

**NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA CONSERVATION PRACTICE STANDARD**

WASTE TREATMENT

(No.)

CODE 629

DEFINITION

The use of unique or innovative mechanical, chemical or biological technologies that change the characteristics of manure and agricultural waste.

PURPOSE

To use manure and waste treatment facilities to improve water quality and air quality by:

- Reducing the nutrient content, organic strength, and/or pathogen levels of manure and agricultural waste.
- Reducing odors and gaseous emissions
- Facilitating desirable waste handling and storage
- Producing value added byproducts that facilitate manure and waste utilization.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where there is a need to implement waste treatment technologies that are not within the scope of other NRCS Conservation Practice Standards and that are sufficiently developed for incorporation into a manure or agricultural waste management system. This includes new or unique components or processes.

CRITERIA

General Criteria Applicable to All Waste Treatment Purposes.

Laws and Regulations. Ensure that the manure and waste treatment facilities and processes are planned, designed, and

constructed to meet all federal, state, and local laws and regulations.

Utilities. Locate all buried utilities in the project area including drainage tile and other structural measures.

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

When the planned technology involves a system or process, the design documentation must include a process diagram containing, at a minimum, the following information:

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

It is the responsibility of the technology provider to furnish information from a university or other independent research entity to document the effectiveness of the technology to achieve its intended purpose. Provide independent, verifiable data demonstrating results of the use of the facility or process in other similar situations and locations. If

available, document the effectiveness of the technology under different climatic factors. Documentation from peer reviewed journals is preferable. 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.

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

Where components of a facility or process are not described in a current NRCS Conservation Practice Standard, the system provider shall furnish a minimum one year warranty on all construction, equipment, and applied processes.

Expected System Performance. Clearly document the expected system performance prior to system installation. At a minimum, document all expected system volumetric flow rates, macro-nutrient reductions or changes in form, expected pathogen reductions, gaseous ammonia and hydrogen sulfide emissions reductions (or increases).

Operating Costs. The system provider will furnish an annual estimate of operating costs and the time, labor, energy, and equipment requirements for each waste treatment component of the waste management system and on the operation cost or savings the waste treatment component will have on the waste management system as a whole. Identify as estimates the operating costs not based on actual data. Adequately document the anticipated operation cost or savings of the waste treatment component on the entire system.

Monitoring. As part of the system, install equipment needed to properly monitor and control the waste treatment facility or process. Process control parameters to be monitored must include those parameters identified in the design documentation. Identify parameters considered critical to proper system operation in the Operation and Maintenance (O&M) Plan.

Monitor critical equipment status and unit processes.

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.

Handle and store all byproducts in such a manner as to prevent nuisances to neighbors or to the public at large.

The land application of byproducts to supply plant nutrients must meet the criteria in NRCS Conservation Practice Standard *Nutrient Management (Code 590)*.

Handle and dispose of any unmarketable or unused byproducts in accordance with all applicable federal, state, and local laws and regulations. A plan for dealing with such byproducts shall be prepared and approved 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.

Recycle the waste treatment byproducts to the extent possible without causing a hazard to the environment.

Safety. To minimize hazards, include safety features in the design of the process or facility. Provide guards and shields for moving parts of the equipment used in the treatment process. Fence waste treatment facilities and post warning signs where needed to prevent children and others from entering a hazardous area.

Carry out all treatment processes in accordance with all safety regulations. Wear protective clothing when handling potentially harmful chemicals that may be used in the process. Provide proper ventilation.

CONSIDERATIONS

Location. Locate the waste treatment facility as near the source of manure or other waste and as far from neighboring dwellings or public areas as practical. For proper location, 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. Use Virginia Conservation Practice Standard *Waste Separation Facility (Code 632)*, as needed.

Visual Screening. Evaluate the visual impact of the waste treatment facility or process within the overall landscape context. Look at implementing screening with vegetative plantings, landforms, or other measures to alleviate a negative impact or enhance the view.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for waste treatment facilities in accordance with the criteria of this standard and good engineering practice.

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

DESIGN DATA

1. Completed Environmental Evaluation and subsequent requirements.
2. Soils investigation, if needed.
3. Layout and installation details of livestock facilities, waste collection points, waste transfer components, waste treatment and storage facilities. Include supporting documentation.
4. Location of all inflow and discharge pipelines, pipeline materials, diameter and slope. Include elevations of components, if needed.
5. Details of support systems for all components of the treatment facility.
6. Design computations, including purpose of practice and references used.
 - a. Process diagram with information listed in Criteria section.

- b. Data demonstrating results of use of the facility or process. Documentation of the expected system performance.
 - c. Impacts and mitigation measures, if needed.
 - d. Manufacturer's warranty on construction and applied processes. Also includes identification of planned service life of each component.
 - e. Estimated annual cost of operation.
 - f. Monitoring plan which identifies parameters to be measured and the needed equipment.
 - g. Handling, storage, and disposal requirements of byproducts.
 - h. Safety features, including fencing and signage, as appropriate.
 - i. Pretreatment options for waste, if needed.
7. Required tests to determine the effectiveness of the waste treatment as appropriate.
 8. Other plans to manage the system including a nutrient management plan for proper land application of byproducts.
 9. Standard Cover Sheet (VA-SO-100A), if needed.
 10. Materials and quantities needed. Identify borrow material and/or spoil area, as needed.
 11. Vegetation and/or ground cover requirements, as needed.
 12. Identification of needed Erosion & Sediment Control measures.
 13. Supplemental practices required, including a Nutrient Management Plan.
 14. Virginia Conservation Practice Specifications (700 Series).
 15. Operation and Maintenance Plan

CHECK DATA

1. As-built plans including dimensions, types and quantities of materials installed, and variations from design. Include justification for variations.

2. Document completion of supplemental practices.
3. Adequacy of vegetation and/or ground cover, if installed.
4. Complete as-built section of Cover Sheet, if needed.

OPERATION AND MAINTENANCE

Develop an O&M plan and review with the owner/operator prior to construction of an innovative waste treatment facility or implementation of an innovative waste treatment process. Ensure the O&M plan is consistent with the proper operation of all system components and contains 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
- The service life of each component as identified by the manufacture of service provider. The minimum service life for the waste treatment facility or process is ten years. Where components have less than a ten year service life, clearly identify their planned replacement schedule.

REFERENCES

USDA-Natural Resources Conservation Service. Virginia Electronic Field Office Technical Guide (eFOTG), Section IV. [On-line]. Available at:
<http://www.nrcs.usda.gov/technical/eFOTG>.

USDA-Natural Resources Conservation Service. Virginia Engineering Design Note 591 – Amendments for Treatment of Agricultural Waste. [On-line]. Available at:
<http://www.nrcs.usda.gov/technical/eFOTG>.

USDA-Natural Resources Conservation Service. National Engineering Handbook – Part 650, Engineering Field Handbook.

USDA-Natural Resources Conservation Service. Virginia 700 Series Construction Specifications. [On-line]. Available at:
<http://efotg.sc.egov.usda.gov/>

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