STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

DEH Circular Letter 2000-01

TO: Directors of Health
Chief Sanitarians
Professional Engineers
Licensed Installers/Cleaners

FM: Frank A. Schaub FAS
Supervising Sanitary Engineer
Environmental Engineering Section

DATE: January 13, 2000

RE: Sewage Updates

1. Year 2000 Revisions to Technical Standards
2. Code Training and Discussions
3. Installation of Pump Vaults in Septic Tanks
4. The Density of Developments
5. Septic Tank Outlet Filter Letter

1. **Revision to Technical Standards:** Our section has completed revisions to the Technical Standands and the publications are now available to health departments and the public. *Although the changes made to the Technical Standards become effective January 1, 2000, new requirements in Section V, Septic Tanks will not be required until July 1, 2000.* Septic tank changes include compliance with ASTM C1227, installation of outlet filters, and installation of manhole extensions on existing deep tanks. Even though all of our state septic tank manufacturers have been aware of these forthcoming changes, they still have many tanks in stock and the next six months will give them an opportunity to eliminate that stock and comply with the new requirements for septic tank construction. We have delivered many of the Technical Standards to local health departments already and will be mailing a few more in the near future. Engineers and installers may purchase the document for $3.00 by mailing a check made out to Treasurer, State of Connecticut, and mailing it to the address below. Please mark the envelope "Attention – Joseph Mitchell" so that your document can be quickly mailed.

2. **Code Training and Discussions:** As with past changes to regulations or Technical Standards, our staff will be assisting local health departments in conducting meetings locally to review the changes and discuss other items of concern to health departments, engineers installers, and cleaners. Several of these meetings have already been scheduled and a few have been successfully completed. In addition to reviewing the new changes, we have various samples of septic tank effluent filters so all can review and inspect first hand. We are requesting health departments locate suitable sites for training of their area engineers,

Phone: (860) 509-7296
Telephone Device for the Deaf (860) 509-7191
410 Capitol Avenue - MS # 51-SEW
P.O. Box 340308 Hartford, CT 06134
An Equal Opportunity Employer

installers and cleaners. We would prefer a minimum of 40 individuals at each session and further suggest small health departments contact adjacent health agencies to coordinate training and the selection of the best site. We would like to do the training during normal working hours but are also willing to conduct evening sessions if the demand is there. A three-hour minimum is necessary to review all the changes, discuss filter inspections and respond to questions from the attendees. The format which brings regulators, engineers, installers and cleaners to the same meeting has been preferred by the local health departments. The months of January and February are preferable for conducting these training sessions. Please contact us so we can lock in the dates and make preparations for your area. We can bring copies of the new regulation for sale at these meetings.

3. **In-Tank Pump Vaults:** Attached please find a copy of a letter which was recently written to address installation of pump vaults within a septic tank. We believe the letter is self-explanatory and provides the names of three companies that have requested approval for use of these vaults. You will note that each company utilizes a screened (filter like) pump vault in the second chamber of the tank that allows effluent at mid depth to enter the vault. These screened vaults would meet the requirements for installation of an outlet filter in a septic tank.

4. **Density of Development:** Over the past two years, we have been working with our sister agency, the Department of Environmental Protection (DEP) to address groundwater pollution in several densely developed residential areas in our state. Some of these involve inland watercourses and others are coastal developments with both year round and seasonal use homes. We are all familiar with densely developed residential subdivisions and the typical problems of small system failures, pollution of storm drainage systems and tidal flush systems which may have been constructed in or close to the seasonal high ground water levels.

   Some municipalities and DEP have identified groundwater pollution problems involving high ammonia, nitrogen and bacteria/viruses on properties with lots as small as $1/8^{th}$ or $1/10^{th}$ of an acre. Even lots with "good soils" that do not suffer from hydraulic limitations can create pollution problems in dense developments. High-density developments with these soils will not pollute storm drainage systems, cause surface breakouts, or backup into the houses. They will however, adversely affect groundwater quality due to increased nitrogen loading. One can easily imagine the impact of eight three-bedroom homes constructed on a single 1-acre parcel.

