SECTION 3

Manure Handling AND STORAGE

Livestock manure handling, storage, and management are an important part of every livestock operation. Efficient removal of manure from the livestock production facility is necessary for optimum livestock productivity. The sustainability of the operation also depends on a sound manure management system, including the treatment, transfer or use of manure as a fertilizer for crop production.

Livestock production practices and manure properties often dictate the type of manure handling equipment that can be used. The storage structure type and its operation affect nutrient losses and the uniformity of the nutrients when the manure is removed from the storage.

3.1 Solids Content

The type of manure handling equipment that can be used depends on the solids content of the manure. Livestock manure is classified as either a liquid, semi-solid ("slurry") or solid:

- **Liquid** – Liquid manure contains less than five per cent solids. Pig manure typically has a solids content of nine to ten per cent as excreted. The additional liquid comes from washwater and spillage from drinkers.
- **Semi-Solid** – Semi-solid manure contains five to 25 per cent solids.
- **Solid** – Solid manure contains greater than 25 per cent solids. To produce solid manure, bedding must be added or the liquid must be drained off and the manure dried.

3.2 System Components

The components of a manure management system include collection, transfer, storage, treatment and utilization (Table 1). The application of manure is covered in detail in Section 4.

3.3 Equipment Selection and Maintenance

When handling manure, it is important to use equipment that is designed for that purpose and to operate and maintain the equipment according to the manufacturer's instructions. Manure handling equipment must function reliably in a corrosive environment. Equipment also requires proper maintenance if it is expected to have a long service life. Preventative maintenance and the use of reliable equipment are critical for avoiding problems.

Liquid manure systems generally rely on pumps for various stages of the manure management system. Problems can occur when clumps of solids enter the pumps so there must be some method of screening or cutting solid material. In liquid manure storages, solids settle out and agitation is required to bring the solids back into suspension. Chopper pumps are appropriate for agitation since they do not easily become plugged with solids. These pumps have capacities of about 200 litres per second (L/s) or 2,600 imperial gallons per minute (imp. gal/min). Pumps used for liquid manure application, on the other hand, may range in capacity from 20 to 90 L/s (260 to 1,200 imp. gal/min) and can

pump manure up to three kilometres (km) (1.86 miles (mi)) through pipes and flexible hoses. While liquids are transferred by gravity or by pumps, solid and semi-solid manure is transferred by conveyors, augers, piston pumps or front-end loaders.

3.4 Planning a Manure Storage Structure

Manure storage structures must be sufficiently impervious to prevent leakage, provide an appropriate level of odour control and have adequate capacity to provide flexibility for timing application operations. The design of the storage will depend upon the location, the size required, the characteristics of the manure and the methods of filling and emptying. Although

Table 1: Components Of A Manure Handling System For Livestock Production

Operation	Solids	Semi-Solid/Liquids
Collection	Gutter Cleaners Front-End Loaders	Slotted Floors (complete with gutters) Scrapers cable hydraulic tractor
Transfer	Manure Wagons Open Tank Appliers Dump Trucks Earth Moving Equipment	Pumps submerged, open impeller piston pneumatic Augers Vacuum Tank Wagon Pipeline Gravity Continuous Flow Gutters Large Diameter Pipes
Storage	Stockpile Bunk Silo	Glass Lined Steel Concrete Earthen
Treatment	Aerobic compost dry Anaerobic	Aerobic pre-storage partial total Anaerobic Solid/Liquid Separation
Use	Application Energy Production (e.g. syngas)	Application Irrigation Energy Production (e.g. biogas)

some design considerations are discussed, producers are advised to contact an agricultural engineer for design information.

3.4.1 Permits

Under the Livestock Manure and Mortalities Management Regulation (Appendix B), the construction, modification or expansion of any manure storage structure, regardless of size, requires a permit from Manitoba Conservation. All investigation, design, construction supervision and final certification must be done by a professional engineer registered in the Province of Manitoba. Schedule A of the regulation (see Appendix B) specifies the minimum siting and construction requirements for manure storage structures. These requirements are designed to protect surface water, groundwater and soil and provide consistent construction practices throughout the Province. Before a permit is issued, Manitoba Conservation must be satisfied that sufficient suitable land is available to implement an appropriate manure management plan. Contact Manitoba Conservation or Manitoba Agriculture, Food and Rural Initiatives for further information on storage structure design, siting criteria and regulatory requirements.

