VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

FACT SHEET
Requirements for Animal Waste Use and Storage

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 General Permit Regulation (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. 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

Animal waste that is not immediately land applied must be stored properly.

1. Animal waste shall be stored in a manner that prevents contact with surface water and ground water. Animal waste that is stockpiled outside for more than 14 days shall be kept in a facility or at a site that provides adequate storage and include the following:
   a. Animal waste shall be covered to protect it from precipitation and wind;
   b. Storm water shall not run onto or under the stored animal 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 ($1X10^{-6}$ centimeters per second); and
   d. For animal 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.
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.
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 or treatment facilities shall maintain at least one foot of freeboard at all times, up to and including a 25-year, 24-hour storm.

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.

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:

   ⇒ A&L Agricultural Lab (804) 743-9401
   ⇒ Spectrum Analytical Lab 1-800-321-1562
   ⇒ Virginia Tech Soil Testing Lab (540) 231-6305

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**

	1st Crop	+	2nd Crop	+	3rd Crop	Options
Three (3) Crop Rotation:	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_2O_5 removal per yield unit (lbs)
(Gallons or Tons per acre)		Animal Waste P_2O_5 content (lbs per gallon or ton)		

Table 1. Maximum Soil P	**VPI & SU (Mehlich I)**		**A&L (Mehlich III)**	
REGION	**P (lbs/ acre)**	**P (ppm)**	**P (lbs/ acre)**	**P (ppm)**
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_2O_5 Per Yield Unit (lbs)**	
Row Crops	Grain - Bushels	Silage - Tons
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:
1. **** divide **25** by the animal waste P_2O_5 content to calculate the animal waste application rate.
2. For double crops, add removal for each crop.
3. Additional crops - see Table 4-7 of the DCR Standards and Criteria at: http://www.dcr.virginia.gov/documents/StandardsandCriteria.pdf

Notes:

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 permanent vegetated buffer*
- 35 feet from surface water with a permanent 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.

Application Timing

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

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

- ⇒ Source name
- ⇒ Source address
- ⇒ Source permit number (if applicable)
- ⇒ Date animal waste was received
- ⇒ Amount of animal waste received
- ⇒ Final use of animal waste
- ⇒ Locality where animal waste will be utilized (nearest town/city and zip code)
- ⇒ 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
- ⇒ Maps identifying the application fields and storage sites
- ⇒ Land application rate(s)
- ⇒ Land application date(s)
- ⇒ Crops planted
- ⇒ Soil test results (if obtained)
- ⇒ Method used to determine the animal waste application rate(s): (NMP, standard rate, soil test recommendations or phosphorus crop removal)
- ⇒ 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 DEQ website at http://www.deq.state.va.us/Programs/Water/LandApplicationBeneficialReuse/LivestockPoultry.aspx
You may also contact the Virginia DEQ toll free (in Virginia) at **1-800-592-5482**.