

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

WASTE UTILIZATION

(Ac.)

CODE 633

DEFINITION

Using agricultural wastes such as manure and wastewater or other organic residues.

PURPOSE

- Protect water quality
- Protect air quality
- Provide fertility for crop, forage, fiber production and forest products
- Improve or maintain soil structure
- Provide feedstock for livestock
- Provide a source of energy

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where agricultural wastes including animal manure and contaminated water from livestock and poultry operations; solids and wastewater from municipal treatment plants; and agricultural processing residues are generated, and/or utilized

CRITERIA

General Criteria Applicable to All Purposes

All federal, state and local laws, rules and regulations governing waste management, pollution abatement, and health and safety shall be strictly adhered to. The owner or operator is responsible for securing all required permits or approvals related to waste utilization, and for operating and maintaining any components.

Use of agricultural wastes shall be based on at least one analysis of the material during the

time it is to be used. In the case of daily spreading, the waste shall be sampled and analyzed at least once each year. The waste analysis will identify nutrient and ion specific concentrations.

When agricultural wastes or municipal wastes will be land applied, the NRCS Nutrient Management Conservation Practice Standard, Code (590) shall be planned and applied.

Where agricultural wastes will be spread on land not owned or controlled by the producer, the waste management plan, as a minimum, shall document the amount of waste to be transferred and who will be responsible for the environmentally acceptable use of the waste.

Records of the use of wastes shall be kept a minimum of five years as discussed in OPERATION AND MAINTENANCE, below.

Municipal Waste

Application of Municipal Wastes and Biosolids is regulated in Colorado. See the Colorado Department of Public Health and Environment, Biosolids Regulation No. 64, 1994, as amended, for specific information.

The sampling frequency for municipal wastes and biosolids is determined by the amount of Annual Biosolids Production. Annual Biosolids Production is defined as the amount of biosolids annually applied to the land and includes those facilities that further process biosolids, e.g. composting, for public distribution.

When municipal wastes or biosolids are land applied, the Ceiling Concentration Limits and Cumulative Pollutant Loading Rates for potential pollutants such as: arsenic; cadmium; copper; lead; mercury; molybdenum, nickel, phosphorus, selenium,

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and; zinc, shall be monitored in accordance the Colorado Department of Public Health and Environment, Biosolids Regulation No. 64, 1994, as amended.

Additional Criteria to Protect Water Quality

All agricultural waste shall be utilized in a manner that minimizes the opportunity for contamination of surface and ground water supplies.

Agricultural waste shall not be land-applied on soils that are frequently flooded, as defined by the National Cooperative Soil Survey, during the period when flooding is expected.

When liquid wastes are applied, the application rate shall not exceed the infiltration rate (in/hr) of the soil. For each application, the amount of waste applied shall not exceed the water holding capacity of the soil for the active root zone. Wastes shall not be applied to frozen, snow-covered or saturated soil if the potential risk for runoff exists. The basis for the decision to apply waste under these conditions shall be documented in the waste management plan.

Location. Waste shall not be applied at locations:

- where the watertable is within 24 inches of the surface;
- within the 25 year flood plain of surface water courses;
- where bedrock is within 20 inches (50 cm) of the surface;
- where land slope exceeds 15 percent;
- where water erosion rates exceed tolerable soil loss rates, (T) and;
- where waste application will worsen existing saline or sodic soil problems.

Management. When the waste is injected in clean water such as a sprinkler irrigation system, the system shall be separated from the waste source by an air gap or be equipped with a pressure sensitive backflow prevention device. Surface irrigation systems shall have tail water recovery pits or shall be otherwise operated to prevent contaminated runoff from leaving the field.

When applying waste with irrigation water, plan and implement the Irrigation Water Management conservation practice standard, Code 449, to decrease nonpoint source pollution of surface and groundwater resources.

Waste applied within 200 feet (60m) upslope of any waterbody shall be injected or incorporated within 24 hours.