3.4.2 Location

Manure storages should be located close enough to barns to allow convenient filling, without limiting the expansion of the facilities. They may also be located close to fields for application purposes. For those storages requiring long distance pipelines, there are special design considerations that must be addressed, such as type and size of pipeline, and clean-out provisions. These considerations must be detailed by the design engineer and are included in the permit issued by Manitoba Conservation. The storage should be accessible for field application equipment.

The location of the manure storage should provide the recommended separation distances from neighbours and residential areas (see Section 6.2). Existing trees should be used for shelterbelts and the establishment of additional shelterbelts should be considered.

The storage location should not collect surface runoff. Manure storages must not be constructed on the banks of rivers or drainage channels, or in depressions that may carry surface runoff.

Surface and groundwater should be protected from potential spills from the manure storage. Any abandoned wells within 100 m of the manure storage should be identified and properly sealed. A grassed buffer strip should be provided to intercept manure that could enter a watercourse in the event that the storage leaks or overflows. In order to minimize any risk of polluting, all manure storages must meet minimum setback distances (Table 2) outlined in the Livestock Manure and Mortalities Management Regulation.

Soil and groundwater conditions should be assessed to ensure the site is suitable for the type of storage planned (see Section 6.4.1). For example, where groundwater levels are near the bottom of the storage, an earthen storage structure should not be used without a suitable liner. See Section 3.5.1 for details on the construction requirements of earthen manure storage structures.

Table 2: Required Manure Storage Setbacks[1]

Storage Type	Distance (m) to[2]	
	Surface watercourse, sinkhole, spring, or well	Property Boundary
All manure storage structures	100	100
Field storage	100	N/A
Composting	100	100

[1]Refer to Appendix B, Livestock Manure and Mortality Management Regulation.

[2]See Appendix C for imperial units.

3.4.3 Size

The size of the manure storage structure is determined by the volume of manure produced and the length of time that manure will be contained. The volume of manure produced varies from one operation to another and depends on the size of operation, management practices and facility design. The volume of manure can increase significantly due to drinker water spillage or from washing. In farrowing and nursery operations, where washing is performed regularly, the volume of liquid manure may increase by a factor of two or three. However, the use of water conserving devices such as wet/dry feeders can reduce water use by up to 40 per cent when compared to standard feeders. The amount of bedding used also affects the volume of manure produced. If bedding is used in solid systems, the weight of manure may increase by 20 per cent and the volume may double.

Accurate estimates of manure production are very important when expensive storage systems are used, such as covered or open concrete or steel structures. To estimate storage volume requirements, it is often beneficial to evaluate an existing operation that is similar to the planned facility. Tables 3a and 3b provide manure production rate estimates for various types of pig operations. Values may vary depending on management and design. For more assistance,

Table 3a: Minimum Manure Storage Volume Requirements (Including Spilled And Wash Water)

Livestock	Storage Volume[1]	
	Litres per day	m^3 per day
1 Sow, Farrow to Finish (110-115 kg)	65.1	0.0651
1 Sow, Farrow to Weanling (up to 5 kg)	22.7	0.0227
1 Sow, Farrow to Nursery (23 kg)	28.3	0.0283
1 Weanling, Nursery (5-23 kg)	2.8	0.0028
1 Grower/Finisher (23-113 kg)	7.1	0.0071

[1]See Appendix C for imperial units.

contact one of the resource professionals listed in Appendix K, Contact Information.

The storage should have reserve capacity to accommodate precipitation and the accumulation of solids. The storage must always have enough capacity to handle a major rain storm without overflowing. There should also be enough capacity to provide flexibility for applying manure when field conditions, labour availability, weather and local regulations allow. Short-term storage may require more management and labour, since the time required for setting up and putting away equipment is increased. More importantly, poor weather, labour shortages and equipment breakdowns can seriously disrupt the timing of application. For operations prohibited from winter application, a minimum storage capacity of 200 days is required. Increasing the storage capacity to 400 days for earthen manure storage structures is often recommended. This ensures that manure will not have to be applied during the banned winter period (November 10 to April 10) and provides more flexibility for any unforeseen events, such as inclement weather, during the application season.

