Carbon Monoxide

Sources

Carbon monoxide (CO) is a colorless, odorless, and tasteless gas, that is formed whenever carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes to about 56% of all emissions. It may temporarily accumulate at harmful levels, especially in calm weather during winter and early spring, when fuel combustion reaches a peak and carbon monoxide is chemically most stable due to the low temperatures.
Sources of carbon monoxide include:

- Automobile emissions. (High levels are possible near large parking lots, traffic jams, or crowded city streets, where large numbers of slow-moving cars accumulate.) In cities, 85-95% of all CO emission may come from motor vehicle exhaust
- Home/building heating.
- Volcanoes, thunderstorms and forest fires.
- Vegetation during various growth stages.
- The chemical transformation of methane, a gas emitted from decaying plants in swamps and marshlands.

Carbon monoxide from natural sources usually dissipates quickly over a large area, posing no threat to human health.

Health Effects

Carbon monoxide enters the blood stream by combining with hemoglobin, the substance that carries oxygen to the cells. This combination occurs 200 times more readily with carbon monoxide than with oxygen, starving the body of oxygen. Carbon monoxide adversely impacts health in many ways:

- It affects the central nervous system at relatively low concentrations.
- It weakens heart contractions, lowering the volume of blood distributed to various parts of the body.
- It significantly reduces a healthy person's ability to perform manual tasks, such as working, jogging and walking.
- It causes healthy people to feel tired and drowsy from short-term exposure to concentrations greater than 30 parts per million (ppm).
- It causes shortness of breath and chest pain in people with heart disease at exposures as low as 10 ppm.
- It induces irritability, headaches, rapid breathing, blurred vision, lack of coordination, nausea, dizziness, confusion and impaired judgement in healthy people at levels greater than 35 ppm.

Even three or four hours after exposure, half the excess carbon monoxide may remain in the blood stream.
People especially susceptible to CO include:

- Children (and the human fetus).
- The elderly.
- Those with respiratory or heart illnesses. (The 4.2 million people in the U.S. suffering from angina pectoris - a disease characterized by brief spasmodic attacks of chest pain due to insufficient oxygen levels in the heart muscles - are especially susceptible.)
- Those with anemia.
- Those exposed for long periods of time, such as traffic officers and people sitting in parked/idling cars over sustained periods.
- Cigarette smokers. (Smoking while driving in heavy traffic may result in increased exposure - from cigarette smoke and engine exhaust. Tests of automobile drivers show exposure to high levels of carbon monoxide can impair a driver's judgment and ability to respond rapidly in traffic. It can also impair vision and produce headaches.)

However, at high concentrations, CO is poisonous to everyone, even healthy people.

Other Effects

At concentrations commonly monitored in the ambient air, carbon monoxide does not appear to adversely affect plants, wildlife, or materials.
CO can contribute to the formation of smog, ground-level ozone.
Carbon monoxide is a common indoor air contaminant. Concentrations of 1 to 2 ppm are common in homes with normal gas-fired furnaces; malfunctioning furnaces can lead to indoor concentrations of up to 120 ppm.