7020.2100 LIQUID MANURE STORAGE AREAS.

Subpart 1. **General requirements; exemption.**

A. This part describes site restrictions and requirements for design, construction, maintenance, and operation of liquid manure storage areas.

B. All liquid manure storage areas must be designed, constructed, and operated in accordance with subparts 2 to 7.

C. An owner of a liquid manure storage area that has been unused for a period of three years or more shall, prior to using the structure for storing manure or process wastewaters, have a design engineer evaluate and prepare a report on the condition of the liner and include this report with a permit application submitted according to part 7020.0405.

D. Liquid manure storage areas described in subitems (1) and (2), which provide temporary storage or processing, are exempt from this part, except for subparts 3, items C and D; 5, item A; and 7. The owner must submit design plans and specifications for review and approval prior to construction of a liquid manure storage area described in subitem (1) or (2) that include the information listed in subpart 4, items F, I, J, and N:

(1) a liquid manure storage area constructed of concrete with a maximum volume of 5,000 gallons; and

(2) a liquid manure storage area constructed of concrete with a maximum volume of 20,000 gallons, if it:

(a) is located in an area that would not be subject to the site restrictions in subpart 2; or

(b) has a minimum separation distance to bedrock of five feet.

An exemption granted under this item does not prevent the agency from imposing permit conditions, if appropriate to protect human health and the environment, or governing construction and operation of the exempt liquid manure storage area.

E. A liquid manure storage area described in this item is exempt from this part, except for subparts 5, item A; and 7. The owner must submit design plans and specifications that include the information listed in subpart 4, item N. The exemption under this item applies to a liquid manure storage area designed, operated, and maintained as a solids settling area included as part of a vegetative treatment area designed according to level 4 or 5 of Vegetated Treatment Area, Conservation Practice Standard Code 635, incorporated by reference under part 7020.0205, provided:

(1) manure-contaminated runoff is purged from the liquid manure storage area within 24 hours; and

(2) the floor is constructed of:

(a) concrete; or

(b) one foot of cohesive soils and separated from bedrock by at least two feet of soils that are not coarser than a sandy loam.

An exemption granted under this item does not prevent the agency from imposing permit conditions, if appropriate to protect human health and the environment, or governing construction and operation of the exempt liquid manure storage area.

Subp. 2. **Site restrictions.** Except as provided in item C, the construction or expansion of a liquid manure storage area is prohibited in the areas identified under part 7020.2005 and items A and B.

A. A manure storage area with a capacity of more than 250,000 gallons in an area where geologic conditions are suitable for sinkhole development and where four or more sinkholes exist within 1,000 feet of the proposed site.

B. In areas which are susceptible to soil collapse or sinkhole formation, the minimum separation distance to bedrock and the manure storage area liner design standards under subpart 3, item B, and prohibitions must be in accordance with subitems (1) to (3).

(1) Animal feedlots capable of holding fewer than 300 animal units or manure storage areas capable of holding manure produced by fewer than 300 animal units that contribute to liquid manure storage areas at the facility must comply with the following:

(a) where the separation distance to bedrock is less than five feet, construction of a liquid manure storage area is prohibited; and

(b) where the separation distance to bedrock is five feet or more and less than 20 feet, the manure storage area liner must be concrete-lined, aboveground, or composite-lined according to subpart 3, item B, subitem (2) or (3).

(2) Animal feedlots capable of holding 300 or more and fewer than 1,000 animal units and manure storage areas capable of holding the manure produced by 300 or more and fewer than 1,000 animal units that contribute to liquid manure storage areas at the facility shall comply with the following:

(a) except as provided in unit (c), where the separation distance to bedrock is less than ten feet, construction of a liquid manure storage area is prohibited;

(b) where the separation distance to bedrock is ten feet or more and less than 30 feet, the manure storage area liner must be concrete-lined, aboveground, or composite-lined according to subpart 3, item B, subitem (2) or (3); and

(c) where the separation distance to bedrock is five feet or more and less than ten feet, the manure storage area must be:

i. an aboveground manure storage area;

ii. concrete-lined with a secondary liner consisting of a synthetic liner, HDPE liner, or two foot or greater cohesive soil liner; or

iii. composite-lined with at least a three-foot compacted cohesive soil liner under the synthetic liner.