3.5 Storage Types

In Manitoba, the most common manure storage structure is the earthen storage. There are single-cell, two-cell or three-cell earthen storages. Concrete and steel tanks and alternate storage structures are also in use.

3.5.1 Earthen storage structures

Earthen storage structures are used for storing liquid manure. Their advantage is the low capital cost relative to the volume stored. The disadvantages are the greater surface area for odour emissions, the nutrient losses to the atmosphere and the maintenance requirements. Earthen manure storages also have additional specifications for the site location (see Section 6, Site Selection and Appendix B, Livestock Manure and Mortalities Management Regulation).

Earthen manure storages should be constructed to accommodate the equipment used for emptying, agitating and maintaining the slopes. The slopes of the inside walls should be 1:3 or 1:4 (vertical: horizontal). The outside wall slopes should be 1:5 so that a grassed cover can be established and to allow equipment access for maintenance and manure pumping. A berm width of at least 2.4 m (eight feet (ft)) should be provided for tractors and pumps.

Table 3b: Estimated Rates Of Solid Manure Production For Pigs[1]

Livestock Type	Volume-basis[2] (m^3/day)	Weight-basis[2] (kg/day)
1 Sow, Farrow to Finish (110-115 kg)	0.049	39.2
1 Sow, Farrow to Weanling (up to 5 kg)	0.015	12.1
1 Weanling, Nursery (5-23 kg)	0.0017	1.3
1 Grower/Finisher (23-113 kg)	0.0048	3.7

[1]Adapted from Table 5 of the Province of Alberta's *Agricultural Operation Practices Act* - Standards and Administration Regulation (AR 267/2001)

[2]See Appendix C for imperial units.

3.5.1.1 Protection of earthen storage structures

Earthen manure storage structures should be erosion proof. The tops and outside slopes of the berms must be seeded to grass and regularly mowed to provide protection against erosion and to improve stability. During the emptying of the storage, vigorous agitation is necessary to bring the

settled solids into suspension. Most pumps will create enough turbulence at the bottom of the storage near the pump intake to severely erode the base of the storage structure and compromise the integrity of the storage liner. The same hazard may occur under or around the transfer pipe inlet to the storage. Curbed concrete ramps and pads prevent rutting from pump-out equipment and erosion from agitation and inlet piping.

