NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

MARYLAND

WASTE TREATMENT

(No.)

CODE 629

DEFINITION

The mechanical, chemical or biological treatment of agricultural waste.

PURPOSE

To use mechanical, chemical, or biological treatment facilities and/processes as part of an agricultural waste management system:

- To improve ground and surface water quality by reducing the nutrient content, organic strength, and/or pathogen levels of agricultural waste.
- To improve air quality by reducing odors and gaseous emissions
- To produce value added byproducts
- To facilitate desirable waste handling, storage, or land application alternatives.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where the form and characteristics of agricultural waste make it difficult to manage so as to prevent it from becoming a nuisance or hazard or where changing the form or composition provides additional utilization alternatives, and where conventional waste management alternatives are deemed ineffective. More specifically:

- Liquids and solids need to be separated for further processing or for effective transport and subsequent utilization.
- Raw agricultural waste contains excess nutrients for land application based on crop utilization requirements or nutrient ratios need to be modified to be more consistent with crop utilization requirements.
- There is a need to reduce the potential for leaching or runoff of nutrients.
- Odors and/or gaseous emissions from livestock production facilities and waste storage/treatment system components must be reduced.
- Value-added byproducts can be produced to offset treatment costs.
- Reduction of pathogens is required.

CRITERIA

General Criteria Applicable to All Waste Treatment Purposes.

Laws and Regulations. Waste treatment facilities and processes must be planned, designed, and constructed to meet all federal, state, and local laws and regulations.

Design. The system provider shall complete and supply to the land owner/operator a detailed design of the facility/process clearly outlining the objectives and anticipated outcomes of implementation.

The design documentation shall include a process diagram containing, at a minimum, the following information:

1. Volumetric flow rates including influent, effluent, and recycle streams.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service - Maryland or visit the Field Office Technical Guide.

2. Waste load projections including volume, mass, and characteristics of the waste important to the waste treatment facility or process.

3. Unit process volumes and hydraulic retention times where appropriate.

4. Air emissions projections from the system.

5. Nutrient fate projections within the system.

6. Process monitoring and control system requirements as described below in the Monitoring section of the criteria.

Independent, verifiable data demonstrating results of the use of the facility or process in other similar situations and locations shall be provided.

Where use of a waste treatment facility or process to improve one resource concern negatively impacts another, impacts and mitigation measures, if required by state or local agencies, are to be documented. The mitigation measures shall become a required component of this practice.

Plans and Specifications to document this practice shall be as described below.

Components. Waste treatment facilities and processes may consist of multiple components. Where criteria for individual components are described in existing NRCS practice standards, those practice standards and their specific criteria shall be used for planning, designing, and installation of that component.

Where components of a facility or process are not described in a current NRCS practice standard, the system provider shall furnish a one year warranty on all construction or applied processes. In addition, the manufacturer shall provide a warranty that describes the service life of each component and what the warranty covers.

The waste treatment facility or process shall have a minimum practice life of ten years. Where components have less than a ten year service life, their planned replacement during the life of the practice shall be clearly identified in the Operation and Maintenance Plan.

Expected System Performance. The expected system performance shall be clearly documented prior to system installation. At a minimum, the expected system volumetric flow rate, expected macro-nutrient reductions or change in form, expected pathogen reductions, gaseous ammonia and hydrogen sulfide emissions reductions (or increases) shall be documented.

Operating Costs. Where components of a facility or process are not described in a current NRCS Conservation Practice Standard, the system provider shall furnish an annual estimate of operating costs for the system. Operating costs not based on actual systems data shall be clearly identified as estimates.

Monitoring. Equipment needed to properly monitor and control the waste treatment facility or process shall be installed as part of the system. Process control parameters to be monitored shall include those parameters identified in the design documentation. Parameters considered critical to proper system operation shall be identified in the Operation and Maintenance Plan. Run status of critical equipment and unit processes shall be monitored.

Byproducts. Implementation of a waste treatment process or operation of a waste treatment facility shall not result in discharge of byproducts harmful to the environment.

All byproducts shall be handled and stored in such a manner as to prevent nuisances to neighbors or to the public at large.

Byproducts land applied to supply plant nutrients shall meet the criteria in NRCS Conservation Practice Standard 633, Waste Utilization and NRCS Conservation Practice Standard 590, Nutrient Management.

Any unmarketable or unused byproducts shall be handled and disposed of in accordance with all applicable federal, state, and local laws and regulations. A plan for dealing with such byproducts shall be prepared and approved by NRCS prior to utilization of the process or installation of the waste treatment facility, and shall include a listing of any permits or permissions required for the execution of the plan.

Byproducts shall be recycled to the extent possible without causing a hazard to the environment.

Safety. Design of the process or facility shall include safety features to minimize hazards. Guards and shields shall be provided for moving parts of the equipment used in the treatment process. Waste treatment facilities shall be fenced and warning signs shall be posted where needed to prevent children and others from entering a hazardous area.

