Volume 12
Number 3
Summer 1998

Small Flows

Decentralized Wastewater Treatment: A Misnomer

By Richard J. Otis, P.E.

Editor's Note: This paper was presented at the ASAE conference in March 1998 at Orlando, FL. The National Small Flows Clearinghouse is reprinting it as part of our commitment to present realistic and comprehensive views of wastewater management for small communities to our readers.

Introduction

Unsewered communities with failing individual septic tank systems expect that conventional sewerage will solve their sanitation problems. Once into planning, however, they often find that the cost of gravity sewers with a central or regional treatment plant is beyond their capability to pay. Even if substantial grants are obtained to reduce the local share of construction costs, the recurring operation and maintenance costs can create financial hardships. Unaware that other options might exist, community leaders believe that their alternatives are either to sewer only what is affordable, leaving outlying property owners on their own, or to take no action. With either of these options, health and environmental threats continue and economic growth and property values decline.

The lack of affordable alternatives has generated the promotion of "decentralized" treatment in which individual onsite treatment or cluster systems are employed in lieu of central treatment. Because installation of the collection sewers represent 65 to 80 percent or more of the construction costs of the entire collection and treatment facilities, use of onsite and cluster systems can result in significant savings in construction costs. Despite the potential for substantial savings, the idea of "decentralized" facilities has not been popular. The attitude in most small communities faced with the need for improved sanitation is that if conventional sewerage is not affordable, then it is better to wait until grants are available to reduce the local share of costs to affordable levels. The decision is made without full knowledge of other viable options. If onsite and cluster systems are to become an accepted alternative, we need to examine why central sewerage is so attractive.

Central Sewerage Works!

The belief by unsewered communities that conventional sewerage is their best and only option is understandable. Collection and treatment technologies are sound and well proven. They are designed, operated, and maintained by professionals using scientific principles to meet specific water quality objectives. Treatment facilities and effluent discharges are located away from inhabited areas so that malfunctions do not create significant public health risks. Public funds are available in the form of low-interest loans or grants for financial assistance in construction. Costs to users are known and amortized over time.

Why we choose central sewerage over continued use of onsite systems is simple: there are no surprises. It works, it's not in our backyard, the responsibility for its performance is not ours as users, and its costs are predictable and can be budgeted. While affordability may be an issue that delays its implementation, cost is seldom an issue in selecting central sewerage as the preferred solution.

There is no question that central sewerage is a sound and effective method of managing wastewater. The technologies employed perform reliably and consistently. The only problem with the concept is that it was developed to solve wastewater problems in urban areas where densities of development are high. In small rural communities, densities of development are typically much lower, which often makes central sewerage excessively costly. High costs either create financial hardships or are used as an excuse for inaction. The fact that regulatory agencies usually will tolerate inaction if conventional sewerage is not affordable shows that we are more committed to our financial well being than to environmental well being. If we were committed to our water quality and environmental goals, we would insist that everyone comply with environmental regulations and strenuously seek more appropriate wastewater facilities for small communities.

Why Not Onsite Treatment?

The concept behind "decentralization" is the employment of individual onsite treatment systems or clustered treatment as a permanent rather than interim alternative to central sewerage. Where the cost of installing conventional sewers is excessive, onsite systems are more cost effective because the collection sewers are not necessary. Despite demonstrated savings, however, small communities rarely select the "decentralized" option. Onsite treatment systems are perceived as inadequate substitutes and are quickly dismissed. Why?

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Planning Can Reduce Liability from Onsite Inspections

by Margaret Caigan McKenzie
NSFC Contributing Writer

Inspectors of onsite septic systems need to be vigilant not only about safety and health, but also about potential lawsuits. The reasons for inspecting an onsite septic system are as varied as the types of inspections that can be done and the expertise of the individuals performing the inspections. Variances exist in defining a system failure, recommending a system pumping schedule, and deciding whether it is more advantageous to repair, upgrade, or replace a failed system.

Inspectors prepare to use a Sludge Judge® to measure the depth of sludge in a septic tank. Note that the inspectors are wearing protective rubber gloves and eye protection. *Photo courtesy of Ashco-A-Corporation, Morgantown, WV.*

By following industry-established standards, however, an inspector's liability can be limited or reduced. For this reason, it is important for inspectors to keep current, comply with all state and local regulations, and perform only those inspections that are within the scope of their expertise. Even with these safeguards, lawsuits can and will occur. That is why it is comforting to know that liability insurance coverage is available to help protect the inspector from lawsuits in today's litigious society. One place to check for coverage is the National Association of Waste Transporters Inc. (NAWT), at (800) 236-6298.

The Inspection Process

There is no single inspection process that will guarantee the prevention of a lawsuit, but the Pennsylvania Septage Management Association (PSMA) has developed the following guidelines as a way for inspectors to objectively determine the type and condition of the septic system and to disseminate that information to the homeowner.

Authorization for Inspection: As in any profession, documentation is critical, and the first piece of documentation to have on file is an inspection authorization form signed by the homeowner. This form should clearly state that all preliminary information provided by the homeowner is complete and true and that the inspector has permission to enter the property, disclose history records, and contact previous pumpers and inspectors.

The authorization document should clearly define what the cost for inspection includes if this information was not specified in the contract. For example, let the homeowner know up front if the basic cost for inspecting the system does not include pumping the tank (and often it doesn't).

Gather preliminary information: At the beginning of each job, the inspector should compile background information to trace the history of the system. For example, the inspector should interview the resident about system usage and household practices that affect the system's performance. This includes laundry and cleaning schedules and types of major water- and waste-generating appliances in the

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NATIONAL SMALL FLOWS CLEARINGHOUSE

Helping America's small communities meet their wastewater needs

safety

Chlorine Safety: Know What You're Doing

by Kathy Jesperson
NSFC Contributing Writer

For more than 90 years now, chlorine has been the most prevalent disinfectant in the U.S. for drinking water supplies and municipal wastewater. Its use has virtually eliminated waterborne diseases, such as cholera, typhoid, dysentery, and hepatitis A, noted the Chlorine Chemistry Council (CCC).

"Chlorine belongs to a group of elements known as halogens and is found naturally in combined states only—chiefly as sodium chloride or ordinary table salt," explained Pure Water Solutions Web site. "It is manufactured commercially by running an electric current through salt water. This process produces free chlorine, hydrogen, and sodium hydroxide."

According to the Occupational Health and Safety Administration (OSHA), because chlorine is considered an extremely reactive element and its accidental release could be harmful or even fatal, it must be handled with extreme care. Therefore, its handling, storage, and transport are regulated.

Exposure Can Be Fatal

Accidental exposure to chlorine can pose some serious health risks. According to the U.S. Environmental Protection Agency's (EPA) Technology Transfer Network (TNNWeb), acute exposure to chlorine at high levels (>30 parts per million), results in chest pain, vomiting, toxic pneumontis, pulmonary edema, and even death. At lower levels (<3 ppm), chlorine is a potent irritant to the eyes, the upper respiratory tract, and lungs.

Chronic health effects of chlorine exposure include decreased body weight, eye and nose irritation, respiratory tract inflammation, and kidney and liver damage. Chlorine may also corrode teeth as well as increasing a person's susceptibility to tuberculosis.

EPA's TNNWeb further noted that no information is available about the carcinogenic effects of inhaling chlorine. Most of the studies available were designed to investigate the relationship between chlorination byproducts found in drinking water, such as trihalomethanes, and cancer in humans. These studies did, however, show an association between bladder and rectal cancer and chlorination byproducts.

Because of these health threats, whether immediate or long-term, OSHA urges all employees to be familiar with emergency procedures, the location and proper use of emergency equipment, and the methods of protecting themselves during rescue operations. They should also familiarize themselves with regulations regarding any hazardous material they must work with. And there's more than one organization regulating chlorine.

Know the Regulations

The U.S. Department of Transportation (DOT), EPA, and OSHA regulate chlorine. DOT and OSHA require that chlorine be labeled as a poisonous gas. DOT also requires diamond-shaped DOT warning signs, which must be visibly posted on vehicles carrying 1,000 pounds or more of chlorine. Manifests—or records—must be kept any time any quantity of chlorine is transported.

When chlorine is delivered by truck, the truck should never be allowed to keep its motor running during unloading. If a chlorine cylinder should develop a leak, the combination of chlorine and carbon monoxide from the vehicle's exhaust forms phosgene, which is a deadly gas that prevents oxygen uptake into the bloodstream.

Storing chlorine also poses some risks. Since chlorine gas expands rapidly, the May 1988 edition of the *Uniform Fire Code* requires chlorine storage rooms to be equipped with exhaust ventilation systems large enough to handle the entire contents of the single largest tank or cylinder of chlorine.

"If you rupture a cylinder, it won't explode," explained Ken Dennis, president, Dennis Chlorination Service, Baltimore, MD. "But the liquid contents will almost immediately turn to gas. One cup of compressed chlorine gas in a liquid form will expand approximately 460 times. It is two and one-half times heavier than air and will fall into low-lying areas."

Since exposure may be fatal, OSHA's *Hazard Communication Standard* [29 CFR 1910.1200] requires an emergency procedure plan. If 10 or more pounds of chlorine is accidentally released into the atmosphere within a 24-hour period, employers are required to notify the National Response Center as well as state and local authorities.

Chlorine cylinders must be chained to the wall and clearly labeled as pictured here. In this case, a ventilation system has not been installed, which is in violation of OSHA and EPA regulations.

In addition to these codes, EPA requirements under the Clean Air Act (CAA), rule 61, effective August 19, 1996, make it necessary for utilities storing 2,500 pounds of chlorine or more onsite to develop Risk Management Plans (RMP). These plans must include hazard assessment, accident prevention, and emergency response programs, including worst-case scenarios. Programs must be in place and RMPs submitted to EPA by June 21, 1999.

Observe Precautions

According to the Water Environment Federation's (WEF) textbook, *Wastewater Disinfection*, the following precautions should be observed by operators when connecting cylinders to the manifold:

- Flexible connectors should always be replaced if they are discolored, become crimped, or emit a crackling or screeching noise because connectors may rupture without warning.
- A chlorine respirator should always be worn when changing cylinders, and all valves must be closed before breaking connections in the pressure lines.
- Use the buddy system when changing cylinders and performing maintenance on pressure components.
- A system should never be operated when a leak exists or a component is not working.
- Equipment should be operated first on manual control to determine that the hydraulic, vacuum, and pressure systems are all working properly.

Plan Risk Management Programs

"Prevention is the emerging aspect of the CAA requirement for RMPs [Risk Management Programs]," said Julie Vanden-Bosch, EPA communication team member. "EPA believes that this regulation will lead to the reduction of risk in surrounding communities.

"All facilities must submit a plan for the worst-case scenario, and those facilities that are a part of Program 2—where we expect many wastewater and drinking facilities to be—must submit an 'alternative' or more realistic scenario," Vanden-Bosch continued. "They must also talk to communities about what this means. A worst-case scenario takes into account what would happen if the uncontrolled release of all of the chlorine onsite should occur over a ten-minute period within a five-mile radius.

"In general, the risk of worst-case scenarios is very low," Vanden-Bosch continued. "Combining them with worst-case weather conditions make it even less likely. It could still happen, but it is unlikely. Alternative, or more realistic scenarios, generally have smaller quantities and lower release rates than worst-case scenarios.

"They also allow you to take into account your active and passive mitigation systems. That means most facilities have prevention valves that can stop chlorine leaks before they hit the air," Vanden-Bosch said. "They also have trained personnel to help clean up leaks, and this includes local fire departments. The thing we want to stress is that planning for accidents and taking steps to prevent them is necessary.

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"These plans will eventually be publicly available via the Internet," Vanden-Bosch continued. "We have two model plans in development that will help when utilities are ready to develop their plans. These will also be available on the Internet."

Setting Up a Safety Program

An RMP is only part of a good safety program. According to the WEF's textbook, "the first step toward the safe design and operation of a disinfection facility is the understanding of the properties of various disinfectants."

There are three commonly used forms of chlorine: solid calcium hypochlorite, liquid sodium hypochlorite, and chlorine gas. "Where a large amount of chlorine is required, chlorine gas is preferred over sodium hypochlorite because of its cost effectiveness," noted the CCC.

The DOT classifies calcium hypochlorite as a corrosive and rapid oxidant. Sodium hypochlorite is classified as a corrosive agent, and chlorine gas as a nonflammable corrosive gas under pressure.

Calcium Hypochlorite

Calcium hypochlorite is considered unstable and combustible, and may react unpredictably when combined with many common substances such as petroleum products, oils, fats, grease, acids (even mild ones), and sugars. The reaction when combined with one of these substances may be termed as explosive.

Also, chlorine gas may spontaneously emit from powdered chlorine in storage, especially under high temperatures. Therefore, calcium hypochlorite should be kept in a cool, dry, well-ventilated storage area. Containers should not be stored with other chemicals or in an area where it can be exposed to direct sunlight.

Operators who work with calcium hypochlorite should always wear eye protection and dust masks. They also should always have immediate access to an eye wash and shower facility.

Calcium hypochlorite is typically used in strengths of 60 to 65 percent.

Sodium Hypochlorite

Sodium hypochlorite is a liquid form and comes in a variety of strengths. It is considered unstable and corrosive with a shelf life of approximately 90 days. Large amounts of chlorine gas can be liberated spontaneously from liquid chlorine upon contact with oxygen.

Eye protection and access to emergency eye wash stations and shower facilities are recommended for operators handling sodium hypochlorite. This chemical may also cause severe burns to skin and clothing, so protective clothing is recommended as well.

Sodium hypochlorite is typically used in strengths of 5.25 to 15 percent.

Chlorine Gas

Chlorine gas should always be treated as if it were moist chlorine, which is very corrosive. "It is an irritant, a suffocant, and a vesicant (a substance that causes blistering). It will support combustion of iron and steel at approximately 200 degrees C (400 degrees F)," noted WEF's textbook.

"Chlorine gas is detectable by smell at low levels, and has a green-yellow color at higher levels of concentration in the atmosphere," noted WEF's textbook. "At levels below one part per million (ppm), it is undetectable unless instrumentation is used. OSHA has set the maximum contaminant level (MCL) at one ppm over an eight-hour period."

"Chlorine gas is its own best warning system," said Dennis. "It has a distinct smell and irritates the eyes and throat. When you mix chlorine with water you get hypochlorous acid.

"Acid in your lungs will not come out," Dennis continued. "Your body tries to produce fluid to dilute the chlorine, and your lungs will fill with fluid—basically you will drown yourself."

Follow the Rules

Dennis offers these recommendations when handling chlorine gas:

- Do not expose cylinders to heat.
- Never tamper with the valve.
- Never lift the cylinder by the protective hood that covers the valve.
- Do not drop cylinders or knock them over.
- Always chain cylinders to a wall. Cylinders should be chained to the hand cart as well.
- Do not connect two or more cylinders to a common manifold because of the possibility of rupture.
- Do not store cylinders near elevators, stairwells, air intakes, or anyplace where fumes can spread and contaminate other places.
- Store cylinders separately from other chemicals and make certain that they are properly labeled.
- All facilities using chlorine should keep a leak repair kit on hand. The kit should contain clamps, drift pins, hammers, wrenches, and other tools necessary to stop the leak.

Handling Leaks

"Most leaks happen when you're changing cylinders," said Dennis. "Never change a cylinder by yourself. Be careful of how much force you use when you're opening a valve. If the valve will not open, do not force it. Send it back to the manufacturer you bought it from, or have someone from the company come and open it for you.

"If you suspect a leak, use an ammonia solution to help you find out where it's coming from," said Dennis "Attach a small cloth or swab soaked with ammonia water to one end of a stick and apply it to the suspected area. If there is a leak, a white, smoky cloud will form around the area."

Some leaks aren't always obvious. "Valves that are discolored are a good indication of a leak," Dennis explained. "You should always have access to a capping kit, because a minor leak mixed with humid air creates an even bigger leak due to the corrosive action."

Dennis also recommends conducting monthly safety drills so workers will be familiar with emergency procedures.

What to Do in an Emergency

OSHA requires that certain emergency procedures be followed in the event that an accidental release of chlorine should occur. These include:

- notifying safety personnel;
- removing all sources of heat and ignition;
- keeping all combustibles away from the leak;
- ventilating potentially explosive atmospheres;
- evacuating the spill area for at least 50 feet in all directions;
- finding and stopping the leak without risk; if this cannot be done the cylinder must be isolated until all gas has dispersed; and
- using water to reduce vapors, but not pouring water onto the spill or leak area.

Where Can I Find More Information?

More information about chlorine safety may be obtained by contacting the following government agencies:

Occupational Health and Safety Administration

To report life-threatening situations, call (800) 321-OSHA.
Visit OSHA's Web site at *http://www.osha-slc.gov*.

U.S. Environmental Protection Agency

For more information about the EPA's Risk Management Program, call (800) 424-9346. Visit its Web site at *http://www.epa.gov/ceppo*.

National Institute of Occupational Safety and Health

For information about work place safety, call (800) 35-NIOSH.
Visit their Web site at *http://www.cdc.gov/niosh homepage.html*.

U.S. Department of Transportation

Information about highway safety may be obtained by calling (202) 366-1153. Transit safety information may be obtained by calling (202) 366-1398. Railroad safety information may be obtained by calling (202) 493-6300. Visit the DOT Web site at *http://www.dot.gov*.

A fact sheet about chlorine disinfection will be available in September 1998 as part of the EPA's Environmental Technology Initiative (ETI). This fact sheet can be obtained by calling the National Small Flows Clearinghouse at (800) 624-8301 or (304) 293-4191.