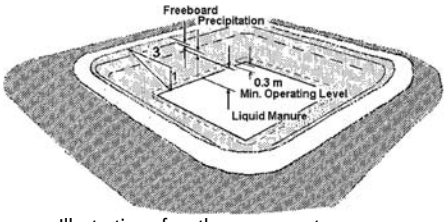


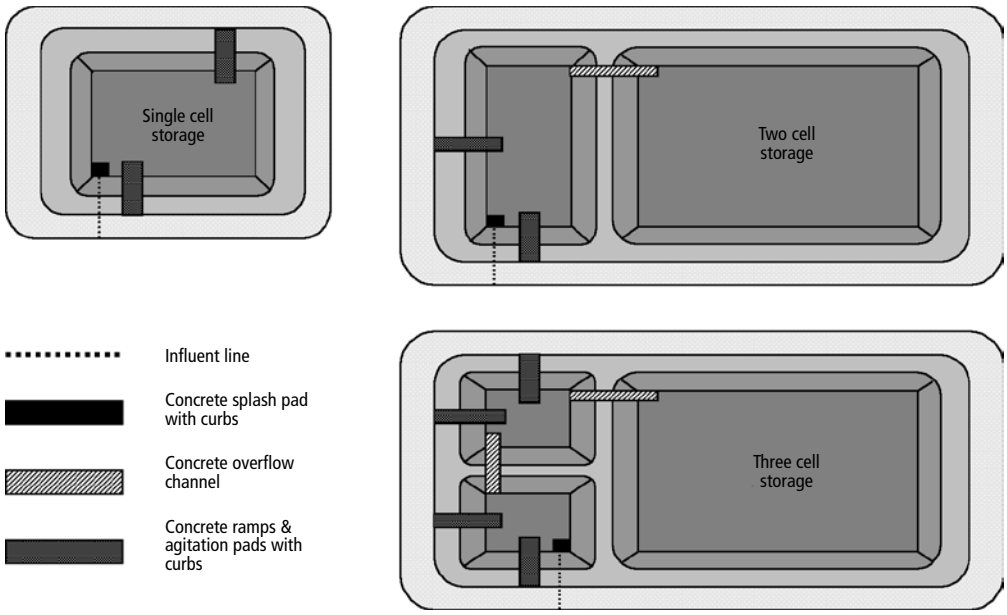
Illustration of earthen manure storage

3.5.1.2 Earthen storage designs

Most earthen storage structures designed with useable volumes under 10,000 m^3 (350,000 ft^3 or 2,000,000 imp. gal.) have a **single storage cell**. Depending on the size of the storage, multiple pumping stations may be required. Typically, the agitator has to be repositioned every 30 m around the perimeter of the storage to thoroughly suspend the settled solids and clean the storage bottom. Each of these pumping stations must have a curbed concrete access ramp and pumping pad.

Two-cell earthen storage structure designs are increasingly used for larger storage volumes. The primary, smaller cell, with a capacity from 25 to 30 per cent of the total structure's volume, allows the solid fraction of the manure to settle. The larger, secondary cell essentially stores liquids. The liquid manure from the primary cell has a greater solids content and, therefore, a higher organic matter level, than that from the secondary cell. Vigorous agitation is usually required in the first cell to suspend the solids, whereas the liquids from the second cell can be pumped out without agitation. Since agitation releases strong odours, it is advantageous to reduce the time required to agitate the manure and suspend the solids. The time required to agitate the primary cell of a two-cell storage is significantly less than that required to agitate and suspend the solids in a large, single-cell structure.

Some two-cell earthen storages have a bottom transfer pipe between the two cells with a valve that allows the liquids from the second cell to return to the primary cell during pumping. These storages only require one pumping station for the entire storage structure. Ideally, the primary cell should be small enough for the solids to be thoroughly suspended with a single pumping station.



Typical layout of a single-cell, two-cell and three-cell storage structure

A two-cell storage system makes clean-out and therefore, solids removal more manageable. Another advantage of the two-cell design is that the manure can be agitated more effectively providing a more uniform nutrient content, particularly in the case of phosphorus. With time, however, a significant amount of solids will still be transferred to the secondary cell, settle and require removal. Cleaning of the secondary cell requires ramps for access of heavy machinery. Precautions must also be taken to avoid scouring the unprotected storage liner in the secondary cell. When designing any storage, consider the need for a manure storage structure cover.

Final stage of the construction of an earthen storage: compacted with a sheepsfoot packer

3.5.1.3 Construction requirements

The Livestock Manure and Mortalities Management Regulation specifies strict design and construction requirements for earthen manure storage structures. Construction requirements are specified for earthen storage structures that are to be built in areas where good clay or clay-till type material exists (see Appendix B):

- topsoil must be stripped
- soil must be properly compacted using a fully ballasted sheepsfoot or vibrating packer to a density of at least 95 per cent of Standard Proctor dry density

- construction shall be completed under conditions where soil temperatures are above freezing
- curbed concrete ramps and pads must be provided for berm and liner protection. They must be provided at all locations in the storage affected by scouring (inlet, transfer pipes, agitation ramps)
- the top and outside berms must be covered with suitable soil for seeding to grass.

Where the earthen storage structures are located within the unsaturated part of an aquifer, or if sufficient clay or clay-till does not exist under the storage, the addition of a compacted clay or synthetic liner and monitoring wells are required.

3.5.1.4 Groundwater pollution concerns

Seepage from improperly constructed or poorly maintained earthen storage structures and the associated risk of groundwater contamination are a serious concern.

