

Pit Foaming and Manure Gases

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NOVEMBER 2010

In the past year Ontario pork producers have reported several occurrences of manure pits under slatted floors producing large volumes of black foam. The foam can fill up pits, exit pump-out ports, push through pit fan ventilation openings, and rise through the floor slats. Though the cause of the foam and how to prevent it are still unknown, producers should be aware of the possible dangers that the foam can cause.

Whenever you are dealing with liquid manure in confined spaces like barns or pump out ports there is always the danger of hazardous gases. Methane (CH₄) and hydrogen sulfide (H₂S) gases are always produced during anaerobic breakdown of manure in manure pits. The risk of these manure gases becoming a serious and possibly deadly problem can be minimized if managed properly. As the gases are released and become trapped by foam at the surface, the foam then starts to build up. When the foam is disturbed by pig activity, power washing, water sprinklers or agitation it releases methane (CH₄) and hydrogen sulfide (H₂S) gas. If the ventilation system cannot clear the volume of released gases, they can be trapped in the barn, with potentially deadly consequences.

Methane

Foam captures methane and when bubbles are broken, through agitation or other means, it RAPIDLY releases methane. Methane concentrations inside the foam are 60 – 70 %, which is above explosive concentration. When foam bubbles are broken, methane accumulates in the barn space above the pit and becomes explosive.

Methane is lighter than air and will rise to the ceiling of the room. When methane exceeds 4 – 5 % of the air volume and there is a flame or spark from a heater pilot light, electric or gas motor, light switch, an explosion may occur. This has been the case with some barn explosions in the Midwest USA.

Hydrogen Sulfide

Hydrogen sulfide, which is heavier than air, will accumulate at the surface of the pit, base of the floor or foam. This gas is lethal in very small quantities and can cause death to pigs and humans.

Safety Precautions

Keep people out of buildings if you suspect any problems related to manure gases.

Cost-effective gas monitors which constantly monitor and display carbon dioxide (CO₂) or hydrogen sulfide (H₂S), with a range from 0 to 500 ppm, in 1 ppm increments, are available from approximately \$140.

- Ventilate properly/check to see if ventilation is working
 - NEVER agitate without having all ventilation fans operating and inlets open
 - Make sure fan ventilated barns have proper static pressure to ensure maximum air flow and mixing (i.e. no windows or doors left open)
 - Pit ventilation working (remember pit fans may not work if foam is blocking or above pit ventilation outlets)
 - Fans on full

- Ceiling inlets open
- Pump-outs sealed
- Mixing fans on if available

- Turn OFF pilot lights/other sources of ignition when agitating
- No rooster tailing with manure pump
- No agitation until manure is 2 ft below slats
- If possible, agitate intermittently

Be extremely cautious when foam is being broken up.

Iowa State University Extension has an excellent video on “Foaming and Deep-Pit Manure Pumping Safety” at <http://vimeo.com/15463270>

For more information on dealing with manure gases follow the link <http://www.omafra.gov.on.ca/english/engineer/facts/04-087.htm> or phone the Agricultural Information Contact Centre 1-877-424-1300 and ask for the factsheet “Hazardous Gases”.

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