(3) Animal feedlots capable of holding 1,000 or more animal units or manure storage areas capable of holding the manure produced by 1,000 or more animal units that contribute to liquid manure storage areas at the facility shall comply with the following:

(a) except as provided in unit (c), where the separation distance to bedrock is less than 15 feet, construction of a liquid manure storage area is prohibited;

(b) where the separation distance to bedrock is 15 feet or more and less than 40 feet, the manure storage area liner must be concrete-lined, aboveground, or composite-lined according to subpart 3, item B, subitem (2) or (3); and

(c) where the separation distance to bedrock is ten feet or more and less than 15 feet, the manure storage area must be:

i. an aboveground manure storage area;

ii. concrete-lined with a secondary liner consisting of a synthetic liner, HDPE liner, or two foot or greater cohesive soil liner; or

iii. composite-lined with at least a three-foot compacted cohesive soil liner under the synthetic liner.

C. Where construction or modification is required to correct a pollution hazard at an existing animal feedlot capable of holding fewer than 300 animal units, construction or modification is not prohibited. Construction or modification under this item must not result in an expansion of the animal feedlot capacity to hold more than 300 animal units or the manure storage area capacity to hold the manure produced by 300 animal units or greater.

D. Removal of bedrock in order to comply with the applicable separation distances under item B is prohibited unless specifically authorized by the commissioner. In making the determination to allow the removal of bedrock, the commissioner shall consider:

(1) geologic sensitivity of the proposed location;

(2) type and extent of bedrock to be removed;

(3) length of time the manure, manure-contaminated runoff, or process wastewater is stored or processed in the liquid manure storage area;

(4) likelihood of a discharge to waters of the state given the design standards that are proposed, including the volume that will be stored;

(5) type of material proposed to be stored and the material's expected pollutant concentration; and

(6) analysis of other options that would allow for compliance with the separation distances.

Authorization to remove bedrock under this item does not prevent the agency from imposing permit conditions, if appropriate to protect human health and the environment, to govern construction and operation of the liquid manure storage area.

Subp. 3. **Design standards.**

A. Except as provided in item B, a new or modified liquid manure storage area at a facility capable of holding 1,000 animal units or more or the manure produced by 1,000 animal units or more must be designed to provide a minimum storage volume necessary so that the facility has at least nine months of storage capacity.

B. Liquid manure storage areas designed and operated to provide storage for only manure-contaminated runoff or process wastewater shall be designed to provide a minimum storage volume necessary to accommodate the volume generated from a 25-year, 24-hour storm event and any additional volume needed to be consistent with the proposed manure management plan application frequency.

C. Liquid manure storage area liners must comply with the following:

(1) non-concrete-lined manure storage areas must be designed and constructed to achieve a maximum theoretical seepage rate of not more than 1/56 inch per day throughout the design life of the manure storage area;

(2) concrete-lined manure storage areas must be designed and constructed with: water stops or joint sealant materials at all construction joints; sealing of all cracks which may extend through the concrete liner with appropriate sealing materials; and a floor having a concrete thickness of not less than five inches. The floors must have:

(a) steel reinforcing based on subgrade drag theory in American Concrete Institute, Slabs on Grade, ACI-360; or

(b) fiber reinforcing, for which the design engineer must specify the type of fibers and the dosage rate in subpart 4, item F;

(3) composite-lined or aboveground manure storage areas must be designed and constructed to achieve a maximum theoretical seepage rate of not more than 1/560 inch per day throughout the design life of the manure storage area; and

(4) aboveground manure storage areas located in areas not subject to the site restrictions under subpart 2, may be designed and constructed according to seepage standards under subitem (1) or (2), as applicable.

D. Water supply systems, fuel lines, electrical conduit, or other equipment not solely functioning as part of the manure handling or transfer system must not be designed or constructed to penetrate the liner of a liquid manure storage area. Piping and equipment functioning as part of the manure handling or transfer system which penetrates the liner of a liquid manure storage area must be identified in the design plans and specifications. The design plans and specifications must include details on the location and purpose of the penetrations, dimensions of the penetrations, and the methods and materials used to provide a seal between each penetration and the liner.

Subp. 4. **Design plans and specifications.** The owner shall prepare and submit to the commissioner or county feedlot pollution control officer, for review and approval, design plans and specifications, including all assumptions and calculations, meeting the requirements of items A to N with a permit application or at least 90 days prior to the commencement of construction. Design plans and specifications, except plans and specifications for concrete-lined manure storage areas having a capacity of 20,000 gallons or less, must be prepared and signed by a design engineer.

A. Results and interpretation of a site and soils investigation that includes the information and requirements in subitems (1) to (10).