There is increased risk of groundwater contamination in areas where the subsoil underlying the storage consists of sand, sand and gravel or shallow bedrock forming the aquifers. In these areas and where there is less than 5 m to an aquifer, earthen storage structures must be lined and equipped with monitoring wells. Seepage detection systems may also be required. Compacted clay and/or artificial liners reduce the rate of seepage and potential for impact on groundwater.

In some areas, even a lined earthen storage may not be adequate. Concrete or steel storage structures may be acceptable alternatives in these situations.

3.5.2 Concrete and steel structures for liquid manure

Concrete or steel structures for liquid manure may be partially buried or above ground. Odours tend to be less from these structures than earthen manure storages because for an equivalent amount of storage volume, there is less surface area exposed to the atmosphere. Furthermore, depending on the type of feed used the manure in concrete and steel structures can develop a crust layer which can further reduce odours.

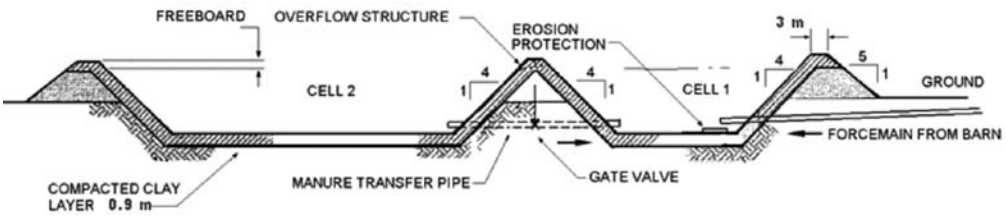


Illustration of a two-cell liquid storage structure design

Concrete (left) or steel (right) liquid manure storage structures

Typically, an above ground storage is a circular silo-type structure with an open top made from pre-cast concrete panels, reinforced cast-in-place concrete, or glass lined steel panels. Underground storages are generally rectangular in shape and require proper design to withstand all earth, hydrostatic and live loads.

The size and shape of the manure storage will dictate the number of agitation locations and the type of agitation equipment used for clean out. Large diameter, above ground storage tanks often require high capacity agitation pumps to be lowered into the tank over the wall and have a number of pump-out ports located around the perimeter. Larger, buried tanks will often be divided into smaller compartments with agitation pump access and partial dividing walls built inside the tank. These partial walls allow liquid overflow between compartments, but provide more effective clean-out by reducing the volume of manure to be agitated within each compartment.

Generally, above ground concrete or steel storage tanks are seldom covered due to the extremely high cost of the cover material and the support structure for the cover. However, covered concrete or steel storages have been used to capture gases when combined with manure treatment systems. See Appendix E for a comparison of nitrogen losses from different systems.

3.5.3 Field storage

Storage of solid manure from pig operations is generally limited to solid manure from straw-based housing systems or solid-liquid separation systems for treatment or handling. Solid manure must be stored in a manner that controls seepage and potential runoff.

Under the Livestock Manure and Mortalities Management Regulation, solid manure can be stored in a field. It must be at least 100 m away from any surface watercourse, sinkhole, spring or well and it must be stored in a manner that does not cause pollution of surface water, groundwater or soil. Dikes may be required to prevent runoff from the field storage from entering surface or groundwater or leaving the property. The regulation also restricts how long any particular site may be used to store solid manure. It states that if solid manure is stored as field storage at any particular site during the period January to December of one year, the manure must be removed from that site by November 10 of the following year. The field storage site must not be used again for at least 12 months and a crop must first be grown on the site in order to recover any nutrients that may have leached into the soil from the stored manure.

3.5.4 Earthen and concrete pads for solid manure

For coarse textured soil conditions, a compacted clay liner or concrete pad may be required under the manure pile. Perimeter curbs or a constructed collection basin may be required to contain runoff from the solid manure. The liquids can then be collected and applied to neighbouring crop land or treated through an adjacent vegetative buffer strip. To minimize the volume of liquids to be handled, the storage structure should be designed to divert outside runoff water away from the storage area.

A front-end loader or an excavator is normally used to remove manure from the solid manure storage area. Where there is a concrete pad, a concrete bucking wall should be provided to assist with filling the bucket. Access for loading and hauling equipment should also be provided.

