many years

Industrially important metals and their compounds that can have a toxic effect when the dust or fumes are inhaled include arsenic, antimony, cadmium, chromium, lead, manganese, mercury, selenium, tellurium, thallium, uranium, and a few others

The effect of some metals, such as magnesium and zinc, appears to be transient Only limited data are available on the exotic and rare earth metals

Although the dusts and fumes from metals with low toxicity do not need as much attention as the dusts and fumes from highly toxic metals, they should not be neglected or disregarded The metals with low toxicity are more readily controlled because greater amounts can be tolerated, but their dusts and fumes should be kept at reasonable levels since excessive amounts of any of them can be harmful

Inhalation of the dust of lead compounds is the most common mode of entry of lead into the system, and ingestion of lead compounds can add to the problem if personal hygiene is poor Workers therefore should be encouraged to wash thoroughly before eating, and lunchrooms should be set apart from work areas Smoking should be prohibited in work areas Work clothes and street clothes should be stored separately

Lead is a normal constituent of plants and animals, and people ingest and excrete it daily even though they are not exposed to excessive lead in their daily work When intake rates exceed the normal excretion rates, however, lead builds up in the body When the accumulation reaches a sufficient level, symptoms of poisoning or intoxication appear The concentration of airborne lead should therefore be kept below the threshold limit because of lead's high toxicity and its tendency to accumulate in the human system

Beryllium intoxication is a severe systemic disease that can result from the *inhalation* of the dust or fume of metallic beryllium, beryllium oxide, and soluble beryllium compounds (There is no evidence of intoxication from the *ingestion* of insoluble compounds) Only the inhalation of the beryllium-bearing dusts or fumes produces systemic disease Accordingly, control of such dusts and fumes to keep them below the concentration specified by ACGIH (American Conference of Governmental Industrial Hygienists) threshold limit values is a basic protective measure

When the soluble salts of beryllium, especially beryllium fluoride, contact cuts or abrasions on the skin, deep ulcers may be formed which heal very slowly, and complete surgical excision of the ulcer is sometimes required to effect healing

Metal fume fever is an acute condition caused by a brief high exposure to the freshly generated fumes of metals such as zinc, magnesium or their oxides Symptoms appear from 4 to 12 hr after exposure and consist of fever and shaking chills There is complete recovery usually within one day, and ordinarily the employee can return to work without recurrence However, after a period in which there has been no contact with the fume, for example, after a layoff, resumption of exposure is likely to bring on an attack

Metal fume fever is caused by heavy concentrations of fumes Zinc oxide fume is the most common source, but cases caused by the inhalation of fumes from magnesium oxide, copper oxide, and other metallic oxides have also been reported The condition does not occur from the handling of these oxides in powder form Apparently, it results only from the inhalation of extremely fine particles freshly formed as fume (called a "nascent fume") Cadmium, mercury, and other metals may also produce a fever followed by the toxic effects of the element

Gases

It would seem that everybody is well informed concerning carbon monoxide, the gas which is responsible for more hazardous exposures and incidents than any other, and also the gas responsible for the greatest number of cases of fatal asphyxiation In areas where there is an active possibility of escape of gases containing carbon monoxide, there tends to be an increasing use of multipoint carbon monoxide alarms Such installations have been placed in a number of blast furnace plants where carbon monoxide concentrations of the gas are in the order of 26 or 27 percent

Fortunately, for most fuel gas purposes natural gas is coming into increasing use and