

June 9, 1995

GMP #69

To: District Environmental Health Managers
District Health Directors
OEHS Staff

From: Donald J. Alexander, Director
Division of Onsite Sewage and Water Services

Subject: Experimental Protocol for Puraflo™
Peat Filter Treatment System
Onsite - Product Approval - Puraflo™

The Department has completed a review of the Puraflo™ treatment system and on June 9, 1995, the Division approved an experimental protocol to test the Puraflo™ system in accordance with §2.25 of the Sewage Handling and Disposal Regulations. This GMP is intended to provide guidance on how to process applications for Puraflo™ systems. The site criteria are contained in the **Experimental Protocol** document and will be covered in greater detail during training.

Conceptually, the Puraflo™ system will provide additional wastewater treatment prior to soil treatment and disposal and thereby reduce the minimum site requirements necessary to finish treating the effluent. Approval of this protocol is intended to allow the demonstration of the Puraflo™ system for the purposes of determining whether the system can overcome soil and site limitations that would prohibit the use of a conventional onsite system due to the proximity or rock or water table or both.

The Department's approval of this protocol is only granted for the Puraflo™ system and is not transferable to any other product. Applications for products other than Puraflo™, or for sites that exceed the scope of this waiver, are subject to the provisions of §2.25.

The process to obtain a construction permit for Puraflo™ system begins with filing an application. Applications may be made to review a new site, to modify a previously issued permit, or to convert a 415 certification letter to a construction permit to allow a Puraflo™ system. The waiver defines the Puraflo™ system as an experimental system. The experimental protocol submitted by

Bord na Mona was prepared by a professional engineer and all testing associated with the protocol will be conducted under the auspices of a professional engineer. Given the simple design and hydraulics aspects of this system, the Division considers this adequate to comply with the requirements of §2.25 as they relate to the requirements for a professional engineer. Local health departments may, at their discretion, require either formal or informal plans and specifications, as deemed appropriate for the proposed use and site conditions, prior to issuing a permit. All provisions of §2.25, including but not limited to the requirements for a backup site, apply when issuing a permit. Applicants seeking the Department to waive the requirement for a backup site, must apply to the commissioner for a variance from this regulation. Decisions will be made individually based on the guidelines contained in the regulations. Individual permits shall be issued by the local health department and a copy of the permit and site conditions sent to the Division on Onsite Sewage and Water Services.

When a new application is made for a construction permit and it specifically requests a Puraflo™ system, an application fee shall be charged and the site shall be evaluated in the same manner as any application for a conventional septic system except that the site and soil conditions contained in the **Experimental Protocol** may be used. If the site and soil conditions meet these criteria, the site shall be deemed suitable for a Puraflo™ system.

Applications to convert a 415 certification letter to a Puraflo™ system shall follow the same general process, including collecting a fee; however, no soil evaluation is specifically required. A site evaluation (as opposed to soil evaluation) may be necessary to assure that conditions have not substantially changed since the letter was issued. If the site and soil conditions are unchanged and meet the criteria contain in the **Experimental Protocol** the site shall be deemed suitable for a Puraflo™ system.

When an application is made to convert an existing Type I or II permit to a Puraflo™ system, no application fee shall be charged as no site evaluation should be necessary. If the documented site and soil conditions indicate the site meets the criteria in the **Experimental Protocol**, the site shall be deemed suitable for a Puraflo™ system.

System design, installation, and operation shall comply with the requirements described in the **Experimental Protocol**, Bord na Mona design, construction and installation literature, the Sewage Handling and Disposal Regulations and standard engineering practices.

Attachment

GMP #69

Onsite - Product Approval - Puraflo™

3/19/19 Rescinded

Conditions of Approval

Puraflo™ Experimental Protocol

I. System description.

The Puraflo™ wastewater treatment system consists of the following listed key components. This experimental protocol is based on the specific components listed. Equivalent components may be used after receiving written approval from the Division of Onsite Sewage and Water Services. Unless otherwise stated, the components of the Puraflo™ system shall comply with the intent, objectives and requirements of the Sewage Handling and Disposal Regulations.

A. Building Sewer. The building sewer used in conjunction with a Puraflo™ system shall comply with Part IV, Article 2 of the Sewage Handling and Disposal Regulations (the regulations).

B. Pretreatment system. The minimum pretreatment system preceding a Puraflo™ system shall be a septic tank designed and installed in compliance with Part IV, Article 3 of the Sewage Handling and Disposal Regulations but having a holding capacity of not less than 1,000 gallons. In accordance with the experimental protocol submitted December 1994, baffled septic tanks are recommended but not required.

