



Los Angeles World Airports
Global Leader in
Airport **Sustainability**

Glossary:

LAX Air Quality and Source Apportionment Study



Air Basin: A land area with generally similar meteorological and geographic conditions throughout. To the extent possible, boundaries are defined along political boundary lines and include both the source and receptor areas. California is currently divided into 15 air basins.

Atmospheric Dispersion Modeling: A model using meteorological and emissions inventory data, mathematical equations and algorithms to simulate how air pollutants are dispersed. Used to estimate or to predict the downwind concentration of air pollutants emitted from sources such as industrial plants and vehicular traffic.

Air Quality Standards: The not to exceed levels of air pollutants prescribed by regulations in a defined area.

Air Toxics: Any air pollutant for which a national ambient air quality standard (NAAQS) does not exist (i.e. excluding ozone, carbon monoxide, PM10, PM2.5, sulfur dioxide, nitrogen oxides) that may reasonably be anticipated to cause cancer; respiratory, cardiovascular, or developmental effects; reproductive dysfunctions, neurological disorders, heritable gene mutations, or other serious or irreversible chronic or acute health effects in humans.

Airborne Particulates: Total suspended particulate matter found in the atmosphere as solid particles or liquid droplets. Sources of airborne particulates include dust, emissions from industrial processes, combustion products from the burning of wood and coal, combustion products associated with motor vehicle or non-road engine exhausts, and reactions to gases in the atmosphere.

Ambient Air: Any unconfined portion of the atmosphere, open air, or surrounding air.

Area Source: Any source of air pollution that is released over a relatively small area but which cannot be classified as a point source. Such sources may include vehicles and other small engines, small businesses and household activities, or biogenic sources such as a forest that releases hydrocarbons. May also be referred to as nonpoint source.

Arterials: Major streets or roadways that typically cross through communities.

Benzene: A widely used chemical formed from both natural processes and human activities. It is found in the air from emissions sources such as burning coal and oil, gasoline service stations, and motor vehicle exhaust. An organic chemical compound and a known carcinogen with the molecular formula C₆H₆.

Butadiene: Is a simple conjugated diene. It is an important industrial chemical used as a monomer in the production of synthetic rubber. Several studies show butadiene exposure increases risk in cardiovascular diseases and cancer. Animal

data suggests the carcinogenic effects of butadiene may have a higher sensitivity to females over men when exposed to the chemical. While this data reveals important implications to the risks of human exposure to butadiene, more data is necessary to draw more conclusive risk assessments.

California Ambient Air Quality Standards (CAAQS): Standards set by the State of California for the maximum levels of air pollutants that can exist in the outdoor air without unacceptable effects on human health or the public welfare. These are more stringent than national standards (NAAQS).

California Air Resources Board (ARB): The State's lead air quality agency, consisting of a nine-member Governor-appointed board. It is responsible for attainment and maintenance of the state and federal air quality standards, and is fully responsible for motor vehicle pollution control. It oversees county and regional air pollution management programs.

Carbon Dioxide (CO₂): A colorless, odorless, non-poisonous gas that exists in trace quantities (less than 400 parts per million) within ambient air. Carbon dioxide is a product of fossil fuel combustion. Although carbon dioxide does not directly impair human health, it is a greenhouse gas that traps terrestrial (i.e., infrared) radiation and contributes to the potential for global warming.

Carbon Monoxide (CO): A colorless, odorless, poisonous gas, produced by incomplete burning of carbon-based fuels, including gasoline, oil and wood. Carbon monoxide is also produced from incomplete combustion of many natural and synthetic products. For instance, cigarette smoke contains carbon monoxide.

Chemical Mass Balance: One of several air quality receptor models that have been applied to air resources management. Receptor models use the chemical and physical characteristics of gases and particles measured at source and receptor to both identify the presence of and to quantify source contributions to receptor concentrations.

Chlorofluorocarbons (CFCs): A family of inert, nontoxic, and easily liquefied chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere, they drift into the upper atmosphere, where their chlorine components destroy ozone. The 1990 Clean Air Act includes provisions for reducing releases (emissions) and eliminating production and use of these ozone-destroying chemicals.

Community Benefits Agreement (CBA): An agreement stemming from the LAX Master Plan. It sets forth (1) a range of community benefits and impact mitigations that will be provided by the Los Angeles World Airports as part of the LAX Master Plan Program, and (2) an ongoing role for the LAX Coalition for Economic, Environmental and Educational Justice in implementation and oversight of these benefits and mitigations.

