



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

Innovative and Alternative System Approval

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FOR: AeroCell[®] SCAT Treatment Unit

APPROVAL DATE: **September 12, 2008**

In accordance with the Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems (Regulations), an application dated August 18, 2008, has been submitted by Quanics Inc., for approval of the AeroCell[®] SCAT Treatment System as Innovative & Alternative On-Site Wastewater Treatment Unit.

Based on the review of the application, the Department hereby grants approval of the use of the AeroCell[®] SCAT Treatment System as an Innovative & Alternative On-Site Wastewater Advanced Treatment Unit. Approval is subject to the conditions, limitations, and requirements set forth herein:

1. Product Description and Components

The AeroCell[®] SCAT is a pre-engineered media trickle filter housed in a fiberglass container. The AeroCell[®] uses a synthetic open cell foam media. The open cell foam material allows simultaneous air flow and effluent flow. As microbes grow they colonized the interior pore spaces of the foam. This allows a beneficial biofilm to grow out into the large open pore spaces. Oxygen is transferred directly to the biofilm without having to diffuse through the water.

Advanced treatment begins when septic tank effluent is sprayed on the top surface of the media. Effluent passes through and around individual pieces of foam. The

aerobic degradation of organic matter, filtration of suspended solids and nitrification occurs across thin films in and on the media pieces. Oxygen is supplied to the unit through an air vent through the side of the fiberglass container.

The system is made up of a primary treatment tank and a secondary treatment unit. Raw sewage enters a two compartment tank. The first compartment provides primary treatment, where settleable solids accumulate on the bottom and floatable solids accumulate on the surface. A Zabel A300 (or equivalent) filter is required on the pipe between the first and second compartment of the tank to help retain solids in the first compartment. Effluent from the clear layer of the first compartment flows into the second compartment where a pump located in a screened vault transfers effluent to the filter pod. It is here where secondary treatment occurs.

There are one to four spray nozzles inside the filter pod that distribute the liquid over an open cell foam media in the pod. The wastewater percolates down through the media and is collected at the bottom of the pod. The wastewater then flows through a pipe to an adjustable or fixed, gravity or pressure recirculation device. With the adjustable recirculation device, when there are no flows, all of the treated effluent is returned to the first compartment. Otherwise, approximately 20% of the treated effluent is discharged and 80% is returned to the first compartment.

Table 1 below depicts the various models numbers and associated treatment capacity.

Table 1: Required Tankage and Number of Filter Units: Systems Using Separate Septic/Recirc Tanks

| Model | Capacity (gallons per day - gpd) |
|-----------------------|----------------------------------|
| ATS-SCAT-3-AC-200 | 200 |
| ATS-SCAT-4-AC-400 | 400 |
| ATS-SCAT-6-AC-650 | 650 |
| ATS-SCAT-8-AC-1000 | 1000 |
| ATS-SCAT-8-AC-C500 | 500 |
| ATS-SCAT-86-AC-C750 | 750 |
| ATS-SCAT-88-AC-C1000 | 1000 |
| ATS-SCAT-886-AC-C1250 | 1250 |

* Signifies ANSI-NSF Standard 40 Certified models

- a. The pretreatment tank shall be a dual compartment septic tank, sized and constructed in accordance with the Regulations.
- b. An effluent filter providing filtration of solids down to 1/32" shall be installed on the outlet from the first compartment into the second compartment. **The filter shall be accessible.**

- c. The second compartment of the pretreatment tank will house a STEP Pumping package. Pump control will be controlled with timed or demand controllers.
- d. Each system will require recirculation at a minimum rate of 80%. The recirculation may be achieved utilizing one of the following: Quanics Gravity Recirculation Devices, Quanics Pressure Recirculation device or an equivalent acceptable means. Approval must be granted by both Quanics Inc. and DNREC.

2. Claim

Approval is based on information submitted by the Manufacturer indicating the specified models will routinely provide effluent quality not exceeding: 30 mg/l of BOD₅; 30 mg/l of TSS; and 20 mg/L TN or a 50% reduction (assuming influent loading does not exceed the treatment capabilities of the units).

3. Flow

The approval is based on flows not exceeding 1250 gallons per day. Flows greater than 1250 gallons per day but less than 2500 gallons per day may be permitted on a case by case basis in accordance with the manufacturer's recommendations.

Approval is applicable for domestic strength effluent only. All commercial applications must seek prior Department and Quanics approval.

4. Use and Design Criteria

- a. The AeroCell[®] system may be installed for new and replacement systems with conventional and innovative and alternative disposal systems.
- b. An on-site wastewater treatment and disposal system permit application incorporating an AeroCell[®] 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.
- c. The designer must assure that the pretreatment unit and AeroCell[®] has above grade access. The design also must ensure that the control panel is not located in an enclosed structure and is accessible.
- d. The AeroCell[®] unit shall not be installed within areas subject to traffic loads unless specifically designed on a case by case basis in accordance with the Regulations.
- e. Each system will require recirculation at a minimum rate of 80% return to the pretreatment unit and 20% flow to the final disposal system.

- f. The pump sizing for the STEP system shall be determined in accordance with the STEP Pumping Sizing criteria as outlined by Quanics. **Dosing shall be demand or timed dose.**
- g. 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.

5. Installation Procedures

- a. The AeroCell[®] unit 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.

6. Operation and Maintenance

- a. The AeroCell[®] treatment system shall be operated and maintained in accordance with Quanics' Operation and Maintenance Manual.
- b. The manufacturer or manufacturer's representative shall comply will all Department mandated requirements as specified in permit conditions. This shall include operation and maintenance requirements.
- c. The AeroCell[®] treatment system shall be inspected at a minimum of once every 6 months by a certified service provider.
- d. The service provider shall be a Class E System Contractor, or Class H System Inspector who has been certified by the manufacturer on the AeroCell[®] unit.
- e. The AeroCell[®] treatment system shall be maintained according to the AeroCell[®] Operation and Maintenance Manual as published by Quanics Inc.

7. Sampling and Approval

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

8. 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 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 no 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.