



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

**Innovative and Alternative System Approval**

**ISSUED TO:** Knight Treatment Systems, Inc.  
281 Co. Rt. 51A  
Oswego, NY 13126

Phone 1-800-560-2454

**FROM:** Hilary Moore – Environmental Engineer  
Ground Water Discharges Section

**FOR:** White Knight Microbial Inoculators Generator

**APPROVAL DATE:** August 31, 2005

**AMENDED DATES:** June 6, 2006  
September 6, 2007

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In accordance with the Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems (Regulations), an application dated August 19, 2005, has been submitted by Knight Treatment Systems for approval of the White Knight enhanced biological augmentation system as an Innovative & Alternative On-Site Wastewater Treatment Technology.

Based on the review of the application, the Department hereby grants conditional approval for the use of the White Knight system as an Innovative & Alternative On-Site Wastewater Treatment Technology. **Installations may occur under this approval and are subject to the conditions, limitations, and requirements set forth herein:**

## 1. Product Description

The Enhanced Biological Augmentation of Onsite Wastewater Treatment Systems is the methodology of introducing a group of task specific selected microorganisms through IOS-500™ inoculums in tandem with the White Knight Microbial Inoculator Generator™, a device that is incorporated into an onsite wastewater treatment train, typically the septic tank, to significantly improve overall treatment system performance assuring system longevity and to rehabilitate organically clogged soil absorption systems.

The device is designed to continuously inoculate a septic tank or other treatment vessel with large numbers of naturally occurring selected strains of very powerful, non-pathogenic IOS-500™ bacteria. Through airlift mixing, recirculation, and fine bubble aeration principles the device brings the selected bacteria into contact with fixed film substrate and the suspended organic compounds in a septic tank, or other process treatment vessel. The introduced pure cultures of bacteria grow at logarithmic rates as they voraciously digest most of the organic pollutants that are found in wastewater and the organic waste compounds that have been transferred to the soil.

The Fine bubble driven airlift features of the White Knight Microbial Inoculator Generator™ are designed to allow for more efficient transfer of oxygen and low maintenance, high rate circulation of wastewater through the device, and across the fixed film media. An abundant oxygen supply supports a greater number of more robust bacteria providing more rapid digestion. Specifically designed clog resistant internal media provides for uninterrupted flow across abundant surface area for the establishment of the selected fixed-film culture.

Many of the natural bacteria found in wastewater such as the coliform group are not as aggressive at decomposition and cannot compete with the selected introduced IOS-500™ cultures. The introduced cultures multiply in the tank and are carried by the effluent stream out to the soil enhancing its treatment capabilities and hydraulic functionality.

## 2. Claim

**The White Knight is not an aerobic or other advanced treatment unit subject to NSF 40 requirements. Information submitted by the Manufacturer indicating the specified model will routinely provide effluent quality not exceeding 30 mg/l of BOD<sub>5</sub>, and 30 mg/l of TSS at the end of the treatment train in which the White Knight has been incorporated into.**

### **3. Use and Design Criteria**

- a. Determination that a White Knight System is suitable for installation at a site shall be made based on an evaluation conducted using White Knight Site Evaluation Checklist. All applicable criteria for installation shall be satisfied prior to device installation.
- b. The White Knight may be incorporated into new, existing and replacement systems with conventional and innovative and alternative disposal systems.
- c. The White Knight system may only be installed in DNREC approved septic tanks.
- d. The White Knight system may be used for systems up to **500** gallons per day or as approved by the Department.
- e. An on-site wastewater treatment and disposal system permit application incorporating a White Knight system shall be designed in accordance with the Regulations, and manufacturer's specifications. The design shall be completed by a DNREC Class C Design Engineer unless otherwise approved by the Department. The permit application shall include proper unit specifications and evaluation checklist.
- f. The designer must assure that the White Knight system has above grade access. The control panel and blower must be accessible.
- g. The White Knight unit shall not be installed within areas subject to traffic loads unless specially designed on a case by case basis in accordance with the Regulations.
- h. The manufacturer is responsible for providing the Department a list of all local distributors and their associated contact information. This list must be kept current and shall be submitted to the Department on a yearly basis.

### **4. Installation Procedures**

- a. The White Knight 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.

## **5. Operation and Maintenance**

- a. The White Knight system shall be operated and maintained in accordance with the manufacturer's specifications.
- b. The manufacturer or manufacturer's representative shall comply with all Departments mandated requirements as specified in permit conditions. This shall include operation and maintenance requirements.
- c. Throughout the life of the system, the permittee shall maintain a service agreement with a DNREC approved service provider.
- d. The system shall be inspected at a minimum of twice a year or more frequently as to ensure the proper operation and maintenance of the system.

## **6. Sampling and Approval**

The Department reserves the right to sample any unit at any time.

## **7. General Conditions**

- a. Use of the system for wastes other than residential shall be on a case by case.
- b. In the event that the product fails to perform as claimed by the applicant, and it is found that the system is installed and working as designed, and there is not toxicity in the waste; the use of the units for new installations shall cease. Use of the units 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.