

# HYDROGEN SULFIDE



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## 1. PURPOSE

- a. **H2 Enterprises, LLC (H2)** is constantly striving to improve the safety of our employees, customers, and community. To further that goal, we have developed and have implemented this program specific to Hydrogen Sulfide Safety. Through this program, we hope to assure that all company employees performing job tasks in which a potential Hydrogen Sulfide exposure could occur, are protected. Compliance with this program is mandatory and is applicable to all company employees who work in an environment where Hydrogen Sulfide may be present in any amount. Failure to comply will result in disciplinary action and/or is grounds for termination

## 2. DEFINITIONS

- a. Permissible Exposure Limit (PEL) - means the dermal or inhalation exposure limit. For Hydrogen Sulfide, the PEL is 10 PPM.
- b. Hydrogen Sulfide (H<sub>2</sub>S) – Colorless gas or liquid, with the odor of rotten eggs (sulfur smell)

## 3. EXPOSURE

- a. Exposure to Hydrogen Sulfide occurs in many industries. Most exposures center around the oil and natural gas industries. Hydrogen sulfide is an extremely toxic, flammable gas that may be encountered in the production of gas good gas, high-sulfide high sulfur content crude oil, crude oil fractioning, associated gases, and waters. Hydrogen sulfide is heavier than air and can collect in low places. As an employee of the company, potential exposure to various forms and amounts of hydrogen sulfide may occur during certain job activities. However, any exposure should be avoided. If an exposure cannot be avoided through ventilation, etc., proper personnel protective equipment must be used. Protective Equipment required to protect personnel is to be supplied at no cost to the employees.

## 4. FORMS OF HYDROGEN SULFIDE EXPOSURE

- a. Hydrogen Sulfide exposures are almost exclusively through inhalation. However, other exposures such as ingestion should not be overlooked. Inhalation at certain concentrations can Hydrogen Sulfide to injury of death. The listed IDLH (immediately dangerous to life and health) level is extremely low (300 PPM).

## 5. HEALTH EFFECTS OF HYDROGEN SULFIDE OVEREXPOSURE

- a. If steps are not taken to control exposure, continued inhalation of Hydrogen Sulfide Hydrogen Sulfide could result in:

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- i. Loss of the sense of smell.
  - ii. Death
- b. Low concentration exposures (under 10 PPM)
  - i. In low concentrations, Hydrogen Sulfide can be detectable by its odor; however, the smell cannot be relied upon to forewarn of dangerous concentrations, because it rapidly paralyzes the sense of smell. A longer exposure to the lower concentrations may result in the loss of the sense of smell.
  - ii. Symptoms from repeated exposure to low concentrations usually disappear after being removed from the exposure for a period.
- c. Higher concentration exposures (10 PPM and above)
  - i. Concentrations that are prolonged or of high concentrations may lead to death. It should be well understood that the sense of smell will be rendered ineffective by hydrogen sulfide, which can result in an individual failing to recognize the presence of dangerously high concentrations. Exposure to hydrogen sulfide causes death by poisoning the respiratory system.
- d. Reporting of problems
  - i. Immediately notify your supervisor if you develop potential signs or symptoms associated with Hydrogen Sulfide exposure. You should also notify your supervisor if you have difficulty breathing while wearing a respirator or suspect problems with other personal protective equipment.
- e. Exposure assessment
  - i. The job site foreman will determine if employees are exposed to concentrations of hydrogen sulfide. The exposure determination shall be based on the following:
    - 1. If the initial exposure determination reveals employee exposure to be below the STEL, continuous monitoring will be performed. In addition, continuous ventilation shall be used. Appropriate personnel protective equipment will be worn by all employees exposed to Hydrogen Sulfide.
- f. Preventing exposure
  - i. Proper control of exposure to Hydrogen Sulfide is the responsibility of both the Employer and the employee. All the control methods discussed below are essential to minimize additional sources of Hydrogen Sulfide absorption from inhalation. Strict compliance with these provisions can virtually eliminate several sources of Hydrogen Sulfide exposure that significantly contribute to excessive Hydrogen Sulfide absorption.
  - ii. Review the site-specific safety programs as well as the site emergency action plan.

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- iii. Ventilation systems may provide for venting of the Hydrogen Sulfide vapor prior to entrance into the area.
- iv. Respiratory Protection shall be used in combination with continuous monitoring when warranted by the conditions of the area. If alarm sounds, all employees must evacuate the area or don SCBA or respirator air lines, if applicable.
- v. If Self-contained breathing apparatus is to be worn, all provisions applicable to the use of respirators apply as well as the provisions of the **H2** Respiratory protection program.
- vi. Equipment shall be operated per the manufacturer's instructions.
- vii. Detection equipment shall be calibrated prior to use and on a schedule per the manufacturer's instructions.
- viii. Continuous monitoring shall be used when Hydrogen Sulfide has been detected.
- ix. Protective work clothing and equipment must be worn when the exposure to Hydrogen Sulfide and Hydrogen Sulfide compounds is above the PEL.

## **6. EMPLOYEE INFORMATION & TRAINING**

- a. Annual training will be conducted per the **H2**, Safety Program. Information and training will be given to all employees who may be exposed to Hydrogen Sulfide.
- b. Site specific training will be conducted by the site foreman and per the **H2** Safety Program. Information and training will be given to all employees (**H2** and Sub-contractors) who may be exposed to Hydrogen Sulfide. The training program will inform employees of the following:
  - i. Emergency response procedures and shutdown procedures.
  - ii. Locations of safety equipment.
  - iii. Confined space and enclosed facility entry procedures.
  - iv. Routes of egress.
  - v. Worker awareness and understanding of workplace practices and maintenance procedures to protect personnel from exposure to hydrogen sulfide.
  - vi. Facility sources of Hydrogen Sulfide.
  - vii. Documentation of employee information and training is kept on file at the **H2** home office.

## **7. RECORD KEEPING**

- a. The following records will be kept on file at the home office, if applicable:
  - i. Exposure monitoring for airborne Hydrogen Sulfide

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- ii. Name and job classification of employees measured
- iii. Details of the sampling and analytic techniques.