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Small Flows

Innovative Wastewater System Protects Dewees Island

by Natalie Eddy
NSFC Staff Writer

"The waste we create as a species needs to be dealt with in the most environmentally sound and efficient way possible so that the health of an ecosystem is not detracted from but enhanced."

That statement from John L. Knott Jr., chief executive officer and managing director of Dewees Island, sums up his beliefs and vision for the island.

Located 12 miles northeast of Charleston, South Carolina, Dewees Island is an exclusive 1,206-acre barrier sea island with white sand beaches, several freshwater lakes, and a panoramic view of the Atlantic Ocean.

Although developers might have made more money turning the island into a tourist spot, they opted instead to make it a self-sustaining community that exists in harmony with the natural environment.

More than 65 percent of the island is in permanent conservation by law, with more than 350 acres designated as a wildlife refuge, which must remain undeveloped. Developers have chosen to limit construction on the rest of the island to a maximum of 150 homes. Currently, 15 residences and four company buildings are on the island, with construction plans pending for an additional 10 to 12 residences this year.

Lots are two acres each, although developers only allow 7,500 square feet of each lot to be disturbed or used for construction.

A 7,500-gallon holding tank is installed near the absorption field on Dewees Island in South Carolina. *Photo courtesy of_____.*

Sustainable Development

Knott says Dewees was built on the idea of "sustainable development," which is the economic and efficient use of human, natural, and capital resources. He believes humans should be essential participants in their own environment and that the environment and development are natural allies.

Nowhere is that commitment to sustainable development more apparent than with the innovative wastewater treatment system the island employs. Wastewater disposal occurs through a pressure sewer system, pressurized transmission mains fed from homes to a community soil absorption field.

Because the water table averages only four feet from the surface, the soil absorption field is a mound system, built up 10 feet to provide adequate separation distance. The field is located on the inland side of the island.

Each residence is equipped with a two-stage anaerobic pretreatment system known as a septic tank/rock filter system. This consists of a 1,000-gallon septic tank for pretreatment and solids reduction, two 1,000-gallon anaerobic upflow rock filters, and an effluent pumping system.

Knott says two safety features are built into the system: one residence's pump can pressurize the entire system's sewer mains, and each pump is equipped with a malfunction alarm. An 85-kilowatt generator is used to ensure maintenance of the system in a power failure.

The wastewater flows through small-diameter sewer lines under a road to a central public works area where a hydrogen peroxide-based odor control and disinfection system is used to promote decomposition and control odors.

A pressurized transmission system combined with an emergency pump station bypass system keeps the effluent moving to a below-ground storage tank with a 7,500-gallon capacity. A duplex pumping system and a pressurized distribution system then allow the treated wastewater to flow through small-diameter pipes to the underground absorption field.

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NSFC Completes Nationwide Data Collection Project on Onsite Systems

Can you answer the following questions about onsite systems in your area?

- how much does a permit for a new onsite system cost?
- how much would you expect to pay for the installation of a new onsite system?
- who performs onsite system inspections?
- what are the common reasons for onsite system failure?
- how many homes have onsite systems?

If your answer to any of these question is "I don't know," but you need to know this information to help you in your profession or to better serve your community, then the National Small Flows Clearinghouse (NSFC) has the report for you. *National Onsite Wastewater Treatment: A National Small Flows Clearinghouse Summary of Onsite Systems in the United States, 1993*, details the findings of the NSFC's two-year comprehensive study on the status of onsite wastewater treatment systems in the U.S.

Data Collection

The information in the report was gathered from local health departments across the country.

"An initial challenge for the project was locating the health departments, because the organization of health agencies varies from state to state," said Tricia Angoli, the NSFC technical assistance specialist who coordinated the project.

In all, the NSFC contacted 3,490 local health departments across the U.S. All were mailed questionnaires, and at least one attempt was made, through additional mailings and follow-up telephone calls, to contact each organization not responding. By the end of the initial phase of the project, the NSFC had successfully collected information from 1,567 local health agencies.

"The NSFC has never attempted a study of this scope before," said Angoli. "We learned a lot from the experience, and we have a considerable amount of information to pass on to the public."

Project Findings

The information obtained from health departments show that there are both differences and similari-

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Helping America's small communities meet their wastewater needs

Privately Owned Systems Are Washington Island's Solution

by Donna Briesemeister, Bennette Burks, and David Venhuizen, P.E.,

Editors Note: Donna Briesemeister is project coordinator for the Washington Island Demonstration Project; Bennette Burks is the chief of the onsite sewage program at the Wisconsin Department of Industry, Labor, and Human Relations; and David Venhuizen, P.E., is a private consultant and project engineer for the Washington Island Demonstration Project.

A decentralized wastewater management program that combines innovative onsite wastewater treatment systems with an ongoing municipal management plan should prove to be the right answer for residents of Washington Island, Wisconsin.

The geology of Washington Island, a small island located in Lake Michigan, is characterized by shallow soils and fissured, cavernous carbonate bedrock. Spring runoff often disappears down sinkholes in farmers' fields.

Older development on the island has long been served by conventional septic systems. However, the use of holding tanks for wastewater has been increasing in new development, primarily around the shoreline. The pumpage from the tanks is disposed of by field spreading (land application).

As this practice proliferates, the capacity of suitable land for field spreading is being strained. This, along with concern about leakage from older holding tanks and failing conventional onsite systems, has posed potential for degradation of the island's drinking water supply, i.e. its groundwater.

A central plant for treating holding-tank wastes was originally proposed for the island. But thanks to a successful demonstration project featuring denitrifying sand filter treatment systems coupled with shallow low-pressure-dosed (LPD) disposal fields, Washington Island now has a viable, more cost-effective alternative to the central treatment plant—a system that would have come with a $6 million price tag.

The Demonstration Project

The demonstration project was designed and overseen by David Venhuizen, P.E., who specializes in innovative/alternative wastewater management. Funding was provided by the Wisconsin Department of Natural Resources (DNR) as an extension of Washington Island's wastewater facility planning process. It was supervised by the former Wisconsin Department of Industry, Labor, and Human Relations, which is currently the Wisconsin Division of Safety and Buildings (WDOSB), part of the State Department of Commerce. Onsite systems are now regulated by the WDOSB.

Seven sand filter/LPD systems were installed on the island during the fall of 1991 and the summer of 1992. Five systems serve private residences, the sixth serves a marina office building, and the seventh serves the island's only grocery store and butcher shop. Twice weekly, from January 1992 until July 1994, water samples were taken for analysis from various points in each system's treatment train.

Donna Briesemeister, the demonstration project coordinator, pointed out that the sand filter/LPD systems functioned very well, even during the arctic winter of 1993-94. "They produced a highly treated effluent, reducing total nitrogen content of the wastewater by more than 60 percent in most cases."

The Management Plan

In addition to proving to the satisfaction of the WDOSB that these systems were capable of preventing groundwater pollution, the DNR required that Washington Island develop a municipal management plan to insure the proper operation and maintenance of all privately-owned wastewater systems.

Drawing from a report on management options prepared by Venhuizen, town board member Allen Thiele devised a program calling for periodic inspection of all systems, along with a mandatory repair clause for systems that fail the inspection.

Under the proposed management program, there would be municipal supervision, oversight, and system evaluation for all new construction. Future use of holding tanks would be severely restricted in favor of sand filter systems and other onsite treatment and disposal options appropriate to each site.

Right: An onsite system is installed for a Washington Island grocery store. The system includes a grease trap, a septic tank, and a sand filter.

Below: An LPD disposal field will provide final treatment after it is covered.

Photos courtesy of Donna L. Briesemeister.

A sludge management plan would call for the continued use of field spreading for the disposal of septage and pumpage from remaining holding tanks. The volume of sludge, and, therefore, land area requirements, would be greatly decreased because there would be fewer number of holding tanks.

The Facility Plan

In February 1995, Venhuizen submitted a draft of a facility plan to the DNR. The Washington Island Facility Plan included the demonstration project data and the town's proposed management program, and it showed the decentralized option to be more cost-effective for treating holding tank pumpage than the centralized system.

The facility plan proposed a modified production model of the denitrifying sand filter system that could be made by existing precast tank manufacturers. It also included a groundwater impact evaluation that justified using the denitrifying sand filter/LPD system for sites with less than the code-specified soil depth to bedrock or groundwater.

Approval and Installation

In the spring of 1995, WDOSB approved the sand filter/LPD technology and alternative soil and siting criteria for use on Washington Island. In October 1995, two more systems designed by Venhuizen were installed on Washington Island and approved by WDOSB under a "petition for variance" procedure.

"The Washington Island project has indicated how innovative onsite wastewater systems can be employed within decentralized

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Cooperative Action is Key to WA Island Project's Success

by Donna Briesemeister
Washington Island
Demonstration Project
Coordinator

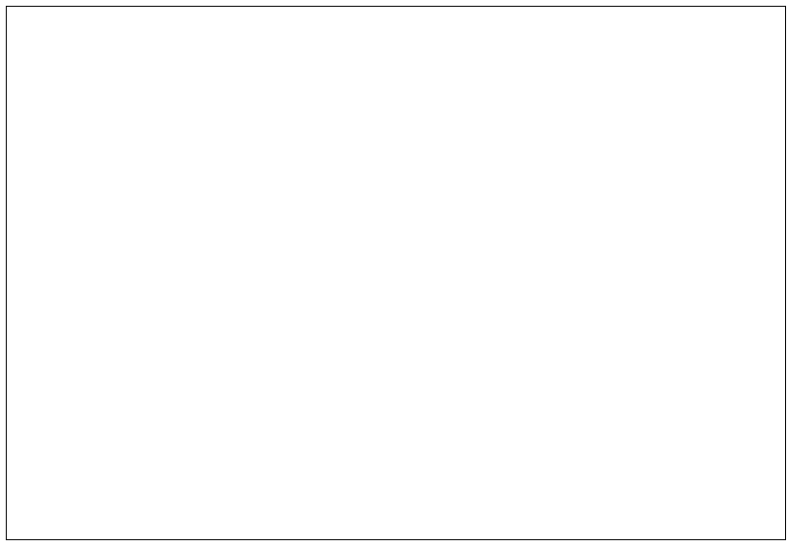
Three years ago, Washington Island was a community in need of a wastewater treatment solution. Washington Island is now committed to municipal management of privately owned onsite wastewater treatment systems.

The first step in finding that solution was for our community to define its basic values. Only then could we collectively make the wise decisions that would defend rather than degrade those values.

On Washington Island, this united vision included a love for the natural environment, a commitment to local control of land use regulation, and a sense of mutual respect and fair play.

Beyond these was a basic belief that many people working together are more likely to solve community problems in a constructive way than are a few people working in isolation.

In order to include a large part of the community in problem solving, civic leaders had to give up control of the end result of each discovery process. This was necessary to gain the best available input, and to achieve broad-scale consensus within the community for the resulting decisions.



