State of Delaware
Department of Natural Resources & Environmental Control
Division of Water Resources
Ground Water Discharges Section

Innovative and Alternative System Approval

ISSUED TO: Delta Environmental Products / Pentair Water

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FOR: Delta Drip Dispersal System -ASD

APPROVAL DATE: **July 21, 2007**

In accordance with the Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems (Regulations), an application dated April 2007/July 2007 has been submitted by Delta Environmental Products Inc. for the approval of the Delta drip dispersal system.

Based on the information submitted, the Department approves the use of the Delta drip dispersal system as an Innovative & Alternative On-Site Wastewater Treatment and Disposal System. The following conditions, limitations, and requirements must be adhered to:

1. Product Description

The Delta Drip Dispersal System is a fluid handling system for dispersal of treated wastewater effluent into the soil. The system incorporates an NSF certified standard 40 Class I secondary treatment unit, filtration, time and level controlled application with ultra low rate drip distribution.

The effluent is processed in the treatment unit which is sized according to the waste flow, biological demand or the number of bedrooms, whichever is greater. Treated effluent from the treatment unit gravity flows into the dosing chamber. The dosing chamber is sized to provide flow equalization for peak flow events. The effluent will be time dosed via a two float operating system in which every two hours or as determined by the site, a PLC activates the pump to deliver $1/7^{th}$ to $1/12^{th}$ of the effluent produced each day to the drip irrigation field. Prior to the effluent entering the drip grid, it passes through the spin filter or disc filter. Prior to each dosing cycle, the PLC opens the filter flush valve causing a turbulent cyclical flow across the surface of the filter cleansing it and returning the flush water to the pretreatment tank for reprocessing. During the dosing cycle, small uniform doses of effluent are applied at the prescribed depth via Wasteflow PC or Netafim bioline drip emitter line. Once per week, the plc opens the field flush solenoid to allow each zone to sequentially flush at velocities sufficient to scour the inner surfaces of all lines and transport all fines and organic debris back to the pretreatment tank.

The system contains the following

a. Pretreatment: Advanced treatment is required. The advanced treatment unit shall be approved for use by Delta and the Department.
b. Filtration: Automatic self cleaning filters that are capable of screening particles larger than or equal to 100 microns. These shall be disc or screen filters.
c. Air Vents: Air vacuum breakers installed at he high point of each drip on the supply and return sides of the field to keep soil from being aspirated into the drip emitters due to back siphoning or back pressure after the pump shuts off.
d. Field Flushing: Automatic field flushing valve used to enable accumulated debris and sediment to be flushed from the dripline back to the pretreatment units.
e. Tubing: Geoflow's Wasteflow PC dripline with pressure compensating emitters spaced uniformly in the tubing (24 inch centers, other center spacing may be approved on a case by case basis). The tubing consists of three layers; the inside layer is bactericide protector, the middle layer is black and the outside layer is purple striped for identification. The emitters are impregnated with Treflan to inhibit root intrusion.

NETAFIM BioLine for wastewater with pressure compensating emitters spaced uniformly in the tubing (24 inch centers, other center spacing may be approved on a case by case basis)). Manufactured in purple for nonpotable sources. The BioLine emitter is impregnated with bactericide protector.

f. Controls: Control/software package controlling all functions including filter flushing, system dosing and flushing and audible/visible alarms.

2. Approved Delta Drip System Packages

All components including tubing, controllers, filters, pressure regulators, air vacuum breakers, filter flush valves, field flush valves, zone valves, zoner, and headworks shall be those specified in the Whtiewater Pre-Engineered Drip Disposal Systems Design Manual, dated April 2007. All components that are not in this guide must seek the approval of the manufacturer and the Department prior to use.

3. Scope of Use

The drip dispersal system may be used for residential waste with flows <1,500 gallons per day. Other usages will be based on a case by case basis. **This system requires secondary treated effluent.**

4. Siting Criteria

a. Loading rates are to be based on the most restrictive texture within the upper 24" of the surface. See the attached chart for loading rate associated with a percolation rate.
b. For at-grade systems, the tillage depths are to be 6-8", although slightly deeper depths may be necessary in the case of shallow thick plow pans or similar restrictive layers within 12" of the surface.
c. Landscape position is also a necessary consideration. Systems are not to be sited within a closed depression or where water tends to pond during heavy rainfall events.

5. Separation Requirements

<u>New Construction:</u>

Separation requirements;

- 18" from limiting zone
  * Full Depth installation = 24" limiting zone, 6" trench

* Surface installation (At-grade systems) = 18-22" limiting zones require that 3" sandy fill be added, then place tubing 1" into sandy fill and add 6" topsoil cap (***See Design and Construction Notes for Site Preparation).***

* ***Advanced treatment required ****

- 10 – 17" from limiting zone **requires advanced treatment**. A 12" separation distance must be maintained from the limiting zone. For limiting zones 10-16", 3" of suitable sandy fill must be added, then place tubing 1" into fill and add 6" topsoil cap.

