

Livestock Manure Storage

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FACT SHEET #12

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PRODUCTION



2) to apply the manure at an appropriate time to minimize any potential environmental impact. It is recommended that manure be stored over the winter months. Liquid manure does not soak into the frozen soil, which increases the likelihood of manure runoff into surface water during the spring melt. Regulations are in place to control winter application of manure.

What are the environmental concerns about manure storage?

The main concern with earthen manure storage is the possibility of a slow leak and movement of soluble compounds into ground or surface water. Above-

ground storage structures may break and release a large volume of liquid manure all at once, which also threatens both ground and surface water.

What about the odour from stored manure?

Manure storage structures or sites should be located to minimize odour nuisance to neighbours. A fact sheet in this series, *Siting Livestock Production Operations* describes choosing a suitable location for manure storage. Manitoba's *Farm Practices Guidelines for Beef, Dairy, Hog or Poultry Producers* contains recommendations on separation distances between neighbours and storage structures. Another fact sheet *Livestock Odours*:

Introduction

Specific government regulations are in place for the construction and operation of manure storage structures. Producers must be capable of storing livestock manure until it can be applied to crop land.

Why is manure stored?

There are two major reasons for storing manure:

- 1) to allow its application as fertilizer at the most practical and beneficial time for crops. Manure contains nutrients worth thousands of dollars to producers who wish to use manure rather than commercial fertilizers; and



Solid manure stored near poultry operation.

Sources, Concerns & Solutions addresses odour issues from livestock operations.

How is manure stored?

The type of manure storage depends on whether the manure is handled in solid, semi-solid or liquid form.

Solid manure can be stored in piles that may be located in the farm yard or directly in the fields where spreading is intended.

Semi-solid systems are sometimes used in dairy operations where producers add bedding to the pens or stalls of livestock but not enough to absorb all the liquids. This semi-solid manure cannot be piled or pumped. Therefore, it must be pushed through underground pipes to the bottom of a shallow structure referred to as a "molehill."

Liquid manure storage structures are used by most pork producers and some dairy and egg-laying operations. These

structures may be either in-ground (earthen structures or concrete tanks) or above-ground (concrete or steel tanks). In Manitoba, earthen manure storage structures are the most common. Concrete storage structures can be designed as under-barn, partially underground or above-ground structures. Steel structures are also available for above-ground liquid manure storage.

Are there specific requirements for manure storage?

Yes. Since 1994, all manure storage structures and solid manure piles must be located more than 100 metres from surface watercourses, wells or springs. Where necessary, berms or dikes must be provided to ensure that no liquid runs into or away from solid or semi-solid manure piles. In addition, all earthen manure storage structures built in Manitoba, regardless of the livestock

operation size, are subject to specific construction standards.

In 1998, the construction standards were expanded to include all new and modified manure storage structures. Through a permit process, *The Livestock Manure and Mortalities Management Regulation MR42/98*, requires that all new manure storage structures be designed and constructed under the supervision of a professional engineer. Manitoba Conservation inspects all storage structures at critical points during construction.

Design specifications for earthen manure storage structures are developed to address the site's geological conditions. The regulation allows a seepage rate under earthen manure storage structure no greater than 3 cm/year and only then where there is at least 5 metres of clay naturally located under the structure. This seepage rate is set to protect the groundwater located below the clay. Where soil at a given location does not have enough natural clay, a clay liner must be installed. If a shallow aquifer is located beneath the area, the earthen manure storage structure must be built with a plastic liner. A monitoring well system used to detect leaks is required any time a liner is used.

Producers must install concrete ramps in the earthen manure storage structures to provide access for equipment. Grass must be seeded on the sides of earthen manure storage structures to prevent erosion from rainfall.

Earthen manure storage structures, when designed to meet current standards and operated to maintain the



Above-ground steel structure for storage of liquid manure.

structural integrity of their floors, walls, and liners, are secure for storing manure.

Are lagoons and earthen storage structures the same thing?

No. Earthen manure storage structures are often incorrectly called "lagoons". Lagoons are waste treatment facilities designed to "digest" municipal sewage. Earthen manure storage facilities and lagoons may look the same but a lagoon must be larger to allow for the biological activity required for treatment. Treated effluent from lagoons that meets standards may be discharged into surface water. Manure must not be discharged into surface water.

How big must liquid manure storage structures be?

Livestock operations with 300 animal units and greater must store all manure

over winter for application the following year. These storage structures must be big enough to store manure for at least 200 days. Operations between 300 and 399 AU have until November 10, 2010 to comply with the prohibition on winter spreading.

Earthen manure storages that were constructed before 1994 as well as steel and concrete manure storages built prior to 1998 must be registered with Manitoba Conservation. Permitted storages are deemed registered. The deadline for application for registration was June 10, 2004. Manitoba Conservation must inspect the storage prior to registration and can require that any problems be fixed. A manure storage structure that has not been registered with Manitoba Conservation cannot be used after November 10, 2010.

Most earthen manure storage structures are built to provide storage for more than 400 days. This long storage capacity gives the producer more flexibility in applying the manure when the crop needs it

Why are earthen manure storage structures so common in Manitoba?

Earthen manure storage structures can be affordably constructed to provide 400 to 500 days storage capacity. These storage structures are environmentally sound options when site conditions are suitable.

Are Manure Storage Structures Inspected?

Yes. Manitoba Conservation has the mandate to inspect all manure storage structures yearly.

Inspections are scheduled for shortly after manure storage structures have been emptied since any damage will be more visible at that time. If results from monitoring wells reveal contamination that could have come from the stored manure, Manitoba Conservation will order the operator to hire a qualified third-party investigator to determine the source of the contaminants. Where necessary, Manitoba Conservation will order appropriate repairs to the storage structures.



Earthen storage structure for liquid manure.

Summary

Livestock manure can be managed in an environmentally sound manner when the requirements of *The Livestock Manure and Mortalities Management Regulation* are met. By storing manure, the farmer can use it as a fertilizer at the most appropriate and effective time in the crop production cycle. When constructed in accordance with regulation, inspected annually and operated with care, manure storage structures provide environmental protection during the expected lifetime of the operation.

For further information about livestock production, refer to other titles in the series: "Living with Livestock Production," available from Manitoba Agriculture, Food, and Rural Initiatives offices.

More detailed information can be found on the Internet at www.gov.mb.ca/agriculture/livestock. Copies of the Farm Practices Guidelines for Hog Producers (1998 edition) and Poultry Producers (2000 edition) in Manitoba are available from Manitoba Agriculture, Food, and Rural Initiatives offices in rural Manitoba and from Agriculture Publications 8th floor, 401 York Avenue, Winnipeg MB R3C 0P8 (FAX: 204-948-2498)*

** The 1995 editions of the other titles of the series are presently available; they are being updated.*

Other titles available include:

- Health Issues and Livestock Production
- Livestock Odours – Sources, Concerns and Solutions
- Surface Water Issues
- Nitrates in Soil and Water
- Land Application of Manure
- Siting Livestock Production Operations
- Understanding Anti-microbial Resistance
- Food Safety on the Farm
- Livestock Operations and Groundwater Quality
- Livestock Pathogens – A Natural Occurrence
- Managing Livestock Mortalities
- Confinement of Livestock
- Phosphorous in Soil and Water