   Section 19-13-B103e (a)(4) states that no permits shall be issued "for any new subsurface sewage disposal system where the naturally surrounding soil cannot adequately absorb or disperse expected volume of sewage effluent without overflow, breakout or detrimental effect on ground or surface water". Several years ago, we addressed the absorption and dispersal of effluent by naturally occurring soils with Minimum Leaching System Spread

(MLSS). We would now like to bring forth our concerns with respect to high-density development. Recent modifications to our Technical Standards include a system, that compresses a large amount of leaching area into a small area. Due to its compact size, previously non-buildable parcels underlain by well-drained sand and gravel soils may now be reconsidered for development in light of this change. With that in mind, we are recommending that any reconsideration for lot development also include scruitinization with respect to nitrogen pollution. Use of DEP's 1982 pollution renovation criteria could be utilized for this calculation. If any existing or proposed lots were being considered for new construction, we would recommend local health departments require nitrogen analysis for all parcels where the density of development exceeds one bedroom per 0.167 acre. If more than a two-bedroom house was proposed on a third acre parcel or less, we would recommend the analysis be performed. If more than a three-bedroom home were proposed on a one half-acre parcel, we would recommend nitrogen analysis be performed. Please note that these guidelines are consistent with the existing Public Health Code, which is intended to protect both public health and the environment. They should be applied to all new construction (and not include repairs) no matter what kind of leaching system is being proposed.

5. **Septic Tank Effluent Letter:** Enclosed please find a five page informational letter on tank outlet filters. This document should provide answers to many frequently asked questions. Please feel free to reproduce this document for local distribution as needed.

Enclosure (1) Pump Vault Letter
(2) Septic Tank Filter Letter
(3) Technical Standards Training Sessions - Listing

n:\sewage\franks\cir9942

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

TO: **Directors of Health**
Chief Sanitarians
Professional Engineers
Licensed Installers

FROM: **Frank A. Schaub**
Supervising Sanitary Engineer
Environmental Engineering Section

DATE: **January 13, 2000**

RE: **APPROVAL OF IN-TANK FILTER/PUMP UNITS**

Over the past several years, several manufacturers of filtered pump vaults have requested approval of their products for installation in a septic tank where pumping to the leach field was required. Typically, the vault is installed in the second compartment of a specially modified septic tank with an opening large enough to facilitate the circular filter/pump vault unit that normally extends above the top of the tank. The extensions come with an access manhole that is extended to grade. The filtered units draw effluent from the mid-section of the tank and the filter not only provides a better quality effluent for discharge to the system but also protects the pump.

In our Technical Standards under Section VI, Distribution of Sewage Effluent, the second paragraph of subsection A clearly requires 24 hour emergency storage capacity above the alarm when a single pump is used, or dual alternating pumps with no required emergency storage. The most common design typically incorporates a septic tank followed by a pump chamber that ranges from 1,000 to 1,500 gallons in size. The pump is installed in the pump chamber with controls set low to maintain adequate storage capacity above the alarm. This criterion could also be achieved with a single tank if the designer specified a somewhat oversized septic tank. For example, assume a three-bedroom home is to be built requiring a minimum 1,000-gallon capacity septic tank. The designer seeks approval for installation of a 2,000 - gallon capacity septic tank with an oversized access manhole on the second compartment to facilitate the pump vault. Controls on the pump unit are set such that the pump on float occurs at the 1,400- gallon capacity level. The pump off float could perhaps be set at the 1,250- gallon mark thereby providing a 150- gallon per cycle dose. If the alarm were set at 1,500 gallons, the difference in elevation between the 1,500-gallon mark and the 2,000- gallon sewer inlet pipe would provide a 500 gallon, 24 hour emergency storage above the alarm float.

What is critical about this example is that the liquid level within the tank must always be maintained above the opening in the 1/3-2/3 tank compartment wall to prevent floating scum in the first chamber from getting into the second chamber. The filtered pump vault would most likely not allow scum to be discharged to the system but we would still prefer the second chamber effluent to remain relatively clear of solids or floating material.

