

Glossary

Note: This glossary integrates definitions from the ISEA¹ and other sources, and many of the definitions are included verbatim.

Still need definitions for:

ingestion	
pathway	intensity
receptor	plume
inhalation	vapor intrusion model *
surface soil	volatile organic compound*
subsurface soil	semi volatile organic compound*
groundwater	polycyclic aromatic hydrocarbon*
surface water*	heavy metal*
wastewater*	background*
site conceptual model*	screening (or screening levels)*
aquifer	dose*

Absorption barrier:

Any exposure surface that may retard the rate of penetration of an agent into a target. Examples of absorption barriers are the skin, respiratory tract lining, and gastrointestinal tract wall (cf. exposure surface).

Activity pattern data:

Information on human activities used in exposure assessments. These may include a description of the activity, frequency of activity, duration spent performing the activity, and the microenvironment in which the activity occurs.

Activity use limitation (AUL):

Under the Massachusetts Contingency Plan, in cases when a chemical release cannot be cleaned to MCP standards (e.g., contaminated soil found under a building that cannot be removed), the responsible party may place an *AUL* on the contaminated area. This *AUL* is a deed restriction that prohibits unsafe usage of property by current or future owners.

Acute exposure: A contact between an agent and a target occurring over a short time, generally less than a day. (Other terms, such as “short-term exposure” and “single dose,” are also used).

Agent: A chemical, biological, or physical entity that contacts a target.

Aquifer:**Background level:**

A typical or average level of a chemical in the environment. *Background* often refers to naturally occurring or uncontaminated levels, i.e., the amount of an agent in a medium (e.g., water, soil) that is not attributed to the source(s) under investigation in an exposure assessment. Background level(s) can be naturally occurring or the result of human activities. (Note: **natural background** is the concentration of an agent in a medium that occurs naturally or is not the result of human activities).

Bioavailability:

The rate and extent to which an agent can be absorbed by an organism and is available for metabolism or interaction with biologically significant receptors. Bioavailability involves both release from a medium (if present) and absorption by an organism.

Biomarker/biological marker:

Indicator of changes or events in biological systems. Biological markers of exposure refer to cellular, biochemical, analytical, or molecular measures that are obtained from biological media such as tissues, cells, or fluids and are indicative of exposure to an agent.

Bounding estimate:

An estimate of exposure, dose, or risk that is higher than that incurred by the person with the highest exposure, dose, or risk in the population being assessed. Bounding estimates are useful in developing statements that exposures, doses, or risks are “not greater than” the estimated value.

Carcinogen:

Any substance that may produce cancer.

CERCLA:

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as Superfund. This is the legislation that created ATSDR.

Chronic exposure:

A continuous or intermittent long-term contact between an agent and a target. (Other terms, such as “long-term exposure,” are also used).

Comparison values:

Estimated contaminant concentrations in specific media that are not likely to cause adverse health effects, given a standard daily ingestion rate and standard body weight. The *comparison values* are calculated from the scientific literature available on exposure and health effects.

Concentration:

The amount of one substance dissolved or contained in a given amount of another. For example, sea water contains a higher concentration of salt than fresh water.

Contact volume:

A volume containing the mass of agent that contacts the exposure surface.

Contaminant:

Any substance or material that enters a system (the environment, human body, food, etc.) where it is not normally found.

Dermal (exposure):

Referring to the skin. *Dermal* absorption means absorption through the skin.

Dose:

The amount of substance to which a person is exposed, i.e. the amount of agent that enters a target after crossing an exposure surface. *Dose* often takes body weight into account.

Dose rate:

Dose per unit time.

Environmental contamination:

The presence of hazardous substances in the environment. From the public health perspective, *environmental contamination* is addressed when it potentially affects the health and quality of life of people living and working near the contamination.

Exposure:

Contact with a chemical by swallowing, by breathing, or by direct contact (such as through the skin or eyes [exposure surfaces]). *Exposure* may be short term (acute) or long term (chronic), and the duration of exposure may be relevant.

Exposure assessment:

The process of estimating or measuring the magnitude, frequency and duration of exposure to an agent, along with the number and

characteristics of the population exposed. Ideally, it describes the sources, pathways, routes, and the uncertainties in the assessment.

Exposure concentration:

The exposure mass divided by the contact volume or the exposure mass divided by the mass of contact volume depending on the medium.

Exposure duration:

The length of time over which continuous or intermittent contacts occur between an agent and a target. For example, if an individual is in contact with an agent for 10min a day, for 300 days over a 1-year time period, the exposure duration is 1-year.

Exposure event:

The occurrence of continuous contact between an agent and a target.

Exposure frequency:

The number of exposure events in an exposure duration.

Exposure loading:

The exposure mass divided by the exposure surface area. For example, a dermal exposure measurement based on a skin wipe sample, expressed as a mass of residue per skin surface area, is an exposure loading.

Exposure mass:

The amount of agent present in the contact volume. For example, the total mass of residue collected with a skin wipe sample over the entire exposure surface is an exposure mass.

Exposure model:

A conceptual or mathematical representation of the exposure process.

Exposure pathway:

The course an agent takes from the source to the target.

Exposure period:

The time of continuous contact between an agent and a target

Exposure route:

The way an agent enters a target after contact (e.g., by ingestion, inhalation, or dermal absorption).

Exposure scenario:

A combination of facts, assumptions, and inferences that define a discrete situation where potential exposures may occur. These may include the source, the exposed population, the time frame of exposure,

microenvironment(s), and activities. Scenarios are often created to aid exposure assessors in estimating exposure.

