

Appendix D - TECHNICAL STANDARDS FOR CONCENTRATED ANIMAL FEEDING OPERATION

1. Except as provided in (8), application rates for manure applied to each field must be determined based on the criteria given below.
 - a. The CAFO shall complete a field-specific assessment to determine the appropriate basis (nitrogen- or phosphorus-based) for application of plant nutrients. The field-specific assessment for CAFOs applying manure on fields that are located in a watershed that is listed as impaired for nutrients (total phosphorus or total nitrogen) must follow the method listed in (i). The field-specific assessment for CAFOs applying manure on fields that are not located in a watershed that is listed as impaired for nutrients (total phosphorus or total nitrogen) may follow the procedures in either (i) or (ii).
 - i. The field-specific assessment must be based on the phosphorus index assessment method described in United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) No. 80.1 Nutrient Management, Agronomy Technical Note MT-77. The nutrient application basis is determined as follows:
 1. nitrogen-based application, if the site vulnerability rating is low (total phosphorus index value is less than 11);
 2. phosphorus-based, if the site vulnerability rating is medium (total phosphorus index value is between 11 and 21);
 3. phosphorus-based application up to crop removal, if the site vulnerability rating is high (total phosphorus index value is between 22 and 43); or
 4. no application, if the site vulnerability rating is rated as very high (total phosphorus index value is greater than 43).
 - ii. The field-specific assessment must be based on a representative soil sample, as described in (3), using the Olsen soil test method. The nutrient application basis is determined as follows:
 1. nitrogen-based application, if the Olsen phosphorus soil test is less than 25 mg/L;
 2. phosphorus-based application, if the Olsen phosphorus soil test is greater than 25.1 mg/L and less than 100 mg/L;
 3. phosphorus-based up to crop removal, if the Olsen phosphorus soil test is greater than 100.1 mg/L and less than 150.0 mg/L;
 4. no application, if the Olsen phosphorus soil test is greater than 150 mg/L.
 - b. The CAFO shall complete a nutrient need analysis for each crop to determine the acceptable amounts of nitrogen and phosphorus to be applied to the field based on the appropriate basis (nitrogen- or phosphorus-based application) as determined in (a). The nutrient needs must be determined based on Montana State University (MSU) Extension Service Publication 161, Fertilizer Guidelines for Montana Crops or other relevant sources. For crops not listed in Bulletin 161, the Department may approve a fertilizer application rate provided by the local county extension

service or other qualified source. The CAFO must identify the source of the nutrient needs analysis in the nutrient management plan.

- c. The CAFO shall complete a nutrient budget based on the nutrient needs of the crop as determined in (b) that accounts for all sources of nutrients available to the crop. Other sources that must be addressed where applicable include those in (i) through (v),
 - i. The nitrogen needs determined in (b) must be reduced based on nitrogen fixation credits if a legume crop was grown in the field in the previous year. Nitrogen reduction for annual legume crops is ten pounds per acre and for perennial legumes is 50 pounds per acre, unless appropriate justification is given showing a lower rate is appropriate, but not less than 35 pounds per acre for all perennial legumes except black medic and annual sweet clover, for which the rate is not less than 15 pounds per acre, and lentils and chick peas, for which the rate is not less than 30 pounds per acre,
 - ii. The nitrogen needs determined in (b) must be reduced based on nitrogen residuals from past manure applications based on nitrogen mineralization rates given in Schedule I

Schedule I. Nitrogen Mineralization Rates

<u>Type of Wastes</u>	<u>First Year⁽¹⁾</u>	<u>Second Year</u>
Fresh poultry manure	0.90	0.02
Fresh swine manure	0.75	0.04
Fresh cattle manure	0.70	0.04
Fresh sheep and horse manure	0.60	0.06
Liquid manure, covered tank	0.65	0.05
Liquid manure, storage pond	0.65	0.05
Solid manure, stack	0.60	0.06
Solid manure, open pit	0.55	0.05
Manure pack, roofed	0.50	0.05
Manure pack, open feedlot	0.45	0.05
Storage pond effluent	0.40	0.06
Oxidation ditch effluent	0.40	0.06
Aerobic lagoon effluent	0.40	0.06
Anaerobic lagoon effluent	0.30	0.06

⁽¹⁾ If irrigated, reduce first year mineralization by 0.05.

