R18-9-E322. 4.22 General Permit: Subsurface Drip Irrigation Disposal, Less Than 3000 Gallons Per Day Design Flow

A. A 4.22 General Permit allows a subsurface drip irrigation disposal system that receives high quality wastewater from an advanced on-site wastewater treatment facility and dispenses it to an irrigation system that is buried at a shallow depth in native soil. The Director may require a thin layer of soil or engineered fill cover on the surface of the native soil, depending on wastewater quality delivered to the drip emitters.
   1. The drip irrigation disposal system is designed to disperse the treated wastewater into the soil under unsaturated conditions by pressure distribution and timed dosing.
   2. A subsurface drip irrigation disposal system reduces the downward percolation of wastewater by enhancing evapotranspiration to the atmosphere.
   3. Drip irrigation disposal systems are considered if high groundwater, shallow soils, slowly permeable soils, or highly permeable soils are present at the site or if water conservation is needed.

B. Performance. An applicant shall ensure that:
   1. A drip irrigation system is delivered treated wastewater that meets the following criteria:
      a. A category "A" drip irrigation system requires wastewater delivered to the system that meets the following minimum water quality criteria:
         i. TSS of 10 milligrams per liter, 30-day arithmetic mean;
         ii. BOD5 of 10 milligrams per liter, 30-day arithmetic mean;
         iii. Total nitrogen (as nitrogen) of 53 milligrams per liter, five-month arithmetic mean; and
         iv. Total coliform level of 10 (Log10 1) colony forming units per 100 milliliters, 95th percentile.
      b. A category "B" drip irrigation system requires wastewater delivered to the system that meets the following minimum water quality criteria:
         i. TSS of 20 milligrams per liter, 30-day arithmetic mean;
         ii. BOD5 of 20 milligrams per liter, 30-day arithmetic mean;
         iii. Total nitrogen (as nitrogen) of 53 milligrams per liter, five-month arithmetic mean; and
         iv. Total coliform level of 100 (Log10 2) colony forming units per 100 milliliters, 95th percentile.
   2. A drip irrigation system of category "A" or category "B" shall be designed to meet the following performance criteria:
      a. No ponding on the land surface,
      b. Evapotranspiration of at least 50% of the emitted wastewater to the atmosphere, and
      c. Incorporation of a fail-safe mechanism to prevent inadequately treated wastewater from being discharged.

C. Notice of Intent to Discharge. In addition to the Notice of Intent to Discharge requirements in R18-9-A301(B) and R18-9-A309(B), the applicant shall submit:
   1. Documentation of the pretreatment method proposed to achieve the wastewater criteria specified in subsection (B)(1), such as the type of pretreatment system and the manufacturer's warranty;
   2. Initial filter and drip irrigation flushing settings;
   3. Calculations of the site evaporation rate;
   4. Design calculations, showing the number of perennial plants needed to achieve the required evapotranspiration rate; and
   5. If supplemental irrigation water is introduced to the drip system, the volume and volume percent of the supplemental water.

D. Design requirements. An applicant shall ensure that:
   1. Drip irrigation lines and emitters are properly placed.
      a. Category "A" drip system. The applicant shall ensure that:
         i. Unless the manufacturer specifies deeper placement, lines and emitters are placed from six to 12 inches below the surface of the native soil; and
         ii. Soil is replaced over the top of the drip system components.
      b. Category "B" drip system. The applicant shall ensure that:
         i. Unless the manufacturer specifies otherwise, lines and emitters are placed more than six inches below the surface of the native soil; and
         ii. A cover of soil or engineered fill is placed on the surface of the native soil to achieve a total emitter burial depth of at least 12 inches;
   2. Wastewater is filtered to remove particles 100 microns in size and larger;
   3. Applicable requirements under R18-9-E304 for pressure distribution systems are followed;
   4. A pressure regulator assures that excessive operating pressure or surges do not damage the drip irrigation system;

5. Wastewater distribution pipe is Schedule 40 PVC or better, sized for a flow velocity during flushing of at least two feet per second;
6. The system is designed to flush the irrigation components with wastewater. The applicant shall ensure that piping and valves allow the wastewater to be pumped in a line flushing mode of operation with discharge returned to the treatment system headworks;
7. Air vacuum release valves are installed to prevent water and soil drawback into the emitter;
8. Emitters are spaced no more than two feet apart. The applicant shall ensure that:
    a. Drip lines are placed from 12 to 24 inches apart unless variations in spacing allow preservation of existing trees and shrubs or enhance performance to overcome site limitations;
    b. Emitters shall be designed to discharge from 0.5 to 1.5 gallons per hour.
9. A suitable backflow prevention system is installed if supplemental water for irrigation is introduced to the pumping system. The applicant shall not introduce supplemental water to the treatment system;
10. Plants are selected with regard to the ability of each species to maintain evapotranspiration rates and absorb nutrients;
11. Drip irrigation is used in soils graded as:
    a. Sandy clay loam, clay loam, silty clay loam, or finer with weak platy structure or in soil with a percolation rate from 45 to 120 minutes per inch; and
    b. Sandy clay loam, clay loam, silty clay loam, or silt loam with massive structure or in soil with a percolation rate from 31 to 120 minutes per inch.
12. The minimum vertical separation distances are 1/2 of those specified in R18-9-A312(E)(2) if the design evapotranspiration rate is 50% or more of design flow, except that the minimum vertical separation distance shall not be less than one foot.

E. Installation requirements. An applicant shall ensure that:
1. The irrigation pipe is installed by a plow mechanism that cuts a furrow, dispenses pipe, and covers the irrigation pipe in one operation, or a trencher and hand tools that dig a trench not more than four inches wide;
2. Drip irrigation pipe has an incorporated herbicide to prevent root intrusion for at least 10 years and an incorporated bactericide to reduce bacterial slime build-up. The applicant shall store drip irrigation pipe to preserve the herbicidal and bactericidal characteristics of the pipe.

F. Operation and maintenance requirements. In addition to the applicable requirements in R18-9-A313, the permittee shall test the fail-safe mechanism quarterly to prevent discharge of inadequately treated wastewater.

Historical Note

New Section adopted by final rulemaking at 7 A.A.R. 235, effective January 1, 2001 (Supp. 00-4).