To notify the National Response Center of a leak, call (202) 426-2675.

Disinfection Package

For those interested in disinfection with or without chlorine, the NSFC offers a package that contains articles about various types of disinfection treatments, including chlorine, ultraviolet radiation, ozone, and hydrogen peroxide. Each treatment is compared and contrasted with similar systems. To order this product, call (800) 624-8301 or (304) 293-4191 and request Item #WWBKGN81. The cost is $14.80 plus shipping and handling.

maintenance

Planning Can Reduce Liability from Onsite Inspections

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house such as a washing machine, dishwasher, and garbage disposal.

Visual inspection: Walk the grounds to look for obvious signs of system failure. For example, look for seepage and lush vegetation, backup of sewage, odors, effluent ponding, breakout to the surface of the ground or to surface waters, eroded soil, and any other unusual features. This is also a good time to look for risers to indicate tank location.

Locate the treatment tank: If the tank's location was not apparent during the visual inspection, the inspector can ask the homeowner for any design plans, as-built drawings of the system, or reports from previous inspection or maintenance visits that will show the tank's location. If these records are unavailable, the inspector could use a probe to locate the tank or a non-invasive technique such as an electronic transmitter.

When using a probe to locate the tank, be careful not to damage the tank by over-aggressive probing, particularly if the tank is plastic or fiberglass. If the inspector chooses to use an electronic transmitter instead, always test the transmitter to ensure it is working properly. Then flush the transmitter down the toilet and use the electronic receiver to locate it, thereby locating the tank.

Access the treatment tank: If the inspector needs to unearth the tank's inspection ports and manhole, the digging should be done with care so that the inspector can neatly replace the sod.

Flush toilets: Flush every toilet in the dwelling at least once to observe level changes in the septic tank or backup conditions.

Check storm drainage system: Make sure the storm drainage system is not connected to the septic tank.

Determine condition of tank, baffles, and cover: Check the tank closely for cracks, leaks, improperly installed or loose inlet and outlet baffles, and breaks in lines outside the tank. If the tank is metal, do not walk on it since these tanks rust quickly from the sulfuric acid formed by the anaerobic decomposition of waste.

Remember never to enter the tank to inspect its parts. Septic tanks contain toxic gases that can kill in a matter of minutes. (See the Spring 1998 issue of *Small Flows* for the article, "Staying out of a Jam: Confined Spaces Require Safety Measures.")

Determine the capacity of the treatment tank: Tank capacity can be checked by determining the tank surface area with a probe and then determining the water depth inside the tank with a wooden dowel or a sludge measuring device.

While there are various methods for calculating the capacity of the treatment tank, two of the methods proposed by PSMA are:

Cylindrical tank:
Diameter squared (in inches)
times depth (in inches)
times .0034 gal/in^3
equals total gallons.

For example:
60" diameter tank, 48" liquid depth (60" x 60") x 48" x .0034 = 587.52 gallons

(*Note that .0034 is a constant incorporating $\pi \div 4$ and the number of gallons in one cubic inch of space.*)

Square or rectangular tank:
Length (in feet)
times depth (in feet)
times width (in feet)
equals cubic capacity.
Cubic capacity
times 7.5
equals gallons.

For example: 96" = length, 48" = width, 60" = depth of tank
8' x 5' x 4' = 160 cubic capacity
160 x 7.5 = 1200 gallons

(*Note that 7.5 is the number of gallons contained in one cubic foot of space.*)

PSMA notes that a satisfactory liquid level is three inches below the inlet, or equal to the height of the outlet.

Check scum and sludge levels: Determine the thickness of scum and the depth of the sludge blanket. The inspector can do this using specialized tools such as a Sludge Judge®.

Check aerobic tank operation: For aerobic tanks, check the operation of the aerator (compressor or propeller and motor), timer, alarm, electrical components, and level controls.

Check system pump: If the system has a pump, inspect the operation of the pump, float, alarm, and electrical connections.

Locate the absorption field: Determine the size of the absorption field and if it is holding water. If the absorption field is failing, PSMA recommends not pumping the septic tank without the homeowner's written waiver for a second opinion. NAWT concurs with this opinion and states in its inspection instructions ". . . upon pumping, water flowing back from the absorption area would indicate an unacceptable condition. A high water level in the tank would immediately indicate an unacceptable condition. If this occurs, do not pump the treatment tank. You probably will have trouble getting paid by the owner if you pump [the] tank and fail [the] system! Or, the owner will say you pumped the tank and everything should be okay now. Right? Not pumping the treatment tank gives the owner the option of getting a second opinion."

Check the pumping records: If the tank has not been pumped in two years, or if the combined sludge and scum level exceeds that allowed by state and local regulations, have the tank pumped. (NAWT cites 20 percent as a conservative number to use during property transfer inspections.) Observe the absorption field to determine if the wastewater backflows into the treatment tank.

It is also a good idea to run water in every sink and observe whether it drains freely or sluggishly to determine if the home's plumbing is connected to the septic tank.

Dye Test

This test is commonly used by health departments to locate hydraulic failures or illegal discharges. An advantage to this test is that if there is a breakthrough, the dye will become visible on the ground surface. This makes the dye test a simple test to perform to determine a failure of the system or to detect portions of the home's wastewater not going into the treatment tank. For example, a washing machine may not be connected to the septic tank but instead is depositing its waste into a roadside ditch.

There are, however, several disadvantages to this type of testing: it does not pinpoint the cause of the system's failure and it may take more time for the dye to surface than the inspector allows, causing the inspector to infer that the system is functioning properly.

Hydraulic Loading or Flooding Test

This test is performed by discharging 400 plus gallons of water through the system. Many health departments discourage this type of testing since it can actually do harm to the system by artificially flooding the septic tank and field. This could enable suspended solids to escape the tank and clog the drainfield. In addition, the results of such a test can be misleading since environmental conditions such as rain or drought and home usage changes such as over or under utilization of the system will directly affect the outcome of the test.

Analyzing the Data

The challenge in pinpointing the cause for a system malfunction is in analyzing all the possible causes of the problem, according to the PSMA *Technical Manual for Sewage Enforcement Officers*. The manual points out that an incomplete analysis of a malfunctioning system can create more of a problem than was originally present. For example, it explains how choosing a seepage pit or deep excavation to repair surface malfunctions serves only to transfer the sewage

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The Inspector's Tool Kit

Although individual inspectors may have preferences for specific tools to use during an inspection, a list of the most commonly used items found in a basic tool kit includes:

- Rubber Gloves
- Rubber Boots
- Masking Tape
- 100-foot Cloth Measuring Tape
- 25-foot Steel Measuring Tape
- Probe
- Shovel
- Crowbar
- Line Level
- Sludge Measuring Device
- Scum Measuring Device
- Flashlight
- Mirror
- First Aid Kit
- Plumber's Snake
- Metal Detector
- Snake Bite Kit
- Dye Test Kit

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malfunction from the surface of the ground to the groundwater. This often leads to contamination of local water supplies.

Another example of an improper repair method listed in the technical manual is the add-on in which a new bed or trench area is excavated to expand the existing system without evaluating the soils or the condition of the existing system. This may result in the recurrence of the malfunction since the new area will be overloaded with most of the sewage flow from the home. In shallow soil over open voids, it can also result in groundwater contamination.

The Inspection Report

Prepare a report for the homeowner that describes any deficiencies in the system and needed corrective measures. This final step is crucial and can often be the basis for a lawsuit.

The inspector needs to be explicit about the information included in the report and cautious about the information omitted. For example, was the homeowner informed about the various solutions for repairing a malfunctioning system? Some inspectors believe that the only way to correct a malfunction is to replace the system with a new one. This is not always true. What is always true, however, is that the inspector must always be able to support reasons for recommending one corrective measure over another.

PSMA recommends including a disclaimer in the inspection report. For example, it is important for the homeowner to know that an inspection is only a snapshot of the system at the time of inspection and does not guarantee future performance. It would help the homeowner understand this if the inspector would explain that a change in the amount of wastewater generated in the household and the amount of solids carried in the wastewater are just a few considerations that determine how often the tank needs to be pumped and how well the system will work.

Educate the Homeowner

As many inspectors have found, some homeowners are not aware of the type of system they have, its location, or when it was last serviced. It is no wonder, then, that most home- owners are uninformed about the proper way to care for a septic system.

Although it is not required, it would be helpful to both the inspector and the homeowner if the inspector would outline practices for the homeowner that can benefit or harm the system. For example, the inspector could tell the homeowner about inexpensive devices to help reduce sewage flow such as a low-flow toilet, shower heads, and faucet aerators. The inspector could explain that wastes from a garbage disposal are not easily digested by bacteria in the septic tank and could suggest composting this garbage waste instead and using it as a fertilizer for a garden. It also would be helpful for the homeowner to know that either peak daily overloads or continuous overloads may cause the system to malfunction. For example, weekend guests, parties, new water-using appliances, and washing several consecutive loads of laundry are all possible causes of a system overload.

To those uninformed about wastewater systems, little thought is given to the concentration or the content of the sewage discharged into the system. The inspector can explain how reducing the amount of pollutants discharged into the system and keeping toxic household chemicals, grease, and oil out of the system can extend the system's life. This extra time and effort could be rewarded by creating a strong bond with the homeowner, one in which the inspector's business can be greatly increased through word-of-mouth—one of the most valued forms of advertising.

Sources of Funding for System Repairs and Replacements

It can be difficult to keep up with the many government programs that are available for funding system repair or replacement or to know where to go to find out about them. Often, many grants or low-cost, long-term financing is available, but the homeowner is unaware of it or assumes it is available only for low-income individuals. That is why informing home-owners of possible sources of funding for the repair, upgrade, or replacement of a system is a great service not only to the homeowner but to the agencies formed to help them.

Information that explains inspections of onsite systems to homeowners is included in the Spring 1998, Vol. 9, No. 2 issue of Pipeline *(Item #SFPLNL13). Telephone the National Small Flows Clearinghouse (NSFC) at (800) 624-8301 or (304) 293-4191.*

For information about financing programs available to help low-income homeowners afford replacement of or repairs to their wastewater systems, the inspector could advise the homeowner to check with the local health department, the Rural Utilities Service at the U.S. Department of Agriculture, 1400 Independence Ave., SW Washington, DC 20205, their state legislator, or the NSFC at (800) 624-8301 or (304) 293-4191.

Homeowners may also contact the NSFC technical assistance staff for the names of inspection companies listed in the NSFC's Manufacturers and Consultants Database. To be included in this database, inspection services also should contact the NSFC.

NODP Site Demonstrates Phosphorous Removal Using Iron Oxide

A unique demonstration project is under way in Benzie County, Michigan, that incorporates iron oxide into onsite systems to remove phosphorus entering the lakes in excessive amounts from failing onsite sewage disposal systems. This effort is a part of Phase I of the National Onsite Demonstration Project (NODP), which is managed by the National Small Flows Clearinghouse (NSFC) to assist communities in funding, installing, monitoring, and managing model onsite wastewater systems as cost-effective, viable alternatives to centralized sewage systems.

Chief among the environmental concerns of this Benzie County resort area are restrictions caused by numerous lakes, small lots, sandy soils, and seasonal fluctuations in population. Project sites include seasonal and year-round occupancy lakeside properties.

This demonstration project is unique because in addition to repairing failed systems, the county is attempting to remove the phosphorus that is causing algae blooms in the lakes.

To remove the phosphorus, the systems were installed so that the wastewater would flow over layers of iron oxide concentrate, since there is an affinity between iron and phosphorus ions. The Benzie County Health Department has primarily used three methods of phosphorus removal:

1. *iron oxide powder mixed with natural sands and calcium carbonate beneath the bottom of the disposal system*
2. *phosphorus removal chamber with gravel pack sand/iron oxide*
3. *a sand filter containing naturally occurring sands that are high in iron oxide to remove both nitrate and phosphorus*

There are seven demonstration sites in Benzie County, and five of those—the Bateman, Roth, Moseler, Poggemeyer, and Campbell sites—have onsite wastewater systems that involve phosphorus removal.

All sites have achieved phosphorus removal rates of approximately 50 to 95 percent, according to William Crawford, director of environmental health for the Benzie County Leelanau District Health Department.

Crawford oversees all of the demonstration sites in Benzie County. "This project gave us the opportunity to try sewage treatment methods that can have a positive impact on our surface and groundwaters for decades to come. With this demonstration project, we now have a design direction that will allow us and other health departments to effectively treat sewage in environmentally sensitive areas," said Crawford.

The site has attracted a large number of visitors, including about 50 people from the Michigan Onsite Wastewater Recycling Association and approximately 50 representatives from the Michigan State Cooperative Extension Service. In addition, regional sanitarians visited each site. Benzie County has also had an Australian visitor tour the site to learn ways to effectively handle phosphorus problems in wastewater.

The NSFC is currently developing information materials on all the Benzie County sites from Phase I for use by different audiences. These materials will include information on design, construction, and monitoring results.

For more information about the Benzie County demonstration project or other NODP sites, call the NSFC at (800) 624-8301 or (304) 293-4191. Updates on the project will be included in future issues of Small Flows.

Decentralized Wastewater Treatment: A Misnomer

continued from page 1

- *Freedom from Uncertainty:* From the user's perspective, sewers work. Drainage of sewage from the home is interrupted only rarely. When problems occur in the collection system or treatment plant, individual users are seldom aware because they usually occur remote from users and are attended to immediately by trained personnel. This is not the experience with onsite systems. Failures often occur unexpectedly and on the owner's property. Having little knowledge of what to do, they can feel helpless and anxious about a large, unplanned expense. Once the expense is incurred, uncertainty remains over when the next failure will occur.

- *Freedom from Responsibility of Ownership:* Central sewerage requires little from the user other than to pay the sewer charges. This is not the case with onsite systems. Owners are responsible for performance of their onsite systems; they must be careful about their water use, they must watch what materials are discharged to the systems, they are not free to have certain conveniences such as garbage grinders, they must perform periodic servicing and maintenance, and they are required to repair or replace the systems when malfunctions occur. Owners are forced to accept these responsibilities usually without adequate knowledge about how their systems are designed and should be operated.

- *Predictable Costs:* Central sewerage may cost more over time than onsite systems but the costs are amortized over long periods. Regular but small payments are required. These payments are easily incorporated into household budgets and can be paid as painlessly as the cable TV bill. Onsite systems are another matter. If repairs or replacements are necessary, costs are incurred with little warning and are not easily absorbed in most household budgets.

- *Public Financing:* Public financing, loans, and sometimes grants are available to assist communities with construction of central sewerage. Usually, financial assistance is not available to individual property owners for construction of their onsite treatment system.

- *Environmental Protection:* Central sewerage offers the reassurance that the wastewater is being successfully treated to meet specific water quality goals. Onsite systems have not provided this reassurance. Most onsite systems are designed to keep the wastewater below ground rather than to meet water quality goals. They are continually accused of contaminating ground and surface waters. Many owners genuinely think that their systems are creating water quality problems that may impact their own or a neighbor's drinking water well.

What is so appealing about central sewerage is not the technologies used or the costs; rather, it is the public management that removes responsibility for system performance from the individual user. If onsite and cluster systems are to be an accepted alternative, they must be managed in such a way as to be as invisible to the user as central sewerage.

Decentralization Is Wrong!

In our zeal to promote onsite and cluster systems as a more cost-effective method of wastewater management in small communities, we have focused too much on technologies. Our interest in technologies is performance and cost, while the potential user's interest is in service. To gain the attention of potential users, we have often denigrated central sewerage in favor of decentralized treatment systems. This is a mistaken approach because onsite and cluster systems are not perceived by the public as providing equal service. If we are to succeed in convincing the public that "decentralized" treatment should be seriously considered in small communities, we must elevate the perception of onsite and cluster systems to that of central sewerage rather than trying to discredit central sewerage. What is good about central sewerage—central management—is what is bad about onsite systems. "Decentralized" wastewater treatment is a misnomer!

Wastewater facilities planning for unsewered communities should not be an either/or approach. Planning should begin with equal consideration of all options and the choice of technologies based on appropriate application. Ironically, what is wrong with applying conventional sewerage in many unsewered communities is not because of inherent flaws in the technologies used but because of our failure to properly manage the existing "decentralized" facilities. When we are able to show that onsite systems can be designed and operated over extended planning periods to meet water quality and public health objectives, onsite technologies will gain stature equal to conventional sewerage. This will be achieved only through centralized management. While "decentralization" of treatment is the outcome, centralization of management must be the approach. Service rather than technology needs to be our focus!

Integrated Wastewater Management

Appropriate application of technology is our objective. Appropriateness should be based on public health and environmental objectives as well as cost effectiveness in terms of both monetary and non-monetary considerations. More than likely, this may mean that the most appropriate wastewater facility for a community will be a mix of both conventional sewerage and onsite systems under management by a single utility district. If this concept is ever to be accepted by regulators, engineers, and the public, onsite treatment practices must improve.

Designing for Water Quality

Application of onsite treatment must be driven by performance goals rather than prescriptive requirements. We will not solve problems if we are more concerned about setback distances, percolation rates, or number of bedrooms than we are about treatment needs. Existing homes on small lots or unsuitable soils must have alternatives to conventional sewerage unless we are willing to evict the occupants. Selection of wastewater treatment alternatives must be based on appropriateness in meeting water quality objectives cost effectively rather than arbitrary rule requirements.

