

Feed storage areas at animal feedlots

Techniques to minimize pollution potential and permit requirements

Discharges from areas used to store feedstocks for animals can present a serious environmental concern when not managed correctly. Corn silage leachate is approximately 200 times stronger than raw domestic sewage and as little as one gallon of leachate can lower the oxygen of 10,000 gallons of surface water to a level that would not allow fish and other aquatic life to survive.

Large animal feedlot sites are required to obtain an operating permit that includes management techniques for the feed storage area; however, all feedlot facilities need to consider the effects of discharge from their feed storage area.



Managing leachate and feed storage area runoff

There are two common types of liquids generated at a feed storage area.

- *Leachate* is liquid generated from the moisture of the feedstocks as they undergo the ensiling process.
- *Feed storage area runoff* is liquid generated as a result of precipitation on the feedstocks or the surrounding feed storage area where residual feed is present.

Leachate typically has a significantly higher pollutant strength than feed storage area runoff but each can develop into a pollution hazard when not managed adequately.

Below are some best management practices (BMP) to minimize the amount of leachate or feed storage area runoff discharged from the feed storage area.

- Divert all surface water runoff away from the storage area to prevent contamination.
- Harvest silage at a moisture content of 65% or less.
- Cover silage with plastic to prevent precipitation from entering the feedstock pile.
- Install a collection system, such as storage tank or basin, (a permit is required).
- Plant shorter maturity varieties of corn to produce a drier crop and, therefore, less leachate volume.
- Add dry materials to silage to absorb excess moisture to create less leachate volume.



Feed storage area location

Where a feed storage area is located can have a large impact on its pollution potential. A feed storage area located near water features has an increased discharge pollution potential. In addition, the type of base/pad upon which the feedstocks are stockpiled can lead to groundwater concerns related to seepage through the base/pad. The following are BMPs to consider when determining where to locate a feed storage area.

- Locate the feed storage area on flat ground away from surface waters such as streams, ditches, tile inlets, wetlands, and intermittent streams.
 - At least 300 feet is recommended.
- Wells should be located at least 50 feet from silage stockpiles.
- Establish the feed storage area on concrete, asphalt, or at least one foot of cohesive soil.
 - Concrete or asphalt is recommended in sensitive areas (ie. five feet or less to bedrock or sandy soils)
 - Cohesive soils are those categorized as group III or IV by NRCS practice standard 313.
- Locate stockpiles on soils that have a minimum of three feet to the seasonal high water table and five feet to bedrock unless concrete or asphalt is used.
- Divert all surface water runoff away from the storage area to prevent contamination.

Permit requirements

Any site with 1,000 tons or more of sweet corn silage

Anyone who stores 1,000 tons or more of sweet corn silage at any one time must obtain an operational permit from the Minnesota Pollution Control Agency (MPCA). When sweet corn silage is mixed or jointly stockpiled with other feedstocks, the need for an operational permit is determined by the amount of sweet corn silage within the stockpile. The owner must maintain a record of the amount (tonnage) of sweet corn silage in any mixed stockpiles. Multiple stockpiles of sweet corn silage (including mixtures) under common ownership will be considered to be one stockpile when located within ¼ mile of each other.

A feedlot may obtain coverage under the feedlot National Pollutant Discharge Elimination System (NPDES) or State Disposal System (SDS) permit to authorize storage and management of 1,000 tons or more of sweet corn silage. In addition to requirements for sweet corn silage storage, the feedlot facility will be required to comply with all conditions of the NPDES or SDS permit, which may necessitate significant investment to upgrade other parts of the feedlot facility to comply with the discharge standards of the permit.

If the silage storage area is not located at a feedlot, or if a feedlot owner chooses, an industrial SDS permit will be issued to authorize the storage and management of 1,000 tons or more of sweet corn silage. This industrial SDS permit will only apply to the silage storage area and will contain no permit requirements for the feedlot.

With either type of permit, the silage storage site must have a leachate and feed storage area runoff collection system that consists of concrete, synthetic, or earthen lined storage basins or tanks designed by a professional engineer in accordance with applicable design standards.

The associated permit fees for each type of permit are summarized below.

Permit fees	Feedlot NPDES or SDS permit	Industrial SDS permit
Application Fee	General - \$620	General - \$1,240
	Individual - \$1,860	Individual - \$9,300
Annual Fee	General - \$345	General - \$345
	Individual - \$1,230	Individual - \$1,230

The applicable permit must be obtained prior to storing 1,000 tons or more of sweet corn silage or commencement of construction of leachate and feed storage area runoff storage structures.

Feedlots requiring NPDES or SDS permit coverage

When a feedlot has or is required to have NPDES or SDS permit coverage, the permittee must obtain a permit or permit modification prior to:

- Constructing a new feed storage area
- Expanding an existing feed storage area
- Construction of leachate or feed storage area runoff storage structures

Permits and permit modifications are not required for construction or expansion of roofed dry commodity storage sheds. Permit application forms can be found on the MPCA website at: www.pca.state.mn.us/feedlots.

The feedlot NPDES or SDS permit contains specific measures for operation of a feed storage area and management of leachate and feed storage area runoff. The facility must comply with the following standards.

Standards for the base/pad of the feed storage area

The feed storage area base/pad (area upon which feedstocks are placed) must be constructed of a material that is capable of achieving a hydraulic conductivity of 1×10^{-7} cm/sec such as:

- Concrete (min. of 3.5 inches thick)
- Asphalt (min. of 2 inches thick)
- Cohesive soil (min. of 1 foot thick)
 - Categorized as group III or IV by NRCS practice standard 313
 - 2 feet of separation to seasonal high water table

Standards for control of leachate and feed storage area runoff

Leachate and feed storage area runoff must be collected within one of the following structures:

- A liquid manure storage area
 - Constructed according to Minn. R. 7020.2100.
- A vegetative infiltration basin (VIB)
 - Designed in accordance with the NRCS 635 practice standard (unless approved by MPCA)
 - Not allowed when 1,000 tons or more of sweet corn silage is stored on the feed storage area

Other feedlots

A permit is not required for construction/establishment of a feed storage area at a feedlot that does not require NPDES or SDS permit coverage. In addition, there are no technical requirements that apply to the feed storage area; however, the feed storage area must be managed to avoid discharge to waters of the state. It is recommended that the BMP's mentioned earlier in this document be implemented to avoid having the feed storage area become a pollution hazard. If the feed storage area is determined to be a pollution hazard, changes will be required to address the issues.

Leachate and feed storage area runoff utilization

The primary method to handle leachate and feed storage area runoff that is collected is via land application to cropland. Land application must occur at rates that do not exceed the nutrient requirements of the crop and comply with all manure application requirements of Minn. R. 7020.2225. In addition, land application must also occur in accordance with the manure management plan and NPDES or SDS permit conditions and requirements.

For more information

For more information about the feedlot program in Minnesota, please visit the MPCA website at www.pca.state.mn.us/feedlots.