David Venhuizen, P.E., Jim Anschutz, registered plumber, and John Hanlin, contractor, discuss the design and installation of the first sand filter/LPD system in the Washington Island project.
Photo courtesy of Donna L. Briesemeister.

A vigorous public information campaign was critical to the project's success. Extensive efforts were made to keep the entire community apprised of the status of the project at all times.

Among the other essential elements that contributed to our success has been an understanding of the cooperative roles played by:

- system users—the residents of Washington Island,
- suppliers—engineers, plumbers, excavation contractors, and
- regulators—Wisconsin Department of Natural Resources (DNR) and Department of Industry, Labor, and Human Relations (DILHR).

No matter how effective a technology may be, however, or how willing a community may be to employ it, a project such as the Washington Island project would have been "dead in the water" were it not for the efforts and respect of the state regulatory community.

Bennette Burks, chief of DILHR's onsite system program, offered us his agency's then-emerging philosophy for the supervision of individual onsite treatment systems in Wisconsin. DILHR proposed that onsite systems designs should be performance-based, rather than built according to a prescription.

Thomas Gilbert, DNR project manager, offered his agency's cooperation with DILHR in a project that was a hybrid between DILHR's onsite jurisdiction and DNR's municipal wastewater jurisdiction. These two agencies worked together creatively to make their programs fit our needs.

In working through this process, the Washington Island community has become convinced that the lessons of our experience could be useful to communities in other parts of the county, the state, and now, even the nation.

Privately Owned Systems Are Washington Island's Solution

Continued from previous page

management systems to provide multiple benefits," said Venhuizen. "This alternative management scheme is more fiscally reasonable, more environmentally benign, and more socially responsible than a centralized option."

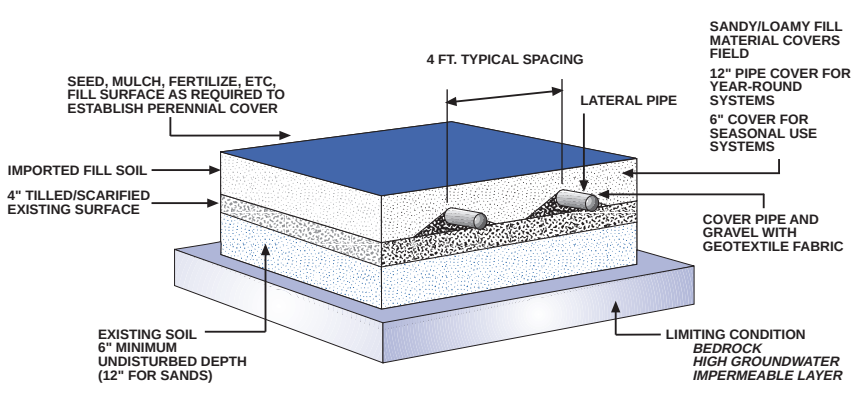
Additional sand filter/LPD systems were under consideration for installation during the spring and summer of 1996. In addition, the facility plan to use onsite systems with a municipal management program was approved by the DNR in November 1995. Originally, the plan was to go into effect on July 1, 1996, giving Washington Island a 10-year period in which to evaluate every onsite system currently on the island and replace any failing system.

However, a court injunction, the result of a lawsuit filed by two local special interest groups against the former Wisconsin Department of Industry, Labor, and Human Relations (now the WDOSB), has put the timetable for implementing the facility plan currently on hold pending the completion of an environmental impact study. The groups' main concern with the plan is the possible affect that allowing alternative onsite systems will have on development and land-use planning in local rural areas.

The WOSB is conducting the environmental impact study. A draft should be completed this winter and the final study will be ready in spring 1997. In the mean time, Washington Island is going ahead with system evaluations for homes in areas likely to be best served by conventional septic tank/soil absorption systems or mound systems. The injunction only limits routine approvals for sand filter/LPD systems. Requests for permits for experimental installations are being approved.

While the possibility of a delay is unfortunate, the initial approval of the project is a victory for the citizens of Washington Island and a triumph of enlightened regulation. The accomplishments of the Washington Island Project could have a long-term implications for the state of Wisconsin and perhaps even the nation.

For more information about the project or for a copy of the report mentioned in this article or the plan for the decentralized system, contact Donna Briesemeister, project coordinator, at (414)-847-2330.



MODIFIED AT-GRADE CONCEPT DISPOSAL FIELD

Innovative Wastewater System Protects Dewees Island

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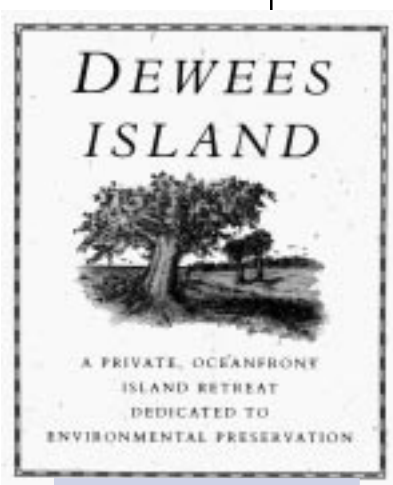
The absorption field is 100 feet wide and 900 feet long and is divided into four quadrants.

"The interesting thing is that we can change the application location and wet one area one day and another the next. The fact that there is no surface discharge or above-ground spray irrigation is a bonus," says Knott.



"We have an opportunity to create a way in which man and nature can live in balance . . ."
John L. Knott, Jr., chief executive officer and managing director, Dewees Island, SC

Because of the developers' commitment to keeping the majority of the land on the island undisturbed, Knott says space is carefully utilized. Part of the absorption field is designated as a soccer/recreation area while the rest is used as a wildflower meadow with only native plants. No fertilizers are used. He calls this "resource efficiency."

Regulatory Considerations

Marion Sadler of South Carolina's Department of Health and Environmental Control (DHEC) was involved in the permitting of Dewees Island's wastewater treatment system several years ago.

"I worked with them on the design and approval of their community septic tank system. They had to do some filling and grading of the absorption field. They went through a period of groundwater monitoring before we even permitted the system," says Sadler.

He added that barrier islands present specific problems for wastewater disposal because of their fragile, sandy soils, and relatively high water tables.

Specifically, with Dewees Island, Sadler says there were two considerations in designing the system: the island's close proximity to shellfish waters, which could lead to shellfish contamination, and the sandy soil.

He says that the system plan was carefully reviewed. "The island had a limited area that could support septic systems because of the groundwater and soil conditions. A large number of lots could not get a septic system permit. The system they chose was easier to monitor because residents share a common soil absorption field," he adds.

Knott says that even if the individual lots could have been permitted, he would have been opposed to individual systems versus a central system. "Individual systems would have disturbed a lot more land, and with rental properties, they would be more difficult to monitor," says Knott.

Island Development

Recorded history of Dewees Island dates back to the 1600s. Various families owned the island, and many developers came and went in the ensuing years.

Then in 1992, the existing owners of Dewees Island merged with another investment group and formed the Island Preservation Partnership (IPP).

It was at this time that Knott was brought in as a developer. "My background is in historic preservation and redevelopment of cities. There were three existing homes when we came here in 1992," says Knott. "When you have an opportunity to help plan a place like Dewees and see what an incredibly beautiful place it is, you don't have any choice except to preserve its beauty.

"We have an opportunity to create a way in which man and nature can live in balance and prove that development can occur in cooperation with the environment."

Knott says the developers tried to approach the design with "a lot of common sense, respect for the environment, and high resource-efficiency at all levels."

The three pre-existing residences are all served by individual septic systems, which are grandfathered into the new regulations.

Flow Rate

Although the system was designed for 100-percent occupancy (based on a maximum of 150 homes containing five family members), the community has a combination of permanent and vacation residences with occupancy rates that vary widely over the year.

The system was designed to handle a daily flow of 325 gallons per household. However, current data shows a daily flow rate of less than 125 gallons per home.

Knott attributes this, in great part, to the island's architectural and environmental guidelines that require every piece of equipment in every building, including sinks, appliances, toilets, and showerheads, to be low-flow fixtures.

In addition, the system's effectiveness is refined through composting kitchen wastes and the prohibition of garbage disposals, according to Knott. Through these practices and the island's ban on irrigation (except for cistern use), Dewees has managed to reduce its water consumption by more than 70 percent based on reasonable standard usage figures.

System Cost

Cost of the system was approximately $400,000, including the absorption field, storage tanks, below-ground storage, treatment facility, and all the mains and street lines.

The system is owned by the Dewees Utility Corporation. Homeowners pay a $5,000 fee for the residential components of the system and hookup. In addition, residents pay a flat monthly sewage rate of $20, plus $2 for every 1,000 gallons of water used.

"The capital costs are not extraordinary," says Knott. "There is a pump onsite, a pump at the main field, and everything else is non-technical. It wouldn't make sense to build a complicated infrastructure that you have to keep maintaining and repairing."

Water is supplied by two utility-owned wells on the island, which are currently operated by the developers. Homeowners use cisterns for landscaping water needs.

Knott says because of the water conservation efforts and the restriction on garbage disposals, there are fewer factors to impede the decomposition process.

"Everything here is about being nontoxic and being able to meet biologic decomposition standards," says Knott. "Detergents and cleaners used by island residents must be biologically balanced not to create a negative impact on waste decomposition."

Dewees Living

Life on Dewees is different than on the mainland, Knott admits. But he adds that most residents don't mind the conservation efforts.

Roads on the island are natural sand-based and restricted to only electric vehicles, such as golf carts. However, there is no golf course or clubhouse on the island.

Private docks are prohibited and are replaced by ample community docks. Activities of Dewees residents include fishing, shrimping, oystering, crabbing, boating, sailing, biking, bird watching, and exploring.

The island is boat accessible only, served by the Dewees Island ferry. There are no bridges and no plans for any because cars are not allowed. It is a 10- to 12-minute boat ride to the mainland. Boating is a way of life for most islanders.

Fire and safety personnel are on the island. Some residents work in Charleston and make the daily trek across water by ferry. Others telecommute from their home offices. In addition, the island's children go to school in Charleston. Most shopping is done on the mainland.

Currently, there are no shops on the island. However, plans are underway for a small pantry store, and an interactive World Wide Web site is being developed to allow homeowners to shop and place orders.

Knott hopes to provide residents with a bulk purchase shopping system that will enable them to buy soap products from a dispenser-type machine. He notes that this will give the community control over what types of detergents and soaps are used on the island, and it will eliminate packaging waste while conveniently providing these services at a lower price.

In cooperation with developers, property owners share in the planning and decision-making about Dewees' future, says Knott.

"I think we have successfully demonstrated that environmentally responsible development has a place in the market. It makes very good environmental sense to use a biological approach for the short and long term," says Knott. "We just need to have a little more common sense and respect for the environment."

For more information about Dewees Island, contact Knott at (800) 444-7352.