C. Secondary treatment system. The Puraflo™ system consists of a four or more treatment modules, nominally 7'1" x 4'7" x 2'6" (L,W,D) containing a proprietary biofibrous media. Septic tank effluent is dosed from a sump to the treatment modules where treatment occurs by a combination of physical, biological and chemical processes. The average treatment capability of the Puraflo™ is reported in Table 1 and, in part, formed the basis for this approval.

Parameter	Percent Reduction
BOD ₅ (mg/l)	>96%
TSS (mg/l)	>95%
NH ₃ -N (mg/l)	>90%
Tot. coliform	>99.9%
E. coli	>99.9%

Table 1

D. Conveyance system. All effluent conveyance components designed to move effluent from the Puraflo™ system to an absorption area shall comply with the requirements of § 4.23 of the Sewage Handling and Disposal Regulations. [Note: Conveyance system refers to the actual conveyance system and not to the proprietary pump and pump chamber portions of the Puraflo™ system.]

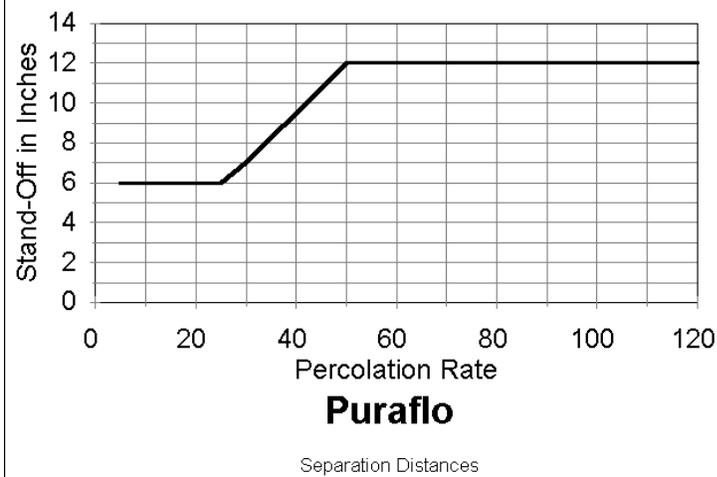
E. Absorption area. When the criteria found in the *Sewage Handling and Disposal Regulations* and Figure 1 (of this document) are met, the absorption field may be designed in accordance with Table 2, below for all systems serving dwellings of one to four bedrooms inclusive. Systems larger than four bedrooms but less than 1,000 G.P.D. shall be designed on a case by case basis by Bord na Mona Environmental Products under the guidance of a professional engineer, using Table 2 as a guide.

Soil Texture	Percolation Rate	Infiltrative Surface (total bottom area)
Group I	1-16	320 Sq. Ft.
Group II	17-40	395-430 Sq. Ft.
Group III	40-60	680--860 Sq. Ft.
Group IV	60-90	967-1290 Sq. Ft.
Group IV	90-120	1254-1720 Sq. Ft.

Table 2

When designing a system in accordance with Table 2, the Puraflo™ treatment unit rests on a gravel absorption pad that is typically 16' by 20'. This pad area provides the initial 320 square feet of absorption area. When greater area is required, trenches shall be designed to provide the additional absorption area. The absorption areas specified above, are based on trench bottom area. Bord na Mona indicates that their system relies on lateral movement and side wall area and has included these considerations in their absorption area requirements above.

II. Scope of Waiver.



This waiver is granted for facilities generating wastewater flows of 1,000 g.p.d. or less and of residential strength

(BOD₅ <250 mg/l). Larger flows may be permitted but shall be reviewed individually to assure compliance with the requirements of § 2.25 of Sewage Handling and Disposal Regulations. A maximum of 100 systems may be installed under this waiver. Of these, 24 systems (six systems in each of the four major soil groups) will be monitored for potential ground water contamination. The sampling protocol is described in Section V.

III. Siting Criteria.

The Puraflo™ system may be used to provide wastewater treatment at any site that meets one of the following classifications:

1. Any site that does not comply with the minimum stand-off to rock and/or water table requirements contained in the Sewage Handling and Disposal Regulations but does comply with the requirements of Figure 1. Systems meeting these criteria shall be sized in accordance with Bord na Mona's design criteria contained in Table 2.
2. Any site that fully complies with the criteria contained in the Sewage Handling and Disposal Regulations, including but not limited to absorption area sizing.

Figure 1.

percolation rate, landscape position, stand-off distances, and set-back distances.

3. Any repair permit that complies with § 2.16 C.2, where the Puraflo™ system is used to enhance treatment and potentially enhance disposal.

The stand-off distances to rock and water table for conventional septic systems are proposed for revision. These revisions may affect the stand-off distance for this system. If the proposed

revisions are adopted as drafted, the stand-off distance for the Puraflo™ system will be revised to 12 inches in all soil types.