Covered steel hoop structures are one type of alternative livestock housing for livestock production

3.5.5 Alternative housing systems

Hoop shelters are a proven alternative housing system. Most hoop shelters are quonset-shaped metal structures covered with polyethylene tarps. The ends are left open for most of the year, but covered during the winter months. Side walls are post-and-plank construction, typically 1.2 to 1.8 m (4.0 to 6.0 ft) high. The floor of the shelter is concrete at one end to hold the feeders and waterers, while the remainder of the floor is covered with deep straw bedding. The construction, modification or expansion of a hoop shelter operation capable of housing 300 or more animal units requires a permit from Manitoba Conservation. All hoop shelters should be designed and constructed according to guidelines issued by Manitoba Conservation.

In Manitoba, hoop shelters are generally used for grower/finisher pigs. The pigs are placed in the shelter at approximately 25 kilograms (kg) (55 pounds (lbs)) and are housed there until they reach market weight. Manure that accumulates in these systems must be managed in a manner that will not cause pollution. The deep straw bedding used in these systems must absorb all or most of the liquid. Any runoff which may occur must be contained on the owner's property and must not be allowed to cause pollution of surface water, groundwater or soil. Hoop shelter systems are normally cleaned out after every batch of grower/finisher pigs. Manure may be composted or temporarily stored in the field and then applied to cropland as fertilizer.

The simplicity of construction, natural ventilation, reduction of odours, and lower costs associated with hoop shelters make them an attractive option for some producers. Although producers can save money on building and energy costs, hoop shelters require increased labour and handling costs. Since these structures are naturally ventilated, prevailing wind direction, amount of natural shelter and other obstructions need to be considered to ensure good air movement in the summer so the pigs are kept cool. In the winter months, a generous supply of bedding is needed for the pigs to follow their natural burrowing instincts to keep warm. Feeding efficiencies are generally poorer in winter and fly control can be more difficult in summer.

When selecting a site for an alternative housing system, consider the following factors:

- avoid sites with porous soils and/or fractured rock that would allow direct access of any contaminants to the groundwater
- maintain minimum property setbacks and separation distances (see Tables 12 and 13, Section 6, Site Selection). A minimum setback of 100 m (328 ft) from a watercourse, well, sinkhole, etc. is required by the Livestock Manure and Mortalities Management Regulation (see Appendix B).

For more information regarding hoop shelter construction, please contact Manitoba Agriculture, Food and Rural Initiatives or Manitoba Conservation.

3.6 Manure Pathogens

All livestock, as well as pets and wildlife, may carry infectious diseases that can be transmitted between animals and humans called zoonotic diseases. There are three main types of microorganisms to consider: bacteria, viruses and protozoa. Human infection can occur through direct contact with an animal, through contact with animal manure, or through ingestion of food or water contaminated with manure. As with all illnesses, prevention is preferable to treatment. The key ways to prevent illness from occurring are:

- maintain good personal hygiene -- hand washing is important!
- select the site for a livestock operation according to the considerations specified in Section 6 (Site Selection)
- handle, store and apply manure according to these guidelines
- avoid water pollution by adhering to environmental regulations.

Proper siting and construction of manure storage structures is critical to preventing contamination of sensitive groundwater areas and nearby surface watercourses.

Bacteria are present in all animal feces, and some are capable of surviving a long time in stored and applied manure, and in soil and water. Some of the bacteria species that may be present in livestock manure include *Salmonella, Campylobacter, E.coli, Clostridium, Leptospira, Listeria* and *Yersinia. Coxiella* and *Brucella* are mentioned in the literature but have not been found in Manitoba in pigs.

Viruses that are found in animals do not usually cause human disease. Also, viruses do not survive well outside a host and are very sensitive to environmental conditions such as temperature and moisture. The bacteria that are present in manure tend to inactivate most viruses.

The protozoa *Giardia* and *Cryptosporidium* are emerging pathogens, which means they are being found more frequently than in the past. They are a particular risk for people with weakened immune systems. Protozoa tend to contaminate surface water supplies and can cause significant and widespread human illness if present in drinking water sources. These organisms have environmentally resistant forms (cysts) that are also resistant to inactivation by conventional water treatment. *Giardia lamblia* (beaver fever) and *Cryptosporidium parvum* (crypto) are shed by wildlife, livestock, pets, and humans; however, the original source of contamination is often difficult to determine.