Replacement System;

Separation requirements:

- 18" from limiting zone – Same installation parameters as above

- 10 – 17" limiting zone – Suitable sandy fill added to establish 20" separation, place tubing 1" into sandy fill and add 6" topsoil cap

  **** Advanced Treatment Required****

- Less than 10" limiting zone **requires advanced treatment** – Suitable sandy fill added to establish 13" separation, place tubing 1" into sandy fill and add 6" topsoil cap. This shall be determined on a case by case basis.

6. Design Criteria

a. The drip dispersal system may be designed for new and replacement disposal systems.
b. Advanced treatment is required. The advanced treatment unit must be approved for use by Delta and the Department.
c. An effluent filter is not to be utilized.
d. An on-site wastewater treatment and disposal system permit application incorporating a Delta Drip Dispersal system must be designed in accordance with the Regulations, and manufacturer's specifications. The design shall be completed by a DNREC Class C Design Engineer. The permit application shall include system specifications, zone layout and calculations.
e. The design shall utilize an approved package system as outlined above. If any other system or components are to be utilized, they must seek prior approval from the Department.
f. The attached guideline dated November 18, 2003 shall be utilized for sizing the disposal area.

g. The design shall be in accordance with both the Department's and Delta's drip design guidelines.
h. Controls shall provide for delivery of designer specified preprogrammed volumes of effluent to each field zone at the designer specified time intervals; automatic flushing of integral unit filters, initiated by a timer; and automatic flushing of the drip laterals for specified duration.
i. The control panel may not be placed in an enclosed structure for residential applications.
j. Control and float levels shall be synchronized to assure the minimum dose is available prior initiating a dosing cycle to a zone. Minimum dose volume per zone shall be 3.5 times the liquid capacity of the drip laterals or otherwise as approved by the Department.
    1. The maximum number of cycles per day should not exceed 12 and the minimum should not be less than 7 cycles per day.
k. The drip system shall be designed to provide a minimum flushing velocity of 2 ft per second at the distal end of the pipe network.
l. A pressure regulator shall be placed just before the drip zone as close to the first lateral as possible in order to ensure constant pressure.
m. If multiple drip zones are necessary, a dosing valve zoner shall be incorporated.
n. The drip laterals shall be fed from the low point in the zone to the high point in order to force air out.
o. The hydraulic unit shall be placed on an aggregate base.
p. The system shall be designed so that it is installed on contour, on average of two foot centers. Steep slop designs shall seek the guidance of the manufacturer.

7. Installation Procedures

a. The drip dispersal system shall be installed by a DNREC Class E System Contractor under the supervision of a manufacturer's representative, or by a DNREC Class E System Contractor who has been certified for unit installation. Proof of certification shall be provided in writing to the Department.
b. Start up of the system and initial operational checks shall be conducted by the Class E System Contractor (trained by the manufacturer), Design Engineer, and a Ground Water Discharges Section (Large System Branch) representative. If the Class E System Contractor is not certified, a manufacturer's representative shall perform the operational checks of the system at start up. If the manufacturer's representative can not

be on site at the time of start up, they must provide final start up approval to the Department in writing.

c. The field(s) shall be staked out and kept free from disturbance.
d. The drip field(s) shall be installed in accordance with manufacturer's recommendations for each site. A vibratory plow, static plow or trencher is most typically used and soil moisture must be dry enough so that soil compaction will not occur.
e. The laterals shall be installed along the natural contour.
f. All electrical connections shall be made by a licensed electrician.
g. The wires from the filter system to the control panel must be run in conduit.
h. The field(s) shall be finished graded to shed surface water. A vegetative cover shall be established to prevent erosion and to allow for effective system operation.

8. Operation and Maintenance

a. The Delta Drip Dispersal System shall be operated and maintained in accordance with the manufacturer's specifications.
b. The manufacturer shall comply with all Department mandated requirements as specified in permit conditions. This shall include operation and maintenance requirements.

9. General Conditions

a. Use of the system for wastes other than residential shall be on a case by case basis.
b. In the event that the system does not perform as claimed by the applicant, the use of the system for new installations shall cease. Use of the system shall not resume until such time the applicant and the Department have reached an acceptable agreement for resolving the situations.
c. Any changes that deviate from the specifications as submitted with this approval shall be approved by the Department prior to use.
d. The manufacturer is responsible in ensuring the Department is aware of all local distributors, representatives and certified contractors. An updated list with contact information shall be provided to the Department annually.