IV. Design Criteria.

All portions of the system shall be designed to provide wastewater treatment and disposal which is equal or superior to that which may be obtained with a conventional gravity drainfield system. In general, the system must provide primary treatment, secondary wastewater treatment, and effluent distribution and application to soils capable of providing sufficient additional secondary treatment to render the wastewater harmless to humans and the environment. Specific deviations from the design practices contained in the Sewage Handling and Disposal Regulations are described below.

A. Field Design.

When the absorption area is located contiguous to the Puraflo™ treatment unit, Bord na Mona's design for gravity flow through adjacent gravel trenches may be used provided:

1. The bottom of all portions of the absorption area shall be installed at a single elevation (+/- 2") and on contour (requires a flat or essentially flat site), or
2. All absorption trenches shall be installed on contour. On sloping sites, parallel distribution (distribution box) shall be employed when more than one lateral is utilized.
3. Other methods may be approved on a case-by-case basis. Note: Distribution methods are being developed by Bord na Mona and additional recommendations may be developed.

Depth. The minimum installation depth of the system (absorption area), shall be level with the naturally occurring grade. On sloping sites this shall be measured on the downhill side of the installation. Cover material shall be provided from the top edge of the Puraflo™ units horizontally in all directions to existing grade and shall cover the top and side of the pad area which may be exposed during construction. The minimum cover over the pad area shall not be less than 4 inches.

Slope. The maximum allowable slope shall be 50%. On slopes up to 30% the four treatment modules will normally be installed using a two-by-two configuration. On steeper slopes, or where physical constraints require it, the

modules may be arranged end-to-end.

B. Pump Design.

The Puraflo™ systems contains a pump and pump chamber as an integral part of the system to dose the biofibrous media. The design and installation of this pump is proprietary and does not need to comply with all of the requirements of the *Sewage Handling and Disposal Regulations* provided the following conditions are met:

1. The pump, pump chamber, and appurtenances do not create any health hazards, safety problems or nuisances.
2. The average life of the pump and components is not less than seven years.

V. Installation

A. Installers shall be trained by Bord na Mona Environmental Products US, Inc., and be certified as having passed their minimum training qualifications prior to installing any systems in Virginia.

B. The manufacturer's recommendations shall be followed for system startup.

C. All mechanical components, pumps, pump cycling, filters, systems must be demonstrated to be fully operational in accordance with their design.

VI. Operation

All system owners shall be provided with written and oral instruction on the proper operation and maintenance of the Puraflo™ system. At a minimum this will include the items contained in § 2.5 of the Bord na Mona proposal. Updates, revisions and other changes to this section are the responsibility of Bord na Mona Environmental Products USA, Inc. Copies of changes should be submitted to the Department on an informational basis.

Nothing in this approval is intended to prevent or restrict the development of instructional materials for public use. No prior approval of such literature is required provided the literature contains no endorsements, approvals, or suggestions that the Department in any manner promotes the use of one system above any other.

VII. Testing and evaluation procedures

Effluent samples shall be collected from at a depth of 12" below the bottom of the absorption area. For the purposes of evaluating test results, only samples collected from collection ports installed above seasonally saturated soil horizons shall be used. [Note: As initially permitted, systems installed in soils with a percolation rate of less than 50 minutes per inch, and in accordance with this protocol, will not always be installed at least 12 inches above a seasonally saturated horizon.] Each system shall have two sampling ports installed for the purpose of sampling effluent. At least one of these sampling ports shall be located beneath the footprint of the Puraflo™ system. One port may be located beneath an absorption field trench provided it is located within the first ten feet of the trench.

The sampling ports must be designed to preclude the entrance of untreated effluent. No sampling port was originally proposed beneath a trench and the Department requests that a design for such a sampling port be developed in conjunction with a University researcher and submitted for review prior to installation.

Tests will be conducted on effluent beneath the trenches for fecal coliform bacteria, pH, and chlorides on a monthly basis. Semiannual tests will be conducted on septic tank effluent and effluent from the Puraflo™ treatment unit for BOD₅. Tests for NO₃-N may be conducted to demonstrate nitrate removal efficiency if desired.

The conducting of all sampling and the submission of reports, shall be done by, or under the supervision of, a professional engineer registered in Virginia. The responsibility for assuring that sampling occurs rests exclusively with Bord na Mona Environmental Products U.S., Inc. In the event that interim test results preclude the possibility of the product passing the experimental protocol, the Department may notify Bord na Mona by certified mail that additional testing is not warranted.

Standards

Fecal Coliforms: The average of samples collected from unsaturated soil horizons shall average less than 10 cfu/100mls and have no single sample in excess 200 cfu/100mls. Sample results obtained during the first six months of operation may be discarded from the performance evaluation at the sole discretion of the Department, when there appears to be due cause. [Note: Performance may be adjusted to correspond with research results on conventional septic tank drainfield system technology with 18" stand-off

in texture group II, III, and IV soils.]