Exposure surface:

A surface on a target where an agent is present. Examples of outer exposure surfaces include the exterior of an eyeball, the skin surface, and a conceptual surface over the nose and open mouth. Examples of inner exposure surfaces include the gastrointestinal tract, the respiratory tract, and the urinary tract lining. As an exposure surface gets smaller, the limit is an exposure point.

Hazard:

A source of risk that does not necessarily imply potential for occurrence. A hazard produces risk only if an exposure pathway exists, and if exposures create the possibility of adverse consequences.

Ingestion:

Swallowing (such as eating or drinking). Chemicals can get in or on food, drink, utensils, cigarettes, or hands where they can be ingested. After *ingestion*, chemicals can be absorbed into the blood and distributed throughout the body.

Inhalation:

Breathing. Exposure may occur from inhaling contaminants because they can be deposited in the lungs, taken into the blood, or both.

Intake:

The process by which an agent crosses an outer exposure surface of a target without passing an absorption barrier, i.e. through ingestion or inhalation (see dose).

Immediate Response Action (IRA):

Under the MCP, an *IRA* can be any of a number of assessments or actions performed quickly to address a sudden chemical release.

Massachusetts Contingency Plan (MCP):

The *MCP* is the Massachusetts Department of Environmental Protection regulation for reporting, assessing, and cleaning up releases of oil and hazardous material.

Media (singular: medium):

Material (e.g., air, water, soil, food, consumer products) surrounding or containing an agent, i.e., soil, water, air, plants, animals, or any other parts of the environment that can contain contaminants.

Medium intake rate:

The rate at which the medium crosses the outer exposure surface of a target, during ingestion or inhalation.

Microenvironment:

Surroundings that can be treated as homogeneous or well characterized in the concentrations of an agent (e.g., home, office, automobile, kitchen, store). This term is generally used for estimating inhalation exposures.

National Priorities List

The Environmental Protection Agency's (EPA) listing of sites that have undergone preliminary assessment and site inspection to determine which locations pose immediate hazard to persons living or working near the release. These sites are most in need of cleanup.

No apparent Public Health Hazard

Sites where human exposure to contaminated media is occurring or has occurred in the past, but the exposure is below a level of health hazard.

Pica:

A behaviour characterized by deliberate ingestion of non-nutritive substances such as soil.

Plume:

An area of chemicals in a particular medium, such as air or groundwater, moving away from its source in a long band or column. A *plume* can be a column of smoke from a chimney or chemicals moving with groundwater.

Potentially exposed:

The condition where valid information, usually analytical environmental data, indicates the presence of contaminant(s) of a public health concern in one or more environmental media contacting humans (i.e., air, drinking water, soil, food chain, surface water), and there is evidence that some of those persons have an identified route(s) of exposure (i.e., drinking contaminated water, breathing contaminated air, having contact with contaminated soil, or eating contaminated food).

Public health assessment:

The evaluation of data and information on the release of hazardous substances into the environment to assess any current or future effects on public health, develop health advisories or other recommendations, and identify studies or actions needed to evaluate and mitigate or prevent human health effects; also, the document resulting from that evaluation.

Public health hazard

Sites that pose a public health hazard as the result of long-term exposures to hazardous substances.

Release Abatement Measure (RAM)

Under the MCP, a *RAM* is an action that may be taken by the responsible party to limit or localize a chemical release until a more comprehensive remedial action can be taken.

Response Action Outcome (RAO)

Under the MCP, when cleanup of a chemical release is complete the responsible party submits an *RAO* to the MADEP. The *RAO* classifies the disposal site as posing no significant risk.

Risk

In risk assessment, the probability that something will cause injury, combined with the potential severity of that injury.

Route of exposure:

The way in which a person may contact a chemical substance. For example, drinking (ingestion) and bathing (skin contact) are two different *routes of exposure* to contaminants that may be found in water.

Source:

The origin of an agent for the purposes of an exposure assessment.

Stressor:

Any entity, stimulus, or condition that can modulate normal functions of the organism or induce an adverse response (e.g., agent, lack of food, drought).

Subchronic exposure:

A contact between an agent and a target of intermediate duration between acute and chronic

Superfund

Another name for the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), which created ATSDR.

Superfund Amendments and Reauthorization Act (SARA)

The 1986 legislation that broadened ATSDR's responsibilities in the areas of public health assessments, establishment and maintenance of toxicologic databases, information dissemination, and medical education.

Target:

Any biological entity that receives an exposure or a dose (e.g., a human, human population, or a human organ).

Time-averaged exposure:

The time-integrated exposure divided by the exposure duration. An example is the daily average exposure of an individual to carbon monoxide. (Also called timeweighted average exposure).

Time-integrated exposure:

The integral of instantaneous exposures over the exposure duration. An example is the area under a daily time profile of personal air monitor readings, with units of concentration multiplied by time.

Time profile:

A continuous record of instantaneous values over a time period (e.g., exposure, dose, medium intake rate)

Total petroleum hydrocarbons:

The total cumulative concentration of hydrocarbons associated with a petroleum product containing 10 or more carbon atoms.

Uptake (absorption):

The process by which an agent crosses an absorption barrier (see dose).

Volatile organic compounds (VOCs)

Substances containing carbon and different proportions of other elements such as hydrogen, oxygen, fluorine, chlorine, bromine, sulfur, or nitrogen; these substances easily become vapors or gases. A significant number of the VOCs are commonly used as solvents (paint thinners, lacquer thinner, degreasers, and dry cleaning fluids).

References:

1. Zartarian V, Bahadori T, McKone T: Adoption of an official ISEA glossary. *Journal of Exposure Analysis and Environmental Epidemiology* 15:1–5, 2005.