- iii. The nitrogen needs determined in (b) must be reduced based on any nutrients provided by commercial fertilizer, irrigation water, or other sources. The CAFO shall provide the basis for the nutrients adjustments on the NMP.

- iv. Nitrogen availability may be adjusted to reflect the method of application given in Schedule II. For phosphorus-based application, the nitrogen availability is 1.0.

Schedule II. Nitrogen Availability and Loss by Method of Application

<u>Application Method</u>	<u>Loss Factor</u>
Injection (sweep)	0.90
Injection (knife)	0.95
Broadcast (incorporated within 12 hours)	0.7
Broadcast (incorporated after 12 hours but before four days)	0.6
Broadcast (incorporated after four days)	0.5
Sprinkling	0.75

- v. If after the first three years of implementing the NMP the yield does not average at least 80 percent of the planned expected crop yield, the NMP must be amended to be consistent with the documented yield levels unless sufficient justification for the use of the higher yield is approved by the Department.
2. Manure that is land applied must be sampled at least once per year and analyzed for total nitrogen (as N), ammonium nitrogen (as NH₄-N), total phosphorus (as P₂O₅), total potassium (as K₂O), and percent dry matter solids. The sample must be representative of the manure that is to be applied to a field and must be collected and analyzed in accordance with (a) and (b).
 - a. Solid manure must be sampled from at least ten different locations (subsamples) within the material to be applied from a depth of at least 18 inches below the surface. Subsamples must be thoroughly mixed in a clean receptacle and a sample of the mixed material must be collected and placed in a sealable plastic bag or other sample container approved by the analytical laboratory. The sample must be identified with the name, source, and date. The sample must be refrigerated and analyzed within seven days or frozen for up to six months or as directed by the analytical laboratory specified in (4).
 - b. Liquid manure must be agitated for a minimum of four hours prior to sample collection or until thoroughly mixed. A minimum of five one-quart subsamples must be collected from different locations in the storage facility. The subsamples must be collected from the liquid manure at a depth of least 12 inches below the surface. The subsamples must be combined into a single container and thoroughly mixed. A sample for laboratory analysis must be collected from the composited subsamples

and placed into a clean one-quart plastic bottle or other sample container approved by the analytical laboratory. The sample must be identified with the name, source, and date. The sample container must not be completely filled. The sample must be refrigerated and analyzed within seven days, or frozen for up to six months or as directed by the analytical laboratory specified in (4).

3. Each field where manure is to be land applied must be sampled at least once every five years in accordance with the procedure given below.
 - a. A minimum of ten individual core samples must be composited to formulate a composite sample for the field. Core sampling in fields with significant landscape variation, including soil type, slope, degree of erosion, drainage, historic usage, or other factors, must be collected from each unit in proportion to the relative abundance in terms of total area. Uniform fields may be sampled in a simple random, stratified random, or systematic pattern following the guidance sources listed below. Individual core samples must be composited and thoroughly mixed in a clean plastic container except that core samples collected at different depths must be kept separate. Alternative soil sampling procedures are given in the following:
 - i. NRCS Sampling Soils for Nutrient Management – Manure Resource Series, MT; and
 - ii. MSU Extension MontGuide Interpretation of Soil Test Reports for Agriculture, MT200702AG.
 - b. The composite soil sample for phosphorus analysis must be collected from a depth of zero to six inches below the surface and analyzed for phosphorus using the Olsen soil test method.
 - c. Composite soil samples for nitrogen analysis must be collected from a depth of zero to six inches below the surface and analyzed for total nitrogen (as N) and nitrate (as N). A second composite sample must be collected at a depth of six to 24 inches and analyzed for nitrate (as N) only. Samples must be analyzed in accordance with method code 4H2a1-3 in NRCS Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report No. 42.
4. Analytical laboratories approved for manure and soil testing are given in MSU Extension Service Publication 4449-1 Soil Sampling and Laboratory Selection.
5. Manure must be applied to fields at times and under conditions that will hold the nutrients in place for crop growth and protect surface and ground water using best management practices described in the nutrient management plan. The intended target spreading dates must be included in the NMP. Manure must not be land-applied under the following conditions:
 - a. on land that is flooded or saturated with water;
 - b. during or within 36 hours of a rainfall event that exceeds four hours in duration or 0.25 inches or more of precipitation; or
 - c. to frozen or snow-covered ground (winter application), except for fields meeting the following criteria:

