

## **Hydrogen Sulfide/Respiratory Protection**

### Course Outline

**Prerequisites:** This course shall have no formal pre-requisite.

**Course Length** – 3-4 hours - Course length shall vary depending on the number of delegates.  
Total course time includes breaks.

**Class Size:** The maximum number of delegates that may be trained and tested per instructor shall be thirty-five (35) in the classroom session.

#### **Course Objective**

- Provide delegates with the sources, hazards and effects of Hydrogen Sulfide.
- Provide delegates with warning, monitoring and detection systems for H<sub>2</sub>S.
- Address Emergency Response Planning and H<sub>2</sub>S.
- Provide delegates with the information needed to successfully wear respirators.
- Provide delegates knowledge about the requirements of a respiratory protection program.
- Address different types of respirators and their use.
- Address inspection, maintenance, and storage requirements.
- Delegates should be able to demonstrate knowledge during written examination.

#### **Course Design**

- Power Point© / Lecture / Audio Video / Visual Aids
- Demonstrations

#### **Successful Course Completion**

- Requires a minimum score of 75% or better.
- Delegates will have no more than thirty (30) minutes to complete the exam.
- Grades shall be calculated by dividing the number of questions answered correctly by the total number of exam questions.

#### **Course Content Summary**

- Classroom

**Breaks:** 10 minutes (approximately every hour)

**Lunch:** 1 Hour (if applicable)

## Course Outline

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

- Regulations
- Key Terms
  - Auto Ignition
  - Flammable Limits
  - Permissible Exposure Limit (PEL)
  - Threshold Limit Value (TLV)
  - Short Term Exposure Limit (STEL)
  - Ceiling
  - Immediate Dangerous to Life and Health (IDLH)
  - National Institute of Occupational Safety and Health (NIOSH)
  - Parts Per Million (PPM)
- What is H<sub>2</sub>S?
- H<sub>2</sub>S vs. Other Notable Deadly Gases
- H<sub>2</sub>S Common Names
- Characteristics
- Disposal method
- H<sub>2</sub>S Limitations
- Where is H<sub>2</sub>S found?
- H<sub>2</sub>S Accumulation
- H<sub>2</sub>S Reactivity

### Effects of Hydrogen Sulfide (H<sub>2</sub>S)

- Respiratory System Effects
- Respiratory System
  - Diaphragm
  - Trachea
  - Bronchi
  - Alveoli

### Hydrogen Sulfide (H<sub>2</sub>S) Exposure Limits

- H<sub>2</sub>S Signs and Symptoms of Exposure
  - 0-50 PPM
  - 100-300 PPM
    - Olfactory Nerve Paralysis
  - 300-600 PPM
  - 600-1000 PPM
- Phrenic Nerve Function
- Variables Effecting Symptoms

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

- Methods of Detection (advantages/disadvantages)
  - Calorimetric Tubes
  - Personal Electronic Detectors
  - Fixed Detectors

### Respiratory Protection

- Common Effects from Respirator Use
- Why Wear a Respirator?
- Breathing Air Composition
- Employee Control Measures
  - Engineering Controls
  - Administrative Controls
  - Personal Protective Equipment
- Employer Responsibilities
- Respiratory Protection Program Requirements
- Employee Responsibilities
- Types of Respirators
  - Air Purifying
  - Supplied Air
    - Self-Contained Breathing Apparatus (SCBA)
    - Atmospheric Supplied Air
    - Cascade Systems
    - Escape Packs
- Fit Testing
  - Quantitative
  - Qualitative
  - Medical Requirements
- Respirator Usage
- Respirator Inspection
- Respirator Maintenance
- Proper Donning/Doffing
- Respirator Storage

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

- Arriving at a H<sub>2</sub>S Location
- Wind Direction Example
- Affected Employee Requirements
- When H<sub>2</sub>S is Present
- Site Location Condition Flags
  - Green – Possible Danger



## **M&A Safety Services**

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- Yellow – Moderate Danger
- Red – Extreme Danger
- Other Deadly Gases Associated with H<sub>2</sub>S
  - Carbon Dioxide (CO<sub>2</sub>)
  - Sulfur Dioxide (SO<sub>2</sub>)
- Regular Drills
- Rescue

### **Practical Session**

While there is no practical session for this course, employers commonly include a Respirator Fit or Pulmonary Function test as a preparatory step prior to deployment of a worker.

### **Training Center Provided Material**

- Course Materials

### **Delegate Requirements**

- None

### **Reference Material / Documents**

BSSE 30 CFR 250.490

OSHA 29 CFR 1910.134