

---

**2.0 Regulation  
Governing  
Individual Onsite  
Wastewater  
Disposal**

**Design Standard VI  
Spray Irrigation Disposal System**

Mississippi State Department of Health  
Post Office Box 1700  
Jackson, Mississippi 39215-1700  
September 2005  
Form No. 309 **Standard VI**

**Mississippi State Department of Health**  
**Design Standard VI Spray Irrigation Disposal**

**Table of Contents**

I.	Introduction.....	MSDH 300-Section 02A-VI-01
II.	General.....	01
III.	Soil and Site Evaluation.....	02
IV.	Location of Spray Irrigation Disposal Systems .....	03
V.	Treatment .....	05
VI.	Dosing Chambers.....	05
VII.	Minimum Pump Specifications.....	06
VIII.	Minimum Filter Specifications .....	06
IX.	Minimum Specifications for Irrigation Equipment .....	06
X.	Minimum Specifications for Disinfection .....	07
XI.	Minimum Specifications for the Spray Field.....	07
	TABLE I .....	09

# DESIGN STANDARD VI

## SPRAY IRRIGATION DISPOSAL

### I. Introduction

The spray irrigation disposal system is a surface disposal system which has two basic design principles different from other surface disposal systems. They are uniform distribution of effluent over a large area, and dosing and resting cycles. This system uses small diameter pipe (sprinkler laterals) connected to pop up or impact spray irrigation heads. The spray irrigation disposal system has the capability of equally distributing effluent at a relatively low rate over the entire spray field to prevent saturation of the soil.

### II. General

1. The system shall be designed to provide an equal volume and pressure at each spray head within 10% of the required system pressure.
2. The spray irrigation disposal system shall be designed and installed in such a manner that during normal operation the inlet to the treatment facility will not become surcharged.
3. The treatment facility and dosing chamber shall be designed, constructed and installed so all joints, seams, and component parts preclude infiltration of surface and groundwater, while preventing the escape of wastewater or other liquids.
4. Electrical equipment shall be protected with safety devices (overload interrupting devices, fuses, etc.). Electrical equipment shall comply with appropriate National Electrical Manufacturer's Association (NEMA). Electrical component parts shall be covered by the manufacturer's limited warranty.
5. Valves, fittings, level control switches and all other components must be designed and manufactured to resist the corrosive effects of wastewater and chemicals used for disinfection.
6. Where soil and site limitations require, the spray irrigation disposal system may be placed in a fill. The imported fill soil must be of a sandy loam texture.
7. Prior to the design of the spray irrigation disposal system, the suitability of the site must be demonstrated through acceptable soil permeability rates, acceptable site conditions and other topographic characteristics.

The design and construction of the spray irrigation disposal system must conform to the criteria as outlined in this regulation.

8. The spray field may be either demand-dosed or time-dosed. A spray field that is demand-dosed shall be fenced or shall have sign(s) posted to indicate the sewage disposal area. A spray field that is time-dosed shall be set to operate at times when human contact with the treated effluent is least likely to occur. Care shall be exercised, by the property owner, to restrict human contact with the spray field area to only the minimum necessary.

### **III. Soil and Site Evaluation**

1. Upon receipt of the Notice of Intent, a plot plan showing the location of the house, driveway, well etc. and a legal description, the soil and site evaluation will be conducted by the county Environmentalist.
2. Information provided on the Notice of Intent and that obtained during the soil and site evaluation will determine acceptance or rejection of the site for the installation of a spray irrigation system.
3. Prior to completing the Notice of Intent/System Recommendation, the Environmentalist shall visit the lot and conduct a soil and site evaluation.
4. The soil determinations will be made based on soil borings to a depth of five feet or restrictive tive horizon. Restrictive soil or site conditions may preclude the use of a spray irrigation system.
5. A satisfactory soil and site evaluation will comply with the following criteria:
  - a. Absence of or protection from frequent flooding.
  - b. Landscape position with positive surface runoff.
  - c. Slopes of less than 12%.
  - d. Depth to high water table of greater than 6 inches.
  - e. Depth to bedrock, fragipan, redoximorphic features or plinthite of greater than 6 inches.

- f. Soil texture and color defined by the Natural Resource Conservation Service as indicating good drainage and suitable for surface application of wastewater, based on a soil boring of five feet.
  - g. Available space in which to install the Spray Irrigation Disposal system meeting all requirements of this Regulation.
6. Sizing of the spray disposal field will be based on the most restrictive soil within 12 inches of the naturally occurring ground surface.
  7. A minimum of 6 (six) inches of naturally occurring soil must be present above a restrictive horizon or a predominantly gray soil before placement of any fill.
  8. To overcome the lack of sufficient depth, to a restrictive horizon and/or seasonal water table, a clean fill material of a texture of sandy loam may be used as fill material. Organic matter shall be removed, from the native soil surface, prior to placing and incorporating the fill. This fill must be incorporated into the native soil to prevent a textural interface from developing. When fill material is used the entire fill area must be sodded to prevent erosion, or other effective erosion control methods used. The full depth of fill material must extend at least ten feet (10') in all directions from outer edge of the spray field and at that point shall be sloped at a grade of no steeper than 3 to 1.
  9. The non compliance of one or more of the above items may (1) require a design alteration or (2) prohibit the use of a Spray Irrigation Disposal system. Slopes of greater than 12 % may be considered on a case by case basis.

