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Environmental Systems **PD-2021-03-01**

Close call on Finger Lakes dairy farm is a reminder of hydrogen sulfide gas concerns around manure storages

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Hydrogen Sulfide is a well-documented and extremely dangerous gas that can be found in manure storages. Hydrogen Sulfide (H_2S) is a byproduct of bacterial breakdown of organic compounds inside a manure storage. It is heavier than air and can concentrate low to the ground or in confined spaces. Any extra source of sulfur on farm has the potential to increase H_2S gas production once it reaches the manure storage. Farms that use gypsum based bedding and anti-slip agents have increased risk of H_2S gas production. A significant amount of work was performed by the Yates County Soil and Water Conservation District and Town of Benton Fire Department to study the levels of H_2S gas around manure storages. Results showed that farms using gypsum products almost always carried higher levels of deadly H_2S gas during manure storage agitation and pump-out. Studies also showed deep bedded packs can carry high levels of H_2S gas.

An incident occurred on a gypsum-using farm in the Finger Lakes region in late fall 2020. A dairy farmer was flushing out gravity flow gutters inside the barn, using recycled manure from the storage. The farm owner was holding the hose at the top end of the gutters while two small children were playing in the barn. Unknown to the farm owner, the children were at the bottom end of the gravity gutters, where H_2S gas was concentrating. One of the children told their father her friend was sleeping and wouldn't wake up. The farm owner quickly realized the danger of the situation and picked up the limp child to take her to fresh air. Luckily the child revived and is well, so a good ending to what was very close to a lethal situation.

This incident is a sharp reminder for all farm owners to be wary of H_2S gas, in particular those farms that use any gypsum-based products. H_2S concentrations over 100 ppm (parts per million) are immediately dangerous to life and health. Based on testing with gas meters on farms in Yates County, measurements on gypsum-based farms were frequently over 1,000 ppm routinely during mixing and pump-out of manure storages. This level of H_2S can be fatal in a matter of minutes. All farm owners, regardless of gypsum usage or not, need to be aware of H_2S danger signs and "hot-spot" identification where gases can accumulate. Studies show that gases store and build up inside manure storages and are quickly released during agitation and pump-out. Since H_2S is heavier than air, it tends to seek the low point: in a pit, or low pockets surrounding a manure storage. Pump-out in open air manure storages can be just as deadly as enclosed areas with gas levels this high. Winds can move and dilute the gas. Early warning signs of exposure to gases can be headache, nausea, and loss of smell, but at high concentrations you can be immediately overcome.

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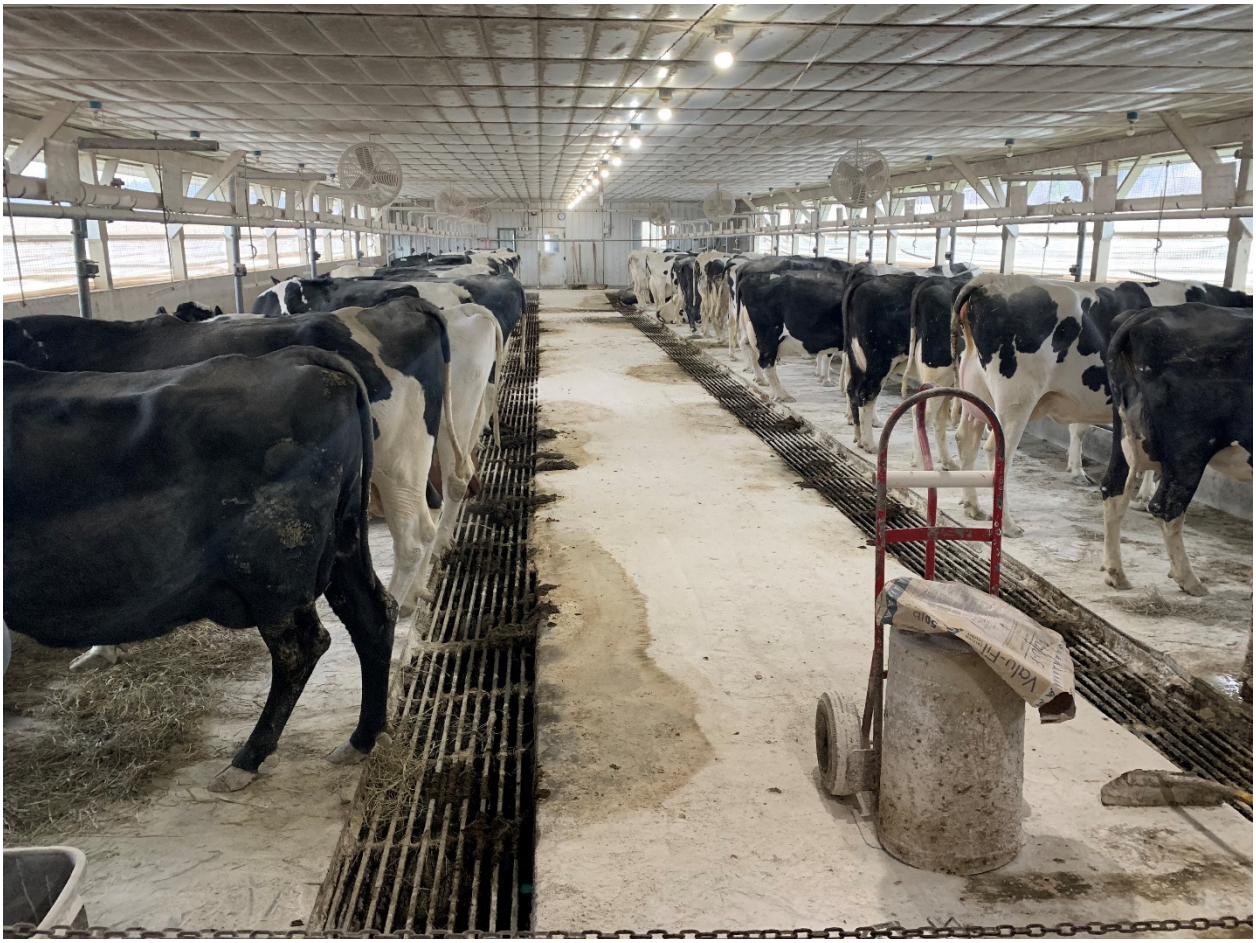
For any farm operator flushing out gravity flow gutters, consider the following:

- First of all, set up a system that does not require anybody to be inside the barn, using temporary pipes.
- If at all possible, do not use manure from the storage as you are introducing H_2S gas into an enclosed facility.
- If you have no other options, ensure all family members are aware of the dangers of this operation, and make it clear that they are not to enter the barn for any reason.
- Animals can be impacted so they also should be removed.
- Open all windows and doors to the barn, turn on all fans to high, and set up additional ventilation fans to supply fresh air directly from outside, towards anyone who needs to be inside.
- Under no circumstances should anyone else enter the barn while the flushing operation is in process.

For additional information on hydrogen sulfide dangers, contact Tom Eskildsen, Yates County Soil and Water Conservation District, by phone at 315-536-5188 or email at tom@ycsoilwater.com. Additional information and publications can be found on the Cornell CALS PRO-DAIRY website at cals.cornell.edu/pro-dairy/our-expertise/environmental-systems/safety.



A Finger Lakes farm had a H_2S gas incident when flushing out gravity flow gutters inside the barn using recycled manure from the storage.