Coastal Zone Programs Addressing Onsite Systems

by Jeremy Canody
NSFC Staff Writer

The Coastal Zone Management Act (CZMA), enacted in 1972, created a voluntary state and federal partnership with a goal of preserving and protecting the nation's 95,000 miles of shorelines, including states bordering the Great Lakes.

Under the coastal zone management (CZM) partnership, the U.S. Environmental Protection Agency's (EPA) Office of Ocean and Coastal Resource Management (OCRM), the National Oceanic and Atmospheric Administration (NOAA), and participating states and island territories share the responsibility for managing coastal areas on a large scale through a wide variety of programs.

These programs, currently approved in 29 states and territories, are based on state laws and regulations meeting federal requirements.

"The coastal zone management program offers incentives for states and territories to get involved in creating their own programs and it gives them the opportunity to receive federal money as well," said Peyton Robertson, environmental protection specialist with OCRM.

Robertson said the CZMA is unique among federal laws in that it gives states the ability to require that federal coastal activities conform to state CZM standards. He explained that some states have passed comprehensive legislation as a framework for coastal management, while others have networked existing laws into an overall coordination scheme. Although the CZM programs are developed and managed by state and, in some cases, local agencies, they are approved, overseen, and evaluated by NOAA.

Together, NOAA and state and local governments work to find local solutions to problems with national impacts.

Robertson said that in addition to the 29 approved programs, Georgia, Indiana, Minnesota, Ohio, and Texas are developing programs, while only two of the total 36 eligible coastal states and islands are inactive.

1990 Reauthorization

Under Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), states and territories with federally approved CZM programs were required to develop coastal nonpoint pollution control programs to be approved by EPA and NOAA. Robertson said these programs address coastal nonpoint pollution problems by integrating federal, state, and local authorities, and helping to build on existing coastal management and nonpoint source programs to reduce and prevent coastal water quality problems.

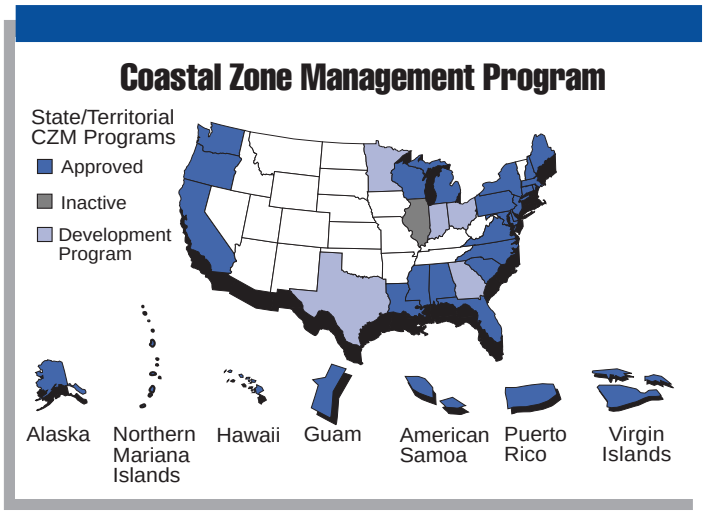
EPA, in consulting with NOAA, published a guidance document containing management measures detailing appropriate nonpoint source control for a number of activities.

The management measure for new onsite wastewater systems states that systems are to be designed, installed, and operated properly, and are to be located away from open water bodies and sensitive water regions. This measure requires that the onsite systems be designed to reduce nitrogen loading in areas where surface water may be adversely affected. The measurement also calls for regular inspections of existing systems and repair and replacement of any failing systems.

Rhode Island

Through its CZARA Section 6217 program submittal, Rhode Island intends to comply with the federal management measures requiring the installation of alternative onsite sewage disposal systems to reduce nitrogen loadings by 50 percent. These systems are presently being installed in coastal areas sensitive to nutrient enrichment, according to James Boyd, an environmental scientist with the Rhode Island Coastal Resources Management Council (CRMC).

In 1984 the CRMC created Special Area Management Plans (SAMP) for the Salt Pond Region and the Narrow River watershed areas to address concerns regarding increases in nitrogen concentrations in groundwater and ramifications to the salt ponds located in these watersheds. The CRMC SAMP policies have decreased residential development density and require the installation of onsite disposal systems for nitrogen reduction in critical coastal areas. The CRMC and the state department of environmental management's Division of Ground Water and Individual



Disposal Systems created a Denitrification Task Force to examine ways to streamline the regulatory process and find ways to incorporate denitrification requirements into regulatory programs, said Boyd.

He added that the state is in the process of revising current regulations that require denitrification units in sensitive coastal areas. This limits the potential adverse effects from onsite disposal systems in nitrogen-limited waters.

Under the new proposal, areas where nitrogen-limited surface waters are adversely affected by excess nitrogen loadings from groundwater will require the installation of any alternative system that can remove a minimum of 50 percent of the total nitrogen that was measured at the septic tank outlet. Boyd said the new regulations will address sensitive coastal areas previously identified by the CRMC.

The state is currently using alternative onsite disposal systems that include trickling filters, sand filters (with a denitrification tank), and composting and incinerating toilets, to reduce the levels of nitrogen loading in sensitive coastal areas. Public education and training for these systems is being conducted through the University of Rhode Island's Onsite Wastewater Training Program.

Florida

Florida's Department of Health and Rehabilitative Services (FDHRS) Onsite Sewage Program is administering a $500,000 EPA grant project that is installing and monitoring onsite wastewater nutrient reduction systems and clustered advanced wastewater treatment systems in the Florida Keys.

"Over a 12-month monitoring period we will be determining how well the systems remove nitrogen and phosphorous," said Tim Mayer, an environmental specialist administering the project for FDHRS. Mayer said they will be evaluating the overall performance, reliability, and economic feasibility of systems, including sand filters, drip irrigation, and fixed-film bioreactors with nutrient removal. (For more information on the project, see a related article in the Spring 1994 *Small Flows*.)

In addition to administering onsite wastewater treatment systems for nutrient removal, other states are testing these same systems in sensitive shellfish growing areas along the Gulf to reduce high levels of fecal coliforms entering coastal waters.

Programs that receive federal funding require a 50 percent match from state dollars in order to implement the programs. Funds are allocated to the states by a formula that takes into account a state's coastal population and its shoreline mileage.

For more information on CZMA and CZARA, contact Robertson at (301) 713-3098, or write to: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, SSMC4, N/ORM3, 11th Floor, 1305 East-West Highway, Silver Spring, MD 20910.

On the World Wide Web, the Coastal Zone Management Resource Page at, http://www.wantree.com.au/%7Keys/index.html is a great resource offering a large selection of coastal zone programs. NOAA's coastal zone home page can be found at, http://wave.nos.noaa.gov/ocrm/cpd/

finance

Can you "Show-Me" the alternatives?

by Kathy Jesperson
NSFC Contributing Writer

In the "Show-Me State," concerned citizens are looking for proof that innovative onsite wastewater systems will help eliminate nonpoint source pollution. And since seeing is believing in Missouri, the Watershed Committee of the Ozarks in conjunction with Greene County and Springfield City Utilities initiated a local watershed protection project that focuses on protecting the water quality of the Fellows and McDaniels Lakes—the two major reservoirs supplying drinking water for Springfield.

Aided by funds allocated through Section 319 of the Clean Water Act and a subgrant agreement with the Missouri Department of Natural Resources, this three-year project, known as the Fellows/ McDaniel Lake 319 Project, is designed to keep the lakes, streams, and groundwater in this vital area clean.

"Without 319 funds, it would be very difficult to demonstrate this project and educate the community about alternative systems and how improperly maintained systems can adversely affect water quality," says Adam Coulter, watershed project coordinator.

Section 319 of the Clean Water Act—the nonpoint source management section—provides federal grants to states so that they can develop and implement nonpoint source management programs. Nonpoint source pollution is pollution that cannot be traced to a specific source, such as effluent from a failing septic tank.

Two Concerns

Designated as priority waterbodies under Missouri's nonpoint source management plan, the Fellows/ McDaniel Lakes area has two primary nonpoint pollution concerns: agricultural runoff and onsite wastewater systems. Each of these problems is addressed by a part of the project.

To address agricultural runoff, the project offers landowners cost-sharing benefits when they install or institute practices that prevent future runoff—such as providing drinking water for cattle outside of stream zones and re-establishing streamside vegetation.

In the second part of the project, innovative and alternative onsite wastewater systems are being demonstrated. Landowners within the watershed area also are offered a cost-share benefit if they choose to participate in the project.

This means that the project pays up to half of the cost for the installation of a homeowner's new system. Money for cost-sharing of alternative systems is provided through 319 grant money and local sources. Springfield received a total of $55,000—$31,500 in 319 grant funds and $23,500 from local organizations.

Land and homeowners are encouraged to become part of the project; however, participation is strictly voluntary.

Innovative Projects

"The kind of projects we're looking at are innovative septic tank installations," says Coulter. "We're especially looking at methods that would be applicable to the southwest Missouri area. "This is considered a karst area and it's very difficult to treat wastewater under such conditions."

In a karst area, fractured limestone, caves, sinkholes, and thin, cherty soils cause effluent to rapidly move from the surface to groundwater supplies, which allows minimal opportunity for soil filtration, adsorption, or microbial activity.

Fragipan soils—a thick, dense, brittle layer of soil, usually within several feet from the surface—are common. This layer restricts percolation of water, which is a major problem with septic systems.

The consequences of treating wastewater in these soil types are surfacing effluent and groundwater contamination. This became evident in a 1984 study conducted by the Greene County Health Department, which suggested that 60 percent of the onsite systems in this area were or might have been contributing, in some degree, to groundwater contamination.

The high rate of contamination found may well be due largely to the geology of the area, says Coulter, adding that conventional septic tank/soil absorption systems often perform poorly in these soils.

Because the Watershed Committee is looking for ways to improve system performance, one of the demonstration projects installed and currently being evaluated is a low-pressure pipe (LPP) system. "This system is a variation of a conventional system," says Coulter. "It shows promise in areas where biologically active soils are shallow."

LPP Differences

"Also, since conventional trench systems are thought to release concentrated levels of effluent, pressurized dosing may prevent the bulk of it from being captured in discrete recharge zones," he continues. An LPP system, on the other hand, allows for uniform distribution of wastewater over the entire soil absorption area, he explains.

According to a Watershed Committee of the Ozarks' brochure, *Maintaining Your Low Pressure Pipe System*, LPP systems also have dosing and resting cycles that help maintain aerobic conditions in the soil, thereby improving secondary treatment. Also, lateral pipe trenches, which are 12 to 18 inches deep, are not as deep as in a standard system, so they are easier and less expensive to install.

Another difference between these two systems is the price. The LPP system in the demonstration project costs about twice as much as a conventional system—$7,000 versus $3,500. The difference in price is due in large part to the extra features that must be included to facilitate the monitoring of the systems for the demonstration project.

