



FACT SHEET

Requirements for Animal Waste Storage and Use

You have received this fact sheet because you are the end-user of animal waste (liquid, semi-solid, and solid animal manure and process wastewater, compost or sludges associated with animal feeding operations including the final treated wastes generated by a digester or other manure treatment technologies). As required by the Virginia Pollution Abatement Regulation and General Permit (9VAC25-192), animal waste must be used in a manner consistent with this fact sheet or as specified in a nutrient management plan prepared by a Virginia certified Nutrient Management Planner. This fact sheet is intended to specify best management practices for land application of animal waste as a source of crop nutrients in accordance with Sections 80 and 90 of 9VAC25-192. If animal waste is to be used for purposes other than land application to crops (for example: animal feed or fuel), these uses may be subject to other laws or regulations. If animal waste is to be used outside of Virginia, contact that state regarding their requirements.

Storage Requirements

Semi-solid and solid waste that is not immediately land applied must be stored properly.

1. Semi-solid and solid waste shall be stored in a manner that prevents contact with surface water and ground water. Semi-solid and solid waste that is stockpiled outside for more than 14 days shall be kept in a waste storage facility or at a site that provides adequate storage and include the following:

- a. Semi-solid and solid waste shall be covered to protect it from precipitation and wind;
- b. Storm water shall not run onto or under the stored semi-solid and solid waste;
- c. A minimum of two feet separation distance to the seasonal high water table or an impermeable barrier shall be used under the stored waste. All waste storage facilities that use an impermeable barrier shall maintain a minimum of one foot separation between the seasonal high water table and the impermeable barrier. Construct impermeable barriers of at least 12 inches of compacted clay, at least four inches of reinforced concrete, or another material of similar structural integrity that has a minimum permeability rating of 0.0014 inches per hour (1×10^{-6} centimeters per second); and

d. For semi-solid and solid waste that is not stored in a waste storage facility or under roof, the storage site must be at least 100 feet from any surface water, intermittent drainage, wells, sinkholes, rock outcrops, and springs. For semi-solid and solid waste that is stored on an impermeable barrier and where any stormwater runoff is collected in the waste storage facility, the semi-solid and solid waste can be stored adjacent to the waste storage facility regardless of the location of the waste storage facility so long as surface water, intermittent drainage, wells, sinkholes, rock outcrops, and springs are protected from runoff from the stored semi-solid and solid waste.

Semi-solid and solid waste that is stored on an impermeable barrier and where any stormwater runoff is collected in a waste storage facility is considered adequate storage and is therefore not required to be covered.

2. Any liquid animal waste collection and storage facility shall be designed and operated to (i) prevent point source discharges of pollutants to state waters except in the case of a storm event greater than the 25-year, 24-hour storm and (ii) provide adequate waste storage capacity to accommodate periods when the ground is frozen or saturated, periods when land application of nutrients should not occur due to limited or nonexistent crop nutrient uptake, and periods when physical limitations prohibit the land application of waste.

3. Waste storage facilities constructed after December 1, 1998, shall not be located on a 100-year floodplain. For the purposes of determining the 100-year floodplain, a Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), a FEMA Letter of Map Amendment (LOMA), or a FEMA Letter of Map Revision (LOMR) shall be used.

4. Earthen waste storage facilities constructed after December 1, 1998, shall include a properly designed and installed liner. Such liner shall be either a synthetic liner of at least 20 mils thickness or a compacted soil liner of at least one foot thickness with a maximum permeability rating of 0.0014 inches per hour. A Virginia licensed professional engineer or an employee of the Natural Resources Conservation Service of the United States Department of Agriculture with appropriate engineering approval authority shall certify that the siting, design and construction of the waste storage facility comply with the requirements of subsection B of 9VAC25-192-90. This certification shall be maintained on site.

5. At earthen waste storage facilities constructed below the seasonal high water table, the top surface of the waste must be maintained at a level of at least two feet above the water table.

6. All liquid waste storage facilities shall maintain at least one foot of freeboard at all times, up to and including a 25-year, 24-hour storm.

