

## **Purpose**

*This document is intended to serve as a reminder of safe work practices and is not a complete presentation of this topic. It should be used by individuals trained and competent in this subject. It is not intended to replace or supersede company procedures, industry standards and/or applicable governmental laws and regulations.*

## **Definition**

H<sub>2</sub>S, also known as sour gas, swamp gas, poison gas, is a poisonous gas byproduct of the exploration and production of oil and gas. It is formed from the decomposition of organic matter and as a byproduct of various chemical reactions.

## **Applications**

Hydrogen sulfide may be found and impose hazards in one or more of the following areas/operations:

Water floods	Sewers or septic systems
Disposal wells	Stagnant cellars/sumps
Hydrogen sulfide production zones	Vacuum/transport trucks
Drilling/workover operations	Flowlines
Production facilities including sweetening plants	and tank batteries      Reserve pits

## **Hazards and Effects of H<sub>2</sub>S**

*Do not rely on your sense of smell to detect H<sub>2</sub>S.*

- H<sub>2</sub>S causes paralysis of the respiratory center in the brain and can result in immediate collapse and death.
- Inhalation of lower concentrations of H<sub>2</sub>S gas can cause irrational behavior resulting in unsafe acts and injuries.
- H<sub>2</sub>S is very flammable.
- H<sub>2</sub>S reacts with steel to form iron sulfide which can ignite when exposed to air.
- H<sub>2</sub>S when burned produces Sulfur Dioxide (SO<sub>2</sub>) which is also toxic.
- H<sub>2</sub>S is highly corrosive and may lead to metal embrittlement/fatigue.
- H<sub>2</sub>S effects are influenced and possibly accelerated by alcohol and certain medications.

Concentrations of H<sub>2</sub>S may affect each individual differently! Exposure may cause:

Skin and/or eye irritation	Dizziness
Loss of appetite	Dryness in nose and/or throat
Fatigue	Coughing
Nausea	Loss of consciousness or death
Headache	

## **General Information**

<b>Concentrations (ppm)</b>	<b>Effect</b>
0.032 - 0.02	Odor Threshold (Begin to smell)

Above 10	Toxic to personnel; wear respiratory protection equipment.
Above 300	Quickly deadens the sense of smell. Considered Immediately Dangerous to Life and Health (IDLH). Respiratory equipment approved for this level must be used.
Above 500	Attacks respiratory center in the brain, causing breathing to stop and loss of consciousness within 15 minutes
Above 700	Rapid loss of consciousness and death.
Above 1000	Immediate unconsciousness and death

if not revived promptly.

See also the **Respiratory Protection** and the **Personal Protective Equipment** topics for additional information.

### **Guidelines**

- Use detection equipment when working in an area where there is a possibility of H<sub>2</sub>S gas, especially in enclosed or below grade areas (holes, trenches, reserve pits).
- Maintain and calibrate detection equipment per manufacturer's specifications.
- Do not enter an H<sub>2</sub>S area without proper training and authorization.
- In IDLH atmospheres a standby person(s) with suitable Self Contained Breathing Apparatus (SCBA) must be available for purposes of rescue.
- **Never attempt to rescue an H<sub>2</sub>S victim without a SCBA.**
- Employees working in H<sub>2</sub>S areas are required to be properly "fit tested".
- All H<sub>2</sub>S exposure victims should be treated by a physician before returning to work.
- In the event of a H<sub>2</sub>S emergency, all personnel should follow the site emergency plan.
- H<sub>2</sub>S areas, facilities, pipelines, and/or flowlines should be properly identified with signage.

### **References**

Texas Railroad Commission Rule 36

BLM Onshore Oil and Gas Order No. 6

OSHA 29 CFR 1910.1000 (Table Z-2) and 1910.134 (Respiratory Protection)

American Conference of Governmental Industrial Hygienist (ACGIH) Threshold Limit Value Pocketbook

National Institute of Occupational & Safety and Health Pocket Guide to Chemical Hazards