



Pennsylvania Department of Environmental Protection

Rachel Carson State Office Building
P.O. Box 8774
Harrisburg, PA 17112-8774
May 11, 1998

TO: All Sewage Enforcement Officers

717-787-8184

The Department's recent correspondence to you regarding the use of peat moss based filter systems in conjunction with onlot system usage has created confusion. This confusion was the result of two letters from the Department which conflict regarding this system. The change in approval status of the ECOFLO peat filter described in our March 1998 letter was not the result of any concern regarding the level of performance documented for the system, but rather concern regarding the method of final treatment or disposal of treated sewage effluent. Specifically, the concern was related to the capabilities of the receiving soils to function hydraulically and whether those soils would function as an absorption area or a ground water recharge system. As you are aware, this impacts whether a system may be permitted by the local agency (soils based treatment system) or if the system must be permitted under the PA Clean Streams Law (ground water infiltration system). This issue will become increasingly important as additional new technologies become available in the future from the Department's numerous research projects.

While it is the intent of the Department to move as many new technologies capable of being used to serve single family dwellings or small developments into the category of onlot systems (as was done with the individual residential spray irrigation system), this will require regulatory changes. In the interim, as new technologies become available for broader use, DEP must depend on its existing permitting processes and classifications.

The letter dated March 1998 was sent to SEOs to limit the use of peat moss based systems until this more detailed letter could be developed based on internal discussions and discussions with proponents of the peat moss technology. This new correspondence will remain as the Department's position regarding the use of peat moss based systems until a revised Alternate/Experimental System Listing that includes peat moss based systems is distributed. This future listing will be consistent with the content of this letter.

To date, ECOFLO is the only peat moss filter which has submitted documentation supporting a listing as an alternate and experimental peat moss filter system option.

This correspondence provides you with more detail regarding peat filters for both repair and new onlot systems using the existing permitting processes and classifications.

General Requirements For All Peat Moss Based Systems

1. There must be a minimum of 195 cubic feet of peat moss evenly distributed in the filter unit (nominally 31 inches deep). The SEO shall confirm the volume of peat moss prior to final

- approval of the system. Note: New compressed packaging for peat moss requires multiplication of the volume printed on the packaging by 1.75 (the compression ratio).
2. Distribution of effluent from the septic tank or aerobic tank to the peat moss filter may be by either gravity flow or by a pump when a timed dose to the peat moss filter is required. A rocking flow diverter may be used to provide for effluent distribution between the filter chambers where multiple chambers are proposed.
 3. The peat moss filter must be watertight and all outlets properly sealed against liquid and solid infiltration and exfiltration. Where inlets are not above the liquid depth of the filter or are at or below a water table limiting zone, the inlet must also be sealed. Where a liner is used, the liner must be 20 mil thick hypolon polyvinyl chloride or polyethylene sheeting placed on 2 inches of sand or a layer of 10 oz. porous textile material to prevent punctures and tears. The liner must be extended to the surface and any inlets or outlets at or below the water table or at or below the water level in the unit must have an anti-seep collar, bentonite clay plug or leak-proof boot sealed to the liner material.
 4. Peat moss filters require maintenance including the periodic replacement of peat moss and an annual inspection by the company providing the filter. The results of this inspection must be provided to the local agency. For options requiring DEP review prior to permit issuance, a copy of the inspection report must be sent to DEP Central Office (BWQP, P.O. Box 8774, Harrisburg, PA 17105-8774). The company's warranty must be attached to the permit application, permit and purchase agreement. This warranty must clearly notify the property owner of the need to replace the peat moss within the life expectancy period established by the company and provide access for the annual inspection.
 5. A capped, 3 inch to 4 inch PVC pipe must be installed in the at-grade absorption area to the base of the course aggregate to provide observation. This pipe must be slotted or perforated at the aggregate end. The annual inspection of the system must include the depth of liquid in this pipe. Access must also be provided to the base of the peat moss filter for collection of samples to determine proper system function.
 6. Where an at-grade system is proposed for use in conjunction with a peat moss filter, care must be taken during construction of the at-grade system to prevent removal or compaction of the site since this system is dependent upon the A and B horizon soils. Sites where previous grading has occurred should be avoided unless sufficient A and B horizon soils remain in place.

Peat Moss - Alternate Onlot System Classifications

Alternate peat moss configurations consist of an aerobic or septic tank with a septic solids retainer filter at the outlet of the second chamber or tank followed by the peat filter and an absorption area. (ECOFLO proposals will use a Zabel septic solids retainer or equivalent in all installations.)

