H2S: THE SILENT KILLER

A very common hazard in the oil and gas industry that is not easily recognized—but can kill very quickly—is Hydrogen Sulfide (H₂S). In certain concentrations, this colorless gas can cause shock, inability to breathe, and potentially death. Exposure to H₂S is a probable hazard for all oil and gas personnel and the main exposure pathway is inhalation. Lower exposure over time will cause fatigue, eye irritation, headaches, coughing, dizziness, drowsiness, and nausea. Higher exposures will intensify the previous symptoms and may result in death.

Determining a Radius of Exposure: The Texas Railroad Commission states that a radius of exposure should be determined and is that distance surrounding a possible or potential leak point where the concentration of 100 parts per million will remain at a constant level for a 24-hour period day by way of continuous emission.

Effects by Concentrations by Volume and Parts Per Million (PPM):

- 0.1 = detectable by odor
- 10 = maximum allowable concentration for 8 hours work
- 100 = immediate danger to health
- 500 = victim loses sense of reasoning and balance; breathing stops quickly and the victim needs prompt artificial resuscitation
- 700 = unconscious quickly and breathing will stop
- 1,000 = unconscious at once, followed by death within minutes

Proper PPE: Anyone required to work in an area that has concentrations of H₂S in excess of 10 PPM must wear protective breathing equipment. Most commonly, workers use a supplied air respirator (SAR) or self-contained breathing apparatus (SCBA). Anyone utilizing these PPE apparatuses should be properly trained prior to wearing these devices and be fit tested.

Test methods for determining H₂S in Natural Gas: Below are a few of the many ways to test for H₂S in natural gas.

- Colorimetric (stain) Tubes
- Tutwiler - Colorimetric method using iodine to titrate a starch solution to an end point
- Cadmium Sulfate Adsorption
- ASTM D5504 - A gas chromatographic method used to speciate sulphur compounds

Of the methods listed above, use of colorimetric stain tubes is one of the most common methods due to low cost and easy deployment. However, some states—such as Texas—prefer that producers use the Tutwiler method. Methods of analysis that provide direct measurement at the source are preferred due to the reactivity of H₂S and other sulfur species.

For more information on H₂S testing services, contact SPL’s technical experts today at 877-775-5227.