Phone:
Telephone Device for the Deaf (860) 509-7191
410 Capitol Avenue - MS # _____
P.O. Box 340308 Hartford, CT 06134
An Equal Opportunity Employer

The single unit septic tank/pump chamber option maybe beneficial for use on repairs where little room is available for both septic tank and separate pump chamber installations. In addition, the pump unit within the tank may address concerns for flotation of empty chambers in wet areas and would reduce the potential for groundwater infiltration when essentially large empty tanks are installed on wet parcels. If dual alternating pumps are installed in a single pump vault, the emergency storage capacity is not required and septic tank sizing would most likely increase only 250 gallons to facilitate the expected pump dose.

If you desire additional information on these in-tank filter/pump units, you may contact the manufacturers directly. The companies, which have submitted requests and have received approvals, include Orenco Systems, Inc. (OSI), (800) 718-4699, Zabel Environmental Technology, (800) 221-5742 and the Zoeller Pump Company, (800) 928-7867. Please feel free to contact these manufacturers directly for more information.

Please note that use of any in-tank filter pump vault manufactured by the companies above does not constitute an endorsement of any of their products and this information is being provided to you at this time as an option to the standard separate septic tank/pump chamber installations. Regulators, engineers and installers must carefully review the Technical Standards to assure pump settings and emergency storage capacities are provided in compliance with the regulations. Prior to specifying use of any in-tank filter/pump, you should check with your local precast concrete tank manufacturer to confirm tank manhole openings suitable for vault installations.

If you have any questions or would like to further discuss these units, please contact our staff at 860-509-7296.

n/sewage/memos/in-tank

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

SEPTIC TANK OUTLET FILTERS
JANUARY 13, 2000
Frank A. Schaub
Supervising Sanitary Engineer

The installation of septic tank outlet filters is not a new concept but will be new to Connecticut starting July 1, 2000 when Connecticut regulations will require installation of an outlet filter for every new tank installed in our state. Some septic tank manufacturers will elect to provide the filter as part of the tank sales. Other septic tank manufacturers may provide an outlet filter for installation by a license installer, or licensed installers may elect to purchase and install the filters on their own. The Department of Public Health (DPH) first approved installation of tank outlet filters back in 1983. Over the years, several filter manufacturers have applied for and received approval for installation of their filter products in septic tanks. Unfortunately, relatively few installers or property owners elected to use tank outlet filters. The year 2000 changes made to our Technical Standards (TS) will now make installation a requirement after July 1st.

Other states, counties, and local municipalities have required installation of tank outlet filters increasingly over the past 5 years. Florida, a state that installs 30 to 40 thousand septic systems each year, has gained much information concerning the installation and benefit of septic tank filters over the past five years. Initially, filters were installed as an option to construction of a two-compartment septic tank. Current regulations require filter installation on all septic tanks, one and two compartment. North Carolina was the latest state to recently require installation of tank outlet filters for all new construction. Reports from these regulators have been positive.

What is an outlet filter? - A septic outlet filter is a device which is installed in place of an outlet baffle and is designed to reduce the amount of suspended solids which are discharged into the leaching system. Organic pollutants from our toilets, sinks, tubs and washing machines discharge large quantities of water together with these organic chemicals for primary treatment by a septic tank. Some heavier pollutants settle to the bottom of the tank in the first compartment and form a stable biological sludge after time. Some lighter pollutants such as soap scum and grease rise up to the top of the tank forming a scum layer. The septic tank contains large quantities of bacteria, which help digest some of the organic pollutants in an environment devoid of oxygen. The dynamic processes of settlement organic digestion by bacteria and hydraulic flow through the tank tend to carry suspended solids through the tank and out the outlet piping. This organic matter combined with other organic pollutants with specific gravities close to that of water and inorganic pollutants such as fibers from washing machines might pass through the septic tank without achieving the benefit of settlement or digestion by bacteria. The purpose of the tank outlet filter is to reduce some of the suspended solids discharged to the leaching system.

Most outlet filters achieve this goal by providing a grid or mesh type interface were floating particles may be temporarily trapped, digested in place or sloughed off to the bottom of the tank. A second method of providing quiet settlement zones within a plate type filter can also reduce suspended solid discharge by providing large flat surface areas for particles to settle on and still rely upon narrow slots for effluent passage. The screen and settlement type filters are normally made of plastic and range from 4 to 18 inches in diameter, 12" to 3 feet in length. They allow septic tank effluent to enter into the filter from below the scum line and above the sludge layer.