Integrating the Regulatory Framework

The focus of onsite wastewater treatment design has been protection of public health through methods that prevent contact between us and the wastewater rather than achieving water quality objectives. This is done by insisting that the wastewater be "disposed" below ground surface and that minimum horizontal setback distances be maintained from wells and surface water. This public health focus is why onsite treatment is regulated by prescription through public health agencies rather than by treatment performance through water quality agencies. As long as two agencies with conflicting requirements are regulating wastewater treatment, implementation of integrated wastewater management will be difficult. However, integrating onsite and municipal wastewater treatment programs within a single regulatory program is not likely to be successful until we have successfully demonstrated that onsite treatment systems can be designed and operated to meet water quality goals. Many state water quality agencies operate under the misperception that onsite treatment is not capable of protecting water quality.

Implementing Centralized Management

An impediment to implementing centralized management of onsite systems is the perception that enabling legislation is needed to operate and maintain treatment components on private property. This is not the case. In most states, sewerage districts now have the necessary powers to operate and maintain onsite treatment facilities when perpetual easements are obtained from the property owner. In most cases, no enabling legislation is needed. Experience has shown that most property owners will give such easements freely if they are assured that they no longer will have the responsibility for their system and that public financing for construction of the facility will be provided. This was demonstrated many times under the Innovative/Alternative Technology program of the EPA [Environmental Protection Agency] construction grants program that funded alternative sewer and onsite management district projects. Enabling legislation may be required only if it is necessary to revise the prevailing onsite design code to accept alternative designs.

Assessing Appropriateness

In selecting any technology for a given application there are trade-offs. If centralized wastewater management of onsite treatment systems is to be a reality, we must be able to evaluate advantages and disadvantages of conventional sewerage and onsite and cluster treatment objectively. In the end, the user should be satisfied that the service provided is the most appropriate. In other words, the user should be willing to pay for the

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service. It is important to understand that the user's willingness to pay is a separate issue from their ability to pay. Affordability is an issue of public funding; willingness to pay is an issue of recognized appropriateness.

The prevailing belief that conventional sewerage is the most appropriate method of wastewater treatment has created biases that make it difficult to objectively evaluate onsite and cluster technology options. Many disadvantages of central sewerage are overlooked, just as many advantages of onsite treatment are disregarded. To gain objectivity, conventional thinking must be challenged and a new paradigm defined. We should not continue to assume that conventional sewerage is the only appropriate approach and then accommodate the resulting consequences of our assumption. Rather, we should begin by defining the long-range development needs of the community and water quality goals for the area to define the criteria of appropriateness. Tables 1 and 2 present some of the comparative advantages and disadvantages of conventional sewerage and onsite/cluster treatment within an integrated wastewater management district.

Conclusion

Decentralized wastewater treatment is a misnomer. Integrated wastewater management that includes conventional central sewerage as well as onsite treatment is the paradigm that we must adopt. Facility planning for unsewered communities should evaluate both conventional sewerage and onsite and cluster treatment to provide service to every property in the planning area all under central management. Integrated wastewater management is not an either/or approach, but an approach that applies the most appropriate technology in each sub-area of the planning area. In most cases, a mix of conventional sewerage and onsite/cluster treatment may be the most appropriate alternative.

Significant barriers remain to be overcome before widespread implementation of integrated wastewater management will be realized, however. Principle among these barriers is the generally held belief that conventional sewerage is the superior approach for all wastewater treatment. This belief is strongly held not because of ignorance by regulators, planners, engineers and the public, but because onsite treatment systems have not been adequately managed to meet public health and water quality goals. Until onsite treatment systems are designed for performance and managed by qualified third parties, affordable wastewater management will remain beyond our reach.

Richard Otis is vice president of Applied Technologies for Ayres Associates in Madison, Wisconsin.

Table 1

Comparative advantages of conventional sewerage and onsite/cluster treatment within an integrated wastewater management district

	Conventional Sewerage	Onsite/Cluster Treatment
Sewerage Development	Most appropriate for mixed, high density development	Most appropriate for low density residential and light commercial development
Treatment Area	Relatively small, remote site	Relatively low wastewater loadings resulting in advanced treatment
Effluent Discharge	Single point discharge simplifying monitoring	Basin-wide discharges for better basin water management
Treatment Capacity	Excess capacity included for planning period	Low initial implementation costs because treatment only provided for existing development
Biosolids Handling	Single collection point and treatment	Segregated, digested biosolids eliminating special treatment or disposal
Operation and Maintenance	Single treatment plant with real time operation to handle difficult wastes	Passive treatment with little need for operator intervention

Table 2

Comparative disadvantages of conventional sewerage and onsite/cluster treatment within an integrated wastewater management district

	Conventional Sewerage	Onsite/Cluster Treatment
Development	Most appropriate for mixed, high density development	Most appropriate for low density residential and light commercial development
Treatment Area	Collection sewers required and higher energy inputs necessary for adequate treatment	Multiple treatment sites require individual designs and private property access
Effluent Discharge	High mass loadings to the receiving environment	Surveillance of multiple treatment plant discharges
Treatment Capacity	High initial capital cost	Capacity must be added for each new development
Biosolids Handling	Mixed biosolids that can result in disposal restrictions	Collection of biosolids from multiple sources
Operation and Maintenance	Full time, skilled staff needed for continuous operation and maintenance	Scattered treatment sites often located on private property

Ultraviolet Disinfection Gains Popularity

by Kathy Jesperson
NSFC Contributing Writer

Editor's Note: The National Small Flows Clearinghouse (NSFC) does not endorse specific wastewater treatment products or technologies. The following article is presented in an effort to share information on emerging developments that could meet readers' wastewater treatment needs.

Disinfecting wastewater ensures a safe environment and protects the public's health by reducing the risks of waterborne diseases such as cholera, typhoid, and dysentery.

One of the growing trends in disinfection is the use of ultraviolet (UV) disinfection units. According to the Water Quality Association (WQA), "throughout the 1980s these units became much more widely used in industrial and commercial applications. Further, with the development of new materials and individual production of components, UV units are now becoming popular for single household use."

UV disinfection uses short-wave UV light to inactivate pathogens. Wastewater flows through or around a tube with UV light penetrating it from all directions. The UV light disrupts the DNA strands of the microorganisms in the wastewater and prevents them from replicating, noted the Water Environment Research Foundation's study *Comparison of UV Irradiation to Chlorination: Guidance for Achieving Optimal UV Performance*.

UV Achieves Acceptance

UV is also rapidly gaining acceptance in the U.S. as an alternative disinfectant. Unlike chlorine, UV light has the advantage of leaving no residual in the water, making it popular for wastewater treatment. In community potable water treatment, UV can be used with marginal chlorination as an alternative to full chlorination.

Another reason for UV's newfound utility may be due to the limits set on residual chlorine under the National Pollutant Discharge Elimination System (NPDES). Currently, most facilities disinfect with chlorine. A major concern with chlorine disinfection is the possibility of a reaction between organic matter in the wastewater and residual chlorine.

This reaction could form either suspected carcinogens or compounds toxic to the environment, such as trihalomethanes and chloramines. Chlorine residuals, even at low concentrations, can be hazardous to aquatic life. Often this means that treatment plants must dechlorinate their effluent, which can add to the expense of treatment.

No Dechlorination Required

Dechlorination is the process of removing free and combined chlorine ions to reduce toxicity. Sulfur dioxide, sodium bisulfite, and sodium metabisulfite are the most commonly used dechlorinating chemicals.

"Ultraviolet devices are most effective when the water has already been partially treated, and only the cleanest water passes through the

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Ultraviolet Disinfection Gains Popularity

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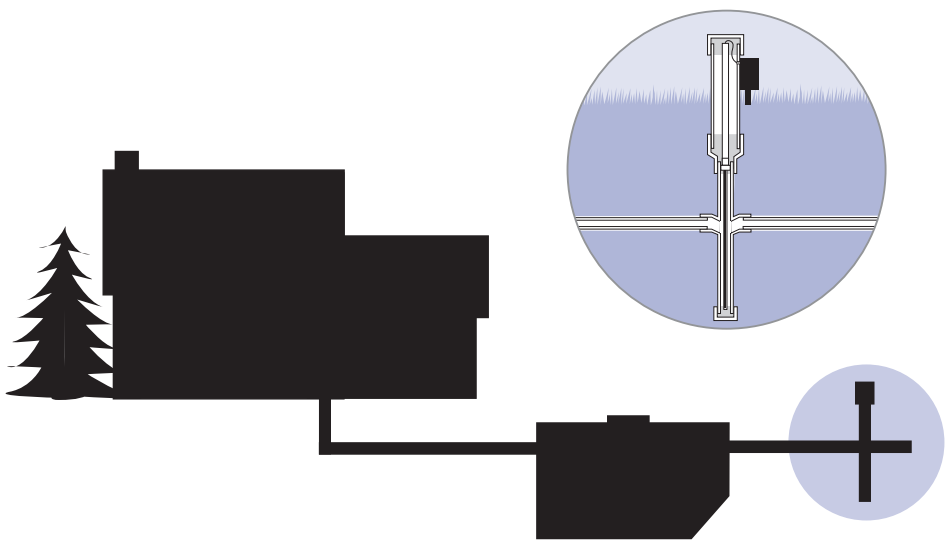
UV flow chamber," noted WQA. "An effective cleaning program is necessary to ensure that biological or chemical foulants do not block UV transmissions into the water. Suspended solid particles and organic matter can shield organisms against the light, which is why it is best to pretreat the water. UV devices are more effective against bacteria than against viruses and parasites."

Ultraviolet disinfection



Placement of the ultraviolet disinfection unit in a typical home septic system.
Courtesy of Salcor Engineering, Inc.

"New UV system designs that incorporate fouling-resistant UV transmitting flouropolymers have increased their reliability and lowered their cost," said James Cruver, president, Salcor Engineering, Inc.

"UV systems are sometimes more expensive to install, but are cheaper to maintain and use in the long run," explained Cruver. "The operating costs for UV systems turn out to be much less expensive, especially when you consider dechlorination. They don't add anything to the water, and UV systems will pay for themselves fairly quickly."

Because UV disinfection is a physical process rather than a chemical one, it is considered safe for the environment. "Clearly, one of the pros of UV disinfection is that it's a non-toxic way of disinfecting wastewater," said Jim Hoyle, environmental health specialist, Tacoma-Pierce County Health Department, Washington.

"We've looked at various ways of disinfecting wastewater, and we've taken on a conservative view of wastewater treatment," he said. "We don't want to use anything that will harm the environment so UV disinfection is probably one of the best alternatives.

"Unfortunately, because there are so few UV units installed here, we have limited data about them," Hoyle continued. "However, some of the problems we've seen with some UV units is that they claim to be watertight, but aren't. And the ease of maintenance really depends on the design.

"Most units weren't designed for individual use," he explained. "They're usually found in large treatment plants, and using a UV unit that's designed for onsite sewage treatment may provide more satisfactory performance. But we certainly do need more information about them as onsite treatment methods."

Individual Design Presents Challenges

Disinfection of home sewage treatment effluent presents unique design challenges, Cruver commented. Constraints include the following:

- Aerobic household wastewater plants are usually installed at or below grade level. The effluent pipe may be as much as 24 inches below grade, and each installation will differ. Therefore, to maintain gravity flow, the UV unit must be below grade and must have very low flow resistance.
- Components of the underground UV system must be easily accessed for service.
- Fluid carrying chambers of the UV system must be installed on a permanent basis.
- The UV disinfection system should be designed for a mild upset condition in the wastewater treatment plant. This would include a higher flow rate plus higher levels of suspended solids and biochemical oxygen demand (BOD).
- Low voltage should be used for safety.

Disinfection Chamber Design

Cruver's home-unit design includes a disinfection chamber that contains a riser section for above-ground access. It is constructed of Schedule 40 ABS soil pipe and fittings and is permanently installed in the effluent line downstream of the treatment plant.

"We intentionally oversized the system for peak flows," Cruver stressed. "The pipe we used for the system contains carbon black. This protects the pipe from the UV light. It is not lined. We considered stainless steel, but wanted to keep the cost down."

Disinfection occurs in a three-inch diameter vertical section 18 inches long, which extends downward from a double tee. Two side ports connect the chamber to the effluent pipe from the home sewage treatment system.

Disinfection Sub-Assembly

The UV light source for disinfection is mounted in a sub-assembly, which can be inserted or removed through the top of a four-inch diameter riser pipe for periodic servicing. The light source is mounted in the center of an anodized frame that divides the three-inch diameter disinfection chamber in half. The frame seals against the inner surface of the disinfection chamber to prevent flow bypass.

The UV light source is surrounded by a clear fused quartz tube to control lamp surface temperature. A clear Teflon film covers the quartz tube to minimize surface fouling.

The frame containing the UV light source connects to a one-inch diameter PVC pipe handle that extends upward to the top of the riser section, which is above grade. This enables a serviceman to easily remove it for lamp changing and maintenance.

When the disinfection chamber is filled with water, the UV light source can operate continuously, whether water is flowing or not. Continuous operation within a lamp surface temperature range of 105 to 120 degrees F provides optimum UV light output and long lamp lifetime.

A fiber optic probe conveys visible light from the UV light source to an electrical junction box mounted on the outside surface of the riser pipe above grade. Thus, the lamp operating status can be confirmed visually without the necessity of removing the disinfection sub-assembly.

Electrical Components

The UV system operates on 12-volt direct current (DC) power and consumes less than 25 watts. A two-amp DC power converter is mounted inside the home, and it plugs into a standard 110 to 120-volt alternating current outlet. The two DC converter outlet wires are joined to two 18-gauge stranded wires (not furnished), which run from the home to the UV disinfection system through an underground conduit to the electrical junction box on the above ground portion of the four-inch ABS riser pipe. The power lead wires attach to a terminal strip inside the junction box.

Recommended Servicing

Normally, aerobic home sewage treatment systems are sold with service contracts, which call for a visit by a trained serviceman every six months to inspect and perform necessary maintenance. The UV light source should be replaced annually.

For more information about the UV unit described in this article, contact Cruver at (760) 631-0975.

Fact sheets about UV disinfection will be available as part of the U.S. Environmental Protection Agency's Environmental Technology Initiative (ETI) in September 1998. To receive copies of these fact sheets, call the NSFC at (800) 624-8301 or (304) 293-4191.

For a list of UV manufacturers, request a UV disinfection Manufacturers and Consultant database search by calling the NSFC.

If you are a manufacturer of onsite, residential UV disinfection units, please call the NSFC to be added to the Manufacturers and Consultants database.

North Carolina's New Land-Based Technology Training Center Aims High

by Timothy Suhrer
Small Flows *Editor*

In 1990, the nation's first "hands-on" onsite wastewater training center with working, aboveground demonstrations was established in Chatham County, North Carolina. Its successor opened this past March in Raleigh, and this offspring plans to eclipse the accomplishments of its parent.

"The Raleigh center, located on more than 30 acres, can truly be called a national training center," said Mike Hoover, Ph.D., professor of soil science and extension soils specialist at North Carolina State University (NCSU) and the center's director. "With this facility, we're seeing the second generation of onsite wastewater training centers."

The National Training Center for Land-Based Technology and Watershed Protection is under construction at NCSU's Lake Wheeler Road Field Laboratories. It expands on the original NCSU On-Site Wastewater Training Center by incorporating other land-based technologies and pretreatment processes for domestic, agricultural and industrial wastewaters. Watershed protection and water quality improvement are complementary components.

Hoover says that the scope of the training center is much broader than existing centers, including faculty, topics, and systems. "Because the resources needed in terms of instructors, acreage, and technologies are tremendous for an expanded center of this kind, I don't see 40 other states replicating the entire center in the near future," he says, "which is why we hope it will serve the industry on a national basis, at least for the present." The center's name, he says, reflects that goal.

The North Carolina College of Agriculture and Life Sciences has dedicated more than 30 acres of land for the training center and more than $100,000 for development of a site plan and basic infrastructure (water, electricity, etc.). Complete funding for major equipment acquisition, demonstrations and displays, a state-of-the art classroom, and year-round operations is not yet secured.

"This national training center fills a critical void by providing hands-on training for a variety of waste management technologies," said Mike Cook, director of the U.S. Environmental Protection Agency's Office of Wastewater Management. "The training center not only addresses how to design and install waste treatment systems, but is focused also upon how to manage them. We think that proper management is a key to making sure that wastewater treatment systems don't contribute to environmental problems."

Participants in the training programs will include environmental health specialists, extension agents, professional engineers, soil scientists, system operators, installers, public officials, and college students.

"The training center is addressing the needs of a variety of audiences," according to Joni Tanner, the center's training coordinator. A hands-on program for installers this spring illustrated how to install pressure-dosed sand filters using prepackaged installation kits. The Subsurface System Operator Training School held each September and the On-Site Wastewater Treatment Conference during October (see sidebar) will include more than 300 environmental health specialists, professional engineers, soil specialists, system operators, and installers. "A Rural Wastewater Capacity Development Forum planned for mid-1999 will educate elected and appointed rural community decision makers about the complete range of land-based wastewater treatment technologies," said Tanner.

Specialized training areas will include onsite system demonstration, septic system research, land application training and demonstration, small community wastewater and water treatment, watershed and water quality management, and agronomic training.

Onsite System Demonstration

This area will showcase conventional, alternative, and innovative onsite technologies for the management of domestic wastewater, including advanced pretreatment and distribution technologies. The first onsite training sessions at the center were held in March for rookie sanitarians, and the onsite system area currently consists of conventional septic systems, a number of aerobic systems, a sand filter, and a peat filter. Advanced distribution components include a drip irrigation system, various pressure manifold systems, and a low-pressure pipe system.