The Watershed Committee's monitoring strategy includes metering the flow rate and sampling. Samples from the dosing tank and strategically placed piezometers located at 10 different sampling points have been analyzed for fecal coliform, nitrates, phosphates, chlorides, and volatile organic compounds. Springfield City Utilities analyzed the samples as part of the local cost share.

Project Objectives

One major objective of this project is to evaluate, and eventually standardize, the site evaluation process for Greene County, says Coulter. "We've been collecting samples and keeping a log for the LPP system for about a year and a half now," he continues. "We want to compare that data with data from a conventional system as well as other alternative wastewater treatment methods. But we don't have any conclusions yet. This will certainly be an ongoing process."

Information gained in the project also will be used to develop training programs for building inspectors and sanitarians throughout Ozark counties, he says. The Department of Natural Resources guidelines for site evaluations will be tested to see how they fit with local conditions as well.

However, the most important goal of this project is to use the information gathered to upgrade onsite programs and protect sensitive groundwaters. "A heightened understanding of onsite system performance in the Ozark terrain should eventually be reflected in improvements for evaluation procedures, designs, and installations," says Coulter.

"We also hope to get people more involved in caring for their septic systems," says Coulter. Through an educational outreach program, which includes distributing brochures, the committee plans to stress the importance of system maintenance. Not only is it cost effective for the owner, it helps protect precious groundwater supplies, he adds.

For more information about this project, call the Watershed Committee of the Ozarks at (417) 866-1127.

Funding from Section 319 of the Clean Water Act is used to install an LPP system in Missouri.
Photo courtesy of Adam Coulter.

NSFC Completes Nationwide Data Collection Project on Onsite Systems

Continued from page 1

ties in the status of onsite wastewater treatment systems and the way that systems are managed within and among individual states. Some factors that often differ from place to place include system costs, permit costs, and the number of onsite system permits issued.

The report also shows many similarities among health departments including reasons for denying onsite system permits, reasons attributed to failing systems, who conducts system inspections, and the delegation of system maintenance as the homeowner's responsibility.

As the report states, "These findings are a beginning to identifying the similarities and differences that exist in the onsite arena and may serve to reinforce the fact that 'No one's situation is unique.'"

Information gathered from the health departments is presented for each state as well as summarized nationally for permits, failing systems/repairs, jurisdictional information, costs, etc.

The following information is excerpted the report.

Permits - Number of new onsite systems permitted in 1993; reasons for denial of new onsite system permits; types of onsite systems permitted; and the charge for an onsite system permit.

"The total number of permits issued by responding health departments in the U.S. during 1993 was 388,961. The number issued by an individual health department ranged from 0-4,000." (See Figure 1.)

"Overall, health departments across the country gave the same reasons for denying onsite system permits. The most common are inadequate lot size, poor/inadequate soils, high water table, shallow bedrock, steep slope, and central sewer availability."

Failing Systems/Repairs -Number of onsite systems that failed in 1993; the main reasons attributed to failure; if records are kept of repairs or alterations to onsite systems; number of onsite systems repaired or replaced in 1993; and the charge (if any) for repair permits.

"The total number of failed onsite systems reported by responding local health departments across the U.S. during 1993 was 87,610. The total number of repaired or replaced onsite systems across the U.S. was 92,402. The number of failures reported by an individual health department ranged from 0-8,343, while the number of repairs and replacements ranged from 0-2,000." (See Figure 2.)

"Health departments attribute failure of onsite systems to many similar factors. These include age, unsuitable soils, lack of maintenance/pumping (neglect by the homeowner), high water table, excessive water use, cesspools, improper construction/installation/design, and clogging of the system."

Jurisdictional Information - Number of homes in jurisdiction; number of homes with onsite systems; the change in population; and the effect of the population change on the number of onsite systems.

"Overall, 74 percent of local health departments have seen a population increase in their jurisdiction. This increase has predominantly been in rural areas or sections outside of central sewer limits. Although some health departments report increases only in sewered areas, their numbers are not as substantial."

"One recurring observation from local health departments was that sites which previously would never have been considered for onsite system use are now being purchased, planned, and developed with onsite wastewater treatment in mind."

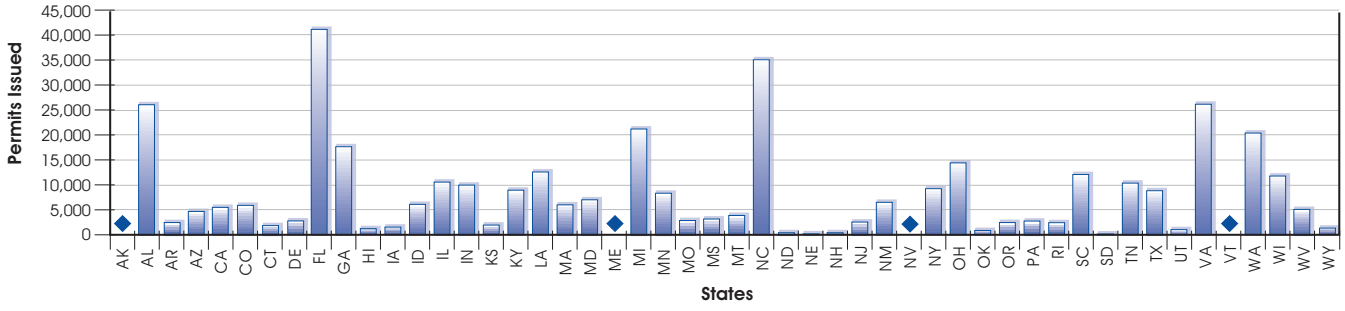
General Questions - Cost range for installing/constructing a new onsite system; who does inspection and maintenance of onsite systems; charges associated with inspections; and how often onsite systems are inspected.

"Overall, costs to install/construct a new onsite system in the U.S. ranged from $150 to $80,000." (See Figure 3.)

Report Availability

The *National Onsite Wastewater Treatment: A National Small Flows Clearinghouse Summary of Onsite Systems in the United States, 1993* will be available soon from the NSFC. To receive a copy or for more information on this exclusive report, contact the NSFC at (800) 624-8301 and ask for Item Number _____. The cost of the report is still to be determined. Shipping and handling charges will apply.

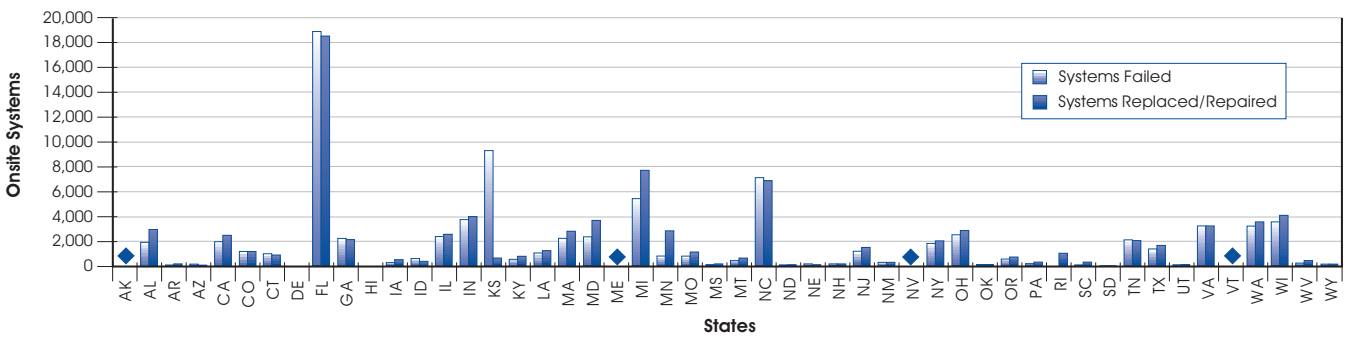
Figure 1: Permits Issued



Total number of permits issued by responding local health departments in each state during 1993.

◆ No Response

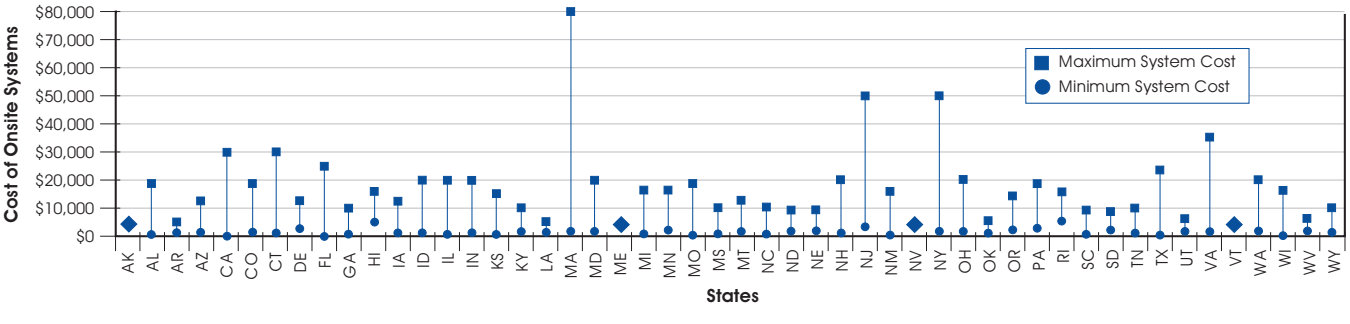
Figure 2: Minimum and Maximum Costs to Install/Construct a New Onsite System



Total number of onsite systems that failed and were repaired or replaced as reported by local health departments in each state during 1993.

◆ No Response

Figure 3: Number of Onsite Systems that Failed and Were Repaired or Replaced



The minimum and maximum cost to install/construct a new onsite system in 1993 as reported by responding local health departments in each state during 1993.

◆ No Response

EPA news

Hardship Grants Available for Disadvantaged Communities

The U.S. Environmental Protection Agency (EPA) recently announced plans for a new grant program designed to help disadvantaged rural communities address their wastewater needs.

The 1996 Congressional Appropriations Act reserved $50 million from state revolving fund (SRF) appropriations to start the new Hardship Grants Program for Rural Communities.

EPA realizes that many small, rural communities have outdated or failed wastewater treatment systems and often cannot afford the full cost of SRF loans to maintain and repair their systems. Under the proposed program, EPA will award grants to states that in turn will offer assistance to qualifying small, disadvantaged communities.

Any rural community with fewer than 3,000 residents can qualify for assistance if:

- its per capita income rate is lower than the national average,
- its unemployment rate exceeds the national average by one percentage point or more,
- the proposed project will improve public health or reduce environmental risk, and
- if the project is unaffordable under criteria established by the state in which the community is located.

EPA urges states to assist their small communities by supplementing SRF loans with hardship assistance.

Qualifying communities may use the hardship grants toward the planning, design, and construction of publicly owned treatment works or alternative wastewater systems, which include onsite systems. States may also use the hardship grants to educate qualifying communities by providing training, technical assistance, and education programs on the operation and maintenance of wastewater treatment systems.

EPA is accepting public comments on the program guidelines until October 21. The agency then will make revisions and have a finalized version of the program guidelines prepared by late 1996.