What is happening to the suspended solids in tanks with no filters? - A large percentage of all septic systems that exist in Connecticut will continue to operate without the benefit of a septic tank outlet filter. The particles that are discharged into the leaching system will be trapped along the perimeter of the leaching system where the sewage meets the soil. An organic slime layer builds up at this point and further effluent treatment is achieved by the slime

Phone: 860-509-7296
Telephone Device for the Deaf (860) 509-7191
410 Capitol Avenue - MS # _____
P.O. Box 340308 Hartford, CT 06134
An Equal Opportunity Employer

layer as liquid effluent slowly percolates through the slime into the surrounding soils. Unfortunately, many systems which are subjected to high loads of biological pollutants or which have received continual loading of suspended solids over many years tend to build up a thick biological layer that ultimately becomes very slowly permeable. This restrictive barrier prevents effluent from getting into the soil and may cause a backup or overflow at the weakest link in the sewage disposal system. It is conceivable that on sites where the sewage flows generated do not exceed the hydraulic capacity of the soil, the reduction in suspended solids resulting from filter installation could reduce the cause of the majority of infiltrative clogging within septic systems.

Why are tank outlet filters beneficial? - By reducing the quantity of suspended solids discharged to any leaching system, the probability of clogging at the soils/stone interface is reduced. If the biological mat does not thicken to a point of becoming excessively restrictive, treatment via passing through the biological mat infiltration/detention by the aerated soils found beyond the leaching system can provide for excellent effluent treatment. In addition, tank outlet filters can help prevent major leaching system failure by property owners who abuse a sewage disposal system or discharge too many pollutants to the septic tank. Like all operating systems, septic tanks require regular service to provide long term effective effluent treatment. In general, the range of pumping frequency is from two to five years depending upon the size of the tank and the occupant loading. Failure to pump a septic tank on a routine basis will result in an accumulation of sludge and scum which, in turn, reduces the efficiency of tank function. This reduction in efficiency will result in a higher percentage of suspended solids passing to the leaching system. Installation of a tank outlet filter will most likely result in plugging of the filter if the tank is not serviced on a regular interval.

In addition, tank outlet filters will also help detect the excessive buildup of organic pollutants caused by over use of household garbage grinders which unnecessarily increase the septic tank loading by grinding up kitchen wastes. Excessive use of a garbage grinder combined with failure to pump the tank on a regular interval could result in premature filter clogging. When this occurs, it provides an educational opportunity for regulatory officials, installers and cleaners to review household water practices and discuss options with the homeowner to reduce the frequency of filter servicing. Over the past several years, we have advised local municipalities of the dangers related to installation of central vacuum systems or portable vacuum systems that use water as a means of eliminating or reducing dust while vacuuming. These small quantities of water are discharged to the septic tank and contain large amounts of organic and inorganic fiber that can quickly pass through a septic tank and plug a leaching system. It is likely that fibrous material will be trapped in the tank effluent filters before doing excessive damage to the leaching system once again providing an opportunity to educate the system user as to the perils of continued water vacuum discharge.

Do tank outlet filters have to be cleaned frequently? - The ideal situation would result in the tank outlet filter remaining functional until the required time for tank servicing. For that reason, it would be desirable for filters not to plug more frequently than every two to five years. The variability of sewage generation and organic loading by the user combined with improper selection of tank outlet filter may result in filters being cleaned more frequently. For example, if a tank manufacturer or installer elects to use a filter product with minimal infiltrate surface area, it is probable that that filter will plug sooner than a filter with a larger infiltrate surface area. If a homeowner elects to grind up all kitchen waste, that household will obviously generate a stronger sewage discharge with more suspended solids as compared to a household without a garbage grinder. It would be preferable for providers of tank outlet filters to make a careful selection and choose an outlet filter with flow capacity and projected time between servicing suitable for the intended client.

