

DAIRY MODERNIZATION

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Never attempt a rescue in an area that may contain hydrogen sulfide without using appropriate respiratory protection and without being trained to perform such a rescue

Respiratory protection during potential hydrogen sulfide gas exposure

The last issue of The Manager presented materials about the possible increased risk of exposure to a hazardous gas called hydrogen sulfide. The intent of that publication was to remind readers about the risks associated with working around any manure storages and handling systems (include free-air storages), pump stations and liquid tankers. Exposure potential tends to be highest during agitation, clean-out and in inadequately ventilated confined spaces, especially during warmer weather or when manure itself may be warm or hot – like with anaerobic digester effluent. Additional risk may be present when gypsum is used in barns and becomes part of a bedded pack or mixed with liquid manure and then stored long-term.

Regardless of gypsum use, stored manure can produce dangerous and lethal levels of hydrogen sulfide (H_2S) gas, and unsuspecting farmers and their family members have died due to exposure. There is evidence that increased risk to human health and life may be present when a readily available source of sulfur, such as gypsum, is mixed with stored manure. This is because there is additional potential for formation of H_2S gas from the sulfur. Since inhaling H_2S can be fatal, raising awareness of this potential to farmers and others working in and immediately around liquid manure and bedded packs is critically important.

The Occupational Safety and Health Administration (OSHA) Web site has a fact sheet posted on H_2S gas exposure at: www.osha.gov/OshDoc/data/Hurricane_Facts/hydrogen_sulfide_fact.pdf. This fact sheet indicates the concentrations of H_2S gas and the associated type of respiratory protection that should be used to protect health and safety if potential exposure is unavoidable. We felt it would be useful to the farm community to have this formal safety information, especially since there are very specific respiratory protection requirements for confined spaces.

Some protective measures must be implemented before entering confined spaces where H_2S and other atmospheric hazards may be present.

1. Air must be tested for oxygen deficiency, explosivity and the presence and concentration of H_2S (and other toxic gases, such as ammonia) by a qualified person using air monitoring equipment, most specifically a

multi-gas meter that detects these atmospheric hazards. This type of equipment was used by local fire department staff to test air quality around manure storages in central NYS in the fall of 2013. Testing should also determine if fire/explosion precautions are necessary.

2. If any atmospheric hazards, such as oxygen deficiency, explosivity, H_2S or other toxic gases are present, the space/area must be ventilated continually to remove the hazard(s) and supply sufficient oxygen to support life. This is always a good idea, whether or not H_2S is suspected, and is preferable to using respiratory protection.

3. If the atmospheric hazard(s) cannot be removed, the person entering the space/area must use appropriate respiratory protection, as outlined below, and any other necessary personal protective equipment, rescue and communication equipment. See the list of further resources for specific requirements for identifying, monitoring and entering confined spaces.

Entering dangerous atmospheres: A level of H_2S gas at or above 100 ppm is Immediately Dangerous to Life and Health (IDLH). So also is a concentration of oxygen less than 19.5%.

Entry into IDLH atmospheres by farmers, their employees, family members and others should be avoided since safe entry can only be made using:

1. A full face-piece pressure demand self-contained breathing apparatus (SCBA) with a minimum service life of thirty minutes.

2. A combination full-face piece pressure demand supplied-air respirator with an auxiliary self-contained air supply. A full face-piece respirator will also prevent eye irritation. If air concentrations of H_2S are elevated, eye irritation and light sensitivity may become serious issues. Workers in areas containing hazardous atmospheres, including H_2S , must be monitored for signs of overexposure.

Michigan State University Extension has additional resources online at <http://nasdonline.org>.

FYI

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