Alternate Peat Moss Filter Option 1:

Pretreatment of septic or aerobic effluent using a self-contained peat moss filter with final treatment and disposal using a standard on-lot system or an alternate at-grade system with up to a 40% reduction allowed in system sizing.

A. Basis for listing:

This listing is based upon the same criteria used to allow for a 1/3 reduction in the absorption area sizing for an aerobic treatment tank. While the same volume of water is reaching the system, the peat moss filter and aerobic systems provide a reduction in suspended solids that reduce clogging in the absorption area and provide for more effective liquid absorption. Peat moss filters have been documented to produce an effluent with low suspended solids. In addition, the peat moss system is not as prone to periodic surges of solids reported for some aerobic tanks and therefore obtained an additional 7% reduction. The reduction in absorption area sizing is eliminated at the higher percolation rates for both peat moss filters and aerobic treatment tanks because the hydraulics of the system become much more critical at percolation rates above 60 minutes per inch.

B. Use of this system:

The use of this system may be approved for either new or repair systems on lots where there is either a lot size problem or an isolation distance problem which may be resolved using a smaller absorption area. The system may also be used to reduce the size of the absorption area where lot size or isolation distances are not a problem.

C. The following rules apply to Alternate Peat Moss Filter System Option 1:

1. No DEP review is required prior to permit issuance.
2. The percolation rate must be 3 to 60 minutes per inch and slopes must be within the range of Chapter 73.
3. The distance between the bottom of the absorption area and the limiting zone must be 48 inches or more.
4. The peat filter installation must be outside the absorption area.
5. Where the reduction in absorption area sizing is applied to a lot where there are no isolation distance restraints, soil profile evaluations and percolation testing must document that there is sufficient area for installation of a full-sized absorption area (prior to the calculation of the 40% reduction).

Alternate Peat Moss Filter Option 2:

Pretreatment of septic or aerobic effluent using a self-contained peat moss filter with final treatment and disposal using an at-grade absorption area designed in accordance with an at-grade alternate system. The percolation rates must be from 61 to 120 minutes per inch; on slopes of up to 8% and a minimum of 20 inches or more suitable soil between the bottom of the absorption area and limiting zone (48 inches of suitable soil or sand /soil not required).

A. Basis for listing:

This listing is based on the pretreatment of sewage effluent through the peat moss filter prior to treatment and disposal in the soil absorption area as discussed regarding "Alternate Peat Moss Filter Option 1." The nominal depth of peat moss at 31 inches in the self-contained filter unit provides treatment at levels capable of receiving final treatment and disposal with as little as 20 inches of A and upper B horizon (bioreactive zone) soils. Research has documented that the topsoil (biologically active zone) provides more effective treatment than deeper soil zones. Taking advantage of this topsoil soil through the use of an at-grade system along with the treatment and flow buffering capabilities of peat moss provides for effective renovation of sewage. This system uses the demonstrated treatment and buffering capabilities of peat moss as a soil replacement when used in conjunction with an alternate at-grade system.

B. Use of this system:

The use of this system may be approved for either a new or repair system as an alternative to the use of an elevated sand mound. The advantage of using this system is that the height of the mound may be reduced.

C. The following rules apply to Alternate System Option 2:

1. DEP review is required prior to issuance of this alternate system permit.
2. Sufficient soils profiles must be conducted to assure a minimum of 20 inches of suitable soil is present under the entire area proposed for the at-grade absorption area.
3. The design of the at-grade system used with a peat moss filter must meet the alternate system standards for these systems described in the "Alternate and Experimental Systems Guidance," except that the soils profile must reveal that there is a minimum of 20 inches of A and upper B horizon soils (instead of 48 to 60 inches of soil). System sizing must meet 73.16(c) (Table A) using the column under "Subsurface Sand Filters and Elevated Sand Mounds."
4. Where the percolation rate exceeds 60 minutes per inch, a time-controlled dose of either the peat moss filter or the absorption area must be used to provide flow equalization.

Alternate Peat Moss System Option 3:

Pretreatment of septic or aerobic effluent using a self-contained peat moss filter with final treatment and disposal using an at-grade absorption area designed in accordance with an at-grade alternate system. The percolation rate must be from 3 to 60 minutes per inch, on slopes of up to 8% with 20 inches of suitable soil between the bottom of the absorption area and the limiting zone (48 inches of suitable soils or sand/soil is not required). Up to a 40% reduction in the size of the absorption area is allowed.