Septic System Research

The research component of the training center is a dedicated area for controlled, long-term and replicated studies related to soil and septic system components. Research will also focus on the introduction and evaluation of new, experimental, and innovative technologies, as well as technology verification and improvement of advanced site evaluation protocols.

"The research facility at the training center not only allows us to conduct long- and short-term research that cannot be performed at private sites, but also permits onsite transfer of research findings to the trainees," said Aziz Amoozegar, Ph.D., professor of soil science at NCSU.

Land Application Training and Demonstration

This training site will feature the major types of irrigation systems used in waste application and the equipment used to land apply municipal, industrial, and animal waste sludges and slurries. According to Karl Shaffer, extension associate in soil science at NCSU and one of the leaders of the land application training and demonstration area, spray irrigation and land application systems will be ready for classes in the late fall.

Training programs involving hands-on demonstrations of conventional and newly developed land application systems will target both waste system operators and college students. Training is planned to teach participants to compare design calculations to actual, measured application rates; to prepare irrigation systems and solids and slurry application equipment to deliver prescribed rates; and to troubleshoot equipment operations. The site will feature equipment from different manufacturers to expose the participants to the widest range of technologies available.

Small Community Wastewater and Water Treatment

The wastewater collection, treatment, and disposal training area will simulate primary, secondary, tertiary, and nutrient removal technologies used by small communities. The mock utility will allow hands-on training for operators of collection systems and wastewater treatment plants, as well as operators of chemical and physical water pollution control systems. Included in the site plan are a pumping

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Mark Your Calendars

14th Annual On-Site Wastewater Treatment Conference
Securing the Future of On-Site Wastewater Systems
October 27–29, 1998
North Carolina State University
Raleigh, North Carolina

This is an advanced training program for county personnel, state agency personnel, professional engineers, consultants, installers, and soil scientists that covers:

- Pre- and Post-Installation Issues
- Pretreatment Options
- Soils and Wastewater Interactions
- System Components and Wastewater Interactions
- General Topics: Computer-Generated Site Plans, Managing Systems in a Watershed, On-Site Websites, Research Updates

The first two days will consist of classroom presentations and will include a manufacturer's exhibition. Participants can select from five field tours throughout the state for the last day's training. (One of the tours will be at the new Land-Based Technology Training Center.)

Registration Fees:
$135 Public Agency Representatives
$250 All Others

For more information and a complete brochure and registration form, call Joni Tanner at (919) 513-1678 or fax (919) 515-7494 or e-mail joni_tanner@ncsu.edu.

The National Small Flows Clearinghouse, established by the U.S. Environmental Protection Agency under the federal Clean Water Act (CWA) in 1977 and located at West Virginia University, gathers and distributes information about small community wastewater systems. *Small Flows* is published quarterly.

Small Flows
Sponsored by:

U.S. Environmental Protection Agency
Steve Hogye, *Project Officer*
Municipal Support Division
Office of Wastewater Management
Washington, D.C.

National Small Flows Clearinghouse
West Virginia University
John L. Mori, Ph.D., *Manager,*
WVU Environmental Services and Training Division
Peter Casey, P. Eng.
NSFC Program Coordinator
Timothy Suhrer, *Editor*
Natalie Eddy, *Staff Writer*
Daniel Gloyd, *Graphic Designer*

International Standard Serial Number
1060-0035

Article Submissions
Small Flows welcomes letters to the editor, articles, news items, photographs, or other materials for publication. Please address correspondence to:

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Small Flows is printed on recycled paper.

Small Flows *Research, Writing Processes Are Thorough*

The ideas behind the articles that appear in *Small Flows* come from many sources. Before the writing process even begins, the editor must decide what type of articles will appear in *Small Flows*, whether the upcoming issue will have a theme and what that theme will be, and which writer will be assigned to what articles.

Article Ideas

New story ideas come from a variety of places. The National Small Flows Clearinghouse's (NSFC) technical assistants (TA) suggest article ideas garnered from their contacts with our readers. Often the TAs return from conferences with new story ideas stemming from presentations they have attended and from speaking with our readers in person. The NSFC's toll-free technical assistance hotline also provides a medium for story ideas. If the TAs find that many callers have been requesting information regarding similar subjects, then they may suggest the topic for a future *Small Flows* issue.

On occasion, readers' letters to the editor may bring to light a new idea or direction for an article. *Small Flows* also accepts externally submitted articles addressed to the editor, if it is deemed to be of interest to our readers and meets NSFC's publication standards. Another source for article ideas is the bi-annual readership survey. (See related article on page 2.) When a large number of readers suggest or request similar subjects, the editor often will use these suggestions to begin developing ideas for upcoming articles.

Planning Meetings

Every three months the *Small Flows* editor convenes a newsletter planning meeting, where the NSFC program coordinator, writers, and TAs discuss the feasibility of particular articles, suggest additional topics, offer possible contacts that writers may need, and talk over different article angles and opinions. Often totally new article ideas or even substantially altered ideas evolve from these brainstorming sessions.

Some story ideas are discarded when a writer or TA comments that such an article was published recently by another publication or is not particularly relevant to our audience.

Once the editor decides which stories will be featured in *Small Flows*, a writer and a TA are paired up to ensure that the technical aspects of the story are complete, correct, understandable, and pertinent. Of course the writers also work directly with external sources as well.

Review Process

Each article is reviewed at various stages throughout the writing process to ensure it is accurate and meets the needs of *Small Flows* readers. Often times, more information comes to light that can alter the focus or direction of an article midway through the allotted writing time. Also the writer may discover that the subject is far too broad to be covered adequately in a single story.

After Publication

Once *Small Flows* reaches our readers, the editor often receives calls requesting permission to reprint or copy certain articles so they may be distributed to community residents, co-workers, local and government officials, and friends. These requests are granted, as long as the material is not altered or used for commercial purposes. The editor also requests that a copy of the printed piece be sent to NSFC.

Are you interested in contributing articles or story ideas to Small Flows*? If so, please contact Tim Suhrer, editor, at P.O. Box 6064, Morgantown, WV 26506-6064, or send e-mail to tsuhrer@wvu.edu.*

NSFC Offers More Informational Products on Biosolids

In this issue of *Small Flows*, the National Small Flows Clearinghouse (NSFC) technical assistants answer the biosolid question: What are class A and B regulations? The NSFC offers a variety of products to help our readers understand biosolids.

Phosphorus Removal

This technical manual summarizes process design information about available phosphorus-removal methods, including biological activity and chemical precipitation. Design considerations, cost comparisons, and case histories are provided.

This cost for this book is $17.70; shipping and handling charges do apply. Ask for Item #WWBKDM41. (1987)

Dewatering Municipal Wastewater Sludges

This manual presents information on dewatering processes for municipal wastewater sludges, including design parameters, performance capabilities, and design deficiencies.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKDM42. (1987)

In-Vessel Composting of Municipal Wastewater Sludge

This report provides eight case studies on in-vessel facilities and describes each facility, its history, performance, and operation. It also includes design and operating considerations for future in-vessel and other sludge composting systems.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKDM80. (1989)

Surface Disposal of Sewage Sludge and Domestic Septage

This manual focuses on surface disposal sites subject to the 40 Code of Federal Regulations (CFR), Part 503, and on landfill units subject to 40 CFR, Part 258, regulations. It explains how these requirements influence selection, design, and operation of these sites and units.

This costs $42.95; shipping and handling charges also apply. Ask for Item #WWBKDM81. (1995)

Guide to Septage Treatment and Disposal

This guide presents practical information on the handling, treatment, and disposal of septage for use by administrators of waste management programs and septage hauling facilities. A list of state and U.S. Environmental Protection Agency (EPA) regional septage coordinators is included.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKGN58. (1994)

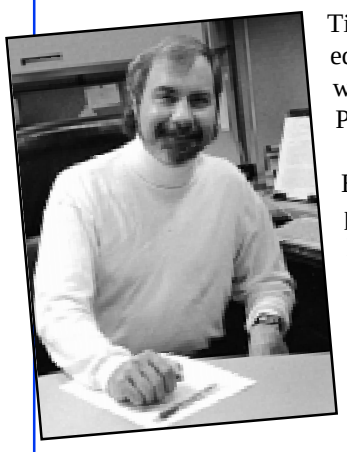
Guide to Biosolids Risk Assessments for the EPA Part 503 Rule

This guide has been prepared to provide an understanding of the risk assessment process that was conducted as a basis for the Part 503 biosolids rule. The document takes the reader through the multiple step risk assessment process. It also highlights some of the key features of the biosolids surface disposal and incineration risk assessments.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKGN85. (1995)

Continued on page 2

Suhrer Named Small Flows *Editor*



Timothy Suhrer, who was serving as promotions writer/editor for the National Small Flows Clearinghouse (NSFC), was named editor of *Small Flows* in June, according to Peter Casey, NSFC program coordinator.

Before joining NSFC, Suhrer had worked as an editor and project manager for the Envision Development Group, Inc., in Morgantown, WV, where he directed teams of graphic artists, word processors, and other editors in the production of mixed media corporate training courses.

Suhrer also has extensive newspaper experience, working as a reporter for many years, as well as serving as editor for an advertising agency.

Suhrer said, "I'll be working to expand the reputation of *Small Flows* and looking closely at the results of our latest readership survey to see how we can best serve our readers."

NSFC Products insert

West Virginia University
Morgantown, WV
(800) 624-8301
(304) 293-4191

NSFC Offers More Informational Products on Biosolids

Continued from page 1

Biosolids Management Handbook for Small Publicly Owned Treatment Works
This handbook serves as a guide for small publicly owned treatment works to maintain compliance under the 40 CFR, Part 503, standards for the use and disposal of sewage sludge. It addresses operating practices and standard interpretation of land application, surface disposal, and incineration.

The cost for this book is $37.05; shipping and handling charges also apply. Ask for Item #WWBKMG02. (1995)

POTW Sludge Sampling and Analysis Guidance Document
This manual is intended to provide guidance in developing and implementing a publicly owned treatment works sampling and analysis program for gathering information on sludge quality as well as determining compliance with permit conditions. Based on current state-of-the-art field and laboratory practices, this manual is recommended for all sludge sampling and analysis programs.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKOM09. (1989)

Control of Pathogens and Vector Attraction in Sewage Sludge
This EPA document describes the federal requirements for pathogens in sewage sludge applied to land or placed on a surface disposal site, and provides guidance for those requirements. Appendices provide information on determining volatile solids and residence time for digestion, sample methods for meeting pathogen reduction requirements, and a list of state and EPA regional sludge coordinators.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKRG30. (1992)

Standards for the Use and Disposal of Sewage Sludge
Standards for the use and disposal of sewage sludge are provided in this document. Areas covered include land application, surface disposal, pathogens and vector attraction reduction, incineration, sludge application rate determination on an annual basis, pathogen treatment processes, and compliance periods and analysis of the sludge.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKRG35. (1992)

Plain English Guide to the EPA Part 503 Biosolids Rule
This document helps with understanding, interpreting, and implementing the Part 503 Rule. A detailed description of the requirements associated with land application, surface disposal, incineration, pathogen and vector attraction reduction, and sampling and analysis is provided. A quick reference of permit application requirements and state and federal biosolids contacts is provided.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKRG38. (1994)

Land Application of Sewage Sludge
This document provides land appliers of sewage sludge with sufficient guidance to fully comply with all applicable Part 503 requirements. It provides a general understanding of the rule and its principles and includes definitions of sewage sludge, land application, and an explanation of who is considered a land applier.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKRG43. (1994)

Preparing Sewage Sludge for Land Application or Surface Disposal
This document focuses on the monitoring, record keeping, and reporting requirements that apply to those people who prepare sewage sludge or a material derived from sewage sludge.

The cost of this book is $7.90; shipping and handling charges also apply. Ask for Item #WWBKRG44. (1993)

Surface Disposal of Sewage Sludge
This document assists owners and operators of surface disposal sites for sewage sludge in complying with the Part 503 rule. Details are provided on monitoring, record keeping, and reporting requirements for surface disposal.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKRG45. (1994)

Part 503 Implementation Guidance
This document provides information that may be needed to properly implement Part 503—for the use and disposal of sewage sludge. A permit writer (state or federal regulator) may use the information in this document to establish appropriate permit requirements for sewage sludge use or disposal. This document may also be used as a reference manual.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBKRG50. (1995)

Septage Computer Search
This NSFC computer search includes more than 80 abstracts of articles on septage. Design guidelines for treatment and disposal, composting, disposal in sanitary landfills, and management are discussed.

The cost of this book is $7.90; shipping and handling charges also apply. Ask for Item #WWBLCM09. (1993)

Composting of Municipal Wastewater Sludges
This EPA publication provides practical information about methods of composting municipal wastewater sludges and includes sections on the principles of the process, system design, public relations, distribution, economics, regulations, and guidelines.

The cost of this book is $10.20; shipping and handling charges also apply. Ask for Item #WWBKDM44. (1985)

Biosolids Recycling: Beneficial Technology for a Better Environment
This booklet discusses and reaffirms the EPA policy encouraging the beneficial use of biosolids. It concludes with a discussion of the scientific basis of the rule and a list of contacts for additional information regarding the rule and risk assessment.

This book is free. Shipping and handling charges do apply. Ask for Item #WWBLGN59. (1994)

Sewage Sludge (Biosolids) Use or Disposal Documents
Developed by the EPA, this booklet lists sewage sludge publications available from various agencies and organizations.

The cost of this booklet is 60 cents; shipping and handling charges also apply. Ask for Item #WWBLGN91. (1996)

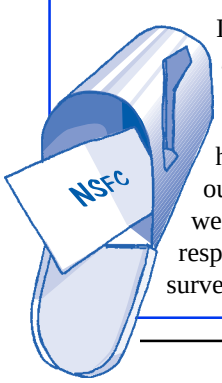
Proper Treatment and Uses of Septage
This video discusses the advantages of land application of sewer sludge (septage) in Florida. The land application of septage is regulated by the EPA and the Florida Department of Health and Rehabilitative Services. This video details the collection of septage, stabilization process, inspections, land application process, and the benefits of land application.

The cost of this video is $15.00; shipping and handling charges also apply. Ask for item #WWVTGN87. (1995)

Innovations in Sludge Drying Beds: A Practical Technology
Paved beds and reed beds as alternatives to conventional sand beds are discussed in this brochure.

This brochure is free. Shipping and handling charges do apply. Ask for Item #WWBRGN20. (1987)

Have you returned your readership survey?



In the Spring 1998 *Small Flows*, we included a readership survey designed to help us better serve our readers. Thus far, we have had a good response; more than 200 surveys have been returned. However, we know that there are many more surveys that have not yet been filled out and mailed.

Please take some time to fill out your survey and return it to us. It will take only a few minutes, and the mailing cost is prepaid.

We hope that the survey results will tell us what our subscribers like, dislike, and want to see more or less of. Any input that you provide will help determine future issues of *Small Flows*. So don't be left out, return your survey today!

National Small Flows Clearinghouse Products List

The National Small Flows Clearinghouse (NSFC) helps small communities reach practical, affordable solutions to their wastewater treatment problems.

The NSFC offers more than 300 different manuals, booklets, pamphlets, and videotapes. These materials range from technical design manuals that detail system design, to general interest videotapes that help small communities plan for their environmental needs.

New products are added regularly and are indicated by a shaded box. Occasionally, the price for a product may change because the product has been updated, or because it is no longer available and is now being photocopied. These price changes are indicated with an astrisk (*).

To place an order, follow the directions on the order form on page 8 of this insert. Abstracts of many products are provided in the NSFC's new *Guide to Products and Services*. The guide may be downloaded via the NSFC's Web site (*http://www.nsfc.wvu.edu*).

