4. The location of the hazard area with respect to a source of uncontaminated respirable air,

5 The state of health of personnel involved,

6 The functional and physical characteristics of respiratory protective devices

The safety professional should familiarize himself with the type of hazard for which a given type of respiratory equipment is approved, and should not permit its use for protection against hazards for which it is not designed *For instance, particulate filter respirators are of no value as protection against solvent vapors, injurious gases, or lack of oxygen Their use under these conditions is one of the most common and most dangerous abuses of respirators*

Oher common misuses of respiratory equipment are to use chemical cartridge respirators where gas masks are required or to use chemical filtering types where atmosphere-supporting or self-contained units are necessary

Some substances require protection against (*a*) damage to the respiratory system, and also (*b*) systemic injury through the skin All substances should be investigated to learn whether this double hazard is involved Some common substances which are hazardous through both the respiratory system and the skin are

Aniline
Carbon disulfide
Cresol (cresylic acid)
Dichloroethylene-1,1
Decalin (decahydronaphthalene)
Diethylene oxide (dioxane-1,4)
Diethylphthalate
Dimethylaniline
Dinitrobenzene
Dinitrochlorobenzene
Hydrogen cyanide (hydrocyanic acid)
Iodoform
Lead tetraethyl
Mercury and its compounds
Nicotine
Nitrobenzene
Nitroglycerine
Organic phosphate insecticides
Phenyl hydrazine
Tetralin (tetrahydronaphthalene)

See Chapter 39, "Chemical Hazards," for a full list

Some workers consider respiratory equipment a nuisance, not realizing that failure to wear it may endanger their lives Usually, the attitude of such men can be changed if someone in authority will clearly explain why the equipment is necessary, show the men how to fit it in position, and explain its operation If such educational efforts fail, the alternative is discipline, for the risk of injury is serious

Excellent health and thorough training in the operation and maintenance of equipment are essential for persons who are to use respiratory protective devices Anyone in questionable physical condition should be prevented from entering environments presenting respiratory hazards, and thus avoid having to wear any emergency breathing apparatus for protection

From the standpoint of fire hazard, neither pure oxygen nor air containing more than 21 percent oxygen is to be preferred to ordinary air for use in atmosphere (air) supplied respirators or open-circuit (demand) type self-contained breathing apparatus, for ventilating, or for other purposes A flammable substance in the presence of oxygen requires only a small fraction of the energy to ignite it as does the same substance in the presence of air, and an ensuing fire or explosion is much more violent

Air or oxygen provided by or supplied to any respiratory equipment must be free from contaminants, quality as well as quantity is important Respirable air should comply with the Compressed Gas Association *Commodity Specification for Air,* G-7 1-1966 (ANSI Z86 1), Grade D This specifies that the maximum impurities be as follows condensed hydrocarbons, 5 mg/m^3 of gas at NTP, carbon monoxide, 10 mg/m^3, and carbon dioxide, 1000 mg/m^3 The presence of a pronounced odor renders the air unsatisfactory for breathing The standard gives methods of verification and other details

Oxygen should meet the requirements of the *United States Pharmacopoeia*

Respiratory protective devices can be classified as follows

1 Air purifying respirators,