Concentration: The relative amount of a substance mixed with another substance. Examples are 5 parts per million (ppm) of carbon monoxide in air and 1 milligram per liter (mg/L) of iron in water.

Contaminant: Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

Continuous Emission Monitoring Systems (CEMS): Machines that measure, on a continuous basis, pollutants released by a source. The 1990 Clean Air Act requires continuous emission monitoring systems for certain large sources.

California Environmental Protection Agency (Cal/EPA): State environmental agency with the mission of improving environmental quality in order to protect public health, the welfare of our citizens, and California's natural resources. Cal/EPA aims to achieve its mission in an equitable, efficient, and cost-effective manner.



Criteria Air Pollutants: The 1970 amendments to the Clean Air Act required EPA to set National Ambient Air Quality Standards for certain pollutants known to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide. The term, "criteria pollutants" derives from the requirement that EPA must describe the characteristics and potential health and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised.

Diesel Engine: A type of internal combustion engine that uses low-volatility petroleum fuel and fuel injectors and initiates combustion using compression ignition (as opposed to spark ignition that is used with gasoline engines).

Dispersion: The movement of a pollutant from a high concentration to lower concentrations covering a larger area.

Emission: Release of pollutants into the air from a source.

Emission Factor: The relationship between the amount of pollution produced and the amount of raw material processed. For example, an emission factor for a blast furnace making iron would be the number of pounds of particulates per ton of raw materials.

Emission Inventory: A listing, by source, of the amount of air pollutants discharged into the atmosphere of a community; used to establish emission standards. Pollution sources can be emitted from mobile and stationary sources into the atmosphere over a specific period such as a day or a year.

Emissions and Dispersion Modeling System (EDMS): A complex source microcomputer model designed to assess the air quality impacts of airport emission sources, particularly aviation sources, which consist of aircraft auxiliary power units, ground support equipment, ground access vehicles, and stationary sources.

Epidemiology Study: Epidemiology is the study of factors affecting the health and illness of populations, and serves as the foundation and logic of interventions made in the interest of public health and preventive medicine. It is considered a cornerstone methodology of public health research, and is highly regarded in evidence-based medicine for identifying risk factors for disease and determining optimal treatment approaches to clinical practice.

Ethanol: Ethyl-alcohol, a volatile alcohol containing two carbon groups (CH₃CH₂OH). For fuel use, ethanol is produced by fermentation of corn or other plant products.

Exceedence: A measured level of an air pollutant higher than the national or state ambient air quality standards.

Formaldehyde: Formaldehyde (H₂CO) can be toxic, allergenic, and carcinogenic. Because formaldehyde resins are used in many construction materials it is one of the more common indoor air pollutants. At concentrations above 0.1 ppm in air formaldehyde can irritate the eyes and mucous membranes, resulting in watery eyes. Formaldehyde inhaled at this concentration may cause headaches, a burning sensation in the throat, and difficulty breathing, as well as triggering or aggravating asthma symptoms. Formaldehyde is classified as a probable human carcinogen by the U.S. Environmental Protection Agency.

Greenhouse Gases: Includes gases present in the atmosphere which reduce the loss of heat into space and therefore contribute to global temperatures through the greenhouse effect. Greenhouse gases are essential to maintaining the temperature of the Earth; without them the planet would be so cold as to be uninhabitable. However, an excess of greenhouse gases can raise the temperature of a planet to lethal levels.

Hydrochlorofluorocarbons (HCFCs): Compounds containing carbon, hydrogen, chlorine, and fluorine. They were originally intended as replacements for CFCs, but are only a temporary solution because they still contain chlorine and have the potential to destroy stratospheric ozone.

Hazardous Air Pollutants (HAPs): Chemicals that cause serious health and environmental effects, the U.S. Congress classified 188 compounds as HAPs. Health effects include cancer, birth defects, and nervous system problems. HAPs are released by sources such as chemical plants, dry cleaners, printing plants, and motor vehicles (cars, trucks, buses, etc.)

Hydrocarbons (HC): Chemical compounds that consist entirely of carbon and hydrogen.

Hydrogen Sulfide (H₂S): Gas emitted during organic decomposition. Also a by-product of oil refining and burning. Smells like rotten eggs and, in heavy concentration, can kill or cause illness.

Inorganic Pollutants: Pollutants of mineral origin and not of basically carbon structure.

