Glossary of Selected Air Quality/Emission Inventory Terms

Source: “Terms of the Environment” http://www.epa.gov/OCEPAterms/

Absorption: The uptake of water, other fluids, or dissolved chemicals by a cell or an organism (as tree roots absorb dissolved nutrients in soil.)

Acid Deposition: A complex chemical and atmospheric phenomenon that occurs when emissions of sulfur and nitrogen compounds and other substances are transformed by chemical processes in the atmosphere, often far from the original sources, and then deposited on earth in either wet or dry form. The wet forms, popularly called "acid rain," can fall to earth as rain, snow, or fog. The dry forms are acidic gases or particulates.

Adsorption: Removal of a pollutant from air or water by collecting the pollutant on the surface of a solid material; e.g., an advanced method of treating waste in which activated carbon removes organic matter from waste-water.

Aerosol: 1. Small droplets or particles suspended in the atmosphere, typically containing sulfur. They are usually emitted naturally (e.g. in volcanic eruptions) and as the result of anthropogenic (human) activities such as burning fossil fuels. 2. The pressurized gas used to propel substances out of a container.

Afterburner: In incinerator technology, a burner located so that the combustion gases are made to pass through its flame in order to remove smoke and odors. It may be attached to or be separated from the incinerator proper.

Air Pollutant: Any substance in air that could, in high enough concentration, harm man, other animals, vegetation, or material. Pollutants may include almost any natural or artificial composition of airborne matter capable of being airborne. They may be in the form of solid particles, liquid droplets, gases, or in combination thereof. Generally, they fall into two main groups: (1) those emitted directly from identifiable sources (primary pollutants) and (2) those produced in the air by interaction between two or more primary pollutants, or by reaction with normal atmospheric constituents, with or without photoactivation. Air pollutants are often grouped in categories for ease in classification; some of the categories are: solids, sulfur compounds, volatile organic chemicals, particulate matter, nitrogen compounds, oxygen compounds, halogen compounds, radioactive compound, and odors.

Air Pollution: The presence of contaminants or pollutant substances in the air that interfere with human health or welfare, or produce other harmful environmental effects.

Air Pollution Control Device: Mechanism or equipment that cleans emissions generated by a source (e.g. an incinerator, industrial smokestack, or an automobile exhaust system) by removing pollutants that would otherwise be released to the atmosphere.

Air Quality Standards: The level of pollutants prescribed by regulations that are not being exceeded during a given time in a defined area.

Air Toxics: Any air pollutant 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. Chemical composition of particulates varies widely, depending on location and time of year. 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, surrounding air.

U.S. Ambient Air Quality Standards: (See: Criteria Pollutants.)

U.S. Attainment Area: An area considered to have air quality as good as or better than the national ambient air quality standards as defined in the U.S. Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others.

Baghouse Filter: Large fabric bag, usually made of glass fibers, used to eliminate intermediate and large (greater than PM_{20} in diameter) particles. This device operates like the bag of an electric vacuum cleaner, passing the air and smaller particles while entrapping the larger ones.

Bioaccumulants: Substances that increase in concentration in living organisms as they take in contaminated air, water, or food because the substances are very slowly metabolized or excreted. An example of a bioaccumulant pollutant is mercury.

Capture Efficiency: The fraction of organic vapors generated by a process that are directed to an abatement or recovery device.

Carbon Monoxide (CO): A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.

Catalytic Converter: An air pollution abatement device that removes pollutants from motor vehicle exhaust, either by oxidizing them into carbon dioxide and water or reducing them to nitrogen.

Catalytic Incinerator: A control device that oxidizes volatile organic compounds (VOCs) by using a catalyst to promote the combustion process. Catalytic incinerators require lower temperatures than conventional thermal incinerators, thus saving fuel and other costs.

Centrifugal Collector: A mechanical system using centrifugal force to remove aerosols from a gas stream or to remove water from sludge.

Climate Change (also referred to as 'global climate change'): The term 'climate change' is sometimes used to refer to all forms of climatic inconsistency, but because the Earth's climate is never static, the term is more properly used to imply a significant change from one climatic condition to another. In some cases, 'climate change' has been used synonymously with the term, 'global warming'; scientists however, tend to use the term in the wider sense to also include natural changes in climate. (See: global warming.)

Concentration: The relative amount of a substance mixed with another substance. An example is 5 ppm of carbon monoxide in air or 1 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.

U.S. Criteria Air Pollutants: The 1970 amendments to the U.S. Clean Air Act required the U.S. 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 air pollutants" derives from the requirement that U.S. 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.