Application Rate

The animal waste application rate can be determined using one of four options:

Option 1: Nutrient Management Plan

Animal waste application rates based on a nutrient management plan can be used when the plan has been developed by a certified nutrient management planner in accordance with §10.1-104.2 of the Code of Virginia. For assistance in locating a nutrient management plan writer: contact DCR at 804-225-4533 or consult the Virginia Nutrient Management Certified Planner Directory, available at: http://www.dcr.virginia.gov/water_quality/documents/nmdir.pdf

Option 2: Standard Rate

Animal waste may be applied to any crop at a rate of no greater than 80 pounds of plant available phosphorus per acre once every three years under the following conditions:

- 1) The plant available phosphorus supplied by the animal waste is based on a waste nutrient analysis obtained in the last two years;
- 2) In the absence of current soil sample analyses and recommendations; and
- 3) Nutrients have not been supplied by manure, biosolids, or other organic sources, other than pastured animals, to the proposed land application sites within the previous three years of the proposed land application date of animal waste.

Option 3: Soil Test Recommendations

Animal waste application rates based on soil test recommendations can be used under the following conditions:

- 1) The soil sample has been obtained in the last three years from the proposed field where animal waste will be applied.
- 2) Soil test recommendations have been provided by a laboratory whose procedures and recommendations are approved by the Department of Conservation and Recreation. Recommendations from the following laboratories are approved by DCR:
 - ⇒ Waypoint Analytical Virginia (804) 743-9401
 - ⇒ Spectrum Analytical Lab 1-800-321-1562
 - ⇒ Virginia Tech Soil Testing Lab (540) 231-6893
- 3) Nutrients from the animal waste application do not exceed the nitrogen needs for the crop, and phosphorus recommendations do not exceed the recommendations for the crops in a three year rotation. If the animal waste application rate is made to supply all of the future crop phosphorus needs, no additional phosphorus is to be applied during the rotation.

Example for Calculating Animal Waste Rate Based on Soil Test Recommendation:

$$\text{Animal Waste Application Rate (Gallons or Tons per acre)} = \frac{\text{Soil Test P Recommendation}}{\text{Animal Waste P Analysis}}$$

Corn crop needs: **120 lbs/acre Nitrogen** and soil test recommendation for **60 lbs/ac Phosphorus**

Animal waste analysis: Available Nitrogen = **40 lbs/ton of animal waste**, P_2O_5 = **50 lbs/ton of animal waste**

	<u>1st Crop</u>	+	<u>2nd Crop</u>	+	<u>3rd Crop</u>	Options
<i>Three (3) Crop Rotation:</i>	Corn grain 60 lbs/ac P recommended 1.2 tons animal waste	+	Wheat grain 60 lbs/ac P recommended 1.2 tons animal waste	+	Soybeans 60 lbs/ac P recommended 1.2 tons animal waste	Apply 1.2 tons to each crop OR Apply only 3.0 tons animal waste to Corn (0.6 tons animal waste to Wheat or Soybeans)

In this example, 1.2 tons of animal waste (60 ÷ 50) will provide the 60 lbs of phosphorus needed for each crop with the nitrogen needs supplemented by commercial fertilizer. Alternatively, applying 3.0 tons of animal waste to the corn crop provides 150 lbs (50x3) of phosphorus for the rotation without exceeding the 120 lbs of nitrogen (40x3) needed by the corn crop. Animal waste used on the wheat or beans cannot exceed the total phosphorus needs of the rotation.

Option 4: Phosphorous Crop Removal

Animal waste application rates based on phosphorus crop removal can be used when the soil test phosphorus levels do not exceed the values listed in Table 1. Table 2. is used to determine the pounds of P₂O₅ removed per unit of harvested yield.