A. Basis for listing:

This listing is based upon the documentation provided under alternate peat moss system options 1 and 2.

B. Use of this system:

The use of this system may be approved for either a new system or repairs to an existing malfunctioning system as an alternative to an elevated sand mound.

C. The following rules apply to Alternate System Option 3:

1. Department review is required prior to permit issuance.
2. Sufficient soils profiles must be conducted to assure a minimum of 20 inches of suitable soil is present under the entire area proposed for the at-grade absorption area.
3. Sizing reductions are not cumulative (i.e. use of either an aerobic tank or infiltration chamber does not allow for an additional sizing reduction).
4. Where this system is used to serve a new dwelling, a time-controlled dose to either the peat filter or the absorption area must be used to provide flow equalization if a reduction in the absorption area is proposed.
5. For repairs, best technical guidance must be applied to maximize system sizing up to the square footage of a full sized system.
6. The design of the at-grade system must meet the alternate system standards for these systems described in the "Alternate and Experimental Systems Guidance" except that the soils profile must reveal that there is a minimum of 20 inches of A and upper B horizon soils (instead of 48 to 60 inches). System sizing must meet 73.16(c) (Table A) using the column under "Subsurface Sand Filters and Elevated Sand Mounds."
7. The system must be designed to take full advantage of the slope to move effluent out from under the absorption area and down gradient with the long side of the bed parallel to contours. This is more critical for systems proposed on sites with slower percolation rates and shallow depth to seasonal high water table but less critical on fractured bedrock

limiting zones and coarse textured soils. This is a site specific determination which should be made in consultation with a soil scientist and will be based upon the type and depth of limiting zone, textural class of soil, topography and percolation rate.

8. Where the system is used to serve a new dwelling, the percolation test, soil profile evaluations and percolation testing must document that there is sufficient area for installation of a full-sized absorption area (prior to the calculation of the 40% reduction).

Peat Moss - Experimental Onlot System Classifications

Experimental Peat Moss Filter Option 1:

Pretreatment of septic or aerobic effluent using a self-contained peat moss filter with final treatment and disposal using an experimental at-grade absorption area. The percolation rate must be from 3 to 120 minutes per inch and a minimum of 20 inches or more suitable soil between the bottom of the absorption area and limiting zone (48 inch of suitable soil or sand /soil not required) on slopes not exceeding 12 percent. (An optional reduction in absorption area sizing of up to 40% may also be proposed using an at-grade system)

A. Basis for listing:

This listing is based on the pretreatment of sewage effluent through the peat moss filtration system prior to treatment and disposal in the soil absorption area. The nominal depth of peat moss at 31 inches in the self-contained filter unit provides treatment at levels capable of receiving final treatment and disposal with as little as 20 inches of A and upper B horizon (bioreactive zone) soils. Research has documented that the topsoil (biologically active zone) provides more effective treatment than deeper soil zones. Taking advantage of this topsoil soil through the use of an experimental at-grade system along with the treatment and flow buffering capabilities of peat moss may provide for effective renovation of sewage. This system uses the demonstrated treatment and buffering capabilities of peat moss as a soil replacement when used in conjunction with an experimental at-grade system.

B. Use of this system:

The use of this system may be approved for either new or repair systems in accordance with Section 73.71 of Chapter 73 and may be approved as an option to the use of an elevated sand mound. The advantage of using this system is that the height of the mound may be reduced.

C. The following rules apply to Experimental System Option 1:

1. DEP Central Office review is required prior to issuance of this experimental system permit.
2. Sufficient soils profiles must be conducted to assure a minimum of 20 inches of suitable soil is present under the entire area proposed for the at-grade absorption area.

3. The design of the at-grade system must meet the experimental system standards for these systems described in the "Alternate and Experimental Systems Guidance except that the soils profile must reveal that there is a minimum of 20 inches of A and upper B horizon soils (instead of 48 to 60 inches).
4. System monitoring is required. DEP Central Office will determine the number of systems where sampling will be required by the system supplier. A zero tension lysimeter must be placed in the system at the depth of the limiting zone or at a more shallow depth in a location at or under a distribution line hole. In addition, capped PVC monitoring port of at least 3" diameter must be installed with the slotted open end at the depth of the limiting zone. DEP will provide design specifications and drawings for these devices. Sampling and monitoring is required every three months for three years. Parameters to be evaluated will include as a minimum fecal coliform, BOD and suspended solids. The sampling period may be shortened by DEP based on the results of initial samples. Results are to be submitted to BWQP, P.O. Box 8774, Harrisburg, PA 17105-8774 and must include a description of the location of the system.

