

## H<sub>2</sub>S Dose-Effect Relationship

### Concentration Effects

|              |  |
|--------------|--|
| 0.02-0.2ppm  | Odor detection.  |
| 50-150ppm    | Eye & Respiratory irritation, Olfactory paralysis.                 |
| 200-500ppm   | Bronchitis, Cephalgia, Dizziness, Staggering.                      |
| 500-1000ppm  | Pulmonary edema, Respiratory depression, Unconsciousness.          |
| 1000-1500ppm | Rapid collapse, Respiratory paralysis. Fatal within a few minutes. |
| 1500-5000ppm | Immediate death.   |

## H<sub>2</sub>S Decontamination

- Remove and double-bag contaminated clothing.
- Flush exposed skin and hair with water for 3-5 minutes. Use caution to avoid hypothermia.
- Irrigate eyes with plain water or saline for at least 5 minutes, remove contact lenses if easily removable without additional trauma to the eye.
- Consider appropriate management of chemically contaminated children, such as measures to reduce separation anxiety.



Photo taken during decontamination of first responders in May 2009 in Southern Vigo County, Indiana.

## Personal Protection

- Respiratory Protection  
Positive-pressure, Self-Contained Breathing Apparatus (SCBA) is recommended in response situations that involve exposure to potentially unsafe levels of H<sub>2</sub>S.
- Skin Protection  
Chemical-protective clothing is not generally required because H<sub>2</sub>S gas is not absorbed through the skin and skin irritation is rare. However, splash protection is recommended to protect clothing from cross contamination and from decontaminating water/solution.



Hazardous Materials Technicians responding to unknown hazards in Vigo County, July 2005. Wearing SCBA and Level B (Splash Protection) Chemical Protective Suits.

## References

- Dangerous Japanese "Detergent Suicide" Technique Creeps Into U.S. by Kevin Poulsen on March 13, 2009
- Hydrogen Sulfide Information Sheet from Agency for Toxic Substances and Disease Registry (ATSDR)
- BASF Chemical Emergency Medical Guidelines for Hydrogen Sulfide.
- MSDS on Hydrogen Sulfide from BOC Gases
- MSDS on Hydrogen Sulfide from Matherson Tri Gas
- Response Guideline from Tokyo Fire Department, Japan

## Chemical Suicide Information Brochure Introduction to Hydrogen Sulfide (H<sub>2</sub>S)



Chemical Suicide of two female in a hotel in Northern London in May 2009. Victims left a note saying "Sorry for the Inconvenience" along with a note to alert presence of toxic chemical.

Sugar Creek Fire Department  
West Terre Haute Police Department  
Indiana TF7 Hazardous Materials Response Team



## History of Chemical Suicide

Caught media attention after over 500 men, women and children took their own lives by mixing common household chemicals to create lethal gases in first half of 2008 in Japan.

U.S. cases started to appear in Summer of 2008 in Pasadena, California.

First Indiana case is Southern Vigo County on May 7th, 2009. Suicide was successful. One law enforcement officer, Four firefighters were decontaminated by HAZMAT Team on the scene due to their exposure.

Deceased was also decontaminated on the scene before Vigo County Coroner's Office took control over the body.



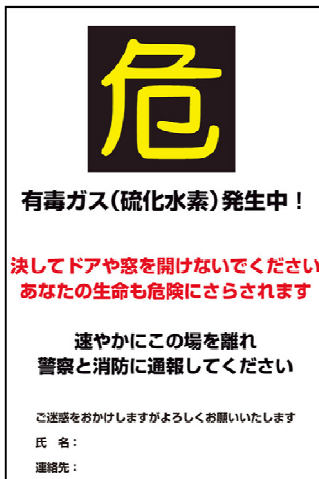
Photo taken at a scene of Chemical Suicide in an Apartment complex in Japan, April 2008. 14 years old girl took her life by mixing 2 chemicals, forced evacuation of 90 surrounding residents.

## Clue of Chemical Suicide

- "Warning" poster to alert others of presence of toxic chemicals. This also aid suicide by delaying rescuers to reach victims.
- Instructional web-site on Chemical Suicide (a.k.a. Detergent Suicide) also contains PDF format of warning poster to post on doors and windows.
- Containers of Toilet Cleaner, Acids, and Pesticides etc at the scene.



Photo taken at a scene of Chemical Suicide in Idaho, May 13th, 2009. 29 years old male committed suicide by creating Hydrogen Sulfide in his vehicle. The victim posted warning signs around his vehicle, stated "Toxic gas: Hydrogen Sulfide. Stay Away. HAZMAT Team Needed. Keep Distance.



Poster used in Japan to alert presence of Hydrogen Sulfide;

"DANGER" Toxic Gas (Hydrogen Sulfide) Emitting!.

Please Don't Open Door or Window, Your Life is At Risk.

Please leave the area immediately and call Police and Fire. Sorry for the inconvenience. Thank you for your assistance.

Name: \_\_\_\_\_

Tel: \_\_\_\_\_



## What is Hydrogen Sulfide (H<sub>2</sub>S)

- CAS 7783-0604 / UN 1053 / DOT Hazard Class 2
- Synonyms include dihydrogen sulfide, sulfur hydride, sulfurated hydrogen, hydrosulfuric acid, "sewer gas", "Swamp gas" etc.
- Colorless, flammable, highly toxic gas. Rotten-egg order can be detectable as low as 0.5ppm. However over is **NOT** a reliable indicator of H<sub>2</sub>S presence.
- Produced naturally by decaying organic matter or by certain industrial processes.
- Slightly heavier than air and may accumulate in enclosed, poorly ventilated and low-lying area.
- Slightly water soluble.



## Health Effect of H<sub>2</sub>S Exposure

Cause inhibition of the cytochrome oxidase enzyme system, resulting in lack of oxygen use in the cells. Anaerobic metabolism causes accumulation of lactic acid, leading to an acid-base imbalance. Also irritate skin, eyes, mucous membranes and respiratory tract. Pulmonary effects may not be apparent for up to 72 hours after



## Health Effect of H<sub>2</sub>S Exposure continues

### Central Nervous System

Injury is immediate and significant. At higher concentration, only a few breaths can lead to immediate loss of consciousness, coma, respiratory paralysis, seizure and death.

### Respiratory

Initially affects the nose and throat. Low concentrations can produce irritation of the nose, throat, and lower respiratory tract. Cough, dyspnea, and bronchial or lung hemorrhage. Higher concentrations can produce bronchitis and pulmonary edema.

### Cardiovascular

High-dose exposures may cause insufficient cardiac output, dysrhythmias and conduction abnormality.

### Renal

Blood, casts, and protein in the urine. Renal failure may occur secondary to cardiovascular compromise.

### Gastrointestinal

Nausea/Vomiting.

### Dermal

Prolonged/Massive exposure may cause brining, itching, redness and painful information of skin.

### Ocular

May result in inflammation and clouding of the eye surface. Symptoms ma include blurred vision, photophobia, spasmodic blinking or