- i. the application area must be at least 300 feet from lakes, streams, intermittent streams, irrigation canals and ditches, open intake structures, property lines, and road right-of-ways;
 - ii. permanent vegetative cover or standing stubble with crop residue greater than 50 percent; and
 - iii. land slope of the field must not exceed the following criteria:
 1. six percent for application of solid manure (total solids content greater than 15 percent); or
 2. three percent for application of slurry or liquid waste (total solids content of 15 percent or less).
6. If winter application is proposed, the CAFO must identify fields suitable for winter application in the nutrient management plan and application rates for manure must not exceed those identified in the nutrient budget as determined in (1)(c).
7. Manure application rates and procedures must be consistent with the capabilities, including capacity and calibration range, of application equipment.
 - a. For an existing CAFO, the NMP must include a statement indicating that the existing equipment has been calibrated to ensure delivery of the application rates described in the plan and has the capacity to meet those rates. The CAFO must maintain the supporting documentation on site and shall make this information available to the Department upon request.
 - b. For proposed operations, or when it is not feasible to calibrate the equipment or verify its capacity at planning time, the operator must perform this application equipment verification prior to the first application of manure. The information required in (a) must be maintained on site and incorporated into any subsequent amendment of the NMP. The CAFO must maintain the supporting documentation on site and shall make this information available to the Department upon request.
 - c. If a commercial hauler is used, the hauler must be responsible for ensuring that the equipment is capable of complying with the application rate in the NMP. The CAFO must maintain the supporting documentation on site and must make this information available to the Department upon request.
8. A multiyear phosphorus application is allowed for fields that require a nitrogen-based application based on a site-specific assessment (site vulnerability rating less than 22) as described in (1). When such application is made, the following conditions apply:
 - a. the application may not exceed the recommended nitrogen application rate during the years of application which may include a calculation for fertilizer inefficiencies or the estimated nitrogen removal in harvested plant biomass during the year of application when there is no recommended nitrogen application;
 - b. conservation practices must be included in the NMP and implemented to minimize the risk of phosphorus loss from the field; and
 - c. no additional manure may be applied to the field until the phosphorus applied in the single application has been removed through plant harvest.

9. As an alternative to the manure application rates based on the criteria given in (1), the CAFO may develop application rates for manure based on NRCS Conservation Practice Standard Code 590 provided that the following conditions are met:
 - a. a field-specific assessment of the potential for nitrogen and phosphorus transport from the field to surface waters must be conducted;
 - b. the form, source, amount, timing, and method of application of manure and any other nutrients to each field must be based on realistic production goals, and minimizing nitrogen and phosphorus movement to surface water must be addressed;
 - c. the appropriate flexibilities for the CAFO must be maintained to implement a multiyear phosphorus application as described in (7);
 - d. manure must be sampled a minimum of once annually for nitrogen and phosphorus and must be analyzed based on procedures and methods given in (2) and (3);
 - e. soil must be analyzed a minimum of once every three years for phosphorus content;
 - f. the results of the manure and soil sampling analysis must be used in determining manure application rates; and
 - g. the nutrient budget must be completed on forms provided by the Department.