ANIMAL WASTE RATE CALCULATION			
Animal Waste Rate	=	Yield per acre (tons or bushels)	X P ₂ O ₅ removal per yield unit (lbs)
(Gallons or Tons per acre)		Animal Waste P ₂ O ₅ content (lbs per gallon or ton)	

Table 1. Phosphorus Environmental Thresholds (Maximum Soil P)	VPI & SU (Mehlich I)		A&L (Mehlich III)	
	P (lbs/acre)	P (ppm)	P (lbs/acre)	P (ppm)
REGION				
Eastern Shore and Lower Coastal Plain	270	135	506	253
Middle and Upper Coastal Plain and Piedmont	272	136	508	254
Ridge and Valley	324	162	562	281

Table 2. Phosphorus Removed		
Crops	LBS. P ₂ O ₅ Per Yield Unit (lbs)	
	Grain - Bushels	Silage - Tons
Row Crops		
Corn	0.38	4.2
Wheat	0.51	4.2
Barley	0.40	5.1
Rye	0.45	5.6
Soybeans	0.89	10.0
Forages	Hay - Tons	Pasture
Fescue or Orchardgrass	16.0	****
Bermudagrass	10.4	****

Notes for Table 2:

- **** divide 25 by the animal waste P₂O₅ content to calculate the animal waste application rate.
- For double crops, add removal for each crop.
- Additional crops - see Table 4-7 of the DCR Standards and Criteria at: <http://www.dcr.virginia.gov/documents/StandardsandCriteria.pdf>

Soil Samples

Where soil samples are necessary to utilize any of the methods described in this document the sample must be less than three (3) years old. A representative soil sample of each field is comprised of at least 20 cores randomly sampled throughout the field. Samples should be taken from the top 4 inches of soil where land is not tilled, or the top 6 inches of soil where land is tilled.

Land Application Timing in Cases of Emergency

In cases of where the waste storage facility is threatened by emergencies such as fire or flood or where these conditions are imminent, animal waste can be land applied outside of the spreading schedule outlined in this Fact Sheet. If this occurs, the animal waste end-user shall document the land application information in accordance with (9VAC25-192-80 A 3) summarized in the *Recordkeeping Requirements Section* on page 4 of this Fact Sheet.

Land Application Conditions & Buffer Zones

Do not spread animal waste within the following buffer zones:

- 100 feet from wells or springs
- 100 feet from surface water without a vegetated buffer*
- 35 feet from surface water with a vegetated buffer*
- Animal waste may not be applied to ice or snow covered ground or saturated soils
- 25 feet from other rock outcroppings
- 50 feet from limestone outcroppings
- 200 feet from occupied dwellings (unless the occupant signs a waiver of the buffer zone)
- Animal waste shall not be applied in such a manner that it would discharge to sinkholes that may exist in the area

* A vegetated buffer is a permanent strip of dense vegetation established parallel to the contours of and perpendicular to the dominant slope of the field.

Land Application Timing

The application schedule below shall be followed in cases where the land application is not being covered under a Nutrient Management Plan (NMP) - not using *Option 1. - NMP* to determine the land application rate.

CROP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Corn												
Small Grain												
Hay or Pasture *												
Hay or Pasture **												
* Includes all cool-season grasses: fescue, orchardgrass (growth occurs in the cooler months of the spring & fall)												
** Includes all warm-season grasses: bermudagrass (growth occurs in the heat of the summer)												
	Animal waste may be spread during these periods											
	Do not spread animal waste during these shaded periods											

Do not spread animal waste more than 30 days prior to planting.

Recordkeeping

Land application of animal waste must comply with the criteria outlined in this fact sheet. All records must be maintained for at least three (3) years from the date of the transaction and land application date.

The attached forms are provided to meet the recordkeeping requirements of the end-user.

