

## Training Module: Liquid Manure

**Objective:** To become aware of the dangers associated with liquid manure storage, and to discuss rescue/emergency responses.

**Trainer's Note:** Stored liquid manure creates dangerous gases and can be a potential site of a drowning. When a person enters an enclosed manure storage or reception pit, without the proper respiratory equipment, the worker may be overcome by the gases, become asphyxiated, and/or drown.

### Background

Manure gas is not a pure substance, but a combination of several gases that are created as manure decomposes. Some components of the gas are toxic, leading to increased toxicity when combined with other gases. Liquid or semisolid manure that is handled by agitating, pumping, and spreading can release large amounts of gases.

### Characteristics of Gases Produced in Decomposing Manure and Some of their Effects:

<u>Gases</u>	<u>Odor</u>	<u>Density</u>	<u>Effects</u>
Ammonia	Pungent <sup>1</sup>	Lighter than air	Irritation to eyes and nose. Asphyxiating at high levels.
Carbon Dioxide	None	Heavier than air	Drowsiness, headache. Can be asphyxiating.
Hydrogen Sulfide	Rotten Egg Smell <sup>1</sup>	Heavier than air	Toxic: causes headache, dizziness, nausea, unconsciousness, death.
Methane	None	Lighter than air	Headache, asphyxiating, explosive in 5 to 15% mixture of methane with air.

<sup>1</sup> Smells are often not distinguishable from other barnyard odors.

### **Preventing Hazards:**

- The first precaution and the safest is **DO NOT** enter a manure storage.
- If it is absolutely necessary to enter a manure storage, check gas concentration levels, thoroughly ventilate the storage, wear a supplied air or self-contained breathing apparatus (SCBA), have at least two people standing by, and put on a safety harness and attach a rope in case rescue is necessary.
- Locate serviceable equipment parts (shear pins, cleanouts, etc.) so that they are accessible from outside the storage area. It is recommended that all storage openings be large enough to allow for the removal of equipment.
- Locate manure pump-out openings in the open air to reduce the danger of working in a confined area when agitating or pumping. A steady supply of fresh air is necessary, especially during agitation.
- Protect all openings to reception pits or storage with sturdy grates and covers to prevent accidental entry by humans, animals, or equipment.
- Removable covers and grates should be used on pumping and agitation ports.
- Always have at least one other person available when agitating a manure storage. The extra person can get help if needed.
- Always operate the ventilation system during agitation.
- Always get help before attempting to rescue livestock that have fallen into a manure storage structure.
- If an animal is overcome by noxious fumes in an enclosed confined area do not try to rescue it. Do not enter the building, turn off pumping and agitation equipment. Increase ventilation to dilute and remove any gases.
- Do not smoke, weld, or use an open flame near enclosed, confined areas where methane can buildup.
- Locate first aid or rescue equipment (air packs and face masks, nylon lines with snap buckles, and parachute type body harness with “D” rings for attaching lines) near the manure storage area.

When protective barriers are missing, earthen storage basins or lagoons are potential drowning sites. To prevent this type of accident, build railings alongside all walkways or piers for open manure storage structures. Fence in earthen storage basins and lagoons. The fence will keep livestock and people away from the structure. Signs should be posted indicating “CAUTION - MANURE STORAGE (or LAGOON).”

In case of an emergency, there should be a lifesaving station around the lagoon. It should be equipped with a reaching pole and ring buoy on a line. (Refer to Pond Safety Module).

### **Review The Following Points**

- Make sure equipment is accessible.
- Grates need to be sturdy.
- Always operate ventilation systems during agitation.
- Never enter confined storage areas alone.

**True or False Answer Key**

1. T, 2. F, 3. T, 4. F, 5. T

## Liquid Manure Quiz

**True or False**

**Name** \_\_\_\_\_

- |   |   |   |
|---|---|---|
| 1. Manure is a combination of several gases that are created as manure decomposes.                                      | T | F |
| 2. There is no danger in entering a manure storage area alone.  | T | F |
| 3. During agitation, ventilation systems should be running.   | T | F |
| 4. If an animal is overcome by noxious fumes in an enclosed confined area, try to rescue it immediately.                | T | F |
| 5. Liquid or semisolid manure that is being agitated, pumped, or spread is capable of releasing large amounts of gases. | T | F |