Case Studies

WWBLCS02	Vacuum Collection System (Cedar Rocks, West Virginia)	$1.30*
WWBLCS03	Variable Grade Effluent Sewers (Maysville Area, Muskingum County, Ohio)	$1.90
WWBLCS04	Alternating Bed Soil Absorption Systems (Crystal Lakes, Colorado)	$2.05*
WWBLCS05	Intermittent Sand Filter (Gardiner, New York)	$1.45*
WWBLCS06	Overland Flow (Kenbridge, Virginia)	$2.45
WWBLCS07	Wetlands/Marsh (Cannon Beach, Oregon)	$2.05
WWBLCS09	Slow Rate Land Treatment (Craigsville, Virginia)	$1.90
WWBLCS10	Year-Round Slow-Rate Land Treatment (Hershey's Mills, Pennsylvania)	$1.90*
WWBLCS11	Flat Grade Sewers (Ericson, Nebraska)	$1.05
WWBLCS12	Grinder Pump Pressure Sewers (Augusta, Maine)	$1.15
WWBLCS13	Minimum Grade Effluent Sewers (Dexter, Oregon)	$1.45
WWBLCS14	New York State Free Access Intermittent Sand Filter	$2.45
WWBLCS18	New York State Septic Tank Effluent Collection and Sand Filter Treatment	$2.20*
WWBLCS21	Pollution Prevention at POTWs	$0.00
WWBKCS22	Combined Sewer Overflows and the Multimetric Evaluation of Their Biological Effects: Case Studies in Ohio and New York	$0.00

Computer Searches

WWBKCM01	Constructed Wetland, May 1998	$19.70
WWBLCM02	Composting Toilets, May 1998	$5.35
WWBKCM03	Failing Systems, May 1998	$13.95
WWBKCM04	Greywater, May 1998	$8.50
WWBLCM05	On Site Management, May 1998	$6.90
WWBKCM06	Mound Systems, May 1998	$10.10
WWBKCM07	Pressure Sewers, May 1998	$7.80
WWBKCM08	Sand Filters, May 1998	$17.70
WWBKCM09	Septage, May 1998	$7.90
WWBKCM10	Wastewater Characteristics, May 1998	$13.40
WWBKCM11	Water Conservation, May 1998	$12.95
WWPCCM12	Customized Bibliographic Database Search	Varies
WWPCCM15	Facilities Database Search	Varies
WWPCCM16	Manufacturers and Consultants Database Search	Varies
WWBKCM17	Lagoons, May 1998	$21.70
WWBLCM18	Drip Irrigation, May 1998	$2.75
WWBLCM19	Spray System, May 1998	$6.75
WWBLCM20	Additives, May 1998	$2.05
WWBLCM21	Low-Flush Toilet, May 1998	$2.75
WWBLCM22	Operator Health and Safety, May 1998	$2.90
WWBKCM23	Disinfection, May 1998	$12.25
WWBKCM24	Site Evaluation, May 1998	$8.50

Computer Software

WWSWDM39	Airvac Version 3.2 and User's Guide	$6.90
WWSWDM55	Station Version 3.0 and User's Guide	$6.45*
WWSWDM58	User Documentation: POTW Expert Version 1.0	$30.75*
WWSWDM77	Gravity Sewer Design Version 2.2 M and User's Guide	$6.05*
WWSWDM79	Variable Grade Effluent Sewer Design Version 2.2 M and User's Guide	$9.20

Design Manuals/Modules

WWBLDM01	Subsurface Soil Absorption of Wastewater: Artificially Drained Systems	$2.45
WWBKDM02	Cost Effectiveness Analysis	$7.65*
WWBLDM03	Onsite Wastewater Disposal: Distribution Networks for Subsurface Soil Absorption Systems	$6.65
WWBLDM04	Onsite Wastewater Disposal: Evapotranspiration and Evapotranspiration/Absorption Systems	$2.30
WWBLDM07	Low-Pressure Sewer Systems	$6.75*
WWBLDM08	Management Plans and Implementation Issues: Small Alternative Wastewater Systems Workshops	$3.05
WWBLDM09	Wisconsin Mound Soil Absorption System Siting, Design, and Construction Manual	$5.90*
WWBLDM12	Site Evaluation for Onsite Treatment and Disposal Systems	$5.65
WWBLDM13	Design Workbook for Small-Diameter, Variable-Grade, Gravity Sewers	$6.65
WWBLDM14	Subsurface Soil Absorption of Wastewater: Trenches and Beds	$3.60
WWBLDM15	Vacuum Sewerage	$7.05*
WWBLDM16	Subsurface Soil Absorption System Design Work Session: New Development—Stump Creek Subdivision	$6.20*
WWBLDM18	Onsite Wastewater Treatment: Septic Tanks	$2.20
WWBLDM20	Technology Assessment of Intermittent Sand Filters	$5.20*
WWBLDM21	Design and Installation of Low-Pressure Pipe Waste Treatment Systems	$4.75
WWBLDM22	Variable Grade Sewers: Special Evaluation Project	$2.45
WWBKDM31	Planning Wastewater Management Facilities for Small Communities	$22.30*
WWBKDM35	Onsite Wastewater Treatment and Disposal Systems	$45.00
WWBKDM36	Municipal Wastewater Stabilization Ponds	$47.25*
WWBKDM38	Constructed Wetlands and Aquatic Plant Systems for Municipal Wastewater Treatment	$10.00
WWBLDM40	Sequencing Batch Reactors	$3.45
WWBKDM41	Phosphorus Removal	$17.70*
WWBKDM42	Dewatering Municipal Wastewater Sludges	$0.00
WWBKDM43	Odor and Corrosion Control in Sanitary Sewage Systems and Treatment Plants	$19.70*
WWBKDM44	Seminar Publication: Composting of Municipal Wastewater Sludges	$10.20*
WWBKDM46	Retrofitting POTWs	$0.00
WWBKDM47	Fine Pore Aeration Systems	$0.00
WWBLDM48	EPA Environmental Regulations and Technology: The National Pretreatment Program	$4.20
WWBKDM49	Municipal Wastewater Disinfection	$0.00

Explanation of Item Number

First two characters of item number: (Major Product Category)

- WW Wastewater
- FM Finance and Management
- GN General Information
- SF Small Flows

Second two characters of item number: (Document Type)

- BK Book, greater than 50 pages
- BL Booklet, less than 50 pages
- BR Brochure
- FS Fact Sheet
- JR Journal
- NL Newsletter
- PC Customized Computer Search
- PL Pipeline
- PK Packet
- PS Poster
- SW Software
- VT Videotape

Third two characters of item number: (Content Type)

- BI Back Issue
- CM Computer Search
- CS Case Study
- DM Design Manuals
- FN Finance
- GN General Information
- NL Newsletter
- OM Operation and Maintenance
- PE Public Education
- PP Public-Private Partnerships (P3)
- RE Research
- RG Regulations
- TR Training

Last two characters of item number:

Uniquely identifies product within major category.

*Note: Shaded areas are new products. * Denotes price, title, or item # change.*

products list

products

WWBKDM50 Identification and Correction of Typical Design Deficiencies at Municipal Wastewater Treatment Facilities $59.35*
WWBKDM53 Alternative Wastewater Collection Systems $25.00
WWBKDM57 Control of Slug Loadings to POTWs Guidance Manual $15.00*
WWBKDM59 Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program $51.30
WWBLDM65 General Design, Construction, and Operation Guidelines: Constructed Wetlands Wastewater Treatment Systems for Small Users Including Individual Residences (Second Edition) $5.00
WWBKDM68 Technical Support Document for Water Quality Based Toxics Control $0.00
WWBKDM69 Ultraviolet Disinfection Technology Assessment $0.00
WWBKDM70 Wastewater Treatment and Disposal Systems for Small Communities $16.55*
WWBKDM71 Retrofitting POTWs for Phosphorus Removal in the Chesapeake Bay Drainage Basin $0.00
WWBKDM72 Guidelines for Water Reuse $30.00
WWBKDM73 Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors $0.00
WWBKDM74 Subsurface Flow Constructed Wetlands for Wastewater Treatment $12.25
WWBKDM75 Combined Sewer Overflow Control $0.00
WWBLDM76 Mound Systems: Pressure Distribution of Wastewater Design and Construction in Ohio $2.75
WWBKDM80 In-Vessel Composting of Municipal Wastewater Sludge $0.00
WWBKDM81 Surface Disposal of Sewage Sludge and Domestic Septage $42.95*
WWBKDM83 Handbook of Constructed Wetlands: Volume 1 ..... $10.10
WWBLDM84 Handbook of Constructed Wetlands: Volume 2, Domestic Wastewater $4.35
WWBLDM85 Handbook of Constructed Wetlands: Volume 3, Agricultural Wastewater $4.60
WWBLDM86 Handbook of Constructed Wetlands: Volume 5, Stormwater $5.50

Fact Sheets

WWFSGN84 Constructed Wetlands/Natural Wetlands $0.30

Finance and Management

FMBKCS21 Cost Savings Models for Environmental Protection: Helping Communities Meet Their Environmental Goals $13.40*
WWBRFN02 EPA's Clean Water Act-Indian Set-Aside Grant Program $0.00
FMBLFN03 A Water and Wastewater Manager's Guide for Staying Financially Healthy $0.00
WWBLFN03 Answers to Frequently Asked Questions About the US EPA Clean Water Indian Set-Aside Grant Program $0.00
WWFSFN04 Rural Community Assistance Program (RCAP) Help for Small Community Wastewater Projects $0.00
FMBKFN06 Combined Sewer Overflows: Guidance for Funding Options $5.00
FMBKFN12 Alternative Financing Mechanisms for Environmental Programs $17.50
FMBLFN13 A Utility Manager's Guide to Water and Wastewater Budgeting $0.00
FMBLFN14 State and Local Government Guide to Environmental Program Funding Alternatives $3.75
FMSWFN16 Determining Wastewater User Service Charge Rates $5.00
FMBLFN17 The Road To Financing, Assessing, and Improving Your Community's Credit Worthiness $0.00
FMBKFN18 Financing Models for Environmental Protection: Helping Communities Meet Their Environmental Goals $0.00
FMBLFN19 Evaluating Municipal Wastewater User Charge Systems $5.50
FMBLFN20 Clean Water State Revolving Fund $0.00
FMBKFN22 Beyond SRF: A Workbook for Financing CCMP Implementation $0.00
FMFSFN24 Clean Water State Revolving Fund Program $0.00
FMBLFN25 Clean Water State Revolving Fund Funding Framework $0.00
FMBKFN26 CSO's: Guidance for Financial Capability Assessment and Schedule Development $0.00
FMFSFN27 Hardship Grants Program for Rural Communities $0.00
FMBLFN29 Federal Funding Sources for Small Community Wastewater Systems $0.00
FMBKGN01 It's Your Choice: A Guidebook for Local Officials on Small Community Wastewater Management Options $7.50
FMBLGN04 Looking at User Charges: A State Survey and Report $5.20
FMBKGN11 Andrew W. Breidenback Environmental Research Center Small Systems Resource Directory $0.00
FMBLGN14 Watershed Approach Framework $0.00
FMBLGN15 Why Watersheds? $0.00
FMBKMG02 Management of a Construction Project. A Guide for Grantees $4.55
FMBLMG05 Septic Systems and Ground Water Protection: An Executive's Guide $2.05
FMBKPE32 Economic Benefits of Runoff Controls $0.00
FMBKPP03 Public-Private Partnerships for Environmental Facilities. A Self-Help Guide for Local Governments $0.00
FMBLPP06 Developing Public/Private Partnerships: An Option for Wastewater Financing $0.00
WWBKMG02 Biosolids Management Handbook for Small Publicly Owned Treatment Works $37.05*
WWBLMG03 Septage Management in Ohio $1.25
WWBKMG04 A Manual for Managing Septic Systems $25.75*
WWBKMG05 Draft Framework for Watershed-Based Training $0.00
WWBKMG07 Environmental Planning for Small Communities: A Guide for Local Decision Makers $15.00

General Information

GNBKGN02 Federal Agency Ground Water Technical Assistance Directory $0.00
GNBLGN03 Watershed Protection Approach $0.00
GNBLGN04 ENVEST: Engineers Volunteering Environmental Service Teams $0.90*
WWBKGN05 Small Town Task Force $5.00
GNBRGN06 Watershed Approach $0.00
GNBKGN08 Watershed Protection: A Project Focus $0.00
GNBLGN09 Office of Compliance An Introductory Guide $0.00
GNBKGN10 Top 10 Watershed Lessons Learned $0.00
GNBLGN11 Section 319 National Monitoring Program: An Overview $0.00
WWBRGN15 Water Reuse via Dual Distribution Systems $0.00
WWBLGN16 Report on the Use of Wetlands for Municipal Wastewater Treatment and Disposal $5.75*
WWBRGN19 Natural Systems for Wastewater Treatment in Cold Climates $0.00
WWBRGN20 Innovations in Sludge Drying Beds: A Practical Technology $0.00
WWBLGN31 Inflow/Infiltration: A Guide for Decision Makers $6.20*
WWBKGN35 Municipal Wastewater Reuse: Selected Readings on Water Reuse $10.50*
WWBKGN36 Waste Water Justice? Its Complexion in Small Places Appendix $0.00
WWBKGN39 Septic Tank Siting to Minimize the Contamination of Ground Water by Microorganisms $13.95
WWBLGN40 EPA Journal Reprint: Protecting Ground Water, The Hidden Resource $4.60*
WWBLGN55 GAO Report: Water Pollution—Information on the Use of Alternative Wastewater Treatment Systems $2.00
WWBKGN58 Guide to Septage Treatment and Disposal $0.00
WWBLGN59 Biosolids Recycling: Beneficial Technology for a Better Environment $0.00
WWBLGN62 Office of Wastewater Management Primer $4.35
WWBRGN63 Clean Water . . . A Better Environment: Wastewater Management at EPA $0.00
WWBRGN64 Source Reduction, An Integral Part of the MWPP Program $0.00
WWBLGN65 Marine and Estuarine Protection Programs and Activities $0.00
WWBKGN67 Summary Report: Small Community Water and Wastewater Treatment $12.35*
WWBLGN71 Combined Sewer Overflows: Screening and Ranking Guidance $0.00
WWBKGN72 Combined Sewer Overflows: Guidance for Long Term Control Plan $0.00
WWBKGN73 Combined Sewer Overflows: Guidance for Permit Writers $0.00
WWBLGN78 United States Census Data: 1980 and 1990 ..... $0.90*
WWBLGN79 Combined Sewer Overflow Control Policy: A Consensus Solution to Improve Water Quality $0.60

WWBKGN85	Guide to the Biosolids Risk Assessment for the EPA Part 503 Rule	$0.00
WWBRGN88	Clean Vessel Act: Keep Our Water Clean—Use Pumpouts	$0.00
WWBKGN89	National Onsite Wastewater Treatment: A National Small Flows Clearinghouse Summary of Onsite Systems in the United States, 1993	$17.50
WWBKGN90	Seminar Publication: National Conference on Sanitary Sewer Overflows	$0.00
WWBLGN91	Sewage Sludge (Biosolids) Use or Disposal Documents	$0.60*
WWBKGN92	Commitment to Watershed Protection: A Review of the Clean Lakes Program	$0.00
WWBKGN93	Response to Congress on Use of Decentralized Wastewater Treatment Systems	$13.10
WWBLGN94	Waste Water Justice? Its Complexion in Small Places	$0.00
WWBKGN96	Compendium of Tools for Wastewater Assessment and TMDL Development	$0.00
WWBKHD52	Directory of Local Health Departments	$26.45*
GNBKIN05	Designing a Water Conservation Program: An Annotated Bibliography of Source Materials	$0.00
WWBKGN97	1996 Clean Water Needs Survey Report to Congress	$15.80

NSFC Newsletters

GNBKIN01	NSFC Publications Index, 1997	$0.00
GNNLBI24	Small Flows, July 1993	$0.00
GNNLBI27	Small Flows, Spring 1994	$0.00
GNNLBI28	Small Flows, Summer 1994	$0.00
GNNLBI29	Small Flows, Fall 1994	$0.00
GNNLBI31	Small Flows, Spring 1995	$0.00
GNNLBI32	Small Flows, Summer 1995	$0.00
GNNLBI33	Small Flows, Fall 1995	$0.00
GNNLBI34	Small Flows, Winter 1996	$0.00
GNNLBI35	Small Flows, Spring 1996	$0.00
GNNLBI36	Small Flows, Summer 1996	$0.00
GNNLBI37	Small Flows, Fall 1996	$0.00
GNNLBI38	Small Flows, Winter 1997	$0.00
GNNLBI39	Small Flows, Spring 1997	$0.00
GNNLBI43	Small Flows, Spring 1998	$0.00
GNNLBI44	Small Flows, Summer 1998	$0.00
SFJRNL01	Small Flows Journal, Vol. 1, No. 1	$0.00
SFJRNL02	Small Flows Journal, Vol. 2, No. 1	$0.00
SFJRNL04	Small Flows Journal, Vol. 4, No. 1	$0.00
SFPLNL01	CSO Pipeline	$0.20
SFPLNL02	Septic Tanks Pipeline	$0.20
SFPLNL03	Septic Tanks Operation and Maintenance Pipeline	$0.20
SFPLNL04	Aerobic Treatment Units Pipeline	$0.20
SFPLNL05	Management Programs Can Help Small Communities Pipeline	$0.20
SFPLNL06	Wastewater Treatment Protects Small Community Life, Health Pipeline	$0.20
SFPLNL07	Alternative Sewers Pipeline	$0.20
SFPLNL08	Choose the Right Consultant for Your Wastewater Project Pipeline	$0.20
SFPLNL09	Lagoon Systems Pipeline	$0.20
SFPLNL10	Sand Filters Pipeline	$0.20
SFPLNL11	Wastewater Characteristics Pipeline	$0.20
SFPLNL12	A Homeowners Guide to Onsite System Regulations	$0.20
SFPLNL13	Onsite System Inspection Pipeline	$0.20*
SFPLNL14	Constructed Wetlands Pipeline	$0.00

Operation and Maintenance

WWBLOM01	Reducing the Cost of Operating Municipal Wastewater Facilities	$0.00
WWBKOM02	Cost Reduction and Self-Help Handbook	$15.55*
WWBLOM04	Contract Operation and Maintenance: The Answer for Your Town?	$1.90
WWBLOM05	Analysis of Performance Limiting Factors (PLFs) at Small Sewage Treatment Plants	$3.05
WWBLOM06	The Onsite Operator Training Program: Success in Every Region!	$3.75
WWBLOM07	Alternative Sewers Operation and Maintenance Special Evaluation Project	$2.60
WWBKOM08	Combined Sewer Overflows: Guidance for Nine Minimum Controls	$0.00
WWBKOM09	POTW Sludge Sampling and Analysis Guidance Document	$0.00
WWBKOM16	Detection, Control, and Correction of Hydrogen Sulfide Corrosion in Existing Wastewater Systems	$22.15*
WWBKOM17	Chemical Aids Manual for Wastewater Treatment Facilities	$0.00
WWBKOM19	Inspectors Guide for Evaluation of Municipal Wastewater Treatment Plants	$0.00

Public Education

GNBLPE01	Xeriscape Landscaping: Preventing Pollution and Using Resources Efficiently	$0.00
GNBRPE02	Everyone Shares a Watershed	$0.20
GNBLPE03	DES Guide to Groundwater Protection: Answers to Questions about Groundwater Protection in New Hampshire	$2.75
GNBRPE04	Test The Waters! Careers in Water Quality	$0.20
GNBRPE05	Adopt Your Watershed	$0.00
GNBLPE06	Reflecting On Lakes: A Guide for Watershed Partnerships	$0.70
WWBLPE01	Is Your Proposed Wastewater Project Too Costly? Options for Small Communities	$0.90
WWPSPE02	Small Wastewater Systems: Alternative Systems for Small Communities and Rural Areas	$0.55
WWBLPE07	Benefits of Water and Wastewater Infrastructure	$0.00
WWBLPE08	The State of the Chesapeake Bay 1995	$0.00
WWBRPE17	Septic Systems: A Guide for Homeowners	$0.00
WWBRPE18	The Care and Feeding of Your Septic Tank	$0.00
WWBRPE20	So . . . Now You Own A Septic Tank	$0.00
WWBRPE21	Groundwater Protection	$0.00
WWBRPE22	Combined Sewer Overflows in Your Community	$0.00
WWBRPE26	Preventing Pollution Through Efficient Water Use	$0.00
WWPSPE27	Water Quality . . . Potential Sources of Pollution	$0.00
WWPKPE28	Homeowner Septic Tank Information Package (NSFC)	$2.00*
WWBLPE30	Homeowner's Septic Tank System Guide and Record Keeping Folder (NOWRA)	$0.50
WWBLPE31	Sanitary Sewer Overflows: What are they, and how do we reduce them?	$0.00
WWPSPE35	Indicator Organisms in Wastewater Treatment	$2.60
WWPSPE36	Pipeline: Small Community Options & Resources	$0.00
WWBLPE37	Homeowner Onsite System Recordkeeping Folder (NSFC)	$0.40
WWBLPE38	Wastewater Treatment: The Students Resource Guide	$1.50
WWBRPE39	Combined Sewer Overflows In Your Community	$0.60
WWPSPE41	Do More with SCORE Poster	$0.00*

Regulations

A number of the regulatory documents have been updated. Please refer to them by date.