Experimental Peat Moss System Option 2:

Pretreatment of septic or aerobic effluent using a self-contained peat moss filter with final treatment and disposal using an alternate or experimental at-grade absorption area with a percolation rate between 3 and 180 minutes per inch with the minimum distance between the bottom of the absorption area and the limiting zone at 10 inches or more to water table and 16 inches or more to rock.

OR

Pretreatment of septic or aerobic effluent using an open bottom peat filter placed directly on aggregate with no distribution system on a site with a limiting zone at 10 inches or more to water table and 16 inches or more to rock with a percolation rate at between 3 to 75 minutes per inch.

A. Basis for listing:

This listing is based upon the treatment and buffering capabilities of the peat moss system as documented in monitoring data and the need to evaluate the capabilities of shallow soils to treat and dispose of pretreated effluent.

B. Use of this system:

The use of this experimental system option is appropriate for repairs only. The advantage of this system is that it may be used as a repair alternative where there are limited soils. The applicability of this system may be limited because of the hydrology of the site related to the movement of treated effluent from beneath the absorption area at a sufficient rate to prevent groundwater mounding.

C. The following rules apply to Experimental Option 2:

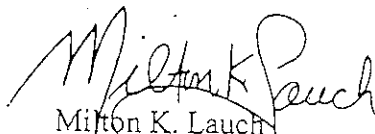
1. The system may only be used for repair systems.
2. Department review is required prior to permit issuance.
3. System monitoring is required. DEP Central Office will determine the number of systems where sampling will be required by the system supplier. A zero tension lysimeter must be placed in the system at the depth of the limiting zone in a location at or under a distribution line hole. In addition, capped PVC monitoring port of at least 3" diameter must be installed with the slotted open end at the depth of the limiting zone. DEP will provide design specifications and drawings for these devices. Sampling and monitoring is required every three months for three years. Parameters to be evaluated will include as a minimum fecal coliform, BOD and suspended solids. The sampling period may be shortened by DEP based on the results of initial samples. Results are to be submitted to BWQP, P.O. Box 8774, Harrisburg, PA 17105-8774, and must include a description of the location of the system.
4. Sufficient soil profiles must be conducted to assure a minimum of 10" of suitable soil is present under the entire area proposed for the at-grade absorption area.
5. Notching into existing suitable soils is not permitted unless this is agreed to by DEP as part of the experiment.
6. Full sized systems must be used unless site restraints limit the size of the absorption area and DEP concurrence on the proposed reduction is obtained.
7. Best available technology regulations apply to the use of this system. Other available alternatives must be evaluated prior to selection of this alternative.
8. Provision for future addition of a disinfection device must be included in the plans and specifications. A condition must be included in the permit that such a device may have to be installed should the experimental system fail to adequately remove fecal coliform bacteria as determined by the Department based on the averages of samples collected in the zero tension lysimeter.
9. The system must be designed to take full advantage of the slope to move effluent out from under the absorption area and down gradient with the long side of the bed parallel to contours. This is more critical for systems proposed on sites with slower percolation rates and shallow depth to seasonal high water table but less critical on fractured bedrock limiting zones and coarse textured soils. This is a site-specific determination that must be made in consultation with a soil scientist and will be based upon the type and depth of limiting zone, textural class of soil, topography and percolation rate.

Clean Streams Law Permitted Options

Where soils are less than 20" and a proposal is made to use a peat moss system for new dwelling, a Clean Streams Law permit will be required. This is based upon the fact that there is little data regarding the impact of groundwater mounding under absorption areas with limited soil thickness. Where groundwater mounding occurs the unsaturated soil zone is decreased and treatment stops. This creates a groundwater discharge. While the use of peat moss systems under an experimental on-lot system permit is acceptable as best available technology for repairs to existing malfunctioning systems to obtain data on its function, it is not an acceptable option for new land development. These proposals must be permitted by DEP under the Clean Streams Law.

Surface water discharges are also possible using this technology. Applicants for permits under this section should be referred to the Department's regional office permit section for information regarding these system options.

Sincerely,



Milton K. Lauch
Chief

Division of Wastewater Management