Advisory Opinion
From the
Technical Review Committee
For the
New England Interstate Regulatory Cooperation Project

Product/Technology Name:
Bioclere

Applicants Name & Address:
John Lafreniere
AWT Environmental, Inc.
P.O. Box 50120
241 Duchaine Blvd.
New Bedford, MA 02745
(508) 998-7577

NEI Category:
3 – Advanced Wastewater Treatment

Date of Opinion:
March 25, 1998

Project Background:
The New England Interstate Water Pollution Control Commission (NEIWPCC) in cooperation with the New England Governors Conference (NEGC), EPA Center for Environmental Industry and Technology (CEIT), EPA's National Small Flows Clearinghouse (NSFC), and the New England state environmental/health agencies responsible for the administration of on-site wastewater treatment systems are undertaking a 12-month pilot project for the regional voluntary evaluation of innovative/alternative on-site wastewater products/technologies. The goal of the project is to facilitate the technical evaluation of innovative/alternative (I/A) on-site wastewater products/ technologies on a regional basis. This effort should help expedite the acceptance of innovative/alternative on-site wastewater treatment products/technologies. The work will be carried out by a Technical Review Committee (the Committee) which will conduct independent evaluations of product/technology performance. The Committee, made up of New England state regulators and advisors, will assess each product/technology on its merits, backed by quality data, and render an Advisory Opinion. The benefit of the Committee is to assist regulators in carrying out their responsibilities for evaluating these technologies in a more efficient manner.

The Committee has defined three categories of On-site I/A technologies:

1. **Material Replacement**
2. **System Modification**
3. **Advanced Wastewater Treatment**

Applicant's Description of Product/Technology:

The Bioclere is a modified trickling filter over a clarifier, which is installed between the primary settling chamber (typically a septic tank) and the distribution box of a traditional on-site system.

Unlike traditional trickling filters, the Bioclere is sealed and insulated to retain the heat generated by the fixed film process. This allows for stable treatment despite dramatic seasonal temperature variations. Oxygen is supplied to the system through a small axial fan creating a force draft ventilation system which is vented through the effluent pipe. The clarifier provides a reservoir from which the media bed may be consistently dosed despite intermittent flows which are typical of on-site systems.

The Bioclere relies on the inherent advantages of the fixed film process, mainly the ability of the biological film to self-regulate over daily and seasonal variations in organic and hydraulic loadings and its ability to withstand varying environmental conditions. Biofilm mathematical modeling has verified that the substrate removal rate is not decreased as drastically for biofilms as it is for suspended growth systems, due to the dynamics of substrate and oxygen utilization that are dependent upon diffusion and mass flux characteristics (US EPA-Nitrogen Control 1993, William et. al 1976).

As the wastewater is generated it typically flows by gravity from the septic tank to the baffled chamber in the clarifier under the biofilter. A dosing pump located in the sump forces wastewater to the distribution system for uniform dispersion over the surface of PVC media. The pump is controlled by an electric timer and operates at a specified cycle to maximize oxygen diffusion and mass transfer of pollutants into the biofilm.

In the Bioclere, as in a traditional trickling filter, a biological film forms on the surface of the media. In the outer portion of the biofilm organic matter and ammonium ions are absorbed and oxidized as the wastewater trickles through the filter. As this film increases in thickness, diffused oxygen is consumed by microorganisms in the outer layer resulting in the development of aerobic, anoxic, and anaerobic zones within the biofilm (Metcalf & Eddy 1991). Absent cell carbon, the microorganisms near the media surface lose their ability to remain attached and slough through the media bed. The sloughed biomass settles on the bottom of the clarifier as secondary sludge and is periodically pumped to the septic tank, thus eliminating the need for media purging and sludge wasting.

The Bioclere is typically installed between the septic tank and the distribution box of a conventional on-site system. Because the treatment process is above the flow, it is generally considered not to intrude on or in any way adversely affect the performance of a conventional on-site system.

Technology Claim(s):
The above-mentioned applicant submitted the following Claims of product performance with the formal submittal. The applicant was seeking the Committee's validation of these claims as part of the product/technology's consideration for regional evaluation in the Advisory Opinion:

Claim: *The Bioclere produces the following levels of treatment for residential wastewater:*

BOD < 30 mg/l or 90% reduction
TSS < 30 mg/l or 90% reduction
Fecal Coliform - 75% reduction
Oil & Grease < 5 mg/l
NH3 < 2 mg/l

Commercial units are designed according to hydraulic and organic influent characteristics and effluent requirements that will achieve the same levels of treatment.

Technical Review Committee's Response to Claims:
The Technical Review Committee's opinion is based on the Committee's evaluation of available information on the product/technology and relates to the specific products, materials, and specifications stated in the Technology Claim(s) of performance.

X The Committee agrees that the product/technology meets the above-stated performance claims. The Committee reached this decision via a unanimous vote.

The applicant should request a determination from the committee for any modifications to the product/technology or to the product/technology claim. The product/technology is also evaluated for the quality of the data, wastewater science, and the technology's apparent merit as an innovative/alternative on-site wastewater treatment technology.

General Observations/Concerns:
After thoroughly evaluating all of the available information, the Technical Review Committee has identified the following concerns which may affect the approval of said technology in a state:

1. *Maintenance is essential to the long-term performance of the system.*
2. *Excessive oil and grease may impact the performance of the trickling filter.*
3. *An operation and maintenance (O & M) manual should be prepared and distributed with each system.*
4. *Care should be taken to properly install the unit per manufacturer's specifications. Of primary concern are the compaction of backfill around the unit and the prevention of unit flotation.*

Recommendations:

Based on the Technical Review Committee's evaluation, the Committee recommends the following items to improve or insure product performance:

1. *The unit should be designed, installed, and operated in accordance with manufacturer's specifications (i.e., waste load, etc.).*
2. *For all mechanical wastewater treatment systems, a licensed treatment plant operator should provide professional maintenance.*
3. *A contract for long-term maintenance should be required for the life of the unit.*
4. *A septic tank effluent filter should be used in any system in which a septic tank is utilized.*

State Regulations:

A positive Advisory Opinion shall in no way be considered a substitute for compliance with individual state regulations. Every states' regulations are designed to reflect the concerns of that state. Information generated in this opinion is intended to alleviate the investigative work required by an individual state for the consideration of said technology for approval as an alternative/innovative technology. Before state approval of the technology, the technology must comply with all pertinent state regulations. The Technical Review Committee also recommends that each state have a control for insuring that the above-listed concerns are met, addressed, or closely monitored and tracked.