All treatment processes shall be carried out in accordance with all safety regulations. Protective clothing shall be utilized when handling potentially harmful chemicals that may be used in the process. Proper ventilation shall be provided.

CONSIDERATIONS

Location. The waste treatment facility should be located as near the source of manure or other waste as practicable and as far from neighboring dwellings or public areas as possible. Proper location should also consider slope, distance of manure and other waste transmission, vehicle access, wind direction, proximity of streams and flood plains, and visibility.

In determining the location of the facility, consider elevation and distance from various components to take advantage of gravity flow where possible.

Manure Characteristics. Waste treatment may require specific total solids and nutrient contents of the waste stream. Pretreatment options such as dilution or settling could be used to adjust the solids content before entering the waste treatment facility or process.

Visual Screening. The visual impact of the waste treatment facility or process should be evaluated within the overall landscape context. Screening with vegetative plantings, landforms, or other measures may be implemented to alleviate a negative impact or enhance the view.

PLANS AND SPECIFICATIONS

Plans shall include engineering drawings and supporting documentation as well as other plans required to manage the system; e.g. a nutrient management plan for proper land application of byproducts.

Plans and specifications for waste treatment facilities shall be prepared in accordance with the criteria of this standard and good engineering practice.

As a minimum, the plans and specifications shall provide the following:

1. Layout and installation details of livestock facilities, waste collection points, waste transfer components, waste treatment and storage facilities.
2. Location of all inflow and discharge pipelines, pipeline materials, diameter and slope.
3. Details of support systems for all components of the treatment facility.
4. Fencing and signage as appropriate for safety purposes.
5. Refer to the section SUPPORTING DATA AND DOCUMENTATION for additional requirements.

OPERATION AND MAINTENANCE

An operation and maintenance (O&M) plan shall be developed and reviewed with the owner/operator prior to construction of a waste treatment facility or implementation of a waste treatment process. The O&M plan shall be consistent with the proper operation of all system components and shall contain requirements including but not limited to:

- Recommended loading rates of the waste treatment facility or process for hydraulic and critical pollutant parameters.
- Proper operating procedures for the waste treatment facility or process, including the amount and timing of any chemicals added.
- Operation and maintenance manuals for pumps, blowers, instrumentation and control devices, and other equipment used as components of the waste treatment facility or process.
- Description of the planned startup procedures, normal operation, safety issues, and normal maintenance items. This includes procedures for the planned replacement of components with less than a ten year service life.
- Alternative operation procedures in the event of equipment failure.
- Troubleshooting guide.

- Monitoring and reporting plan designed to demonstrate system performance on an ongoing basis.

SUPPORTING DATA AND DOCUMENTATION

The following is a list of the minimum data and documentation to be recorded in the case file, as applicable:

Field Data and Survey Notes. The following is a list of the minimum data needed:

1. A system plan sketch of the layout and installation detail of livestock facilities, waste collection points, waste transfer components, waste treatment and storage facilities.
2. Provide the location of all inflow and discharge pipelines, pipeline materials, diameter and slope. Include elevations of components, if needed.
3. Details of support systems for components of the treatment facility.

Design Data. Record on appropriate engineering paper. For guidance on the preparation of engineering plans see chapter 5 of the EFH, part 650. The following is a list of the minimum required design data:

1. Process diagram with information listed in the Criteria section.
2. Data demonstrating results of use of the facility or process.
3. Documentation of the expected performance.
4. Impacts and mitigation measures, if needed.
5. Manufacturer's warranty on construction and applied processes. Also includes identification of planned service life of each component.
6. Estimated annual cost of operation.
7. Monitoring plan which identifies parameters to be measured and the needed equipment.
8. Handling, storage, and disposal requirements of byproducts.
9. Safety features, including fencing and signage, as appropriate.
10. Pretreatment options for waste, if needed.
11. Materials and quantities needed. Identify borrow material and/or spoil area, as needed.
12. Vegetation and/or ground cover requirements, as needed.
13. Identification of needed Erosion and Sediment Control measures. Supplemental practices required, including a Nutrient Management Plan.
14. Operation and maintenance Plan.

Construction Check Data/As-built. Record on survey note paper, SCS-ENG-28, or other appropriate engineering paper. Survey data will be plotted on the plans in red. The following is a list of minimum data needed for the As-built.

1. As-built plans including dimensions, types and quantities of materials installed, and variations form design. Include justification for variations.
2. Document completion of supplemental practices.
3. Adequacy of vegetation and/or ground cover, if installed.
4. Complete the as-built section of the Cover Sheet, if needed.

REFERENCES

USDA-Natural Resources Conservation Service, Maryland Electronic Field Office Technical Guide (eFOTG), Section IV. [On-line]. Available at: http://efotg.sc.egov.usda.gov/efotg_locator.aspx