LAX Master Plan: The LAX Master Plan is a strategic framework for future development of Los Angeles International Airport (LAX). It is the first comprehensive improvement plan for the airport since 1956. The last major renovations were completed prior to the 1984 Olympics in Los Angeles. This LAX Master Plan modernizes the runway and taxiway system, redevelops the terminal area, improves access to the airport, and enhances passenger safety, security, and convenience.

Lead: A gray-white metal that is soft, malleable, ductile, and resistant to corrosion. Sources of lead resulting in concentrations in the air include industrial sources and crustal weathering of soils followed by fugitive dust emissions. Lead is the only substance which is currently listed as both a criteria air pollutant and a toxic air contaminant.

MATES: Acronym for Multiple Air Toxics Exposure Study (MATES) completed by SCAQMD. This study serves as a precursor to this LAX Air Quality and Source Apportionment Study (AQSAS).

Methane (CH₄): A greenhouse gas that is emitted during the production and transport of coal, natural gas, and oil or from the decomposition of organic wastes in municipal solid waste landfills and the raising of livestock. Although CO₂ is more prevalent in the atmosphere, methane is over 20 times more effective in trapping heat than CO₂ over a 100-year period.

Mobile Sources: Sources of air pollution such as automobiles, motorcycles, trucks, off-road vehicles, boats and airplanes.

National Ambient Air Quality Standards (NAAQS): Standards set by the federal EPA for the maximum levels of air pollutants that can exist in the outdoor air without unacceptable effects on human health or public welfare.

Nitrogen Oxides (NO_x): A group of gases that cause acid rain and other environmental problems, such as smog and eutrophication of coastal waters. Burning fossil fuels such as coal and gasoline releases NO_x into the atmosphere.

Nitrogen Dioxide (NO₂): The result of nitric oxide combining with oxygen in the atmosphere; major component of photochemical smog.

Non-Attainment Area: A geographic area identified by the EPA and/or ARB as not meeting either NAAQS or CAAQS standards for a given pollutant.



Non-Parametric Regression Analysis: In statistical inference, or hypothesis testing, the traditional tests are called parametric tests because they depend on the specification of a probability distribution (such as the normal) except for a set of free parameters. Parametric tests are said to depend on distributional assumptions. Nonparametric tests, on the other hand, do not require any strict distributional assumptions. Even if the data are distributed normally, nonparametric methods are often almost as powerful as parametric methods.

Office of Environmental Health Hazard Assessment (OEHHA): The mission of OEHHA is to protect and enhance public health and the environment by objective scientific evaluation of risks posed by hazardous substances. While OEHHA does not promulgate environmental regulations directly, it is responsible for developing and providing risk managers in state and local government agencies with toxicological and medical information relevant to decisions involving public health.

Ozone: A strong smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms. It is a product of the photochemical process involving the sun's energy. Ozone exists in the upper atmosphere ozone layer as well as at the earth's surface. Ozone at the earth's surface causes numerous adverse health effects and is a criteria air pollutant. It is a major component of smog.

Organic Compounds: Chemical Compounds containing carbon and hydrogen.

Particulate Matter (PM): A complex mixture of extremely small particles and liquid droplets. It is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles.

Particulate Matter with an aerodynamic diameter equal or less than 2.5 microns (PM_{2.5}): Fine particles, or PM_{2.5}, are a criteria pollutant that pose an increased health risk over PM₁₀. This is because PM_{2.5} can deposit deep in the lung and contain substances that are particularly harmful to human health. The United States Environmental Protection Agency promulgated national PM_{2.5} standards in 1997.

Particulate Matter with an aerodynamic diameter equal or less than 10 microns (PM₁₀): PM₁₀ is a criteria air pollutant that includes dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including burning of diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steel making, mining operations, agricultural burning (field and slash burning), and operation of fireplaces and woodstoves. Particulate pollution can cause eye, nose and throat irritation and other health problems.

Parts Per Billion (ppb)/Parts Per Million (ppm): Units commonly used to express contamination ratios, as in establishing the maximum permissible amount of a contaminant in water, land, or air.

Peer Review: A process of subjecting an author's scholarly work, research or ideas to the scrutiny of others who are experts in the same field. Successful peer review therefore requires a community of experts in a given (and often narrowly defined) field, who are qualified and able to perform impartial review.