Liquid waste applied on slopes greater than 5 percent (9% if the waste contains more than 15 percent solids) without permanent vegetation:

- shall be injected or incorporated within 24 hours, or
- shall be applied in conjunction with soil and water conservation practices that minimize lateral movement of nutrients and organic matter from the point of application.

Timing. Applications shall be scheduled to assure:

- The nutrients in the waste are available to the vegetation during the growing season;
- Minimal leaching of nitrogen, or other undesirable contaminants, below the root zone, to the extent feasible, and;
- Minimal contamination of surface waters caused by runoff from the application area.

Additional Criteria to Protect Air Quality

Incorporate surface applications of solid forms of manure or other organic by-products into the soil within 24 hours of application to minimize emissions and to reduce odors.

When applying liquid forms of manure with irrigation equipment select application conditions where there is high humidity, little/no wind blowing, a forthcoming rainfall event and/or other conditions that will minimize volatilization losses into the atmosphere. The basis for applying manure under these conditions shall be documented in the nutrient management plan.

Handle and apply poultry litter or other dry types of animal manure or other organic by-products when weather conditions are calm and there is less potential for blowing and

emission of particulates in the atmosphere. The basis for applying manure under these conditions shall be documented in the nutrient management plan.

When waste is sub-surface applied using an injection system, waste shall be applied at a depth and rate that minimizes leaks onto the soil surface, while minimizing disturbance to the soil surface and plant community.

All materials shall be handled in a manner to minimize the generation of particulate matter, odors and greenhouse gases.

Additional Criteria to Provide Fertility for Crop, Forage, Fiber Production and Forest Products

Where municipal wastewater and solids are applied to agricultural lands as a nutrient source, the single and lifetime limits for phosphorus and heavy metals shall not be exceeded. The concentration of salts shall not exceed the level that will impair seed germination or plant growth.

Additional Criteria to Improve or Maintain Soil Structure

Wastes shall be applied at rates not to exceed the crop nutrient requirements or salt concentrations as stated above.

Residue management practices shall be planned and applied to maintain soil structure.

Additional Criteria to Provide Feedstock for Livestock

Agricultural wastes to be used for feedstock shall be handled in a manner to minimize contamination and preserve its feed value. Chicken litter stored for this purpose shall be covered. A qualified animal nutritionist shall develop rations that utilize wastes.

Additional Criteria to Provide a Source of Energy

Use of agricultural waste for energy production shall be an integral part of the overall waste management system.

All energy producing components of the system shall be included in the waste management plan and provisions for utilization of residues of energy production identified.

General criteria for land application is applicable when residues of energy production will be land-applied.

CONSIDERATIONS

The effect of Waste Utilization on the water budget should be considered, particularly where a shallow ground water table is present or in areas prone to runoff. Limit waste application to the volume of liquid that can be stored in the root zone.

Concerns for odor control will exist when waste is applied near farm enterprises that do not cause odors, or near rural neighbors who earn their living off-farm. Significant odor concerns exist when waste is applied near urban areas or rural subdivisions. In these cases the following are alternatives that may minimize the impacts of odors from waste application:

- Apply waste at other locations;
- Inject liquids or incorporate solid waste with tillage immediately;
- Restrict spreading to times when winds are minimal or in a direction that won't carry odors to neighbors;
- Avoid applications when people are home and typically outdoors, (weekends, holidays, warm summer days);
- Apply waste in thin layers that will dry quickly;
- Spread waste within 4 days of excretion if possible;
- Treat waste prior to application in lagoons or by composting;
- Avoid spreading near highways or other highly visible locations, or;
- Keep waste hauling and application vehicles covered during transport and as clean as possible to avoid leaving waste on roadways and to present a positive image of the operation.

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Consider rotating waste applications among several fields instead of continuous applications on the same field to avoid or lessen the opportunity for negative impacts from waste disposal practices.

Priority areas for land application of wastes should be on gentle slopes located as far as possible from waterways. When wastes are applied on more sloping land or land adjacent to waterways, other conservation practices should be installed to reduce the potential for offsite transport of waste.