GNBLRG01	Introduction to Water Quality Standards	$0.00
WWBKRG01	A Guide to State-Level Onsite Regulations, September 1997	$12.50
WWBKRG21	Wastewater Flow Rates from the State Regulations, September 1997	$17.70
WWBKRG22	Percolation Tests from the State Regulations, September 1997	$22.15
WWBKRG23	Alternative Toilets from the State Regulations, September 1997	$15.40
WWBLRG24	Greywater Systems from the State Regulations, September 1997	$6.90*
WWBKRG26	Package Plants and Aerobic Treatment Systems from the State Regulations, September 1997	$13.40*
WWBKRG30	Control of Pathogens and Vector Attraction in Sewage Sludge	$0.00
WWBLRG31	NPDES Storm Water Program, Question and Answer Document, Volume 1	$0.00
WWBLRG34	State Regulations Contact List, September 1997	$0.00
WWBKRG35	Standards for Use and Disposal of Sewage Sludge 40 CFR Part 503	$0.00
WWBKRG36	Domestic Septage Regulatory Guidance: A Guide to the EPA 503 Rule	$0.00
WWBLRG37	NPDES Storm Water Program Question and Answer Document, Volume 2	$0.00
WWBKRG38	Plain English Guide to the EPA Part 503 Biosolids Rule	$0.00

products

products

WWBLRG39	NPDES Self-Monitoring System User Guide	$3.90*
WWBLRG41	Federal Register Part VII EPA CSO Control Policy	$0.00
WWBLRG42	NPDES and Sewage Sludge Program Authority: A Handbook for Federally Recognized Indian Tribes	$0.00
WWBKRG43	Land Application of Sewage Sludge	$0.00
WWBKRG44	Preparing Sewage Sludge for Land Application or Surface Disposal	$7.80*
WWBKRG45	Surface Disposal of Sewage Sludge	$0.00
WWBRRG48	Florida Clean Vessel Act: What It Means For Boaters and Marinas	$0.00
WWBKRG49	Combined Sewer Overflow Control Policy	$4.75
WWBKRG50	Part 503 Implementation Guidance	$0.00
WWBKRG51	US EPA NPDES Permit Writers' Manual	$0.00

Southeast contains: AL, AR, FL, GA, KY, LA, MD, MS, NC, SC, TN, VA, & WV
Southwest contains: AZ, CO, HI, KS, MO, NE, NV, NM, OK, TX, & UT
Northeast contains: CT, DE, IN, ME, MA, NH, NJ, NY, OH, PA, RI, &VT
Northwest contains: AK, ID, IL, IA, MN, MT, ND, OR, SD, WA, WI, & WY

WWBKRG52	Septic Tanks-Southeast From the State Regulations: September 1997	$11.95
WWBKRG53	Septic Tanks-Southwest From the State Regulations: September 1997	$10.10*
WWBKRG54	Septic Tanks-Northwest From the State Regulations: September 1997	$8.50*
WWBKRG55	Septic Tanks-Northeast From the State Regulations: September 1997	$8.80*
WWBLRG56	Location, Separation and Sizing Guidelines-Southeast From the State Regulations: September 1997	$7.35
WWBLRG57	Location, Separation and Sizing Guidelines-Southwest From the State Regulations: September 1997	*$6.75*
WWBKRG58	Location, Separation and Sizing Guidelines-Northwest From the State Regulations: September 1997	$7.50
WWBKRG59	Location, Separation and Sizing Guidelines-Northeast From the State Regulations: September 1997	$8.10
WWBKRG60	Site Evaluations and Inspections-Southeast From the State Regulations: September 1997	$11.55
WWBLRG61	Site Evaluations and Inspections-Southwest From the State Regulations: September 1997	$4.35
WWBLRG62	Site Evaluations and Inspections-Northwest From the State Regulations: September 1997	$4.50
WWBKRG63	Site Evaluations and Inspections-Northeast from the State Regulations: September 1997	$13.20

Research

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WWBKRE16	Preliminary Risk Assessment for Viruses in Municipal Sewage Sludge Applied to Land	$0.00
WWBKRE17	Evaluation of Oxidation Ditches for Nutrient Removal	$15.70*
WWBLRE18	Rock-Plant Filter: An Alternative for Onsite Sewage Treatment	$1.30
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WWBLRE20	Field Performance of the Waterloo Biofilter with Different Wastewaters	$3.75*
WWBKRE21	Potential Effects of Water Softener Use on Septic Tank Soil Absorption On-Site Waste Water Systems	$7.60
WWBLRE22	Project Summary: Treatment of Municipal Waste-waters by the Fluidized Bed Bioreactor Process	$1.15
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WWBKRE24	Evaluation of the Performance of Five Aerated Package Treatment Systems	$5.00
WWBKRE25	The Expanding Dairy Industry: Impact on Ground Water Quality and Quantity with Emphasis on Waste Management System Evaluation for Open Lot Dairies	$10.60

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WWBKGN81	Disinfection Package	$14.80
WWBKGN82	Greywater Technology Package	$7.80*
WWBKGN83	Site Evaluation Information Package	$13.95
WWPKGN86	Nonpoint Pointers: Understanding and Managing Nonpoint Source Pollution in Your Community	$0.00

Training Materials

WWBKTR01	NPDES Compliance Inspection Training Program Student's Guide	$16.85
WWBLTR02	NPDES Compliance Inspection Video Workbook: Inspecting a Parshall Flume	$3.90*
WWBKTR03	NPDES Compliance Monitoring Inspector Training—Sampling	$14.25*
WWBKTR04	NPDES Compliance Monitoring Inspector Training—Biomonitoring	$10.80*
WWBKTR05	NPDES Compliance Monitoring Inspector Training—Overview	$12.35*
WWBKTR06	NPDES Compliance Monitoring Inspector Training—Legal Issues	$16.70
WWBKTR07	NPDES Compliance Monitoring Inspector Training—Laboratory Analysis	$20.00

Videotapes

FMVTMG01	Wastewater Management in Unsewered Areas	$10.00
FMVTPE01	Building Support for Increasing User Fees (videotape and workbook)	$12.60*
WWVTGN10	Morrilton, Arkansas, Land Application of Wastewater	$10.00
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WWVTGN87	Proper Treatment and Uses of Septage	$15.00
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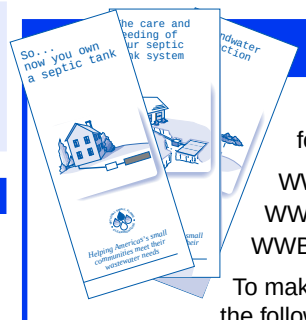

SPECIAL OFFER

NSFC is in the process of updating the following brochures:

WWBRPE18 Care and Feeding of Your Septic Tank
WWBRPE20 So...Now You Own a Septic Tank
WWBRPE21 Groundwater Protection

To make room for the new editions we are making the following offer available to our customers. In order to deplete our stock of these products these three brochures are available free in unlimited quantities as long as supplies last. You pay shipping & handling.

Many New NSFC Products Are Now Available

Site Evaluation—Computer Search

Included in this book is a listing of article citations and abstracts on the topic of site evaluation from the NSFC's Bibliographic Database. What a site evaluation is, what is involved in conducting one, and what the results will show are some of the questions that can be answered by using this collection of article abstracts.

The cost for this computer search is $8.50, plus shipping and handling. Ask for Item #WWBKCM24. (1998)

Disinfection—Computer Search

This listing of article citations and abstracts about wastewater disinfection from the NSFC's Bibliographic Database includes information about the use of ozone, ultraviolet radiation, and chlorine- and bromine-based products for individual system and small community application.

This computer search costs $12.25, plus shipping and handling. Ask for Item #WWBKCM23. (1998)

Treatment Capability of Three Filters for Septic Tank Effluent

Three different septic tank filters from two manufacturers have been developed to increase the quality of the effluent flowing from a septic tank to its attached field lines. The purpose of the filters is to prevent costly repairs to the soil absorption system. These filters can be attached to new septic tanks or retrofitted to existing septic tanks at a relatively low cost. They are constructed of PVC and attached to the interior of the septic tank on the effluent pipe.

This book costs $15.70, plus shipping and handling. Ask for Item #WWBKRE23. (1995)

Environmental Protection Agency's Clean Water Act Indian Set-Aside Grant Program

This brochure summarizes who is eligible for Clean Water Act Indian Set-Aside Grants, what types of projects are eligible, how the program works, and where to go for more information. Regional coordinators are listed for more information.

This brochure is free. Shipping and handling charges do apply. Ask for Item #WWBRFN02. (1997)

Answers to Frequently Asked Questions About the U.S. EPA Clean Water Indian Set-Aside Grant Program

Included in this booklet are answers to some of the most frequently asked questions about the Environmental Protection Agency's Indian Set-Aside (ISA) Grant Program. Regional ISA coordinators, Indian Health Service program directors, and additional sources of funding and technical assistance are provided.

This booklet is free. Shipping and handling charges do apply. Ask for Item #WWBLFN03. (1998)

Top 10 Watershed Lessons Learned

This 59-page book attempts to identify the top watershed lessons learned from partnerships among local, state, and federal entities pursuing approaches to protect watersheds and waterways. Each lesson contains a short description, examples to illustrate it, and a list of contacts and resources.

This book is free. Shipping and handling charges do apply. Ask for Item #GNBKGN10. (1997)

Section 319 National Monitoring Program: An Overview

This 22-page booklet highlights programs under Section 319 of the National Monitoring Program, which addresses nonpoint source pollution. Several watersheds across the country have been selected to be monitored to evaluate how improved land management reduces water pollution.

This booklet is free. Shipping and handling charges do apply. Ask for Item #GNBLGN11. (1997)

Rural Community Assistance Program Help for Small Community Wastewater Projects

This two-page fact sheet highlights the various projects and types of assistance that the Rural Community Assistance Program (RCAP) provides, along with funding options available through the program and where to turn for more information.

This fact sheet is free. Shipping and handling charges do apply. Ask for Item #WWFSFN04. (1997)

Adopt Your Watershed!

This brochure highlights the new watershed campaign, why it is needed, how individuals and communities can make a difference, and resources available in almost all communities.

This brochure is free. Shipping and handling charges do apply. Ask for Item #GNBRPE05. (1997)

Office of Compliance: An Introductory Guide

This booklet introduces the U.S. Environmental Protection Agency Office of Compliance and offers a summary of its major functions, activities, contacts, and a staff directory.

This booklet is free. Shipping and handling charges do apply. Ask for Item #GNBLGN09. (1998)

Homeowner Onsite System Recordkeeping Folder

This folder provides a place to keep and store information about your septic system and its maintenance, which is an important record should problems develop with the septic system or you sell your home.

The cost for this folder is 40 cents, plus shipping and handling. Ask for Item #WWBLPE37. (1998)

Septic Tanks—Southeast, from the State Regulations

Sections concerning each Southeastern state's onsite septic tank regulations were combined into this 83-page book. Design and construction guidelines, siting and installation procedures, and specific operation and maintenance duties are contained within these sections which cover 15 states. State regulatory contacts and references also are given.

The cost for this book is $11.95, plus shipping and handling. Ask for Item #WWBKRG52. (1998)

Septic Tanks—Southwest, from the State Regulations

Sections concerning each Southwestern state's onsite septic tank regulations were combined into this 69-page book. Design and construction guidelines, siting and installation procedures, and specific operation and maintenance duties are contained within these sections which cover 12 states. State regulatory contacts and references are also given.

The cost for this book is $10.10, plus shipping and handling. Ask for Item #WWBKRG53. (1998)

Septic Tanks—Northeast, from the State Regulations

Sections concerning each Northeastern state's onsite septic tank regulations were combined into this document. Design and construction guidelines, siting and installation procedures, and specific operation and maintenance duties are contained within these sections which cover 12 states. State regulatory contacts and references are also given.

The cost for this book is $8.80, plus shipping and handling. Ask for Item #WWBKRG55. (1998)

Septic Tanks—Northwest, from the State Regulations

Sections concerning each Northwestern state's onsite septic tank regulations were combined into this 58-page book. Design and construction guidelines, siting and installation procedures, and specific operation and maintenance duties are contained within these sections which cover 12 states. State regulatory contacts and references are also given.

The cost for this book is $8.50, plus shipping and handling. Ask for Item #WWBKRG54. (1998)

Evaluation of the Performance of Five Aerated Package Treatment Systems

The results described in this study indicate that overall field performance was poor due to unreliable maintenance by homeowners, an ineffective chlorinator/dechlorinator system, inadequate biological treatment, and mechanical malfunctions.

The cost for this book is $5.00, plus shipping and handling. Ask for Item #WWBKRE24. (1993)

Reflecting On Lakes: A Guide for Watershed Partnerships

This booklet takes a watershed management approach to lake protection. A list of the major threats to lake quality and potential pollution sources is given. Information on how to set realistic goals and form partnerships among citizens, government agencies, and lake associations is included.

The cost for this booklet is 70 cents, plus shipping and handling. Ask for Item #GNBLPE06.

Online Discussion Group Proves To Be Popular

The National Small Flows Clearinghouse's (NSFC) online discussion group is proving to be a popular place for people around the country to discuss wastewater issues. To date, more than 250 users have registered and a number of others have viewed the site as "guests." Topics of discussion range from septic system design criteria to integrated wastewater management.

In addition, the NSFC continues to gather information for its Facilities Database. Forms may be downloaded from the Web site so that owners, operators, or managers of small wastewater treatment systems can contribute information to help small facilities.

As in the past, the latest issue of *Small Flows*, *Pipeline*, and *The Small Flows Journal* may be downloaded via the site as well. In addition to the newsletters, the Web site also offers information on the NSFC's services, related projects, and links to other wastewater-related Web sites.

The NSFC Web site is located at *http://www.nsfc.wvu.edu.*

To Place an Order:

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Business hours are 8 a.m. to
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- ☐ Nonpoint Sources
- ☐ Research
- ☐ Training
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NSFC Teams with NSF International for ETV Project

NSF International, in partnership with the National Small Flows Clearinghouse (NSFC), the National Onsite Wastewater Recycling Association (NOWRA), and the National Environmental Health Association (NEHA), has entered into a $2.1 million cooperative agreement under the U.S. Environmental Protection Agency's (EPA) Environmental Technology Verification (ETV) Program. NSF and its partners will work jointly with EPA to develop a pilot program for verification testing of commercially available technologies for source water protection (SWP).

The focus of the ETV program is the verification of the performance of commercial-ready SWP technologies. Technologies are verified against technically appropriate protocols to develop objective, reliable data that would provide potential buyers and regulators with independent evaluations of the technology they are being asked to purchase or permit.

Awarded to the team in late May, the three-year Source Water Protection Pilot (SWPP) comes as a result of EPA's ongoing effort under President Clinton's environmental technology strategy. ETV was created to accelerate the development and commercialization of improved environmental technologies through third party verification and reporting of performance. A request for assistance issued by EPA for verification testing of SWP technologies resulted in the formation of the team. NSF, a recognized world leader in developing standards and providing certification testing, presented the proposal and was selected by EPA as the verification organization for the pilot.