Cyclone Collector: A device that uses centrifugal force to remove large particles from polluted air.

Data Quality Objectives (DQOs): Qualitative and quantitative statements of the overall level of uncertainty that a decision-maker will accept in results or decisions based on environmental data. They provide the statistical framework for planning and managing environmental data operations consistent with user's needs.

Diluent: Any liquid or solid material used to dilute or carry an active ingredient.

Electrostatic Precipitator (ESP): A device that removes particles from a gas stream (smoke) after combustion occurs. The ESP imparts an electrical charge to the particles, causing them to adhere to metal plates inside the precipitator. Rapping on the plates causes the particles to fall into a hopper for disposal.

Emission: Pollution discharged into the atmosphere. Sources of emissions include smokestacks, other vents, and surface areas of commercial or industrial facilities; residential chimneys; and motor vehicle, locomotive, or aircraft exhausts.

Emission Factor: The relationship between the amount of pollution produced and some related activity measurement, such as 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 geographic area (community, city, district, nation, world).

Eutrophication: A condition in an aquatic ecosystem where high nutrient concentrations stimulate blooms of algae (e.g., phytoplankton). Human activities can accelerate the process.

Exposure: The amount of pollutant present in a given environment that represents a potential health threat to living organisms.

Fabric Filter: A cloth device that catches dust particles from industrial emissions.

Flow Rate: The rate, expressed in cubic meters per hour (m^3/hr); at which a gas escapes from a hole or fissure in a tank. This is a stack parameter that is needed for air pollutant modeling.

Flue Gas: The air coming out of a chimney after combustion in the burner it is venting. It can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, particles and many chemical pollutants.

Flue Gas Desulfurization: A technology that employs a sorbent, usually lime or limestone, to remove sulfur dioxide from the gases produced by burning fossil fuels. Flue gas desulfurization is current state-of-the art technology for major SO_2 emitters, like power plants.

Fugitive Emissions: Emissions not released from stacks or units in a facility. Non-stack emissions include leaks from valves, flanges, etc.

Global Warming: An increase in the near surface temperature of the Earth. Global warming has occurred in the distant past as the result of natural influences, but the term is most often used to refer to the warming predicted to occur as a result of increased emissions of greenhouse gases. Scientists generally agree that the Earth's surface has warmed by about 1 degree Fahrenheit in the past 140 years. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that increased concentrations of greenhouse gases are causing an increase in the Earth's surface temperature and that increased concentrations of sulfate aerosols have led to relative cooling in some regions, generally over and downwind of heavily industrialized areas. (See: climate change)

Grain Loading: The rate at which particles are emitted from a pollution source (i.e., number of grains per cubic foot of gas emitted).

Greenhouse Effect: The warming of the Earth's atmosphere attributed to a buildup of carbon dioxide or other gases; some scientists think that this build-up allows the sun's rays to heat the Earth, while making the infra-red radiation atmosphere opaque to infra-red radiation, thereby preventing a counterbalancing loss of heat.

Greenhouse Gas: A gas, such as carbon dioxide or methane, which contributes to potential climate change.

U.S. Hazardous Air Pollutants: Air pollutants, which are not covered by ambient air quality standards but which, as defined in the U.S. Clean Air Act, may present a threat of adverse human health effects or adverse environmental effects. Such pollutants include asbestos, beryllium, mercury, benzene, or radionuclides.

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

Incineration: A treatment technology involving destruction of waste by controlled burning at high temperatures; e.g., burning sludge to remove the water and reduce the remaining residues to a safe, non-burnable ash that can be disposed of safely on land, in some waters, or in underground locations.

Inhalable Particles: All dust capable of entering the human respiratory tract.

Inspection and Maintenance (I/M): 1. Activities to ensure that vehicles' emission controls work properly. 2. Also applies to wastewater treatment plants and other anti-pollution facilities and processes.

Irritant: A substance that can cause irritation of the skin, eyes, or respiratory system. Effects may be acute from a single high-level exposure, or chronic from repeated low-level exposures to such compounds as chlorine, nitrogen dioxide, and nitric acid. Isoconcentration: More than one sample point exhibiting the same isolated concentration.

Low NO_x Burners: One of several combustion technologies used to reduce emissions of nitrogen oxides.

Media: Specific environments--air, water, soil--which are the subject of regulatory concern and activities.

Mobile Source: Any non-stationary source of air pollution such as cars, trucks, motorcycles, buses, airplanes, locomotives, farm and construction equipment.

Nitric Oxide (NO): A gas formed by combustion under high temperature and high pressure in an internal combustion engine. NO is converted by sunlight and photochemical processes in ambient air to nitrogen oxide. NO is a precursor of ground-level ozone pollution, or smog.

