NATURAL RESOURCES CONSERVATION SERVICE

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 by-products 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 Natural Resources Conservation Service (NRCS) conservation practice standards (CPSs) 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 system technology provider shall complete and supply to the landowner or operator a detailed design of the facility or process that clearly outlines the objectives and anticipated outcomes of implementation.

When the planned technology involves a system or process, include in the design documentation a process diagram that contains (at a minimum) the following information:

- Volumetric flow rates—including influent, effluent, and recycle streams.
- Waste load projections—including volume, mass, and characteristics of the waste important to the waste treatment facility or process.
- Unit process volumes and hydraulic retention times (where appropriate).
- Air emissions projections from the system.
- Nutrient fate projections within the system.
- Process monitoring and control system requirements as described in the "Monitoring" section below.

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 that demonstrates results of the use of the facility or process in other similar situations and locations. If available, document the effectiveness of the technology under

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service or download it from the electronic Field Office Technical Guide (eFOTG).

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, document the impacts and mitigation measures if required by state or local agencies.

Components. Waste treatment facilities and processes may consist of multiple components. Where criteria for individual components are described in existing NRCS CPSs, use those CPSs and their specific criteria for planning, designing, and installing that component.

Where components of a facility or process are not described in a current NRCS CPS, the system provider shall furnish a 1-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 change in form, expected pathogen reductions, and gaseous ammonia and hydrogen sulfide emission reductions (or increases).

Operating costs. The system provider shall 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. They shall also furnish an annual estimate of the operation costs or savings that the waste treatment component will have on the waste management system as a whole. Identify the operating costs as estimates that are not based on actual data. Adequately document the anticipated operation costs or savings of the waste treatment component on the entire system.

Monitoring. As a part of the system, install equipment needed to properly monitor and control the waste treatment facility or process. Identify the process control parameters to be monitored in the design documentation. Identify parameters considered critical to proper system operation in the operation and maintenance plan. Monitor critical equipment status and unit processes.

By-products. Implementation of a waste treatment process or operation of a waste treatment facility shall not result in discharge of by-products harmful to the environment.

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

The land application of by-products to supply plant nutrients must meet the criteria in CPS 590, Nutrient Management.

Handle and dispose of any unmarketable or unused by-products in accordance with all applicable federal, state, and local laws and regulations. A plan for dealing with such by-products 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.

Recycle the waste treatment by-products to the extent possible without causing a hazard to the environment.

Safety. Include in the design appropriate safety features to minimize hazards of the facility. Provide guards and shields for moving parts of the equipment used in the treatment process. Install fences around 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 as practicable and as far from neighboring dwellings or public areas as possible. 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.

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, the plans and specifications shall provide the following:

- Layout and installation details of livestock facilities, waste collection points, waste transfer components, and waste treatment and storage facilities (including supporting documentation).
- Location of all inflow and discharge pipelines and pipeline materials, diameter, and slope.
- Details of support systems for all components of the treatment facility.
- Fencing and signage as appropriate for safety purposes.
- Required tests to determine the effectiveness of the waste treatment as appropriate.
- Other plans to manage the system—including a nutrient management plan for proper land application of by-products.

OPERATION AND MAINTENANCE

Develop and review an operation and maintenance (O&M) plan with the owner or 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.
- O&M 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 10-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 manufacturer or service provider. The minimum service life for the waste treatment facility or process is 10 years. Where components have less than a 10-year service life, clearly identify their planned replacement schedule.