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Require gas monitor for safe maintenance

By Mandy Archer Nov 9, 2025

Items needed for "bump testing" a gas monitor. This procedure ensures the monitor's accurate reading of parts per million of a specific gas by introducing a controlled amount of calibration gas to the monitor.

Photo courtesy of Mandy Archer

The headlines, “Three more killed in confined space” and “Six people are dead, including a teenager” both appeared in the last few months. While OSHA is still investigating the latter, two factors led to these deaths — working with manure in confined spaces and the potential presence of hydrogen sulfide (H_2S) gas.

While manure gases can pose a significant risk to human life on their own, gas hazards in a confined space can easily lead to tragedy. Limited entry and exit in a confined space makes rescue difficult, particularly when a hazardous gas has reached deadly concentrations.

Most farmers know that agitating a pit can cause hydrogen sulfide concentrations to rise, but so can the presence of manure left open to the air with limited ventilation.

Dan Neenan, director of the National Education Center for Agricultural Safety, provides training for first responders who encounter H_2S.

“We call it a low-frequency, high-risk type of incident,” he said. “It doesn’t happen that often, but boy, the dangers are sure there.”

Historically, these deaths multiply as a farmer succumbs to the gas and others rush to action.

Daniel Andersen, associate professor of agriculture and biosystems engineering at Iowa State University and @DrManure on X, emphasized the risk can be surprising.

“Remember, H_2S is heavier than air, so confined spaces that have limited ventilation and have ever had manure in them will be high-risk locations,” he said.

You may have heard that hydrogen sulfide gives off a “rotten egg” smell. Here is the problem: You cannot rely on smell as a warning to evacuate. Olfactory fatigue occurs as H_2S concentrations rise, and when the concentration gets deadly, the odor has disappeared.

Monitor use

Gas monitors are your best defense where your nose fails. Neenan suggests familiarizing yourself with your monitor before using it.

Use a four-gas monitor, where H_2S is one of the four gases, or a single-gas monitor just for H_2S to alert to dangerous levels of hydrogen sulfide. With a four-gas monitor, ensure that you know the location of each gas presented on your screen.

It is important to select gas monitors that display the H_2S concentration to avoid guessing. For single gas monitors, that will run you an extra $50, but the knowledge it provides is worth the extra expense.

These monitors have audible and visual alarms typically at two concentration levels, with the low-end equivalent to an 8-hour exposure limit and a 15-minute exposure limit on the high-end. At these levels (about 10 parts per million and 15 ppm), you may experience dizziness, fatigue or nausea. You don’t want to be in environments at 15 ppm very long because of this.

Knowing how to react to the alarm is critical to using these monitors. H_2S is deadly as concentrations increase above these alarm levels. Serious concerns happen at 100 ppm.

If you see the monitor’s concentration display rapidly rising over 15 ppm, the situation could quickly become deadly, so you will know that a rapid response is needed. If concentrations ever reach 100 ppm, get

out immediately. Hydrogen sulfide monitors max out at 100 ppm, so once you are over 100 ppm, you do not know if you are at the deadly concentration of 500 ppm — you just won't know how lethal your surroundings are.

Neenan mentioned two other precautions with gas monitoring. Monitors not only take 40 seconds or more to form an accurate gas concentration readout, but gas monitors must undergo calibration too, called "bump testing."

Representatives from the Great Plains Center for Agricultural Health will be available to bump test gas monitors free of charge at 2:30 p.m. Nov. 13 during the Midwest Rural Agricultural Safety and Health Conference at Hotel Millwright in Amana. Learn more at tinyurl.com/4shmnyf4.

Andersen said H_2S releases from manure faster today than in the past due to sulfur-rich feed and faster manure removal, and ventilation systems may not be designed to keep up. He said less than about 0.5% of applicators used gas monitors 10 years ago, and today, about 7% reported monitor use.

"Use a monitor," he said. "They are low cost but provide great insight into what you are exposed to and are [a] helpful insurance policy."

Educate others

Andersen said it seems those who haul manure regularly know of H_2S dangers, and knowledgeable producers can warn those workers who may be there for the day or as seasonal help.

Another tip is to discuss and practice H_2S emergency response training on the farm and with local emergency responders.

Check out Andersen's Talkin' Crap episode "The Hidden Hazard: Hydrogen Sulfide Safety During Manure Agitation and Pumping" at bit.ly/hiddenhazard. NECAS offers training programs for agricultural managers and workers at necasag.org/safetytraining.

In Iowa, the Volunteer Firefighters Training Fund covers the cost of rescue training as long as there are 12 Iowa volunteers.

People often think "I can hold my breath long enough to go in and get them out," Neenan said. That could be dead wrong.

Have response plans before an emergency and always call 911. Place signage all over the farm and be prepared to state the farm's address in case of emergency.

Neenan said often our first reaction will be to go in to help if someone has succumbed to H_2S gas. Do not go in after them.

As you can imagine, waiting for rescue of a family member is going to be the hardest thing in the world. Instead of putting yourself and others in that horrible situation, just get a monitor and learn how to use it.

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