Copies of the guidelines for the Hardship Grants Program for Rural Communities *are currently available by contacting the State Revolving Fund Program, Mailcode 4204, U.S. Environmental Protection Agency, Washington, DC 20460. Or you may call (202) 260-2268 to request a copy. The guidelines can be found on the Internet at: http://www.epa.gov/WhatsNew.html*

For more information, contact Sheila Hoover (Mail Code 4204), U.S. EPA, 401 M Street SW, Washington, D.C. 20460; (202) 260-2268.

Project XL Program Encourages Environmental Excellence

by Jeremy Canody
NSFC Staff Writer

On March 16, 1995, President Clinton launched the Project XL Communities Program, one of 25 initiatives in his report directed at Reinventing Environmental Regulation. XL stands for "Excellence and Leadership."

Under the president's plan, this program will give a limited number of communities the opportunity to demonstrate excellence and leadership in environmental protection by exploring alternative environmental management strategies that achieve higher levels of environmental quality.

The U.S. Environmental Protection Agency (EPA) introduced four regulatory reinvention pilot programs. Project XL was initiated in a *Federal Register* notice on May 23, 1995, soliciting project proposals from facilities, industry-wide or sector-based programs, and federal agencies regulated by EPA. The Project XL Communities Program was issued in a *Federal Register* notice on November 1, 1995, and began accepting proposals at that time.

Under the Project XL Community Program, EPA is working with state and tribal agencies to grant flexibility in the implementation of environmental regulations to communities in exchange for a commitment to achieve greater environmental performance.

EPA is asking communities to demonstrate specific environmental management actions tailored to local conditions. The agency is seeking projects to deliver better environmental quality than the uniform control approaches used by legislative mandates.

Improved environmental quality can be achieved either directly through the environmental activities of the project or through cost-saving methods resulting from the project.

A final project agreement should include explicit goals, quantitative data (if possible), benchmarks, and requirements that include measurable performance objectives.

Each Project XL Community Program project will undergo four phases before EPA considers it a valid alternative environmental strategy. Each project is proposed, accepted for development of the final agreement, implemented, and evaluated.

By mid-1997, EPA plans to select and initiate 50 projects as part of the overall XL program.

Through the Project XL Community Program, EPA encourages projects that will build, support, and promote cooperation among key stakeholders that may include citizens, businesses, government, and non-profit organizations at the community level.

Communities submitting proposals should demonstrate that they have the technical and financial capabilities to implement their proposals. In addition, EPA favors proposals that demonstrate ways of creating economic opportunity in conjunction with improved environmental quality.

EPA also wants projects that might serve as models for other states, tribes, local governments, regional entities, and communities nationwide.

Although no funding grants are provided for applicants, there are several incentives a successful XL program can provide to a participating community. For example, participating communities will be given the opportunity to develop environmental management strategies to fit local needs that may increase environmental and economic efficiency.

For more information on Project XL for communities contact Chris O'Donnell, director of the EPA's XL Community Pilot Program, at (202) 260-2763. For more information on other XL programs contact Jon Kessler, EPA's Project XL Division Director, at (202) 260-3761.

EPA also maintains a Project XL site on the World Wide Web at: http.//www.epa.gov/projectxl. To receive a fax of the Project XL for Communities information package and/or XL Pipeline Newsletter, call Automated Telephone System at (202) 260-8590. If you are unable to get in touch with the project directors listed, call EPA representative Bill Glasser at (206) 553-7215.

Community Project XL Proposal Submitted by Kokomo, Indiana

One Project XL Community Program proposal currently in technical review was submitted by the city of Kokomo, Indiana.

This submission proposes to treat leachate from the Four County Landfill in Indiana at Kokomo's publicly owned treatment works, pursuant to the permit-by-rule §40 CFR 270.60 (c). Kokomo requests exemption from the Mixture and Derived-From Rules as applied to the leachate introduced into its sewer line at the treatment facility. Kokomo suggests that its Project XL proposal will eliminate the injection of leachate into the environment, prevent release of air pollutants that would result from hauling the leachate from the Four County Landfill to a deep injection well in Ohio, and enhance the environment by treating the leachate and incorporating the treated solids into Kokomo's sludge recycling/composting program.

Progress Continues on ETI Technology Fact Sheets

Progress continues to be made on an Environmental Technology Initiative (ETI) project to widely disseminate information about innovative wastewater treatment.

Funded by the U.S. Environmental Protection Agency (EPA) and conducted by the National Small Flows Clearinghouse (NSFC), the ETI project involves gathering and assessing information about 600 innovative projects, in both small and large communities, that were funded through EPA's former Construction Grants Program.

A federal investment of about $1.1 billion was set aside under this program for innovative technology projects. As data about these innovative systems are gathered, the NSFC will develop and distribute fact sheets about some of the technologies used.

"We're making good progress," said Clement Solomon, NSFC technical assistance specialist and ETI project engineer. "We've reviewed information from a number of sources and are tracking down information from others who worked with the Construction Grants Program. We've also hired an editor, Colleen Mackne, who will begin developing the technology fact sheets."

Solomon expects 30 to 40 fact sheets to be developed during the next year, each of which will systematically describe a specific wastewater treatment technology. The technologies will include various forms or types of:

- aeration/mixing,
- clarifiers,
- disinfection,
- energy conservation and recovery,
- filtration,
- fixed film biological reactors,
- lagoons,
- land treatment,
- nitrification,
- nutrient removal,
- composting,
- digestion, and
- sludge treatment.

The benefits gained from the Construction Grant–funded Innovative and Alternative (I/A) projects have been extremely valuable, said Solomon.

"The NSFC's work represents the next logical step in assessing the lessons learned from these I/A projects, and in making sure that information reaches those in the wastewater profession," he said. "The result should be more of these systems being put to use, by both homeowners and municipalities."

Updates about the project and information about specific fact sheets will be included in future issues of *Small Flows* and *Pipeline*. Information also will be posted on the NSFC's Wastewater Treatment Information Exchange Bulletin Board System (WTIE–BBS).

Formore information about the ETI project, call Solomon at (800) 624-8301 or (304) 293-4191.

NSFC Develops More Information Packages

Editor's Note: This article describes four new information packages available from the National Small Flows Clearinghouse. Refer to the Summer 1996 issue of Small Flows *for descriptions of six other information packages.*

Requests from customers for technical assistance are directed to the National Small Flows Clearinghouse's (NSFC) technical assistance specialists who research each request to provide customers with the most current and accurate information available. When several requests for a specific technology or issue are received, an information package on that subject is generated.

Some of the recent topics that have generated information packages include the following:

Grinder Pump Information Package: This package provides general information on pressure sewers and pressure sewage, three articles about design and performance, three case studies, two database searches (one from the NSFC's Manufacturers and Consultants Database and one from the NSFC's Bibliographic Database), and a list of references. (This 112-page package costs $16.10. Request Item #WWPCGN80)

Disinfection Information Package: This package includes articles on chlorine treatment, ultraviolet disinfection, ozone, and hydrogen peroxide. The introduction includes an article on graywater reuse because of the frequent necessity to disinfect recycled water. (This 143-page package costs $20.55. Request Item #WWPCGN81)

Graywater Information Package: This package contains general information on composting toilets and alternative graywater systems, four articles on design and performance, three case studies, information on hazards, a Bibliographic Database search and a Manufacturers and Consultants Database search. (This 146-page package costs $21.00. Request Item #WWPCGN82)

Site Evaluation Information Package: This package contains information on soil testing, soil classification, conventional soil absorption systems, alternative systems, and a Bibliographic Database search. (This 157-page package costs $22.55. Request Item #WWPCGN83)

For more information on the NSFC's information packages, or to order one of the information packages described in this article, call (800) 624-8301. Please refer to each item by title and number. A shipping and handling charge applies to all orders.

Phase Two of NODP Funded

Phase two of the National Onsite Demonstration Project (NODP) begins October 1 with an additional $1 million to fund alternative wastewater treatment projects in several new communities, says John L. Mori, Ph.D., NODP coordinator.

The first phase of the project, which installed alternative systems in five states, is scheduled for completion on September 30, 1997. Both phases of the project are funded by the U.S. Environmental Protection Agency (EPA) and coordinated by the National Small Flows Clearinghouse (NSFC).

"We're pleased with the progress of the first phase of the NODP and are glad that other states are interested in onsite technologies," says Mori. "We are also pleased to have EPA's support in helping additional communities and broadening the scope of the project in phase two of the NODP."

Phase one of the project focused on technology selection and public education, allowing communities to learn how to deal with their individual wastewater issues.

In addition to this, phase two will encourage communities to establish model management programs for onsite systems and train local officials, engineers, and installers.

NODP staff also will be working to help the NSFC serve as a central data repository and information exchange point for a New England task force. The task force will be evaluating innovative and alternative onsite wastewater treatment and disposal technologies appropriate for small communities. Information collected by the task force will be made available to the public. *(For more information on the New England task force, refer to the article xxxxxxx on page xx.)*

NODP staff also will be working with the National Environmental Training Center for Small Communities to provide training, says Mori.

"Several environmentally sensitive communities will be selected as project sites based on criteria determined by the NSFC and the EPA," says Mori. Selection should occur by January 1, 1997.

An announcement of the official start of phase two of the NODP will be featured in a future issue of *Small Flows*.

New EPA Document Outlines Watershed Approach

A new U.S. Environmental Protection Agency (EPA) booklet outlines the principles of watershed management and explains the benefits of community-based environmental protection.

Watershed Approach Framework is a 16-page booklet that emphasizes building partnerships by stressing the importance of good coordination and cooperation across programs.

Although environmental protection programs have made great strides in improving the nation's water quality, the 1994 national water quality inventory shows that nearly 40 percent of surveyed U.S. waters remain too polluted for fishing, swimming and other uses, the booklet states.

Leading causes of pollution include silt, sewage, disease-causing bacteria, fertilizer, toxic metals, oil, and grease.

The booklet outlines the basics of watershed management and what the key elements of a successful watershed program are, including partnerships, geographic focus, and sound management techniques based on strong science and data.

According to the booklet, there are four key elements of state and tribal watershed approaches:

- Stakeholder involvement – Broad involvement is critical because many solutions depend on voluntary actions.
- Geographic management units – Ideally, the entire area should be divided into units based on hydrologic connections, to allow those involved at every level to scale their efforts up or down to address specific concerns.
- Coordinated management activities – Watershed approaches should constitute improvements in coordination of current programs, processes and procedures to increase efficiency and efficacy.
- A management schedule – A schedule for carrying out coordinated management activities within each of the management units helps organize the work needed to be done by various groups and organizations.

To obtain a free copy of the publication, contact the National Center for Environmental Publications and Information (NCEPI) at 11029 Kenwood Road., Building 5, Cincinnati, Ohio, 45242, or call (513) 489-8190 and ask for Item #EPA840-S-96-001.

