

Glossary of Terms Related to Mercury

Amalgamation	blending of mercury with another metal to produce an amalgam. Some metals are soluble in mercury, such as gold. This process is used in both dentistry and gold mining.
Bioaccumulation	process by which organisms (including humans) take up contaminants (or pollutants) more rapidly than they can eliminate them.
Biomagnification	the incremental increase in concentration of a contaminant at each level of a food chain. This occurs because the food source for higher trophic levels is progressively more concentrated in the contaminant (or pollutant) and thus increases bioaccumulation rates at the top of the food chain.
Calcine	solid material resulting from the heating of Hg-containing ore (to $\approx 700^{\circ}\text{C}$) to extract mercury in the liquid form (or species).
Cinnabar	the main ore of mercury, HgS, mercuric sulfide, a mineral
Contaminant	An element or compound that causes deviations from the normal composition of the environment but is not classified as a pollutant unless it has some detrimental effects.
Elemental mercury	Hg^0 , dominant form of mercury in the atmosphere $\text{Hg}_{(\text{g})}$, released by combustion sources such as the burning of coal in coal-fired electric power plants.
Guadalupe Watershed	watershed where drainage from the New Almaden Mine occurs, funnels into the Guadalupe River, which drains into south San Francisco Bay.
Ligand	a negatively charged ion (anion) that binds to a cation.
Los Alamos Creek	This creek runs past the New Almaden Mine site and flows into the Guadalupe River, which in turn flows into San Francisco Bay near San Jose.
Mercuric sulfide	HgS (in crystalline form, cinnabar or meta-cinnabar)
Mercury vapor	$\text{Hg}_{(\text{g})}$, absorbed into lungs; a neurotoxin; temporary; body does not retain

Mercury	An element; Hg (also known in elemental form as quicksilver because it is a silver-colored liquid at room temperature)
Methylmercury	HgCH ₃ , also sometimes called organic mercury; a neurotoxin that organisms do not easily release from their bodies; found in all tissues. MeHg = CH ₃ Hg ^(II) X where X is a ligand, typically Cl ⁻ or OH ⁻
Mineral	a naturally occurring solid with a relatively fixed chemical composition and a regularly periodic arrangement of atoms referred to as a crystal structure. There are about 3500 known mineral species.
New Almaden Mine	oldest, largest, and most productive mercury mine in North America. It was operated from 1847 to 1976, and 83,974,076 pounds of mercury worth more than \$70 million dollars were mined during this period. About 15% of this total was used in placer gold mining operations in the Sierra Nevada foothills and the Klamath-Trinity Mountains area of northern California.
New Idria Mine	second largest mercury mine in North America which was operated from 1852 to 1972 and is located about 75 miles south of Hollister, CA. Drainage from this mine into the San Joaquin River is thought to transport Hg-containing particles into San Francisco Bay.
Ore	a type of rock that contains economically important elements or minerals in a form and in sufficient quantity to make mining and processing the ore profitable.
Oxidation	a process resulting in the loss of electrons; the presence of oxygen (or another electron acceptor) dissolved in water, such as a flowing stream, results in an oxidizing environment whereby other reduction-oxidation (redox)-sensitive elements can be oxidized.
Placer deposit	a deposit of earth, sand, or gravel, containing valuable minerals in the form of particles, especially adjacent to a river, or in the bed of a mountain stream. Placer deposits form due to the differential settling of the denser, heavier components of the particle load being transported by the running water. Placer materials must be both dense and resistant to weathering processes.

Pollutant	An element or compound whose presence in a natural system produces undesirable physical, chemical, or biological characteristics (<i>e.g.</i> , affects the health of humans, such as methylmercury), resulting from human activities. The introduction of such elements or compounds into the biosphere is referred to as <i>pollution</i> .
Reactive mercury	Hg ^(II) or Hg ⁺² ; also called ionic mercury
Reduction	a process resulting in the gain of electrons; the lack of oxygen (or another electron acceptor) results in a reducing environment; an example of such an environment is oxygen-poor sediment in a stream bed.
Rock	a solid consisting of a mixture of grains of one or more types of minerals; a given rock type (<i>e.g.</i> , granite) can have a range of compositions, unlike a mineral, which has a “fixed” chemical composition.
Species	(also known as chemical form) – an element in a specific oxidation state in a molecule or compound with other elements (<i>e.g.</i> , HgS) or with itself (<i>e.g.</i> , elemental Hg or Hg ⁰). Mercury can be Hg ⁰ , which is referred to as elemental mercury, Hg ⁺¹ , or Hg ⁺² , which is referred to as ionic or reactive mercury.
Sulfate	SO ₄ ⁻²
Sulfate-reducing bacteria	bacteria that reduce sulfate to sulfide to gain energy; they are also responsible for methylating Hg ²⁺ into methylmercury.
Sulfide	S ⁻²
Trophic levels	feeding position in a food chain such as primary producers, herbivore, primary carnivore, etc. Green plants form the first trophic level, the producers. Herbivores form the second trophic level, while carnivores form the third and even the fourth trophic levels.