Polycyclic Aromatic Hydrocarbons (PAHs): Organic compounds which include only carbon and hydrogen with a fused ring structure containing at least two benzene (six-sided) rings. PAHs may also contain additional fused rings that are not six-sided. The combustion of organic substances is a common source of atmospheric PAHs.

Point Source: A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution; e.g. a pipe, ditch, ship, ore pit, factory smokestack.

Quality Assurance/Quality Control (QA/QC): A system of procedures, checks, audits, and corrective actions to ensure that all research design and performance, environmental monitoring and sampling, and other technical and reporting activities achieve the program's desired data quality objectives.

Reactive Organic Gas (ROG): A photochemically reactive chemical gas, composed of non-methane hydrocarbons, that may contribute to the formation of smog. Also sometimes referred to as Non-Methane Organic Gases (NMOGs).

Receptor Modeling: The application of multivariate statistical methods to the identification and quantitative apportionment of air pollutants to their sources.

Regression Analysis: Any statistical method where the mean of one or more random variables is predicted based on other measured random variables.

Semi-Volatile Organic Compounds: A general term for organic compounds that volatilize relatively slowly at standard temperature (20 °C) and pressure (1 atm).

Source: Any place or object from which pollutants are released. Sources that stay in one place are referred to as stationary sources; sources that move around, such as cars or planes, are called mobile sources. Examples of emission sources are power plants, factories, dry cleaning businesses, gas stations or farms. Cars, trucks and other motor vehicles are considered mobile sources. Consumer products and machines used in industry can also be considered sources.

South Coast Air Quality Management District (SCAQMD): The South Coast AQMD is the air pollution control agency for the four-county region including Orange counties and parts of Los Angeles, Riverside and San Bernardino counties. The South Coast Air Quality Management District, by law, is required to achieve and maintain healthful air quality for its residents. This is accomplished through a comprehensive program of planning, regulation, compliance assistance, enforcement, monitoring, technology advancement, and public education.

Spatial Gradient Analysis: This is a technique of using a spatially distributed array of measurements to determine the geographic dispersion of pollutant emissions.

Stationary Source: A place or object from which pollutants are released and which does not move around. Stationary sources include power plants, gas stations, incinerators, houses etc., and exclude mobile sources such as cars, trucks, trains, planes, and ships.

Stipulated Settlement Agreement: Los Angeles Mayor Antonio R. Villaraigosa and the Los Angeles City Council gave final approval in early 2006 to the settlement of lawsuits filed against the Los Angeles International Airport (LAX) Master Plan. The settlement was also approved by the city councils of Culver City, El Segundo and Inglewood; the Los Angeles County Board of Supervisors; the board of the Alliance for a Regional Solution to Airport Congestion (ARSAC); and the Los Angeles Board of Airport Commissioners.

Sulfur Dioxide: A criteria air pollutant and gas produced by burning coal, most notably in power plants. Some industrial processes, such as production of paper and smelting of metals, produce sulfur dioxide. Sulfur dioxide is closely related to sulfuric acid, a strong acid. Sulfur dioxide plays an important role in the production of acid rain.

Time Series Analysis: A time series is a sequence of data points, measured typically at successive times, spaced at (often uniform) time intervals. Time series analysis comprises methods that attempt to understand such time series, often either to understand the underlying context of the data points (where did they come from? what generated them?), or to make forecasts (predictions).

Toxic Air Contaminant (TAC): TACs are substances identified in state



regulations by the ARB. The TACs list includes more than 240 chemicals, including all 188 of the hazardous air pollutants identified in the federal Clean Air Act Amendments (1990).

Technical Working Group (TWG): An ad-hoc group formed to assist LAWA in directing the AQSAS. The group consists of professional experts including: air quality scientists and engineers from the U.S. Environmental Protection Agency, California Air Resources Board, South Coast Air Quality Management District, the State of California Office of Environmental Health Hazard Assessment, Federal Aviation Administration, community organizations, and the University of Southern California.

Ultrafines (UFP): Particulate Matter with an aerodynamic diameter of less than 0.1 micron. This is a subset of Fine Particulate Matter (PM_{2.5}) but does not have a separate air quality standard. The particulate emissions from aircraft engines is thought to be composed almost entirely of ultrafines.

United States Environmental Protection Agency (EPA): The federal agency charged with setting policy and guidelines, and carrying out legal mandates for the protection of national interests in environmental resources.

Volatile: Any substance that evaporates readily.

Volatile Organic Compounds (VOCs): Hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and/or may themselves be toxic. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