Booklet Explains Watershed Protection for Lakes

Reflecting on Lakes: A Guide for Watershed Partnerships is designed for people who want to organize a local partnership to protect a watershed area.

The 12-page booklet is part of the Know Your Watershed Program, which is coordinated by the Conservation Technology Information Center (CTIC), a nonprofit public/private partnership dedicated to the advancement of environmentally beneficial and economically viable natural resource systems.

Reflecting on Lakes begins by identifying attributes that make a lake special and illuminating ways to protect the watershed and improve the lake.

Major threats to lakes outlined in the booklet include an overabundance of nutrients, organic wastes, an overabundance of sediment, metals and other organic chemicals, and rapid raising and lowering of water levels for power generation, irrigation, and other uses.

Possible pollution sources range from mismanaged agricultural practices to wastewater sources, such as combined sewer overflows or failing septic systems.

The booklet concludes that forming a partnership between citizens and government agencies and using clear communication and strong leadership will assure a successful lake-watershed partnership.

For more information on the Know Your Watershed Program or to receive a free copy of Reflecting on Lakes *contact the CTIC at 317-494-9555. A $2 shipping and handling fee applies.*

NPDES Training Modules Available

The U.S. Environmental Protection Agency's Office of Water Enforcement and Permits has developed a five-module training program to introduce the National Pollutant Discharge Elimination System (NPDES) program to new inspectors.

Available through the National Small Flows Clearinghouse (NSFC), *NPDES Compliance Monitoring Inspector Training Modules* contain training information needed by new compliance monitoring inspectors who are unfamiliar with the NPDES program. The program regulates the discharge of storm water from industrial and construction sites according to the 1987 amendments to the Federal Clean Water Act.

The training program includes the following modules:

- *Overview Module* presents a synopsis of the entire NPDES program, including pollution point sources, recordkeeping requirements, and inspection procedures. The module also summarizes the different types of inspections conducted under the program. The cost is $12.65. Order Item #WWPCOM13.

- *Legal Issues Module* discusses the legal issues that must be addressed during an inspection, such as defining a neutral inspection plan, preparing preinspection letters, and maintaining confidentiality. This module also provides legal information to assist inspectors in performing their duties. The cost is $16.70. Order Item #WWPCOM14.

- *Biomonitoring Module* outlines the principles of biomonitoring and the role of biological testing in the inspection program. It includes the basics of toxicity testing from test components to results. The cost is $11.25. Order Item #WWPCOM12.

- *Sampling Procedures Module* details procedures for conducting a sampling inspection, such as evaluating a sampling plan, assessing sample types, and appraising sampling collection techniques. The cost is $13.95. Order Item #WWPCOM11.

- *Laboratory Analysis Module* outlines procedures and information necessary to perform an effective evaluation of a permittee's laboratory, including how to evaluate test validity, data handling and reporting, and lab methodology. The cost is $20. Order Item #WWPCOM15.

To order any or all of these training modules, call the NSFC at (800) 624-8301. Shipping and handling charges apply to all orders.

NOWRA Document Recommends Onsite Performance Criteria

The National Onsite Wastewater Recycling Association (NOWRA) has published *Recommended Onsite Performance Criteria*, a four-page document that defines acceptable system or system component performance.

The document was created by NOWRA's 22-member Technical Practice Committee and was reviewed and accepted by NOWRA's Board of Directors.

Performance criteria are specific and measurable criteria that define acceptable system or system component performance for specific receiving environments based on public health and environmental protection goals. Performance criteria stand in contrast to prescriptive criteria that are specific and measurable design and material requirements.

The purpose of performance criteria is to establish minimum requirements for onsite wastewater systems to ensure the environmentally safe, healthful, reliable, and aesthetically acceptable treatment and recycling of wastewater into the environment throughout the system's service life.

NOWRA's performance standards are intended to be flexible enough that they can be used to define specific and measurable standards for several different receiving environments. The standards can also be used in regions where standards already exist.

For a free copy of Recommended Onsite Performance Criteria, *send a written request to NOWRA, P.O. Box 647, Northbrook, IL 60065-0647.*

A Torrent of Wastewater Information Available on Web

by Chris Berry
NSFC Contributing Writer

The World Wide Web is spilling over with wastewater information. A simple way to find this information is to use software called a Web browser that allows you to search for information located on the World Wide Web. A Web browser allows you to locate specific information by conducting searches using key words.

If you would like to visit a site and you know the exact address, you can simply type the entire address in the blank space provided by your Web browser. This space is usually located at the top of the screen and should be easy to identify, because it will contain the address of the site that you are currently visiting.

The following addresses are some examples of wastewater related Web sites. The information provided below was correct at the time of publication. However, because the Web is a constantly changing resource, what is available one day might be gone or relocated the next. So, the best thing to do is to find an Web browser and start searching!

The American Public Works Association (APWA) home page is a simplistic overview of water related subjects. The APWA is a volunteer association of public and private sector professionals in solid waste and water treatment. This site, located at **http://www.fileshop.com/apwa/main.html**, explains about water supply, stormwater management, early days of flood control, dams, wastewater and sewage, and how water is purified.

An Environmental Protection Agency Web page, located at **http://www.epa.gov/OWOW** (Office of Wetlands, Oceans, and Watersheds), houses many hyperlinks to related water information. Areas that can be accessed from this page include science and technology, wastewater management, groundwater and drinking water, regions, and the American Indian Environmental Office.

The Wastewater Management area includes a hyperlink to the Point Source Information Provision and Exchange System (PIPES), where the EPA, states, municipalities, industries, and the public are able to exchange information through the Bulletin Board System (BBS).

A site to start searching for wastewater related information is the Water and Geology Links. Two major links located at **http://aapg.geol.lsu.edu/goewat.htm#Water** are the Indiana's WETnet and the Urban Groundwater Database.

The WETnet is a virtual water resource that allows users to search for information on water resource projects in three ways, by a person's name, by study area, or by key word. This page also has links to federal and state agencies and general environmental pages.

The Urban Groundwater Database, which is presently under construction, contains information on specific cities and their groundwater issues as well as contacts. Users can contribute information on their own city or town.

The National Environmental Training Service site, located at **http://www.cais.net/tne//neis.water.html**, contains the most requested water, wastewater, and groundwater documents. *The Combined Sewer Overflow (CSO) Control Policy, Environmental Assessment of Proposed Effluent Guidelines for the Centralized Waste Treatment Industry*, and *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, are just some of the documents that are available through this site. These documents can be ordered by mail, phone, fax, or e-mail.

From this site, users can also hyperlink to the most requested documents in other fields, including Environmental Laboratory, Public Policy, Underground and Above Ground Tanks Documents, as well as other fields.

The *Environmental Protection Magazine Online*, located at **http://www.eponline.com**, is an electronic magazine that allows users to find out the current activities in laboratories and universities across the country, submit articles and search back issues of *Environmental Protection* and four other newsletters. This site also features a forum where users can post responses to and submit their own articles.

A page originating in Florida is Your Home Septic System, located at **http://hammock.ifas.ufl.edu/txt/fairs/16824**. Statistics point out that over 1.3 million Floridians live in rural and sparsely developed areas that are not served by public sewage systems.

Users can access information on topics, including what a septic system does,soil considerations when installing a septic tank, including information on soil permeability and depth to the wet-season water table,permitting and installing a septic system, managing a household septic system, which includes information regarding the control of the volume and quality of wastewater, as well as how to maintain the septic tank and drainfield, and repairs to your septic system.

The Web site, A Guide to Wastewater Treatment, sponsored by the Greater Vancouver Regional District, can be found at **http://www.gvrd.bc.ca/sewers/bro/wwguide.html**. This site explains what wastewater is and how much is treated in the Greater Vancouver Regional District. It includes an explanation for users of how and why wastewater is treated. Also included on this page is information about combined sewer overflows (CSOs), wastewater collection, and wastewater residuals.

Mississippi State University's Cooperative Extension Service offers a helpful Web site for septic tank owners. Located at **http://aac.msstate.edu/pubs/pub1869.htm**, this site is part of a voluntary self-assessment in the Home*A*Syst program.

At the Web site, septic system owners can find out if they fall into the category of low, medium, or high risk for problems by answering some basic questions about their septic system.

Offering articles and information in the form of an electronic magazine, **Water Online** is user-friendly and pleasing to the eye. From the home page at **http://www.wateronline.com/**, users can find the latest news in the water industry, a list of suppliers by product category, a list of water-related associations and publications, classified advertisements, a resource library, as well as many other items.

The **Water–Wastewater Web** located at **http://www.w-ww.com/** is a good starting point on the search for information. This site offers hyperlinks to equipment manufacturers' home pages, a reference for professionals, and services, including an area of frequently asked questions where the user can submit questions, forum topics, and classified advertisements. The page, a reference for water and wastewater professionals, is user-friendly and simple to navigate.

Water and Wastewater Treatment at UCLA's Center for Clean Technology located at **http://cct.seas.ucla.edu/cct.ww.html**, offers information about treating water contaminated with small quantities of hazardous substances. Other selected topics are industrial activities and stormwater runoff, inorganic contaminants in waste sediments and sludges, and wastewater reclamation at Lake Arrowhead, California, using reverse osmosis.

Clarification

The **Andrew W. Breidenbach Environmental Research Center (AWBERC) Library Home Page** provides scientific and technical information supporting EPA research programs. The library's subject areas include wastewater treatment, water pollution, and water quality, among others. Located at **http://earth1.epa.gov:80/awberc/awberc.htm**, the library houses the largest scientific/technical collection in the EPA Library Network. It includes 22,000 books, 800 journal subscriptions, and more than 200,000 technical reports.

Users can download and/or order EPA publications including administrative, consumer/community–oriented, standards, and scientific research and technical information, from the hyperlinked **National Center for Environmental Publications and Information** (NCEPI) site. The NCEPI can also be accessed through it's homepage located at **http://www.epa.gov/NCEPIhom/index.html**.

Building the Better Enviro-Tech Mousetrap:

New Cooperative Initiative Seeks to Ease New Technology Regulatory Heartburn

by Tom Groves
Senior Environmental Engineer
New England Interstate Water Pollution Control Commission

Editor's Note: The following article is reprinted with permission from the Spring 1996 edition of Water Connection, *a publication of the New England Interstate Water Pollution Control Commission (NEIWPCC). For more information about* Water Connection *or NEIWPCC, call (508) 658-0500.*

The National Small Flows Clearinghouse (NSFC) is currently entering into an agreement to serve as a central repository of information and data related to onsite wastewater treatment and disposal technologies for the Interstate Regulatory Cooperation Project. The NSFC will also assist the project's Interstate Onsite Technology Review Committee in its work and to make information better available to the industry and the public. Information about the project will be featured in future issues of Small Flows *as it becomes available.*

These days, it seems like technology is advancing and upgrading by the minute—cars, computers, CD players, breadmakers, even hair dryers—we've come to expect as much. For the most part, new technologies move us in the direction of greater ease, performance, and efficiency—"new and improved," streamlined, more super than super. The environmental industry is certainly no exception to this rule.

