Field Office:
Phone Number:

Wastewater Irrigation TN633

DEFINITION

Wastewater irrigation is the preferred method for transferring stored and/or treated liquid animal wastes to agricultural land for utilization as a fertilizer.

Wastewater irrigation is classified as either effluent wastewater irrigation, which is for the liquid only portion of the wastewater; or as slurry wastewater irrigation, which is created by agitation of the effluent wastewater and solids (sludge).

SYSTEM REQUIREMENTS

Adequate buffers should exist between the spray fields and water sources.

Wastewater irrigation systems are to be designed to prevent runoff, uniformly apply the wastewater, and to meet the nutrient needs of the plants.

Nozzle sizes of sprinklers are to be appropriate for the consistency of the manure applied (minimum ¼-inch for effluent wastewater irrigation).

Agitation equipment should be adequate to properly mix effluent and solids into a slurry for irrigation.

Traveling gun systems should be equipped with engine powered travel drives and traveling gun speed control.

Effluent systems should include a strainer on the suction line. The suction intake should be floated or otherwise located at least 18 inches below the liquid surface and as far from the containment structure inlet pipe as possible.

The solids content of the slurry will determine the type impeller selected for the pump system.

OPERATION AND MAINTENANCE

1. Wastewater does not need to be applied within 72 hours prior to a predicted storm event with a probability of occurrence of 50% or more from the National Weather Service unless the land application location appears white on the “Farmer’s Map” at: http://www.srh.noaa.gov/bmx/data/farmers_map/farmers_map.html

2. Wastewater may be spread immediately after a rain if the weather prediction for the next 72 hours and the soil conditions are favorable. In no case shall the application rate of the wastewater exceed either the intake rate or the available water holding capacity of the soil. (DO NOT APPLY TO SATURATED SOILS.)

3. Do not apply wastewater by irrigation when wind direction and velocity would cause drift towards residences, public areas, or roads.

4. Wastewater shall be applied only to land with actively growing crops or to cultivated land with incorporation as close to the planting date as possible (refer to Tennessee NRCS conservation practice standard Nutrient Management, Code 590). All land receiving wastewater should be adequately treated for erosion concerns.

5. Properly collecting and lab analyzing wastewater samples on a regular basis is the preferred method of nutrient content determination when irrigating with wastewater. An alternative and acceptable method is to use nutrient values from the Nutrient Management standard. In either case, the nutrient content of the wastewater should be matched with the nutrient needs of the crop.

6. Field nitrogen test kits are the preferred method to determine on-site nutrient analysis during the agitation and pumping of wastewater. Table values in the Nutrient Management standard can be used when test kits are unavailable. Using these values, the application rate should be adjusted (by adjusting the speed of the traveling gun or the pressure on the sprinkler heads) so that neither the soil intake rate nor the nutrient requirement of the crops are exceeded.

7. Wastewater should not be allowed to rise above the maximum design liquid level of the containment structure in order to maintain emergency storage capacity for the 25-year, 24-hour storm.

8. Schedule application events during dryer times of the year to lower the liquid level in the containment structure to the minimum drawdown level by late fall. This provides the capacity needed to store the winter and spring rains and the wastes that accumulate during the time of the year when irrigation cannot be scheduled.

9. When design sludge storage is full, the sludge should be removed from the containment structure with thorough agitation and pumping of the slurry. Sludge removal intervals may vary depending upon the type of livestock operation, age of the structure, and management conditions. Sludge accumulation should be monitored annually.

10. Agitation of containment structures may need to start as much as 24 hours prior to pumping to ensure thorough mixing of the effluent and solids. Multiple agitators will be needed for large structures. Angle the agitator at 45° to the bank for best circulation motion of the contents and to speed agitation. Continuously agitate the containment structure contents throughout the pumping out procedure.

11. After the irrigation system is used to apply wastewater, it should be flushed with clean water.

12. Slurry is abrasive and can cause wear to the pump and nozzles. Impellers and other parts should be routinely checked for excessive wear and replaced according to the manufacturer's recommendations. Bearings with grease fittings should be lubricated on a regular basis.

13. The nozzle diameter should be routinely checked for tolerance and replaced as needed in order to maintain design application uniformity.

14. Sprinklers equipped with grease fittings should be lubricated on a regular basis. Impulse arms not properly operating should be repaired or replaced. Improper rotation of the sprinkler may result in the intake rate of the soil being exceeded resulting in runoff and/or erosion.

REFERENCES

TN NRCS Conservation Practice Standards:

Nutrient Management, Code 590
Manure Transfer, Code 634
Waste Utilization, Code 633