#### **IV. Location of Spray Irrigation Disposal Systems**

1. All components of the spray irrigation disposal system shall be located a minimum of:
  - a. five feet from any dwelling or permanent structure.
  - b. ten feet from any property line.
2. The aerobic treatment plant and pump chamber shall be located a minimum of 50 feet from any public, private or individual potable water source.
3. Potable water lines and wastewater lines shall not be laid in the same trench. The potable water lines and wastewater lines shall maintain a minimum horizontal separation of 10 feet.

Where a potable water line must cross a wastewater line, the potable water line within 10 feet of the point of crossing shall be at least 12 inches above the wastewater line.

4. The area of the disposal spray field shall not be used for vehicular traffic or parking.
5. Spray Irrigation Disposal systems shall not be located in depressed areas where surface water will accumulate. Provisions shall be made to minimize the flow of surface water over the effluent disposal field.
6. There shall be maintained, from the outer edge of the spray pattern, the following distances:
  - a. 100 feet from any public, private or individual potable water source and be located at a lower elevation.
  - b. 50 feet from recreational waters, shellfish waters or other sensitive areas for spray fields located on slopes of less than eight percent.
  - c. 75 feet from recreational waters, shellfish waters or other sensitive areas for spray fields located on slopes greater than eight percent.
  - d. 50 feet from dwellings, swimming pools, businesses or other inhabited structures.
  - e. 25 feet from lot lines, porches, patios and decks.,
    - f. 15 feet from outbuildings.
    - g. 10 feet from walkways, private roads, driveways, and parking areas.
7. Where all or part of the Spray Irrigation Disposal system is proposed to be installed on property other than the owner's, an easement in perpetuity shall be legally recorded in the proper county and a copy furnished to the local county Health Department prior to listing Spray Irrigation Disposal as an option. The easement shall be of sufficient area to permit access, construction and maintenance of the system.
8. It is the intent of these regulations that a minimum separation of 40 feet between independent spray disposal fields be maintained. Over lapping of the required setback from property lines cannot be negated by the granting of easements.

9. No site for a Spray Irrigation Disposal system shall be approved which is located wholly within an area which is frequently flooded, swamp, marsh or wetland. Except that if permits have been issued and provided to the local health department by the proper regulatory agency authorizing the use of such areas for building sites and the installation of individual onsite wastewater disposal systems, the permitted property shall be evaluated using standard soil and site criteria for an IOWDS.
10. When a proposed lot is located partially within an area which is frequently flooded, swamp, marsh or wetland, that area not within the frequently flooded, swamp, marsh or wetland area may be evaluated using standard soil and site criteria for an IOWDS.
11. In soils that contain a restrictive horizon (fragipan, chalk, bedrock, clay or silty clay), within two feet of the surface, there shall be maintained a minimum of 6 inches of unsaturated soil between the surface and the perched or seasonal water table.
12. In soils that do not contain a restrictive horizon (fragipan, chalk, bedrock, clay or silty clay), within two feet of the surface, there shall be maintained a minimum of 12 inches of unsaturated soil between the surface and the perched or seasonal water table.
13. Easements or right-of-way area for utilities, surface or subsurface drainage, roads, streets, ponds or lakes shall not be used as available space for the location of spray fields. Utility easements can be used as disposal area with proper authorization from the utility. Spray heads and distribution piping shall not be placed on the easement. In no case shall a potable water easement be acceptable for any part of the distribution or disposal.

## **V. Treatment**

The treatment method shall be an aerobic treatment unit in compliance with the current standards of ANSI/NSF International Standard 40 and the applicable sections of the Regulation Governing Individual Onsite Wastewater Disposal.

## **VI. Dosing Chambers**

1. The dosing chamber shall have a minimum working capacity of 1.5 times the maximum volume produced for timed-dose and per manufacturer's specifications for demand-dose systems. The maximum volume produced shall be determined based on charts provided in the Regulation Governing Individual Onsite Wastewater Disposal.

2. The dosing chamber shall be equipped with an audible high water alarm, and a self-opening relief valve.
3. For systems that employ timed dosing, the high water alarm must be set so as to allow a reserve capacity of 50% in the chamber when activated.
4. The dosing chamber shall have a grade level access large enough to allow servicing and/or removal of the largest component in the chamber. Access ports shall be protected against unauthorized entrance or removal.
5. The dosing chamber shall be vented through the grade level access or by means of a separate vent. In either case the vent shall be a minimum of one inch in diameter.
6. The dosing chamber shall be made of material resistant to the corrosive effects of wastewater, chemicals used for disinfection and designed to withstand the lateral and bearing loads to which it is expected to be subjected.
7. All openings shall be sealed with a mastic, butyl rubber or other pliable sealant that is waterproof, corrosion resistant and approved for use in contact with wastewater, in a manner to prevent the entrance of surface and groundwater while preventing the escape of effluent or other liquids.