However, what may frustrate many of those who are running the environmental technology race is that new technologies in the industry, which are generally referred to as innovative, experimental, or alternative, are sometimes stymied by regulators who appear close-minded and pigheaded. But an important part of a regulator's job—a part that usually goes unnoticed by innovators, legislators, and the public, alike—is consumer protection.

Take, for example, the regulated fields of water supply and wastewater treatment. Water and wastewater treatment plant personnel are, for the most part, highly trained and accountable for the quality of their final product. For both, advancing technology is a vital cog in their day-to-day operations. In their efforts to keep their facilities in compliance with environmental standards and, at the same time, deal with budgetary constraints and new regulatory requirements, many look toward incorporating improvements that will make everyone's job easier, more efficient, and, hopefully, more economical.

Most environmental regulators are well aware of this conundrum. The problem arises when new or alternative technologies are proposed. If, for example, there are new technologies that propose to increase a water supplier's microbial filtration removal or to reduce the nutrient load discharged from a wastewater treatment facility, the possibilities should, by all means, be explored. After all, it may make the final product that much better and benefit the public as well.

The Regulator's Dilemma

Most regulators are reluctant to jump right in and give a new technology the "green light." In deciding whether or not to approve a new technology for use in a regulated setting, regulators essentially play the role of the devil's advocate, trying to get a handle on what could go wrong with any given technology—asking questions. Has the technology been adequately field tested? How much testing is enough? What type of documentation/data has the proponent provided? Is the testing facility run by an independent or third party who does not benefit from the product's approval? Under what climate, soil, water conditions was the testing conducted? Can it work here? Will it benefit the public?

Environmental regulators are legitimately concerned with these questions because, beyond consumer protection, their overlying responsibility is to protect the public health and the environment. A regulator wants to be sure that a technology is not only reliable, but that the manufacturer isn't going to disappear into thin air, leaving a water supplier, wastewater treatment plant operator, or a homeowner, in the case of on-site wastewater systems, with no technical support or parts for the product.

In the case of on-site wastewater systems (a.k.a., septic systems), another whole can of worms is the maintenance of the alternative technology, especially if it is a mechanical system. Unlike a treatment plant that is staffed by specially-trained personnel, homeowners traditionally do not have the expertise to maintain and operate their on-site systems.

Aha, An Interstate Approach

Must regulators always be "caught between a rock and a hard place?" Must they always run the risk of being damned if they approve a technology and damned if they don't? What can be done to relieve this new technology burden? Should they simply approve all worthwhile technologies for general use? Or should they require manufacturers to pilot their technologies at a certain number of sites within the state, and then duplicate it again in the next state? There must be a middle ground that will be beneficial to everyone.

Inasmuch as many of the region's environmental regulators have repeatedly found themselves sloshing together in the same, tentative "new technology" boat, the notion of some sort of regional cooperative has its appeal. Testing and evaluating technologies on a regional basis might well be an ideal solution for all involved. The concept of a central testing facility has been long discussed in the field of on-site wastewater treatment systems and is actually becoming a reality at a training and testing center at the University of Rhode Island and a soon-to-be constructed testing facility on Cape Cod.

The [New England] region's environmental regulators have already begun hatching plans for an "Interstate Regulatory Cooperation Project." The plan is to set up a central regional testing facility, or perhaps one in each state, that is directed by a technical review group. In this manner, technologies would be thoroughly evaluated within a controlled setting. Such an approach not only avoids duplication and expense to manufacturers, but also provides regulators with a protocol for performing evaluations and the means to control where and by whom tests are conducted.

The New England Interstate Water Pollution Control Commission (NEIWPCC), U.S. Environmental Protection Agency-New England's Center for Environmental Industry and Technology (CEIT), the New England Governors Conference, and the New England state environmental agencies are all participating in this cooperative project. The goal for the project is to eventually facilitate a review and approval process for alternative technologies in the New England states. To accomplish this, the project's steering committee is piloting a test protocol in one area of environmental technology: alternative on-site treatment wastewater systems.

The Game Plan

The alternative on-site pilot project will develop technical standards that will be used to verify and review new technologies. These technical standards are being developed by NEIWPCC's On-Site Wastewater Task Force, which is comprised of New England and New York State on-site program regulators. The pilot will also include a Memorandum of Agreement between all of the New England states, describing their par-

Continued on page 13

LETTERS TO THE EDITOR

Dear Editor,

This letter refers to an article reprinted from the April 1993 issue of *Small Flows*, "Alternative Toilets: To Flush or Not to Flush." The reason listed in the article for using alternative toilets is that the septic tank system is failing. This means there is a gap between cleaning the loaded septic tank on one hand and finding its alternative on the other.

Another alternative is to convert the septic tank system into a digester system where the biogas is produced by anaerobic digestion. This involves enclosing human excreta sludge in an oxygen-free tank, thus allowing bacteria to eat away at the waste. The bacteria will emit a methane rich biogas that can be burned to provide heat or to produce electricity. The system is well suited where the heat content in the underground is more. If the system is introduced, even on an experimental basis, it will be less expensive and environmentally clean and will produce energy in utilizing human excreta instead of consuming energy for its disposal.

In India, we have not hundreds, but thousands of such individual toilets connected with a digester system producing biogas that is rich in methane. We shall be happy to show any visiting researchers how these systems work.

Sooryakant Parikh
Executive Chairman
NASA (National Sanitation and Environment Improvement Foundation)
Sahyog Com. Centre, 2nd floor, office 2
Laldarwaja, Ahmedabad 380 001
India

Building the Better Enviro-Tech Mousetrap

Continued from page 12

ticipation in this effort.

Through the project, the states will ultimately share and acknowledge the results. A data sharing/clearinghouse will also be developed so that all states, inside and outside of New England, can share the information and references generated. This information will also be useful and accessible to local officials, manufacturers, designers, and homeowners.

Although this project is only a few months old, it is eagerly anticipated by the state governors and environmental commissioners and is on a fast track for completion. Once the pilot technology protocol is developed, regulators hope that it will be easily transferred to other environmental areas.

Most people recognize that technology isn't a bad thing. Properly controlled, it can not only help us protect the environment, it can make everyone's life and job a lot easier. Through the Interstate Regulatory Cooperation Project, we might even be able to make the thankless job of the environmental regulator easier too. If in the process we end up with a whoseamabobbit, a thingamajig, or a whatchamacallit that catches that elusive mouse, then we may, indeed, have built the better enviro-tech mousetrap.

Tom Groves began at NEIWPCC in 1990 as a groundwater coordinator. His duties have since expanded to cover other environmental issues, such as onsite systems, wellhead protection, coastal issues, nonpoint source pollution, wastewater treatment, and computer network administration. Currently Groves is coordinating NEIWPCC's rewrite of TR-16—Guides for the Design of Wastewater Treatment Works. Groves can be reached at (508) 658-0500, ext. 234.

We are pleased to offer this issue of* Small Flows *with an additional four pages of feature and news articles. Look for the product insert that usually appears in the center of each newsletter in future issues.

In the meantime, if you would like to receive a free up-to-date products listing, please call the NSFC at (800) 624-8301 and ask for the* NSFC Guide to Products and Services *update.

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.

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information

NSFC Resources Updated To Provide Latest Information

by Chris Berry
NSFC Contributing Writer

The National Small Flows Clearinghouse (NSFC) is continuously updating its resources to serve its customers more efficiently and to provide them with the most up-to-date information possible.

Manufacturers/Consultants

Todd Olson, technical assistance specialist who manages the Manufacturers/Consultants Database, said that in order to make the new database more user friendly, it is being reorganized to permit searches by one or more of the 80 products or 34 service categories.

The NSFC's technical assistance specialists have accordingly reclassified the existing categories of the Manufacturers/Consultants Database, as well as added new ones. The new categories will allow more flexibility for searches and allow the database to be searched for consultants within their area of specialization.

This database provides customers with a list of industry contacts for wastewater products and professional consultants. It can be used as a contact source for engineers, private citizens, small community officials, and as a referral database for wastewater products and trade items.

Bibliographic

The Bibliographic Database is continuously being updated with new research from periodicals. It currently contains more than 4,300 articles. This comprehensive database allows the NSFC technical assistance staff to handle any type of call relating to a small community or onsite wastewater issue.

More than 150 sources of literature, including research documents, journals, books, handbooks, and reports about alternative onsite systems and small community wastewater treatment systems (i.e., those facilities with wastewater flows of one million gallons per day or less) are regularly searched to keep this database up to date.

Callers can request a specialized search of the database by calling the NSFC. A technical assistance specialist will send the caller the search result, which includes citation information, such as title, author, source, date, and a brief abstract. Each entry is referenced by an identification number that customers can then refer to when ordering the literature that interests them.

Contacts/Referrals

The NSFC maintains a Contacts and Referrals listing that provides information about organizations that assist small communities and have expertise in solving environmental problems.

Information for this listing is currently being updated. It contains a list of agencies, organizations, and programs involved in small community wastewater infrastructure at the local, state, and national levels.

Organizations that are currently listed include national associations, federal and state agencies and associations, trade associations, and colleges and universities.

Organizations interested in being listed in this resource may contact Crystal Stevens, Contacts/Referrals coordinator, at (800) 624-8301, ext. 5550.

For more information on the NSFC's resources, or to request a search, contact an NSFC technical assistance specialist at (800) 624-8301.

New Facilities Database To Be A Networking Tool

by Tamara Vandivort
NSFC Technical
Assistance Specialist

Editor's Note: The National Small Flows Clearinghouse's (NSFC) technical assistance unit is improving its Facilities Database so that it will house information about small wastewater treatment facilities across the country. This information will be made available to help others with their wastewater issues. This article describes how the improved database might assist NSFC customers. A form is also provided on pages 15 and 16 for readers to provide information on facilities to be considered for inclusion in the database.

What is he to do?

An unfortunate homeowner wakes up one morning, stumbles into the bathroom to begin his morning routine only to discover that the toilet won't flush and the sink is clogged. Yep, it's the dreaded septic system backup all right, he says. After the initial panic attack, a few phone calls, and subsequent visits by a consultant and the local health department, the homeowner finds his current system cannot be repaired and needs to be replaced; worse yet, conventional septic systems are no longer allowed in his neighborhood! He finds out there are alternative systems he can use but he's never heard of them, let alone whether or not they work. He can get plenty of written information on them, the consultant is pushing them, and the health department has agreed to approve one of them. But is there anybody he can talk to who has had to rely on one? How can he verify that it does indeed work and will be suitable for his needs? What is he to do?