(1) An analysis of foundation soils for suitability for the proposed manure storage area including conditions that may lead to failure of constructed dikes or walls.

(2) Soil profile information in subitem (5) that must be obtained and recorded at a minimum of two locations within the boundaries of the proposed manure storage area for the first one-half acre of surface area. A minimum of one additional location is required for each additional one acre of surface area for the manure storage area.

Sufficient soil records must be obtained to represent the range of soil conditions throughout the proposed manure storage area site.

(3) Except as required in subitem (4), the information in subitem (5) must be recorded to a depth of at least five feet below the bottom of the proposed liquid manure storage area and to a depth that allows verification of separation to bedrock requirements in accordance with subpart 2, item B. Each borehole completed under this item must be sealed throughout the entire depth by a method that will ensure that the borehole does not become a preferential flow path for vertical groundwater transport.

(4) In areas that are susceptible to soil collapse or sinkhole formation, the information in subitem (5) must be recorded to a depth of at least ten feet below the bottom of the proposed liquid manure storage area, or until bedrock is encountered.

(5) Each soils record must identify the soil texture, depth to the regional water table, and depth to the seasonal high water table.

(6) The soil profile information must be obtained by a method that can identify abrupt changes in soil texture and sand lenses throughout the soil profile.

(7) In areas susceptible to soil collapse or sinkhole formation, a map of the proposed site showing the location of all open and filled sinkholes, depression areas in the landscape, known caves, resurgent springs, disappearing streams, karst windows, and blind valleys within one-half mile of the proposed site location.

(8) An evaluation of potential for groundwater intrusion and damage to the storage area liner.

(9) Where a perimeter drainage tile system is required to control the elevation of the water table or saturated soils in accordance with item J, the design plans and specifications for the drain tile system must include provisions to:

(a) lower the elevation of the water table or saturated soils to below the bottom of the manure storage area liner;

(b) locate the drainage tile a horizontal distance of at least one foot outside the footing of a concrete-lined manure storage area;

(c) install a dedicated drain tile system for each manure storage area; and

(d) install a dedicated tile riser, manhole, or other access which allows collection of tile-water samples for each dedicated drain tile system.

(10) Additional information relating to the proposed manure storage area as requested by the commissioner to evaluate compliance with federal and state rules.

B. The following information if the proposed manure storage area is located in a Minnesota Department of Health approved drinking water supply management area as delineated according to chapter 4720:

(1) the location of the animal feedlot, manure storage area, and land application sites on a map of the Minnesota Department of Health approved drinking water supply management area;

(2) a copy of the vulnerability assessment of the drinking water supply management area from an approved wellhead protection plan according to part 4720.5210, subparts 2 and 3;

(3) a description of the vulnerability of the specific sites for manure storage areas and land application as described in the vulnerability assessment; and

(4) a copy of all parts of the drinking water supply management area plan which pertain to animal feedlots, manure storage areas, and land application of manure.

C. The estimated storage capacity by volume and time period based on the volume of manure, manure-contaminated runoff, and process wastewaters generated, which includes all assumptions and calculations and meets the criteria of subpart 3, item A or B, if applicable or as necessary to ensure adequate storage of manure, manure-contaminated runoff, and process wastewaters consistent with the proposed manure management plan.

D. In addition to the designed storage volume in item C, a freeboard depth of not less than one foot. Liquid manure storage areas that store animal manure and that receive precipitation runoff must provide a freeboard depth of not less than one foot or the volume generated by a 25-year, 24-hour storm event, whichever is greater.

E. A plan for a preconstruction conference that includes the design engineer, contractors, the owner, and the inspector required under subpart 6.

F. Specifications for the liquid manure storage area liner according to the applicable liner design standard identified under subparts 2 and 3.

G. When soil is used as a liner material, location and volume of liner soil available, testing protocol, and predesign test results for soil plasticity index, sieve analysis, and optimal moisture content.

H. A site plan that identifies the locations of predesign soil investigations conducted under item A relative to the proposed manure storage area.

I. Plan details and specifications for all liner penetrations according to subpart 3, item C.

J. Measures for control of water table or saturated soils.

K. A quality assurance and quality control plan that includes specifications for inspections and ASTM testing methods and frequencies.

L. Specifications for liner material protection from damage during construction or subsequent facility operation resulting from the following:

(1) drying and cracking during and after liner construction;

(2) manure agitation and pumping;

(3) freezing and thawing;

(4) hot and cold weather construction;

(5) erosion; and

(6) other physical damage.