## **VII. Minimum Pump Specifications**

1. The pumping system shall be designed to deliver wastewater at the required volume and pressure specified by the spray irrigation head manufacturer.
2. The pumping system shall be equipped with a low water cutoff to prevent damage to the pump during low water conditions in the dosing chamber.
3. The pump shall be constructed of corrosion resistant materials suitable for effluent pumping.
4. The pump shall be sized per manufacturers' specifications to meet or exceed the hydraulic head of the system while delivering the required volume.
5. The pump shall be installed in compliance with manufacturers' specifications so as not to violate pump warranty.
6. The suction and pressure lines shall be PVC schedule 40 and shall be sized to deliver the required volume at the design pressure while not exceeding a velocity of five feet per second.

## **VIII. Minimum Filter Specifications**

1. The filter shall filter the effluent to the minimum specifications of the spray irrigation head manufacturer to prevent clogging.
2. The filter shall be made of material resistant to the corrosive effects of wastewater and chemicals used for disinfection.
3. The filters shall be readily accessible for inspection and/or service.

## **IX. Minimum Specifications for Irrigation Equipment**

1. Sprinklers, valves, controllers and all other equipment used in a spray irrigation system shall be designed, manufactured and warranted by their manufacturer for use in effluent disposal systems.
2. Sprinklers must be of low trajectory type designed to reduce aerosols. Low trajectory spray sprinklers have a nozzle trajectory equal to or less than thirty (30) degrees.
3. Sprinklers shall be connected to their supply line by means of polyethylene (PE) pipe or a "Swing Joint" manufactured specifically for this purpose.
4. Radius reduction by means of adjustment screw, nozzle retaining screw, distance control diffuser pin or other similar devices shall not be allowed.
5. Impact and pop-up sprinklers may be used. Sprinkler risers greater than twenty four (24) inches in height must be braced.
6. Equipment susceptible to freezing must be adequately protected to prevent freezing.

## **X. Minimum Specifications for Disinfection**

Effluent discharge from spray irrigation systems shall be adequately disinfected prior to surface application. The method of disinfection and the disinfection equipment must be in compliance with Design Standard XI.

## **XI. Minimum Specifications for the Spray Field**

Spray irrigation systems may not be installed in drain ways, swamps, marshes, floodplain, concave landscape positions or other areas which would be prohibited for the installation of a conventional onsite wastewater disposal system.

1. Treated effluent shall be sprayed evenly over the entire spray field area with non overlapping patterns. The spray field shall consist of a minimum of three (3) spray heads.
2. The maximum precipitation rate shall not exceed .25 inch per hour.
3. The effluent distribution system shall be designed, constructed and maintained to provide for even distribution of effluent throughout the spray field.
4. Surface runoff of sprayed effluent from the spray field area shall not be permitted. Rainwater shall be diverted away from the spray field area.
5. The spray field area shall be designed and operated to prevent surface accumulation of sprayed effluent.
6. In order to prevent entrapped air causing serious problems pipelines shall be routed on contour, downhill or even uphill but not up and downhill along the same section of pipe.
7. The size of the spray field area shall be determined by soil texture and slope of the site to be sprayed (See Table 1).

**TABLE I**

Soil Textural Class	Absorption Area in sq. ft./bedroom		Additional absorption area in ft. <sup>2</sup> /person over 2 persons/bedroom		Absorption Area in sq. ft./100 gpd	
	% Slope	Square Feet	% Slope	Square Feet	% Slope	Square Feet
Gravel	<b>NOT SUITABLE</b>					
Fine to Coarse Sand, Sandy Loam, Loamy Sand	0 to 8 8 to 12 12 to 16	800 1070 2000	0 to 8 8 to 12 12 to 16	400 540 1000	0 to 8 8 to 12 12 to 16	534 714 1334
Loam, Silty Loam, Sandy Clay Loam	0 to 8 8 to 12 12 to 16	1600 2000 2680	0 to 8 8 to 12 12 to 16	800 1000 1340	0 to 8 8 to 12 12 to 16	1067 1334 1787
Sandy Clay, Silty Clay Loam, Clay Loam	0 to 8 8 to 12 12 to 16	3210 5350 8020	0 to 8 8 to 12 12 to 16	1610 2680 4010	0 to 8 8 to 12 12 to 16	2140 3567 5347
Silty Clay Clay	0 to 8 8 to 12 12 to 16	8020 10030 13370	0 to 8 8 to 12 12 to 16	4020 5020 6690	0 to 8 8 to 12 12 to 16	5347 6687 8914