Nitrogen Dioxide (NO_2): The result of nitric oxide combining with oxygen in the atmosphere; major component of photochemical smog.

Nitrogen Oxide (NO_x): The result of photochemical reactions of nitric oxide in ambient air; major component of photochemical smog. NO_x is a product of combustion from transportation and stationary sources and a major contributor to the formation of ozone in the troposphere and to acid deposition.

Non-Point Sources: 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 small businesses and household activities, forest fires, and natural or biogenic sources such as a forest that releases hydrocarbons.

U.S. Non-Attainment Area: Area that does not meet one or more of the U.S. National Ambient Air Quality Standards for the criteria pollutants designated in the U.S. Clean Air Act.

Non-Methane Hydrocarbon (NMHC): The sum of all hydrocarbon air pollutants except methane; significant precursors to ozone formation.

Non-Methane Organic Gases (NMOG): The sum of all organic air pollutants. Excluding methane; they account for aldehydes, ketones, alcohols, and other pollutants that are not hydrocarbons but are precursors of ozone.

Nonroad Emissions: Also known as “offroad” emissions. Pollutants emitted by nonhighway mobile sources such as aircraft, locomotives, combustion engines on farm and construction equipment, gasoline-powered lawn and garden equipment, and powerboats and outboard motors.

Onroad Emissions: Pollutants emitted by mobile sources from highway vehicles such as cars, trucks, and buses.

Organic Chemicals/Compounds: Naturally occurring (animal or plant-produced or synthetic) substances containing mainly carbon, hydrogen, nitrogen, and oxygen.

Oxidant: A collective term for some of the primary constituents of photochemical smog.

Ozone Depletion: Destruction of the stratospheric ozone layer that shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.

Ozone Hole: A thinning break in the stratospheric ozone layer. Designation of amount of such depletion as an "ozone hole" is made when the detected amount of depletion exceeds fifty percent. Seasonal ozone holes have been observed over the Antarctic and Arctic regions, part of Canada, and the extreme northeastern United States.

Ozone Layer: The protective layer in the atmosphere, about 15 miles above the ground, that absorbs some of the sun's ultraviolet rays, thereby reducing the amount of potentially harmful radiation that reaches the earth's surface.

Particulate Matter: 1. Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions. 2. Very small solids suspended in water; they can vary in size, shape, density and electrical charge and can be gathered together by coagulation and flocculation.

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.

Photochemical Oxidants or Smog: Air pollutants formed by the action of sunlight on oxides of nitrogen and hydrocarbons.

PM_{10}/$PM_{2.5}$: PM_{10} is measure of particles in the atmosphere with a diameter of less than 10 or equal to a nominal 10 micrometers. $PM_{2.5}$ is a measure of smaller particles in the air, with a diameter of less than 2.5 micrometers.

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.

Pollutant: Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.

Pollution: Generally, the presence of a substance in the environment that because of its chemical composition or quantity prevents the functioning of natural processes and produces undesirable environmental and health effects.

Precipitator: Pollution control device that collects particles from an air stream.

Precursor: In photochemistry, a compound antecedent to a pollutant. For example, volatile organic compounds (VOCs) and nitric oxides of nitrogen react in sunlight to form ozone or other photochemical oxidants. As such, VOCs and oxides of nitrogen are precursors.

Quality Assurance/Quality Control: A system of procedures, checks, audits, and corrective actions to ensure that all environmental staff designs and performance activities, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

Remote Sensing: The collection and interpretation of information about an object without physical contact with the object; e.g., satellite imaging, aerial photography, and open path measurements.

Running Losses: Evaporation of motor vehicle fuel from the fuel tank while the vehicle is in use.

Scrubber: An air pollution device that uses a spray of water or reactant or a dry process to trap pollutants in emissions.

Smog: Air pollution typically associated with oxidants. (See: photochemical smog.)

Stack: A chimney, smokestack, or vertical pipe that discharges used air.

Stage II Controls: Systems placed on service station gasoline pumps to control and capture gasoline vapors during refueling.

Stationary Source: A fixed-site producer of pollution, mainly power plants and other facilities using industrial combustion processes. (See: point source.)

Stratosphere: The portion of the atmosphere 10 to 25 miles above the earth's surface.

Toxic Pollutants: See air toxics.

Transboundary Pollutants: Air pollution that travels from one jurisdiction to another, often crossing state or international boundaries. Also applies to water pollution.

Troposphere: The layer of the atmosphere closest to the earth's surface.

Volatile: Any substance that evaporates readily.