M. Special site considerations.

N. A plan for operation, periodic inspection, and maintenance of the manure storage area including schedules and descriptions of:

(1) routine inspections, maintenance, and record keeping to be completed to identify and document damage to the liner from the factors listed in item L;

(2) methods to be used to repair areas of damaged liner;

(3) methods used to monitor the liquid level in the basin to evaluate proper operation and adequate available storage capacity; and

(4) routine inspections of perimeter tile line outlets and inspection manholes to ensure proper operations of the system.

Subp. 5. **Construction and notification requirements.**

A. The owner shall construct the manure storage area according to the design plans and specifications submitted to the commissioner or the county feedlot pollution control officer and as approved by the commissioner or the county feedlot pollution control officer. Proposed engineering changes or modifications to the design plans and specifications must be submitted to the commissioner or county feedlot pollution control officer for review and approval before commencement of construction related to the proposed change.

B. An owner shall notify the commissioner or county feedlot pollution control officer and the design engineer of intent to construct a minimum of three business days prior to commencement of construction. Notification must be completed by letter, telephone, facsimile, or electronic mail and include:

(1) the permit number, if applicable;

(2) the owner's name, and the name of the facility if different than the owner;

(3) the site location by county, township, section, and quarter section;

(4) the design engineer's name; and

(5) the name of the contractor responsible for installing the liner.

C. An owner shall notify the commissioner or county feedlot pollution control officer within three business days following completion of construction of the manure storage area liner. Notification for vertical concrete-lined walls under this item must be completed before backfilling the walls. Notification information must meet the requirements in item B.

D. The owner shall submit a construction report to the commissioner or county feedlot pollution control officer within 60 days of the completion of any new or modified manure storage area. The report must be prepared and signed by the design engineer and must contain an assessment of whether the completed manure storage area conforms to the design plans and specifications submitted to the commissioner or county feedlot pollution control officer. The commissioner may require manure removal from the manure storage area and corrective actions if the construction report indicates that the completed manure storage area does not conform to the design plans and specifications.

Subp. 6. **Inspections of liquid manure storage areas.** An owner constructing a liquid manure storage area, except for a concrete-lined manure storage area with a capacity of 20,000 gallons or less, shall have inspections completed during the construction process which comply with items A to D.

A. The inspector must be one or more of the following:

(1) a professional engineer licensed in the state of Minnesota or a person working under the professional engineer's direct supervision;

(2) a qualified Natural Resources Conservation Services staff person; or

(3) if the manure storage area has a concrete liner, an American Concrete Institute or Minnesota Department of Transportation concrete field testing technician grade/level I certified and concrete field inspector level II certified.

B. During construction of each manure storage area under this subpart, the inspector shall record on a form provided by the commissioner, observations related to conformance to the design plans and specifications and construction standards of the following:

(1) subgrade conditions prior to liner placement including soil texture, strength and moisture content, and presence of any frozen soils;

(2) location and proper functioning of the perimeter drainage tile system, if required, and inspection/monitoring access;

(3) for all concrete-lined manure storage areas:

(a) reinforcing steel size, grade, spacing, cover, and that steel is free of loose rust, oil, or other debris;

(b) concrete quality including air entrainment, temperature, and strength;

(c) handling, placement, consolidation, and finishing of concrete;

(d) curing and protection of concrete after placement, including hot and cold weather protective measures;

(e) location, forming, and surface preparation of construction, contraction, and expansion joints;

(f) placement of flexible waterstop materials in joints; and

(g) application of surface applied or injected crack and joint sealant materials;

(4) repair of construction defects; and

(5) conformance to the liner penetration prohibitions under subpart 3, item C.

C. The contractor responsible for installation of the liner shall certify on a form provided by the commissioner that the manure storage area was constructed in conformance with the design plans and specifications and construction standards for all applicable stages of construction in item B.

D. The owner shall ensure that the following information is submitted to the design engineer for incorporation into the construction report required in subpart 5, item D:

(1) the name and qualifications of the inspector;

(2) the inspection form required in item B; and

(3) the liner contractor's certification form required in item C.

Subp. 7. **Operation and maintenance.** The owner of a manure storage area shall operate and maintain the manure storage area according to plans and specifications approved by the commissioner or county feedlot pollution control officer.

Statutory Authority: *MS s 115.03; 116.07; 122.23*

History: *25 SR 834; 38 SR 1535*

Published Electronically: *June 6, 2014*