

## Management Suggestions

### Manure Storages

- Ensure covered manure storages are ventilated by some means to prevent the accumulation of all hazardous gases.
- Post a "Danger, Deadly Gases" warning sign in a visible location near each pump out station. These signs are available from the Ontario Farm Safety Association.
- Before agitating and emptying an under floor liquid manure storage, remove all livestock, if possible. If it is not possible to remove the livestock, extra precautions must be taken.
- Do not agitate the liquid manure in storage unless absolutely necessary. If agitation is necessary, keep the agitator below the liquid surface and do not direct the stream of agitated manure towards a post or wall. Research has shown that gas levels will increase very quickly when splashing or surface agitation takes place (see [Figure 1](#)).
- If the barn has under floor (pit) ventilation and the porosity of the slatted floor is such that an air velocity through the slats of at least 0.10 m/sec, (20 ft./min.) can be obtained, use the pit ventilation system. Secondly, ensure that any openings such as pump out ports are sealed off. For the pump out port, this might require the use of a piece of plywood or flexible skirt to fit around the tractor driven pump. This will maximize the amount of air being drawn from the room down through the slats. Finally, if gas detection equipment is available, monitor gas levels in the barn.
- If the barn does not have under floor ventilation, or if conditions are such that an air velocity down through the slats of at least 0.10 m/s (20 ft/min) cannot be obtained, provide maximum room ventilation. Be aware that there exists a greater risk when there is no under floor ventilation. Do not enter the barn during and immediately following pumping or agitation. If gas detection equipment is available, monitor gas levels in the barn.
- It is highly recommended that a hydrogen sulphide gas monitor with an alarm be used to monitor gas levels in the barn, whenever this type of storage is agitated or emptied (see [Figure 2](#)). Gas monitors can be obtained from safety equipment suppliers for less than \$250. In addition, there are consultants in Ontario who offer hydrogen sulphide awareness training.
- Always maintain at least one foot of freeboard between the manure surface and the bottom of the slats to prevent animals from routinely breathing hydrogen sulphide and carbon dioxide.
- When flushing gutters, provide maximum ventilation. Do not enter the barn during and immediately following flushing. If gas detection equipment is available, monitor gas levels in the barn.
- Ideally, all pump-out openings should be located outside the building to eliminate the danger of working in a confined area, and be protected by a safety railing when in use.
- Do not attempt to rescue an animal if it collapses during pumping or agitation. Turn off the pump, provide maximum ventilation and wait a reasonable time

before entering the barn. Again, if gas detection equipment is available, ensure a safe concentration level prior to entering.

- Avoid smoking in the barn or near a manure storage facility.
- Manure storages should only be entered by trained personnel equipped with suitable self-contained breathing apparatus. Never assume that gas levels are safe at any time.
- If a rescue becomes necessary, call your local fire department. Do not attempt a rescue on your own.
- If you suspect that you have been exposed to high levels of ammonia, hydrogen sulphide or carbon dioxide, consult your physician immediately.
- Inspect the safety fence periodically to ensure there are no openings and that warning signs are still in place.