Appendix B

SIGNS AND SYMPTOMS OF COMMON ATMOSPHERIC HAZARDS

Common atmospheric hazards in confined spaces:

- < **Oxygen Deficiency**
- **< Oxygen Enrichment**
- **< Presence of Combustible Gases**
- **< Presence of Toxic Gases and Vapors**

Effects of various **OXYGEN** (O_2) levels

23.5% - oxygen enriched, extreme fire hazard **and up**

21% - oxygen level in normal air

19.5% - minimum "safe level" (OSHA)

16% - disorientation
- impaired judgement & breathing

14% - faulty judgement, rapid fatigue

8% - mental failure, fainting

6% - difficult breathing, death in minutes

Source: NIOSH

Effects of various **HYDROGEN SULFIDE** (H_2S) levels

0.13 ppm - minumal perceptible odor

4.60 ppm - easily detecable, moderate odor

10 ppm - beginning eye irritation
- 8 hr. PEL (OSHA, ACGIH)

27 ppm - strong, unpleasant odor

100 ppm - coughing & eye irritation
- loss of sense of smell after 2-5 minutes

200-300 ppm - marked eye inflamation & respiratory irritation after 1 hour

500-700 ppm - loss of consciousness & possibly death in 30 minutes to 1 hour

700-1,000 ppm - rapid unconsciousness, stopping of respiration
- death

1,000-2,000 ppm - immediate unconsciousness
- death in a few minutes
- death may occur even if person is removed to fresh air at once

Source: ANSI Standard #Z37.2-1972

Effects of various **CARBON MONOXIDE** (CO) levels

35 ppm - 8 hr. permissible exposure level (PEL) (OSHA)

200 ppm - possible mild frontal headache in 2-3 hours

400 ppm - frontal headache & nausea after 1-2 hours

800 ppm - headache, dizziness, & nausea in 45 minutes
- collapse & possibly death in 2 hours

1,600 ppm - headache, dizziness, & nausea in 20 minutes
- collapse & possibly death in 2 hours

3,200 ppm - headache & dizziness in 5-10 minutes
- unconsciousness & danger of death in 30 minutes

6,400 ppm - headache & dizziness in 1-2 minutes
- unconsciousness & danger of death in 10-15 minutes

12,800 ppm - immediate unconsciousness
- danger of death in 1-3 minutes

Source: AIHA