Other parasites, such as nematodes and round worms, may also be present in livestock manure and warrant mention. However in most cases, the animal species of these parasites do not cause disease in humans.

When these Farm Practices Guidelines are followed, the risk to public health from manure handling operations or manure storage structures is low.

3.7 Safety

Livestock producers and manure applicators should use safety precautions around livestock manure structures and equipment. Access to manure storage structures should be limited and additional safety precautions may be warranted when handling livestock manure. Fencing the storage to restrict access and visible warnings for children and visitors should be considered. Although the crusted surface of manure in a storage structure may appear solid, it will not support a person.

3.7.1 Dangerous manure gases

As manure decomposes, gases are released. The types of gases produced depends on how the manure is stored. Under aerobic conditions (with oxygen present) fewer dangerous gases are produced. However, when manure is stored anaerobically (no oxygen present), such as liquid manure, some of the gases produced are very dangerous. When liquid manure is stored for several weeks in an enclosed space, dangerous gases can accumulate in the head space of the enclosed area and in bubbles and dissolved gases within the manure itself. The greatest danger occurs when the manure is agitated either mechanically or by gravity flow. During agitation, the gases held in the manure are released and the concentrations can reach lethal levels within the immediate vicinity of the storage. Several deaths have occurred as a result of farm workers entering enclosed spaces where manure gases have accumulated.

The most dangerous gas is hydrogen sulphide. Although it is readily detectable at low concentrations, at higher levels the gas paralyses the sense of smell. **So it is possible to unknowingly encounter a dangerous situation.** As the concentration increases, the hydrogen sulphide blocks the nerves that control the diaphragm causing a person to stop breathing. **When concentrations are high, a single breath of the gas can be fatal.** The other gases and their respective levels considered to be dangerous are listed in Appendix E.

The publication M-10710 *Manure Gas* from the Canada Plan Service, discusses the sources and types of gases of concern. This leaflet is available from Manitoba Agriculture, Food and Rural Initiatives.

Good design and safe practices can prevent accidents from happening. Long-term manure storage should not be in the same air space as the animals or workers. The agitation required to remove the manure from the barn can increase gas concentrations to lethal levels very rapidly. Connections between the barn and long-term storage must be separated by a gas trap to prevent the gases from returning to the barn. The facility should be designed so that all maintenance can be done without entering the storage.

When agitating manure in an in-barn storage, maximum ventilation must be provided. All personnel should work in pairs and wear H_2S detection monitors. Everyone should be evacuated from the air space above the storage. Sufficient headspace for the gases should be created by first pumping without agitation. The manure can then be agitated below the surface, but only as much agitation as is necessary should be carried out.

- **Never enter a manure tank without proper respiratory equipment that is designed for this purpose.** A breathing apparatus specifically built for this purpose, with a full face mask and a remote air tank and hose, is required. **SCUBA equipment is not adequate.**
- **Always work in pairs and carry H_2S monitors.**
- **If an accident does occur, do not attempt to enter the enclosed space. Call immediately for emergency assistance.**

3.8 Reporting Spills

Manure spills from transportation equipment or from manure storage facilities must be reported to Manitoba Conservation. Details on reporting spills can be found in the Livestock Manure and Mortalities Management Regulation (Appendix B).

3.9 Registration of a Manure Storage Structure Without a Permit

Manure storage facilities that do not have permits must be registered with Manitoba Conservation. These facilities include earthen manure storage structures constructed before April 29, 1994 and molehills, steel and concrete tanks constructed before March 31, 1998. Under-floor concrete storage pits that hold less than 30 days' worth of manure do not have to be registered. Manure storage structures that are not registered with Manitoba Conservation can not be used after November 10, 2010.

3.10 Decommissioning Manure Storage Structures

If a livestock operation is discontinued for more than a year, the operator must inform Manitoba Conservation of how they will maintain the integrity of the storage or how they plan to decommission the storage. Please contact Manitoba Conservation for advice on decommissioning the storage.