Who can clean filters? - Reports from other states indicate licensed installers and septic tank cleaners typically provide servicing of tank outlet filters. We anticipate similar results and remind all that only individuals licensed to install and/or clean subsurface sewage disposal systems can offer these services to the public. Homeowners may elect to clean their own filter. However, we do not recommend this unless the homeowner is educated on the proper procedures and on safety/health concerns. Changes made to the technical standards which become effective July 1, 2000 will require a standard septic tank top configuration with service access holes in only three choices. All tanks will have a single outlet access hole over the outlet filter. There are two choices for inlet manholes to facilitate inlet piping from the building to the tank. For this reason, servicing septic tanks after July 1, 2000 will require cleaners and installers to open both the inlet and outlet access covers to clean and inspect both the inlet baffle and outlet filter. Previously, some tanks were manufactured to provide cleaning from a central hole with inspection of inlet and outlet baffles performed via use of mirrors and flashlights. Cleaning of the outlet filter is required each time the tank is serviced. Failure to provide this service by a licensed individual during cleaning could result in disciplinary action against that individual.

Property owners could elect to clean septic tank outlet filters but, precautions must be taken to assure the protection of their and adjacent residents health. Effluent discharged from a tank contains high numbers of harmful bacteria and potentially harmful viruses. For this reason, all water used to rinse filters must be discharged back into the tank. The ground must also be disinfected with chlorinated lime if a spill does occur. Licensed individuals are familiar with the hazards involved with coming into contact with domestic sewage and take necessary precautions using gloves and disinfectants when required. For example, hoses used by the property owner or licensed cleaner should not come into contact with septic tank effluent. If such an event does occur, rinsing and disinfecting of the nozzle and all associated contaminating surfaces would be required. Servicing of filter elements during the winter months may result in a licensed installer or cleaner removing the element and installing a replacement element of same kind. The removed unit could be taken back to the place of business and cleaned in a sanitary manner. Where a hose or water supply is not available during cleaning, licensed individuals may elect to use a hand type garden spray pump to flush trapped particles off the filter back into the tank.

What should a homeowner or licensed individual do if a filter plugs prematurely? - It is possible that some filters may plug more frequently than every two to five years and these occurrences should be used by regulatory and licensed individuals as an opportunity to review water use habits in the house or make changes to the filter in order to provide extended service intervals. The licensed installer or cleaner should interview the property owner to determine if a garbage grinder is actively used. Are vacuum cleaners that use water being used in the residence? Is water softening equipment discharging to the sewage disposal system? Are the occupants disposing unused medication (that may adversely effect the biological activity inside the tank) into the septic tank? Does the clothes washing machine have a self cleaning lint filter which in turn could be discharging all the lint to the septic tank? Has the occupancy of the house recently changed in any way that would result in a greater loading on the septic tank? Is there a home business or are day care services for children being provided? Adult homes for the handicapped have a history of premature system failures due to large quantities of water used and high sewage strengths. These and other questions can be helpful in determining whether more frequent servicing of the septic tank and outlet filter are necessary or whether an outlet filter with increased capacity should be provided.

Some manufacturers of septic tank filters provide several different models of filter units to increase filtering capacity. Other manufacturers provide for easy addition of filter units in series or by multiple installation of units at the same outlet piping. If property owners are reluctant or unwilling to change habits inside the house, installers and cleaners can respond by providing a product that meets their needs for extending service intervals.

What are the drawbacks with respect to installing tank outlet filters? - For the vast majority of property owners utilizing on-site sewage disposal systems, the drawbacks to tank outlet filter installation should be minimal. It will be necessary to uncover two manholes each time a tank is serviced. By providing two access manholes, property owners can be assured of effective and efficient cleaning of both chambers within the septic tank. Currently, servicing some tanks with a central cleaning manhole does not promote complete cleaning of both chamber compartments. There may be drawbacks for some individuals who generate large quantities of organic and inorganic pollutants that discharge to a septic tank. The initial clogging of the outlet filter could result in an artificially high liquid level in the tank that would first be identified by a property owner as gurgling in the household plumbing at the lowest water fixtures being used. Tank outlet filters approved for use in Connecticut must continue to function even when the liquid level in the tank is artificially high or overflows the top of the filtering element. In our regulation, we refer to this as a non- bypass outlet filter. Continued rising of the liquid level in the tank could result in a plugging of the inlet piping or a surface discharge at the septic tank itself. If the septic tank was installed on a relatively level grade with minimal pitch back to the building served, it is possible that effluent could continue to back up in the piping and discharge at the lowest fixture inside the structure. The typical warning signs of slow draining fixtures or gurgling in the piping are apt to alert the property owner long before discharge occurs in the lowest plumbing fixture.