"NSF is pleased to have been selected by EPA as the verification organization for ETV's Source Water Protection Pilot," said Tom Bruursema, NSF's general manager of Environmental and Research Services. "The project presents some unique challenges, as well as opportunities. We look forward to working with NSFC, NOWRA, and NEHA as we proceed with the pilot."

Groundwater contamination comes from such varied sources as septic tanks, municipal landfills, underground storage tanks and pipelines, and agricultural activities.

"The scope of source water protection is very broad," said NSF Project Manager Tom Stevens. "Our initial focus will be on technologies related to decentralized wastewater treatment such as septic tanks, aerobic systems, and alternative technologies like sand filters and peat systems. Other technologies and technology areas are expected to be added as the project develops."

"We are really excited about being part of this," said John Mori, Ph.D., manager of West Virginia University's Environmental Services and Training Division, the organization that includes NSFC. "This program will greatly assist the development of the onsite industry. The big problem has been that while there are many manufacturers of onsite systems, some provide testing and others don't. Regulators want to see test results."

EPA, NSF, and its partners will solicit input from all key stakeholders to develop protocols for performance testing of commercial-ready technologies. Performance testing will then be completed to produce credible data, and the verification results will be distributed to interested parties (e.g., regulators and potential purchasers).

One of the main elements of the project is to gain reciprocal acceptance of protocols, testing, and data generated by the project. "The NSFC will assist in dissemination of verification data and will play a key role in having the technologies accepted by state regulators," said Mori. "It's important for the onsite industry that acceptance by state regulators be reciprocal, so that these technologies can be rapidly installed across the country," he said.

The critical steps in the SWP pilot are identifying key stakeholders and consultants, establishing a Stakeholder Group, forming Technology Panels that will be responsible for developing technically sound test protocols, and verification testing following established QA/QC procedures. Stakeholders will play an integral role in protocol development and product verification testing. Consultants will be selected to develop specific protocols identified by the Stakeholder Group. Consultants are also expected to play a role in testing of products.

The pilot program is expected to be completed within three years from the start of the cooperative agreement with EPA. One task of the pilot is to develop a plan to make the program self-sustaining beyond the three-year period. One possible scenario for future operation is a partnership between NSF, NOWRA, and NSFC, with funding provided by fees paid by manufacturers for product testing and verification.

"The focus of the ETV program is verification, not approval or certification," Stevens said, "and while there are management practices that could be considered, this pilot is concerned with hardware and technologies that are readily available."

The EPA Project Officer for this pilot is Anthony Tafuri, USEPA-NRMRL, Water Supply and Water Resources Division—Urban Watershed Management Branch, Edison, NJ.

Inquiries or requests for additional information may be directed to Tom Stevens at (734) 769-5347 or by e-mail at stevens@nsf.org

North Carolina's New Land-Based Technology Training Center Aims High

Training center classroom under renovation; aerobic treatment unit and peat biofilter demonstrations in forground.

Continued from page 9

station, manholes, a mini-collection system with simulated cross connections to storm sewers and other sources of inflow and infiltration, preliminary treatment, mock physical and chemical treatment units, a package wastewater treatment plant, and effluent filtration and disinfection units. Surface water from a freshwater pond will be used for demonstrations instead of wastewater.

Watershed and Water Quality Management

Demonstrations and training will cover a wide range of monitoring techniques used to assess current water quality conditions, evaluate changes, and facilitate volunteer monitoring. The training will examine the linkages between land use, soil science, hydrology, geology, and water quality. A first-order degraded stream will be restored by demonstrating natural stream processes, and riparian vegetation planting and natural stream succession will be demonstrated in a stream buffer. The restoration planning and implementation will be accomplished through hands-on workshops.

Agronomic Training

The focus of the agronomic training area will be on proper soil sampling techniques and on crop responses to nutrients with examples of commonly grown grass and crop species. Nutrient deficiency and toxicity symptoms for selected plant species will be demonstrated in controlled permanent plots, with special emphasis placed on crop use as an important part of nutrient management to improve water quality in creeks, streams, and rivers. Training will also include discussion of various management options that minimize negative impacts on soil and water quality and the environment, with the objective of enabling program participants to better manage the agronomic integrity of their waste treatment sites and minimize nutrient losses to groundwater and surface water.

While NCSU has the lead in developing this center, the project is a partnership of public and private agencies, including the Consortium of Institutes for Decentralized Wastewater Treatment, the NC Cooperative Extension Service, the NC American Water Works Association, the NC Water Environment Association, the NC Septic Tank Association, and many local health departments throughout the state, as well as product manufacturers across the country.

"We're always looking for more partners," says Tanner. "This center offers an excellent opportunity for environmentally concerned organizations to make their presence and expertise known throughout the waste-treatment industry. Joining forces will do more to solve waste treatment problems."

Anyone wishing further information about the center can call Mike Hoover at (919) 515-7305 (mike_hoover@ncsu.edu) or Joni Tanner at (919) 513-1678 (joni_tanner@ncsu.edu).

Clean Water Needs Exceed SRF Funding

An estimated $139.5 billion is needed to meet municipal wastewater treatment capital needs over the next 20 years according to a U.S. Environmental Protection Agency (EPA) survey.

This figure is included in EPA's *1996 Clean Water Needs Survey*, which estimates the cost for completing various water quality infrastructure projects, many of which are eligible for funding from the clean water state revolving fund (SRF). The needs survey includes costs for publicly owned municipal wastewater collection and treatment facilities and for such activities as storm water, combined sewer overflows, nonpoint source pollution projects, and estuary management projects.

The total needs identified in the 1996 survey were $15.5 billion less than the $155 billion in needs identified in the 1992 survey. "This reflects, in part, progress made in meeting the nation's water quality infrastructure needs," according to the report.

An estimated $3 billion is available from the clean water SRF for fiscal year 1998. Since the SRF program began in 1988, $20 billion has been loaned for various water quality projects.

Small Community Needs

Water quality program needs for small communities represent nearly $14 billion of the survey's total needs estimate, according to the report.

"There is a greater requirement in smaller communities for basic infrastructure when compared to the needs for larger communities," according to the report. A small community is defined as having fewer than 10,000 residents and wastewater flows of less than one million gallons a day.

Small communities are reporting a greater demand for collection sewers. This suggests "continuing efforts to extend wastewater collection and treatment to small communities," according to the report.

Substantial effort went into improving the needs estimates for small communities, many of which lack the resources to adequately document their needs.

The 1996 survey was the twelfth conducted since the Clean Water Act was first passed in 1972. The needs survey is conducted every four years, in part to determine how funding for the clean water SRF should be allocated. The survey does not address private wastewater treatment facilities. The Indian Health Service is conducting a separate assessment for Indian tribes and Alaska Native Villages.

To order a copy of the 1996 Clean Water Needs Survey, *contact Sandi Perrin at EPA at (202) 260-7382. The survey also may be downloaded from the EPA Office of Wastewater Management Web site at* http://www.epa.gov/owm/repcong.htm.

New Program Seeks to Help Communities With Regulatory Process

Small communities may soon have key concerns and potential areas of conflict addressed earlier in the regulatory process thanks to a pilot program known as the Small Communities Outreach Project for Environmental Issues (SCOPe).

Because small communities are often at a disadvantage in terms of resources, information, and ability to participate in the regulatory process, the National Association of Schools of Public Affairs and Administration (NASPAA) initiated this program to give small communities the chance to actively participate in rule making.

An advisory council has been selected to provide direction and contacts for the project and includes Richard Phalunas, Ed.D., representing the National Small Flows Clearinghouse and its "sister" organizations, the National Environmental Training Center for Small Communities and the National Drinking Water Clearinghouse.

"The program's goal," said Phalunas, "is to better inform communities so they can understand and respond to rule making while communicating their problems, ideas, and solutions."

Through a network of NASPAA schools, information will flow between small communities, the U.S. Environmental Protection Agency (EPA), and other interested parties. Competitively selected member schools will choose approximately 12 to 20 communities to participate in SCOPe. After the communities are chosen, SCOPe will track regulatory developments on behalf of participating communities and explain EPA rules and regulations in an understandable manner. Selected institutions will also gather information from small communities and relay it back to SCOPe headquarters for evaluation.

SCOPe will eventually provide a larger audience with information about small communities, how those communities responded to the proposed regulations, and a collection of tested outreach models. At this time, SCOPe is a pilot project limited to communities in the southeastern United States, with the expectation that the program will expand to other regions. However, no time frame has been established for implementing SCOPe nationally.

Participating communities will be chosen by the following member institutions: the Southern Center for Studies in Public Policy at Clark, Atlanta University, Atlanta, Georgia; the Martin School of Public Policy and Administration, University of Kentucky, Lexington, Kentucky; and the Institute for Public Affairs and Policy, College of Charleston, Charleston, South Carolina.

According to SCOPe consultants, if small communities were better informed and participated in the early stages of regulatory development, regulators could find solutions earlier in the rule making process. Costly changes in later stages could be avoided. In time, SCOPe hopes the quality of life in small communities will improve as a result of its efforts.

For more information about SCOPe, you may visit their Web site at http://www. naspaa.org *or call (202) 628-8965.*

A Point of Clarification

In the Spring 1998 issue of *Small Flows*, the article entitled "Free EPA Report Outlines Privitization of Wastewater Facilities," contained on page 7 the statement that $137 billion is needed "to address all local government water infrastructure requirements." What is missing from this statement is that the $137 billion is needed for "water pollution infrastructure requirements," which include controls for stormwater, combined sewer overflows, urban runoff, and other pollution-related controls, but does not include drinking water infrastructure.

U.S.-Mexico Group Seeks ESTD's Help

The United States-Mexico Foundation for Science invited the Environmental Services and Training Division (ESTD) to the first meeting of representatives from the two countries ever to focus on environmental training.

Richard Phalunas, Ed.D., associate manager of ESTD presented to organizations from both the U.S. and Mexico regarding resources available to assist border communities with wastewater, drinking water, and environmental training. ESTD includes the National Small Flows Clearinghouse and its sister organizations, the National Drinking Water Clearinghouse, the National Environmental Training Center for Small Communities and the National Onsite Demonstration Project.

The meeting's objective was to discuss resources that can be brought to the region to develop workforce capacity on both sides of the border, Phalunas said. To aid in achieving this goal, a $4 billion investment is being made in the border communities over the next 10 years by a number of federal and bi-national organizations.

ESTD will help address the border region's training needs and provide technical assistance and information for water and wastewater treatment in border communities. Meetings to further define the program's involvement are now being scheduled.

For more information about the United States-Mexico Foundation for Science, you may visit their Web site at http://www. fumec. org.mx.

Massachusetts Gets New Septic System Test Facility

A groundbreaking ceremony was held at the Otis Air National Guard Base on the Massachusetts Military Reservation June 8 for the state's new septic system test center.

The Massachusetts Alternative Septic System Test Center is the result of a collaboration of the Buzzards Bay Project National Estuary Program, a unit of the Massachusetts Coastal Zone Management Office, Barnstable County Department of Health and the Environment, UMass Dartmouth Center for Marine Science and Technology, and the Massachusetts Department of Environmental Protection (MA DEP). According to Buzzards Bay Project Executive Director Joe Costa, Ph.D., the facility will be managed jointly by Tony Millham, Ph.D., of the Buzzards Bay Project and George Heufelder, project manager of the Barnstable County Department of Health.

Breaking ground at Buzzard's Bay (left to right): John DeVillars, U.S. EPA Region I Administrator; David Struhs, Commissioner of the Massachusetts Department of Environmental Protection; William Delahunt, U.S. Congressman, 10th District; and Trudy Coxe, Secretary of the Massachusetts Executive Office of Environmental Affairs. *Photo courtesy of Tony Millham.*

Funded by a $459,000 U.S. Environmental Protection Agency (EPA) Environmental Technology Initiative grant, the primary purpose of the test center is to speed the introduction and approval of alternative and innovative onsite wastewater treatment technologies in Massachusetts. In 1996, a technical team identified the site at Otis adjoining the base's new wastewater treatment plant as the best site for the facility.

The facility will provide vendors of innovative technologies with opportunities to accelerate Massachusetts regulatory approvals and to reduce the substantial cost of meeting the monitoring requirements for permitted use of onsite systems in Massachusetts and elsewhere in New England. It is expected that the test center will contribute to the wider use of alternative technologies throughout the region.

The approval process of alternative septic system technologies was officially adopted by the MA DEP in the 1995 revisions to the Title 5 sanitary code. This process can be challenging for some small start-up companies. Up to 15 piloting systems are allowed under Title 5, and these must be monitored by the vendor for a minimum of 18 months. The system vendor must then submit a report of each system's performance. As an alternative to this process, vendors who successfully participate in the test center may satisfy the requirements for piloting, resulting in a simplified piloting approval and a large reduction in monitoring, operation, and maintenance costs. Other regulatory approvals for system upgrades, higher loading rates, or reductions in the water table separation distance approvals may be negotiated with MA DEP using the results from the test center. Vendors seeking seasonal-use approvals may use successful test center performance to demonstrate any performance above conventional systems with local boards of health.

In describing how the test center would work, Costa explained, "We will be able to test six innovative technologies at one time, in triplicate, along with conventional septic systems. Manufacturers of innovative septic systems participating in the test center would install three of their systems at their expense. We would monitor the performance of these technologies for up to 18 months and cover 90 percent of the costs of analyses. Besides the reduced costs of testing, participation would also help the vendor with the Title 5 approval process." The test center will use sewage from the base's residential housing to simulate household wastewater. All effluent from the test center will be returned to the Massachusetts Military Reservation sewer with no releases to groundwater, according to Costa.

"The testing facility is one more in a series of successful cooperative efforts by the Commonwealth, EPA, and local government to provide cost-effective and environmentally protective solutions to onsite wastewater problems," said David Struhs, commissioner of the MA DEP, the agency responsible for overseeing the Title 5 regulations pertaining to septic systems and approval of new technologies.

He also indicated that participation in the test center will help companies obtain approval under Title 5. "We will use this center to document how well these new technologies perform compared to conventional septic systems, whether they can provide advanced treatment, and whether these technologies are appropriate for undersize lots, areas with high groundwater, or other difficult sites."

Besides benefiting technology vendors, it is expected that the test center will benefit the public by increasing the variety of systems available, leading to more price competition. The results of testing each technology will be released as public documents that will be available to homeowners and boards of health.

Congressman William Delahunt, who helped secure Pentagon approval for the project said, "The test center will promote new ways to protect our groundwater and coastal resources, while strengthening the region's capacity to help local business develop new environmental technologies."

John P. DeVillars, administrator of the EPA's New England office added, "Cape Cod—indeed, all of New England—faces the enormous challenge of sustaining economic growth and development in a way that is protective of the region's natural resources. This center will go a long way in ensuring that New Englanders will have the innovative tools in the future to prevent groundwater pollution from septic tanks—without breaking the bank or overburdening the homeowners."

New Textbook Available on Wastewater Management

Educators who teach about wastewater systems may want to include *Small and Decentralized Wastewater Management Systems*, a new, comprehensive textbook, to their wastewater management curriculum. The authors of this book are Ronald W. Crites, managing engineer at Brown and Caldwell, and George Tchobanoglous, professor emeritus of the Department of Civil and Environmental Engineering at the University of California.

The information presented in this textbook includes conventional wastewater treatment (with an emphasis on smaller treatment systems), decentralized wastewater management, and natural systems for wastewater management.

The book's design enables its information to be tailored for a variety of wastewater management courses that can be used at either a graduate or undergraduate level.

For the undergraduate, the focus can be centered on those chapters that introduce the student to the field of wastewater management. Here the student can find a thorough discussion of the constituents found in wastewater and their fate in the environment, process design considerations, and basic wastewater treatment principles.

Some information the graduate student or novice practitioner might be interested in includes detailed information on the reuse and recycling of treated effluent and land and aquatic treatment systems.

For more information or to order this book, write to: The McGraw-Hill Companies, Inc., Industry and Government Sales Department 11 West 19th St., New York, NY 10011. Telephone orders can be placed to: (800) 262-4729 (customer service) or (888) 878-5150 (this number is for Federal government customer service only).

NSFC Hotline Q&A

advice

Editor's Note: The following questions are based on calls received over the National Small Flows Clearinghouse's (NSFC) technical assistance hotline. The information was compiled by Andrew Lake of the technical assistance staff. If you have a question, call (800) 624-8301 or (304) 293-4191.

What are biosolids and how are they generated?

Biosolids are a primarily organic solid product produced by wastewater treatment processes that can be beneficially recycled. The generation of biosolids occurs in two forms: sewage sludge and domestic septage. The difference between the two is a result of the collection and treatment processes which occur either at a wastewater treatment facility or an onsite septic system.

Sewage sludge is a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment plant. This includes scum or solids removed in primary, secondary, or advanced wastewater treatment processes, but does not include grit and screenings. The biosolid is generated from the treatment of raw sewage collected at the treatment facility from individual households.

Domestic septage is that which is removed from individual households by a pumping and hauling process. The raw sewage which is pumped from onsite systems, such as septic tanks, holding tanks, or portable toilets is taken to a septage treatment facility or cotreatment at a wastewater treatment facility. With both of these processes, the end result is a semi-treated biosolid. The figure below illustrates the basic wastewater and sewage sludge generation and treatment processes.

At this point it is necessary to determine the suitability of biosolids for land application. Suitability is dependent upon the composition of the biosolid. Some important factors to consider are cost-effectiveness, where to apply, how much to apply, effects on public health and environment, and how much regulatory control and monitoring will be needed. Important properties of biosolids that need to be characterized include: quantity, total solids content, volatile solids content, pH, organic matter, nutrients, metals, organic chemicals, hazardous pollutants, and pathogens.