(See "End-User Animal Waste Transfer Recordkeeping Form" & "Animal Waste Land Application Recordkeeping Form")

The following items related to animal waste transactions must be provided to the source of the animal waste by the end-user:

⇒ Recipient's name & Signature	⇒ Locality where animal waste will be utilized (nearest town/city and zip code)	⇒ Name of stream or waterbody nearest to utilization or storage site
⇒ Recipient's address		

The following items related to animal waste transactions must be documented by the end-user:

⇒ Source's name	⇒ Date animal waste was received	⇒ Locality where animal waste will be utilized (nearest town/city and zip code)
⇒ Source's address	⇒ Amount of animal waste received	
⇒ Source's permit number (if applicable)	⇒ Final use of animal waste	⇒ Name of stream or waterbody nearest to utilization or storage site

The following items related to land application of animal waste must be documented by the end-user:

⇒ Nutrient analysis of animal waste	⇒ Land application rate(s)	⇒ Method used to determine the animal waste application rate(s): (NMP, standard rate, soil test recommendations or phosphorus crop removal)
⇒ Maps identifying the application fields and storage sites	⇒ Land application date(s)	
	⇒ Crops planted	
	⇒ Soil test results (if obtained)	⇒ Nutrient management plan (if applicable)

Additional Information

This fact sheet provides basic information. For additional information regarding requirements for animal waste management, please visit the <https://law.lis.virginia.gov/admincode/title9/agency25/chapter192/section80/> and <https://law.lis.virginia.gov/admincode/title9/agency25/chapter192/section90/> and the DEQ website at <https://www.deq.virginia.gov/our-programs/water/land-application-beneficial-reuse/animal-agricultural-waste>

You may also contact the Virginia DEQ toll free (in Virginia) at **1-800-592-5482**.

End-User Animal Waste Transfer Recordkeeping Form

This record must be maintained by the end-user for at least three (3) years from the date of the transfer.

SOURCE INFORMATION: Animal Feeding Operations Owner/Permittee			
DEQ Permit #: _____			
Name: _____		Business Name: _____	
Mailing Address: _____			
Street	City	State	Zip

Date(s):	Amount:	Gallons	Waste Analysis N-P-K (available - lbs/gal or ton):
		Tons	
Locality where litter will be utilized or stored:			Nearest Stream or Waterbody to Land Application or Storage Area:
Town or City	Zip		
Final Use of Waste: Fertilizer Feed Fuel Other (specify):			

Date(s):	Amount:	Gallons	Waste Analysis N-P-K (available - lbs/gal or ton):
		Tons	
Locality where litter will be utilized or stored:			Nearest Stream or Waterbody to Land Application or Storage Area:
Town or City	Zip		
Final Use of Waste: Fertilizer Feed Fuel Other (specify):			

SOURCE INFORMATION: Animal Feeding Operations Owner/Permittee			
DEQ Permit #: _____			
Name: _____		Business Name: _____	
Mailing Address: _____			
Street	City	State	Zip

Date(s):	Amount:	Gallons	Waste Analysis N-P-K (available - lbs/gal or ton):
		Tons	
Locality where litter will be utilized or stored:			Nearest Stream or Waterbody to Land Application or Storage Area:
Town or City	Zip		
Final Use of Waste: Fertilizer Feed Fuel Other (specify):			

Date(s):	Amount:	Gallons	Waste Analysis N-P-K (available - lbs/gal or ton):
		Tons	
Locality where litter will be utilized or stored:			Nearest Stream or Waterbody to Land Application or Storage Area:
Town or City	Zip		
Final Use of Waste: Fertilizer Feed Fuel Other (specify):			

Animal Waste Land Application Recordkeeping Form

This record must be maintained by the end-user for at least three (3) years from the land application date.
If animal waste is not land applied, this information is not required to be documented.

Date Animal Waste Applied	Field Identification	Number of Acres	Crop Planted	Nutrient Analysis of Waste (available N-P-K lbs/gals or tons)	Gals or Tons of Waste Applied per Acre	Method Used to Determine Rate 1) NMP 2) Std Rate 3) Soil Test 4) P Removal

The following items must also be maintained for at least three (3) years from the land application date:

1. **Field Maps:** a copy of the map with field ID for each field receiving litter
2. **Soil Tests:** If a soil test was obtained, a copy of the test result(s)
3. **NMP:** If an NMP was used to determine the application rate(s), a copy of the plan