If concern for prevention of sewage discharge at the lowest fixture is a primary item, installation of a high liquid alarm within the septic tank can be made. One filter manufacturer offers an alarm as in intricate accessory to the filter installation. Standard high-level alarm floats similar to those installed in an effluent pump chamber could also be installed in a septic tank.

Does the effluent filter have to be installed inside the septic tank? - The answer is no. Several products are available on the market for installation of separate filter units that are housed in vaults installed on the outlet side of the septic tank. Access to these separate filter vaults must be the same as that to a septic tank and location of the vault must be clearly identified on the as-built plans so that installers, cleaners and regulators can be made aware vault location. It would be beneficial if the septic tank outlet cover was provided with a permanent tag noting the location and existence of the separate filter vault.

Are there any National Standards governing septic tank outlet filters? - At the present time, the National Sanitation Foundation (NSF) is developing Standard 46, Section 10 to address a class of products referred to as septic tank effluent filters. This standard will test filters for flow capacity when clean, flow when partially plugged solids reduction, by-pass protection and general structural suitability. While not a true test of each product's ability to effectively trap organic and inorganic pollutants, the standard is a good start to provide comparison for different products.

What would happen if a property owner, installer, or cleaner removed the filter element from its housing? – Removal of a filter element by a licensed installer or cleaner would be a violation of our Code and Technical Standards. For those filter elements installed in a standard 4 inch. Diameter sanitary tee, septic tank function would essentially revert back to the pre year 2000 regulation and an increased suspended solid loading would be placed back on the leaching system. One product manufacturer has a built in shut off feature that prevents unfiltered effluent from escaping to the leaching system when the element is removed from the housing. The shut off feature would remain functional until the liquid level raises above that of the filter housing, approximately 6 inches above the normal tank operating level. At that point, any liquid build up above the top of the filter housing would discharge to the leaching system.

Can you install a tank outlet filter in both single and two compartment septic tanks? - The likelihood of tank outlet filter clogging in a two-compartment tank is less than for one installed in a single compartment tank. The benefits in providing filtered effluent would remain equal for both situations. For that reason, installers, cleaners and property owners should consider the possibility of more frequent servicing if installed in a single compartment tank and the benefits to providing added filtration interface to extend the interval between pumping. One other consideration for retrofitting existing tanks is access to the filter element itself. The manhole over the tank outlet piping must be adequate in size to facilitate retrofitting for filter installation and removing the filter element during cleaning.

Conclusion - Installation of septic tank outlet filters should provide a long-term benefit to the health and protection of the residents in the State of Connecticut. The filters will obviously promote servicing of septic tanks on routine intervals. By reducing the pollutant loading to leaching systems, effluent filters should prolong the effective life of those leaching systems. Many systems, which receive consistent qualities and quantities of sewage effluent over many years, fail due to bio-mat build-up. This clogging failure is observed occasionally with new and recently repaired systems constructed in excellent quality sand fill. When evaluating these premature failures, the breaching of the organic layer along the side wall of the leaching system frequently results in the entire leaching system being drained into the unsaturated adjacent sandy soils. This observation is of a clogged system constructed in highly permeable soils. Reduction of pollutant loading to the leaching system can help reduce this occurrence. Reduction of suspended solids discharged to the leaching system can help extend the function of septic systems constructed in naturally occurring fine sandy soils that tend to build up a biological crust at a faster rate than other course sandy soils.

One Connecticut septic tank manufacturer has elected to provide outlet filters with each new tank installed since August of 1998. Other tank manufacturers who sell tanks beyond our borders have also provided outlet filters with their tanks for some of these out of state deliveries. The reports have been very favorable with respect to minimal problems from servicing or creation of nuisance conditions. This next year will be a learning period for our licensed installers and cleaners, regulators and engineers, as well as property owners as we adjust to the installation and maintenance of septic tank outlet filters.