One of the factors mentioned above is pathogens, which is one of the more important limiting characteristics of biosolids designated for land application. Pathogens are potential disease-causing microorganisms such as bacteria, viruses, protozoa, and eggs of parasitic worms. Pathogens can present a potential public health hazard if they are transferred to land where food crops are grown. It is for this reason that the U.S. Environmental Protection Agency (EPA) developed the Part 503 Biosolids Rule. Part 503 specifies pathogen and vector reduction requirements that must be met for sludges that are to be applied to land. Vectors are animals such as rats or insects that might be attracted to biosolids and can spread disease after coming into contact with the biosolids.

What are the differences in pathogen reduction?

There are effectively two classes of pathogen reduction: Class A and Class B. The two classes differ depending on the level of pathogen reduction that has been obtained. The Part 503 rules identify six alternatives for treating sludges so they can be classified Class A with respect to pathogens. They are summarized here:

Note: In addition to meeting the requirements in one of the six alternatives listed below, the requirements must be met for all six Class A alternatives.

1. *Biosolids must be subjected to one of four time-temperature regimes.*
2. *Biosolids must meet specific pH, temperature, and air-drying requirements.*
3. *Demonstrate that the process can reduce enteric viruses and viable helminth ova. Maintain operating conditions used in the demonstration after pathogen reduction demonstration is completed.*
4. *Biosolids must be tested for pathogens—Salmonella sp. or fecal coliform bacteria, enteric viruses, and viable helminth ova—at the time the biosolids are used or disposed, or, in certain situations, prepared for use or disposal.*
5. *Biosolids must be treated in one of the Processes to Further Reduce Pathogens (PFRP).*
6. *Biosolids must be treated in a process equivalent to one of the PFRPs, as determined by the permitting authority.*

The following are the Pathogen Requirements for all Class A alternatives:

- *either the density of fecal coliform in the biosolids must be less than 1,000 most probable numbers (MPN) per gram total solids (dry-weight basis) or,*
- *the density of Salmonella sp. bacteria in the biosolids must be less than 3 MPN per 4 grams of total solids (dry-weight basis).*

Either of these requirements must be met at one of the following times:

- *when the biosolids are used or disposed,*
- *prepared for sale or give-away in a bag or other container for land application, or*
- *biosolids or derived materials are prepared to meet the requirements for EQ (Exceptional Quality) biosolids.*

Pathogen reduction must take place before or at the same time as vector attraction, except when the pH adjustment, percent solids vector attraction, injection, or incorporation options are met. (See Table 3-4, A Plain English Guide to the EPA Part 503 Biosolids Rule*, Chapter 3.)*

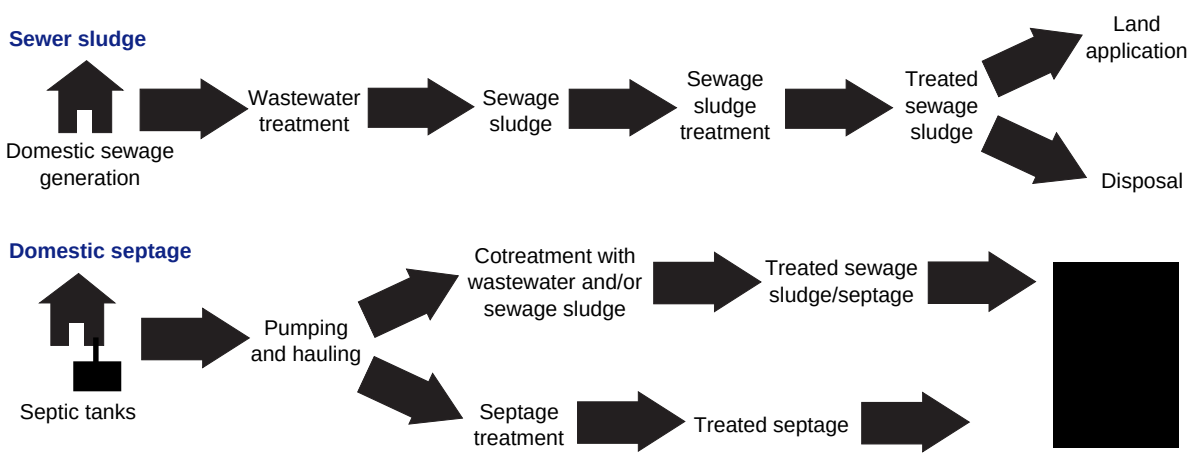
Unlike Class A sludges, in which pathogens are at levels below detectable limits, Class B sludges may contain some pathogens. Because of the presence of some pathogens, Class B sludges must meet certain site restrictions that prevent crop harvesting, animal grazing, and public access for a certain period of time until environmental conditions have further reduced pathogens. Class B pathogen requirements can be met using one of the following three alternatives.

1. *Monitoring of Indicator Organisms—Test for fecal coliform density as an indicator for all pathogens.*
2. *Biosolids must be treated in one of the Processes to Significantly Reduce Pathogens (PSRP).*
3. *Biosolids must be treated in a process equivalent to one of the PSRPs, as determined by the permitting authority.*

The following are the site restrictions for Class B biosolids applied to the land:

- *Food crops with harvested parts that touch the biosolids/soil mixture and are totally above the land surface shall not be harvested for **14 months** after application of biosolids.*
- *Food crops with harvested parts below the surface of the land shall not be harvested for **20 months** after application of biosolids when the biosolids remain on the land surface for 4 months or longer prior to incorporation into the soil. Food crops with harvested parts below the surface of the land shall not be harvested for **38 months** after application of biosolids when the biosolids remain on the land surface for less than 4 months prior to incorporation into the soil.*

Sewage sludge and domestic septage



Modified from EPA/625/R-95/001 Process Design Manual: Land Application of Sewage Sludge and Domestic Septage.

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events

1998 Calendar of Events

If your organization is sponsoring an event that you would like to have promoted in this calendar, please send information to the Small Flows *editor at the address printed in the staff box on page 9.*

September

Event: Practical Approaches to Groundwater Management
By: The Groundwater Foundation
Date: September 9–10
Place: San Antonio, TX
Phone: (402) 434-2740
Fax: (402) 434-2742
e-mail: info@groundwater.org

Event: International Activated Carbon Conference
By: Professional Analytical and Consulting Services, Inc.
Date: September 16–17
Place: Pittsburgh, PA
Phone: (800) 367-2587
(724) 457-6576
Barbara Sherman
Fax: (724) 457-1214
(See also November 4–5)

Event: Design Considerations for Activated Carbon Process Systems
By: Professional Analytical and Consulting Services, Inc.
Date: September 18
Place: Pittsburgh, PA
Phone: (800) 367-2587
(724) 457-6576
Barbara Sherman
Fax: (724) 457-1214

Event: National/International Biodiversity and Water Resources Symposium
By: Institute for Wetland Science and Public Policy and the Association of State Wetland Managers
Date: September 20–24
Place: St. Louis, MO
Phone: (518) 872-1804
(518) 872-2171

Event: Pumper and Cleaner Environmental Expo
By: Cole, Inc.
Date: September 24–26
Place: Long Beach, CA
Phone: (800) 257-7222
Fax: (715) 546-3786
e-mail: Cole@pumper.com

Event: Peaks to Prairies: A Conference on Watershed Stewardship
By: University of Wyoming
Date: September 27–30
Place: Rapid City, SD
Phone: (303) 499-3647

October

Event: WV Statewide Nonpoint Source Pollution Conference
By: Nonpoint Source Resource Management Training Center
Date: October 1–3
Place: Charleston, WV
Phone: (304) 372-7880

Event: Process Level Measurement for Water and Wastewater Treatment Applications
By: Instrumentation Testing Association
Date: October 2
Place: Orlando, FL
Phone: (520) 284-5624
Fax: (520) 284-5625

Event: WEF's 71st Annual Conference and Exposition
By: Water Environment Federation
Date: October 3–7
Place: Orlando, FL
Phone: (703) 684-2452
Nancy Blatt, Barry Eisenberg
e-mail: confinfa@wef.org

Event: AWWA Fall Conference
By: American Water Works Association
Date: October 6–9
Place: Reno, NV
Phone: (510) 659-1970
Fax: (510) 656-3426

Event: Upgrading your Sanitary Sewer Maintenance Program
By: University of Wisconsin
Date: October 14–16
Place: Madison, WI
Phone: (800) 462-0876

Event: PA-AWRA Annual Conference
By: American Water Resources Association
Date: October 16
Place: State College, PA
Phone: (610) 344-5400
Jan Bowers

Event: ASCE Annual Convention
By: American Society of Civil Engineers
Date: October 18–21
Place: Boston, MA
Phone: (703) 295-6060
Vicky Troy

Event: The Technology Revolution in Wastewater Treatment, Disposal and Reuse
By: British Columbia Onsite Sewage Association
Date: October 19–20
Place: Victoria, B.C.
Phone: (250) 748-8500
Fax: (250) 746-1898
e-mail: osieagle@cow.net.com

Event: Agriculture and Water Quality in the Pacific Northwest
By: Agriculture and Water Quality Committee
Date: October 20–21
Place: Yakima, WA
Phone: (509) 838-6685
Fax: (509) 838-6685

Event: 7th Annual National Onsite Conference/Exhibit
By: National Onsite Wastewater Recycling Association, Inc.
Date: October 22–25
Place: Ft. Mitchell, KY
Phone: (847) 559-9233
Fax: (847) 559-9235
e-mail: 103061.1063@compuserve.com

Event: 14th Annual Onsite Wastewater Treatment Conference
By: North Carolina State University
Date: October 27–29
Place: Raleigh, NC
Phone: (919) 513-1678
Fax: (919) 515-7494
e-mail: joni_tanner@ncsu.edu

Event: River Basin Management to Meet Competing Needs
By: U.S. Committee on Irrigation and Drainage and U.S. Bureau of Reclamation
Date: October 28–31
Place: Park City, UT
Phone: (303) 628-5430
e-mail: stephen@uscid.org

November

Event: International Activated Carbon Conference
By: Professional Analytical and Consulting Services, Inc.
Date: November 4–5
Place: Pittsburgh, PA
Phone: (800) 367-2587
(724) 457-6576
Barbara Sherman
Fax: (724) 457-1214
(See also September 16–17)

Event: Seventh Annual National Workshop for State Revolving Fund Managers
By: Council of Infrastructure Financing Authorities
Date: November 8–10
Place: Seattle, WA
Phone: (202) 371-9694
Fax: (202) 371-6601

Event: AWRA Annual Conference on Water Resources
By: American Water Resources Association
Date: November 15–19
Place: Point Clear, AL
Phone: (703) 904-1225
Fax: (703) 904-1228

NSFC Hotline Q&A

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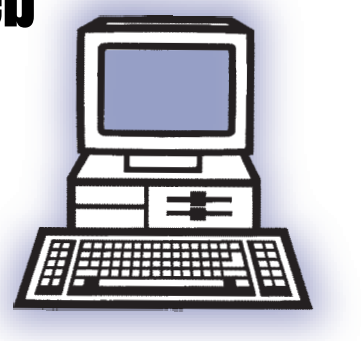
- *Food crops with harvested parts that do not touch the biosolids/soil mixture, feed crops, and fiber crops shall not be harvested for **30 days** after application of biosolids.*
- *Animals shall not be grazed on the land for **30 days** after biosolid application.*
- *Turf grown on land where biosolids are applied shall not be harvested for **1 year** after application of the biosolids when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority.*
- *Public access to land with a high potential for public exposure shall be restricted for **1 year** after application of biosolids. Public access to land with a low potential for public exposure shall be restricted for **30 days** after application of biosolids.*

Why is pathogen reduction important?

The reduction of pathogens ensures an environment with little or no public health risk. Biosolids with either Class A or Class B pathogen status are protective of human health and the environment because of the added site restrictions and management practices that are required for biosolids with Class B pathogen status. As a general rule of thumb, Class A approximately equals Class B plus Site Restrictions plus Management.

See page 1 of the products insert in this newsletter for a listing of sludge/biosolids-related products available from the NSFC.

Wastewater Information Available on the Web



Editor's Note: There is an ample supply of wastewater-related sites on the World Wide Web. The following sites are only a sample of information that is available. At the time of publication, these sites were current, but due to the dynamic nature of the Web, they may have changed, moved, or disappeared.

Municipal Wastewater: FAQs

http://www.ctenvironet.com/mwwfaq1.htm

This site is a resource of municipal wastewater Frequently Asked Question (FAQ) sheets available online from the Connecticut Environmental Information Center.

Users can locate FAQs related to the following headings: federal agency wastewater offices, industrial wastewater treatment and pretreatment, innovative/ alternative treatment process descriptions, preventing water pollution, and treatment process descriptions.

Water Reclamation Facility, University of Florida

http://gnv.fdt.net/~reggiew/index.html

The University of Florida has utilized its own wastewater treatment plant since 1948. In 1991, construction of a new facility was begun, and the new Water Reclamation Facility was completed in 1994. The new facility is a prototype plant, using the Bio-Denipho process to treat wastewater.

The University's site includes information on wastewater plant controls, a flow chart diagram, nitrogen and phosphorous removal, facility schematics and process diagrams, and a list of wastewater terms and definitions.

The Wide World of Activated Sludge

http://www.bendigo.com.au/~sti/wwater/waterlnk.html

This site brings together large amounts of information on activated sludge and links to wastewater related web sites.

The Wide World of Activated Sludge provides users with background information that includes a glossary of wastewater terms, a listing of international conferences and courses, aspects of wastewater microbiology, filamentous bacteria, wastewater organizations, and municipal treatment plant profiles. Also available are descriptions of books, journals, newsletters, reference lists, publishers, technical reports, and papers, including information on how to order or subscribe when pertinent.

City of New Bedford Public Works Wastewater Division Primary and Secondary Treatment Process

http://www.ci.new-bedford.ma.us/DPW/WASTEWAT/Collection.htm

This site provides users with a model of the New Bedford wastewater primary and secondary treatment system and a step-by-step explanation of the secondary treatment process.

Also available at the site are links to information regarding system facilities, how wastewater is treated, sludge process and disposal, treatment facility flows, and technical data for the system.

Reuse of Reclaimed Wastewater Through Irrigation for Ohio Communities

http://ohioline.ag.ohio-state.edu/b860/index.html

This Ohio State University Extension Bulletin contains tables and figures with information ranging from site characterization for wastewater reuse sites to sample irrigation system plan figures.

The body of the bulletin is subdivided into four areas: siting, which includes community considerations, limitations, selecting a site, pretreatment objectives, and pretreatment technologies; design, including land requirements, minimizing public health concerns, provisions for severe weather, water storage, and evaluation of a site for wastewater reuse; management, including irrigation systems, system protection, operation, monitoring, and regulation and issuance of permits; and reference appendixes.

Living Technologies

http://www.livingmachines.com

This Web site explains the technology of Living Machines™, which are wastewater systems that naturally treat both sewage and high strength organic waste.

Also available are links to representative projects, including information on the company, the type of waste the system was designed to handle, the capacity of the system, and the year in which construction was completed. Also available is a listing of facilities that can be toured.

WEF Conference Outlined

The 71st Annual Water Environment Federation (WEF) Conference and Exposition will be held October 3–7 at the Orange County Convention Center in Orlando, FL.

Billed as WEFTEC '98, the event is the largest water quality conference and exposition in North America.

One highlight of the conference is a planned speech by award-winning journalist David Brinkley on Wednesday, October 7.

Brinkley has over 50 years' experience in journalism, reporting on every U.S. President since Franklin D. Roosevelt. Before retiring from the airwaves last year, Brinkley had won every major broadcasting award.

The conference includes more than 34 hours of technical sessions and workshops on current wastewater topics, including

- wastewater treatment research,
- municipal wastewater treatment,
- residuals and biosolids management,
- collection systems,
- remediation of soil and groundwater,
- industrial issues and treatment technology,
- surface water quality and ecology,
- management facility operations,
- current issues,
- natural systems and water reuse,
- public and regulatory issues, and
- international and regional issues.

There will be more than 700 exhibitors and 800 technical sessions, including 16 full-day workshops and 10 facility tours.

To register, contact WEF at (800) 666-0206.

NOWRA Conference Slated for October

The National Onsite Wastewater Recycling Association's (NOWRA) Seventh Annual Conference and Exhibit will be held October 22–25 in Northern Kentucky (Greater Cincinnati area) and will feature more than 30 educational sessions.

The program is designed to appeal to regulators and academicians, as well as those in the private sector. The 30 courses will be presented in 40 time slots, with four sessions running concurrently.

This year's theme, "Onsite Treatment: First Choice for Protecting the Environment" will demonstrate how and why onsite treatment is an environmentally sound first choice for treating waste.

Conference organizers hope to double attendance this year to more than 600 participants.

Kentucky is home to one of NOWRA's largest constituent state group members. In addition, several nearby states including Ohio, Tennessee, Missouri, Virginia, and Indiana all have new or established onsite groups.

Exhibits will be closed during the educational sessions to allow exhibitors a chance to participate in the entire program. However, ample time will be provided for attendees to visit exhibits on Friday and Saturday throughout the day and evening hours.

A total of 61 booths are available at the Drawbridge Estate, where the conference will take place. Exhibitor and attendee information and forms are available on NOWRA's website at *www.nowra.org*.

Small Flows

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North Carolina's New Land-Based Technology Training Center

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Also in this issue

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