N03: No performance standard is established; however, results may be used to demonstrated nitrate-nitrogen reduction and used where this is necessary.

Chlorides: An increase in chloride concentrations must be observed to confirm that treated effluent is being collected.

BOD5: Septic tank effluent samples must be greater than 100 and less than 300 for any individual samples and average greater than 150 over the sampling period to verify that a typical strength, residential waste is being treated.

Effluent from the Puraflo™ unit may be regularly tested to demonstrate treatment effectiveness but is not required for pass fail. Results may be used to qualify the Puraflo™ system for use as a provisionally or generally approved system under the *Discharge Regulations*.

Surfacing and ponding

Any system that shows surfacing of effluent shall be considered a failure. An evaluation shall be made of the system and the cause of failure and corrective action shall be taken.

Ponding depth within the absorption area shall be monitored on a monthly basis in each system. Two monitoring ports shall be installed exclusively for this purpose and ponding depths reported not less than monthly. Ponding depths shall be compared with systems installed in conventional systems to attempt to determine the life expectancy of the system with the higher application rate of more highly treated wastewater.

VII. Operation and monitoring.

For the first three years of use after this experimental protocol is granted, Bord na Mona Environmental Products, US Inc. shall maintain a log of all systems installed. Said log shall include the following minimum information: System location (by tax map or owner's name and county) soil conditions where the system was installed, and all associated physical, biological and chemical data if the system is one being monitored. Said log shall be reported to VDH on a quarterly basis and shall be provided by the 15th of the month following the end of the quarter. The log shall be available to VDH within 5 business days upon request.

VIII. Responsibilities and permitting procedures.

- A. This approval has been granted specifically for the process described in the application made by Bord na Mona Environmental Products, US, Inc. for the Puraflo™ system. Any changes to the components used in this process must be reviewed and approved by VDH on a case-by-case basis prior to use.
- B. No contractor may install a Puraflo™ system unless they are first certified by Bord na Mona, Inc., as meeting their minimum competency standards for contractors.
- C. The Puraflo™ system is an experimental system; however for the purposes of permitting, it shall be handled in the same manner as a Type II system.
- D. Permitting shall be done by the local health department based on their satisfactory site evaluation and review of plans and specifications prepared in accordance with the manufacturer's specifications and all applicable state regulations and policies and any relevant local ordinances.
- E. Bord na Mona shall be responsible for providing up to six classes (up to 50 students each) during the first 6 months after this approval is granted and two classes annually thereafter. The training shall include a manual covering proper siting, sizing, construction, installation and inspection processes for the Puraflo™ system. All training materials, the course syllabus and training locations shall be reviewed and approved by the Division prior to training occurring.
- F. Should the Puraflo™ systems fail to perform to the satisfaction of the Department, the Department may rescind or modify this experimental protocol. Prior to taking such action the Department shall notify Bord na Mona of nature of the problem and of the action the Department intends to take.

June 9, 1995

Mr. Joseph Walsh, President
Bord na Mona Environmental Products U.S., Inc.
P.O. Box 77457
Greensboro, N.C. 27417

Dear Mr. Walsh:

The Division of Onsite Sewage and Water Services has completed review of the experimental protocol you submitted for the Puraflo™ wastewater treatment system. I am pleased to inform you that the Division is approving this system for demonstration in Virginia under a mutually agreed upon protocol.

The experimental protocol that will be used to evaluate this system is attached. As you know, several changes have occurred to the originally submitted protocol to reflect concerns of the Division and concerns expressed by the Sewage Handling and Disposal Advisory Committee. Your cooperation and the cooperation of your staff was very much appreciated as the process developed.

It is our intention to review data on this system on a regular basis and to continue to work with you during the evaluation period. Therefore, complete and timely data collection and reporting will be essential to maintaining this approval. Failure to either collect or report data may result in an immediate suspension of this approval.

To the greatest extent possible, the Division is interested in assuring that the Puraflow system, with reduced stand-off distances, can perform as well or better than a conventional septic system in terms of risk to public health and longevity. To the greatest extent possible, the research we are funding at Virginia Tech will be used to establish this standard. In order to define a standard of performance, we used data from an ongoing research project that is evaluating the performance of onsite systems. The initial standard is stringent. Upon completion of this research, the Department may wish to relax the performance standard, if data indicates the initial standard is too stringent.

Mr. Joseph Walsh
June 9, 1995
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I look forward to continuing to work with you and our staff during this evaluation. If you have any questions or comments as this evaluation proceeds, please feel free to call me.

Sincerely,

Donald J. Alexander, Director
Division of Onsite Sewage and Water Services

3/19/1996 Rescinded