It is preferable to apply wastes on pastures and hayland soon after cutting or grazing before re-growth has occurred. Nitrates may accumulate in some forage crops. Consider animal health when developing waste application plans for grazing lands. Grazing should be prohibited for a period of at least 60 days after waste application to minimize the opportunity for parasite transmission.

Minimize environmental impact of land-applied waste by limiting the quantity of waste applied to the rates determined using the Colorado Conservation Practice Standard Nutrient Management, Code (590) for all waste utilization.

Consider the net effect of waste utilization on greenhouse gas emissions and carbon sequestration.

Soil nitrogen levels may influence sugar production and fruiting in vegetable and fruit crops. To avoid impacting the quality of these crops consider avoiding waste application, or otherwise carefully managing soil nitrogen during the year(s) fruit, berry and other sugar producing crops are grown.

PLANS AND SPECIFICATIONS

Plans and specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations and Operation and Maintenance sections of this standard. Specifications shall describe the requirements

for applying this practice to meet the intended purpose.

Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan or other acceptable documentation.

The waste management plan shall account for the utilization or other disposal of all agricultural and municipal wastes produced, and all waste application areas shall be clearly indicated on the plan map.

OPERATION AND MAINTENANCE

Records shall be kept for a period of five years or longer, and include when appropriate:

- Quantity of manure and other waste produced and their nutrient content;
- Soil test results;
- Dates and amounts of waste application where land applied, and the dates and amounts of waste removed from the system due to feeding, energy production or export from the operation;
- Describe climatic conditions during waste application such as: time of day, temperature, humidity, wind speed, wind direction and other factors as necessary;
- Waste application methods;
- Crops grown and yields (both yield goals and measured yield);
- Other tests, such as determining the nutrient content of the harvested product and;
- Calibration of application equipment.

The operation and maintenance plan shall include the dates of periodic inspections and maintenance of equipment and facilities used in waste utilization. The plan should include what is to be inspected or maintained, and a general time frame for making necessary repairs.

REFERENCES

Biosolids Regulation No. 64, 1994, as amended, (5 CCR 1002-19), Colorado Department of Public Health and Environment, Water Quality Control Commission.

Colorado Field Office Technical Guide, Section I. Agronomy Technical Note No. 77. 1991. Pesticide and Fertilizer Application, Operation, Safety, and Maintenance. USDA, Natural Resources Conservation Service. Lakewood, CO.

Colorado Field Office Technical Guide, Section I. Agronomy Technical Note No. 95. 2003. Colorado Phosphorus Index Risk Assessment, Version 3, USDA, Natural Resources Conservation Service. Lakewood, CO.

Colorado Field Office Technical Guide, Section I. Agronomy Technical Note No. 97. 2003. Colorado Nitrogen Leaching Index Risk Assessment, Version 2. USDA, Natural Resources Conservation Service. Lakewood, CO.

Colorado Chemigation Act, Section 35, 11-101 CRS (Sup. 1990), Colorado Department of Agriculture.

Colorado State University Cooperative Extension Crop Publication No. 0.500, Soil Sampling, 2000, Fort Collins, CO.

Colorado State University Cooperative Extension Crop Publication No. 0.547, Biosolids Recycling on Crop and Rangeland, 1994, Fort Collins, CO.

Colorado State University Cooperative Extension Crop Publication No. 568A, Best Management Practices for Manure Utilization, 1999, Fort Collins, CO.

Confined Animal Feeding Control Regulation, 8.1.0 (5 CCR 10002-5), Colorado Department of Public Health and Environment, Water Quality Control Commission.

Control of Manure Odors, ASAE Engineering Practice Standard EP379.1, ASAE (formerly American Society of Agricultural Engineers).

NRCS Agricultural Waste Management Field Handbook, Chapter 11 - Waste Utilization, Chapter 12 - Waste Management Equipment, and Chapter 13 - Operation, Maintenance and Safety.

Colorado Conservation Practice Standard Code 590, Nutrient Management, 2004. USDA Natural Resources Conservation Service. Lakewood CO.

Colorado Conservation Practice Standard Code 449, Irrigation Water Management, 2002. USDA Natural Resources Conservation Service. Lakewood CO.