursors in the air basin. During late spring, summer, and early fall, light winds, low mixing heights, and abundant sunshine combine to produce conditions favorable for maximum production of O_3. The SCAB is designated as in non-attainment for both the federal and State ozone standards. Ozone is considered a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources generating ROC and NO_x emissions.

The federal and State Clean Air Acts require that management plans be developed for areas designated as non-attainment to establish strategies to achieve compliance. Because California's regulations are more stringent than the federal standard, two ozone plans apply to the project vicinity.

Ozone effects include eye and respiratory irritation, reduction of resistance to lung infection, and possible aggravation of pulmonary conditions in persons with lung disease. Ozone is also damaging to vegetation. The state one-hour ozone standard in the SCAQMD was exceeded 5 days in 1996 and at least once per year from 1997 through 2000. In 2002, the SCAB as a whole experienced ozone levels greater than federal standards more often than any other location in the country.

Carbon Monoxide (CO)

The SCAB is in non-attainment for both federal and state carbon monoxide standards. The basin exceeded federal standards in 2002; the highest 8-hour average in the basin was 107% of federal standard levels. Carbon monoxide is a non-reactive pollutant that is a product of incomplete combustion. Ambient carbon monoxide concentrations usually follow the spatial and temporal distributions of vehicular traffic and are also influenced by meteorological factors such as wind speed and atmospheric mixing. Under inversion conditions, carbon monoxide concentrations might be distributed more uniformly over an area out to some distance from vehicular sources.

CO is a colorless and odorless gas that, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Relatively high concentrations are typically found near crowded intersections and along heavily used roadways carrying slow-moving traffic. Even under the most severe meteorological and traffic conditions, high concentrations of CO are limited to locations within a relatively short distance (300 to 600 feet) of heavily traveled roadways. Overall CO emissions are decreasing as a result of the Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973. CO concentrations are typically higher in winter. As a result, California has required the use of oxygenated gasoline in the winter months to reduce CO emissions.

Nitrogen Oxides (NO_x)

The SCAB is a maintenance area for the federal and state NO_x standards, which means it was previously in non-attainment. It did not exceed federal standards in 2002. Only one location in the basin--in east San Fernando Valley--exceeded State standards in 2002, and only on one day. There are two oxides of nitrogen that are important in air pollution: nitric oxide (NO) and nitrogen dioxide (NO_2). Nitric oxide and NO_2 are both emitted from motor vehicle engines, power plants, refineries, industrial boilers, aircraft, and railroads. Nitrogen dioxide is primarily formed when NO reacts with atmospheric oxygen. Nitrogen dioxide gives the air the “whiskey brown” color associated with smog. High levels of NO_2 may be linked to increases in acute respiratory illnesses. Since NO_x emissions contribute to ozone generation, NO_x emissions are regulated through the O_3 Attainment Plans.

Although NO_2 concentrations have not exceeded national standards since 1991 and the state hourly standard since 1993, NO_x emissions remain of concern because of their contribution to the formation of O_3 and particulate matter.

Particulate Matter (PM_{10})

The SCAB is in non-attainment for the federal and State PM_{10} standard, although the annual arithmetic mean of PM_{10} in 2002 in the area surrounding the project area did not exceed federal standards. PM_{10} is particulate matter smaller than 10 microns in diameter. It can be inhaled deep into the lungs and cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust and fume producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter such as demolition and construction activities are more local in nature while others such as vehicular traffic have a more regional effect.

Fine Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ is particulate matter smaller than 2.5 microns in diameter. The State adopted $PM_{2.5}$ standards in 2003 of an annual average of 12 $\mu g/m^3$. Most areas

of the SCAB, including the project site, were in excess of these standards in 2002. Health impacts from $PM_{2.5}$ are similar to those linked to PM_{10}.

Sulfur Dioxide (SO_2)

Sulfur dioxide (SO_2) is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Though SO_2 concentrations have fallen to levels well below State and federal standards, more reductions in SO_2 emissions are desirable because sulfur dioxide is a precursor to sulfate and PM_{10}. Exposure to SO_2 can aggravate symptoms of asthma. The basin did not exceed or approach federal or State standards for sulfur dioxide in 2002.

Sulfates (SO_4)

Sulfates are linked to aggravation of asthmatic and cardio-pulmonary conditions. The basin did not exceed or approach federal or State standards for sulfates in 2002.

Lead (Pb)

Lead concentrations formerly were greater than state and federal air quality standards by a wide margin, but have not exceeded state or federal air quality standards at any regular monitoring station since 1982. Though special monitoring sites immediately downwind of lead sources recorded very localized violations of the state standard in 1994, no violations were recorded at these stations in 1996. Consequently, the Basin is designated as an attainment area for lead by both the EPA and ARB. Lead can impair the formation of blood and conduction of nerves.

Toxic Air Contaminants (TAC)

Toxic air contaminants (TAC) are pollutants known or suspected to cause cancer or other serious health effects such as birth defects. Toxic air contaminants might also have significant adverse environmental and ecological effects. Examples of TAC include benzene, diesel particulate, hydrogen sulfide, methylchloride, 1,1,1-trichloroethane, toluene, and metals such as cadmium, mercury, chromium, and lead.

Health effects from TAC vary depending on the specific toxic pollutant but might include cancer, immune system damage, as well as neurological, reproductive, developmental, and respiratory problems. According to the EPA, approximately 50% of the TAC we are exposed to comes from mobile source emissions. The EPA and ARB are both concerned over diesel particulate matter emissions. The EPA has published its final rule to control emissions of hazardous air pollutants from mobile sources in the March 29, 2001 Federal Register. The ARB approved a comprehensive diesel risk reduction plan in September 2000.