An operator at a small wastewater treatment plant is pulling out his hair: a new subdivision was recently developed next to the plant and now the new neighbors are complaining about odor. He's talked to umpteen consultants and they all claim their product is the best. The town manager wants him to hurry and get something done about it because she's tired of the complaints at city hall. She is pushing him to purchase the cheapest of the odor control devices unless he can explain why to buy one of the more expensive ones. But he is reluctant to agree to anything because he is going to have to live with the decision. If it doesn't work, it's going to be his mistake and the complaints will continue. He wants to know if there is anybody who has had such an odor eater installed at their plant and whether or not they were happy with it? More importantly, were the neighbors happy with it? What is he to do?

NSFC can help

The National Small Flows Clearinghouse (NSFC) is undertaking the task of matching the people with real-life wastewater dilemmas to the people with the real-life wastewater treatment experiences—those who use the systems and operate the facilities. To accomplish this, a new and improved version of the Facilities Database has been developed by the NSFC. This database will house information on facilities using conventional, innovative, or alternative technologies.

While this database will not list every wastewater treatment facility in the country, it will contain numerous examples of facilities using various technologies under a variety of conditions and uses across the country. Individual, cluster, and community systems used at trailer parks, state parks, restaurants, housing developments, and ski resorts will be included. Any wastewater treatment system, whether an individual onsite system, a privately operated facility, or a publicly owned treatment work (POTW), will be considered for inclusion in this database as long as the flow is small—ideally not exceeding one million gallons per day (mgd).

Personalized reports

Reports generated from this database will list facilities that meet the specific informational needs of the customer. That is, a report will list facilities using specific technologies within a particular state or U.S. Environmental Protection Agency (EPA) region; whether it is a commercial, private, or public facility; facility owner, operator, and consultant contact information; design flow; and operating flow.

Networking is the objective of this database; that is, the purpose in housing this information is to have a list of contacts familiar with their facilities who are willing to talk to people who are either considering using the same technology or are having problems with their system. For instance, if a developer in Oregon is considering clustering a few homes together on a recirculating sand filter in a new subdivision, he or she will be able to call the NSFC and ask for contacts with other developments that have the same type of system in a similar circumstance. A technical assis-

Continued on page 21

information

National Small Flows Clearinghouse
Facilities Database Collection Form

1

■ **Facility Information**

Name _____

Street: _____

City: _____ State: _____ Zip Code: _____

■ **Operator/Contact Information**

Name: _____

Street: _____

City: _____ State: _____ Zip Code: _____

Telephone No. _____ Fax No. _____

e-mail: _____

■ **Other Information**

Who owns this facility? _____

What estimated population is served by this facility? _____

Is this facility: ___ commercial ___ public ___ private, or ___ other?

If other, please explain: _____

_____

Is this facility ETI (EPA construction grants program) funded? ___ Yes ___ No ___ Unknown

Estimated design flow: _____ gpd

Estimated operating flow: _____ gpd

What was the initial startup date for this facility? _____

Was a consultant involved in the design of any of the technologies at this facility? If so, please complete the consultant information below.

■ **Consultant Information**

Consultant Name:

Company Name: _____

Street: _____

City: _____ State: _____ Zip Code: _____

Telephone No. _____ Fax No. _____

e-mail: _____

(Use an additional sheet of paper if there are more consultants or if you wish to add comments.)

■ **Ways the NSFC Can Help You**

Would you like to know of other facilities in your state or region using similar technologies? Yes ___ No ___

Would you like to know of other consultants in your state or region working with technologies similar to those at your facility? Yes ___ No ___

Would you like to know of manufacturers making products for technologies used at your facility? Yes ___ No ___

Would you like to be added to the mailing list for our free publication, Pipeline? Yes ___ No ___

Would you like to be added to the mailing list for our free publication, Small Flows? Yes ___ No ___

Return completed form to:
Tamara Vandivort
National Small Flows Clearinghouse
P.O. Box 6064
Morgantown, WV 26506-6064
or Fax to:
(304) 293-3161

complete other side

Attention Readers:

The National Small Flows Clearinghouse (NSFC) is currently collecting information for its updated Facilities Database and needs your help in locating information on small wastewater facilities. Please fill out this form and return it to the NSFC if you know of a facility that should be included in this database. (See article of page 14 for a complete description of the Facilities Database and how it can be used.) We appreciate your assistance!

What technologies does this facility incorporate? (Please circle all that apply.)

Collection System
Combined Sewer Overflow (CSO)
Conventional Gravity Sewer
Grinder Pump
Pressure Sewer
Sanitary Sewer Overflow (SSO)
Septic Tank Effluent Pump (STEP) System
Small Diameter Gravity Sewer (SDGS)
Vacuum Sewer
Other (Please explain)_____

Pretreatment
Aerated Grit Chamber
Bar Screens
Comminutors
Flow Equalization Basin
Flow Metering
Grease Trap
Horizontal Flow Grit Separation
Vortex Grit Separation
Other (Please explain)_____

Primary Treatment
Dissolved Air Floatation (DAF)
Home Aerobic Unit (HAU)
Imhoff Tank
Package Plant
Primary Clarification/Sedimentation
Septic Tank
Other (Please explain)_____

Secondary Treatment
Activated Sludge
Aerobic Lagoon
Anaerobic Lagoon
Faculative Lagoon
Free Water Surface (FWS) Constructed Wetland
Hydrograph-Controlled Release Lagoon
Media Filter
Natural Wetland
Oxidation Ditch
Rotating Biological Contactor (RBC)
Sequencing Batch Reactor (SBR)
Subsurface Flow Constructed Wetland
Trickling Filter
Other (Please explain)_____

Tertiary Treatment
Activated Carbon Filtration
Nutrient Removal System
Tertiary/Maturation Polishing Pond
Other (Please explain)_____

Effluent Containment
Chemical Toilet
Holding Tank
Other (Please explain)_____

Effluent Disposal
Alternating Field
Bed System
Contour System
Curtain/Underdrain System
Dripline Irrigation
Evapotranspiration System (ET)
Gravelless System
Low Pressure Pipe Distribution (LPP)
Mound System
Overland Flow
Rapid Infiltration
Seepage Pits
Slow Rate Land Application
Spray Irrigation
Surface Discharge
Trench System
Other (Please explain)_____

Solids Treatment/Disposal
Aerobic Digestion
Anaerobic Digestion
Belt Filter Press
Chemical Conditioning
Composting
Dewatering
Drying Beds
Heat Drying
Incineration
Independent Septage Treatment Facilities
Land Application/Reclamation
Landfill
POTW Septage Treatment Process Addition
Septage Receiving Station
Sludge Lagoon
Other (Please explain)_____

Disinfection
Chloramines
Chlorination
Dechlorination
Chlorine Dioxide
Ozone
Ultraviolet Disinfection (UV)
Other (Please explain)_____

Greywater/Blackwater Treatment
Blackwater Treatment System
Composting Toilet
Greywater Treatment System
Incinerating Toilet
Privy
Recycle/Reuse System
Other (Please explain)_____

complete other side

information

Attention Readers:

The National Small Flows Clearinghouse (NSFC) is currently collecting information for its updated Facilities Database and needs your help in locating information on small wastewater facilities. Please fill out this form and return it to the NSFC if you know of a facility that should be included in this database. (See article of page 14 for a complete description of the Facilities Database and how it can be used.) We appreciate your assistance!

Water 2000 Communities To Receive USDA Funding

There is some good news for communities without a safe and dependable source of water. The U.S. Department of Agriculture has announced that $70 million in loans and grants will be provided to fund drinking water projects in 54 communities in 35 states.

As part of its nationwide Water 2000 initiative to provide safe affordable drinking water to every home in the U.S., the funds will be used to build, improve, or expand public drinking water systems.

"These loans and grants will help families and businesses who either do not have drinking water or their tap water is undrinkable," said President Clinton.

The communities that will receive funding were chosen based on the results of a state-by-state needs assessment conducted in 1995. The assessment determined that nearly 2.5 million Americans—including 1 million Americans without indoor plumbing—have the most critical needs. Another 5.6 million were identified as having additional serious needs, including water pressure problems, a lack of adequate water storage facilities, and outdated distribution systems.

The National Drinking Water Clearinghouse offers two free Water 2000 products. *Water 2000: A Plan for Action* (Item #DWPCRE02) provides an outline of the USDA's Water 2000 plan and addresses the reasons behind a lack of water access, federal and technical assistance resources, and long-term solutions to community water problems.

The "Water 2000 Rural Safe Drinking Water Needs Assessment" chart (Item #DWPCRE09) breaks down by state the results of the USDA's 1995 Water 2000 needs assessment. It lists the number of households and level of financial needs for each. For example, the chart shows that North Carolina has the greatest number of people with drinking water needs (423,353), while Kentucky has the greatest financial need for funding ($1 billion) to address its water problems. The states are listed two ways: alphabetically on front and according to greatest financial needs on the back.

If you would like additional information about Water 2000 or the needs assessment, contact Bart Handford, Rural Utilities Service, at (202) 720-1261.

NETCSC Offers Fall Wastewater Training Session

Mark your schedules now for a wastewater-related training sessions developed for environmental trainers and technical assistance providers who train wastewater professionals.

"Onsite Wastewater System Operation and Maintenance" will be held October 22–24 in Laughlin, Nevada. It discusses onsite wastewater treatment and disposal systems, subsurface wastewater treatment systems, components, basic rules, and concepts. The cost is $275 per person or $225 each if two or more people attend from the same organization.

Sponsored by the National Environmental Training Center for Small Communities (NETCSC), this session covers basic wastewater principles and effective training techniques. Course participants receive copies of curriculum materials and instruction in how to deliver the courses.

NETCSC is a nonprofit organization funded by the U.S. Environmental Protection Agency to help environmental trainers improve the quality of drinking water, wastewater, and solid waste services in small communities.

In addition to sponsoring training curricula development and delivery, NETCSC also offers a free quarterly newsletter; low-cost training products; a toll-free training assistance, information, and referral hotline; and answers to training-related questions.

To register, or for more information about NETCSC training programs and services, contact Sandy Miller, conference services representative, at (800) 624-8301, ext. 5536.

NETCSC Course Available

A course that introduces local officials to small community drinking water, wastewater, and solid waste management issues is available for purchase from the National Environmental Training Center for Small Communities (NETCSC).

Basics of Environmental Systems Management (BESM) for Local Officials is a comprehensive curriculum for environmental trainers to use in helping local officials with long-term environmental planning.

The complete course covers drinking water regulations, treatment, distribution, quality, and quantity; wastewater generation, collection, facility siting, and technology; solid waste generation, storage and collection, landfill siting, and recycling. Decision making and community involvement are covered as well and include local officials as decision makers, group techniques, citizen involvement techniques, and citizen participation.

The complete BESM package contains a 21-chapter trainer's manual, 16 booklets designed for use by local officials attending BESM training sessions, and 16 booklet masters that may be reproduced.

The complete package costs $87 (Item #TRTPCD01); the 16 booklets may be purchased for $28 (Item #TRBLCD02/16); and the 16 booklet masters may be purchased for $22 (Item #TRBLCD03/16). Shipping and handling charges apply to all orders.

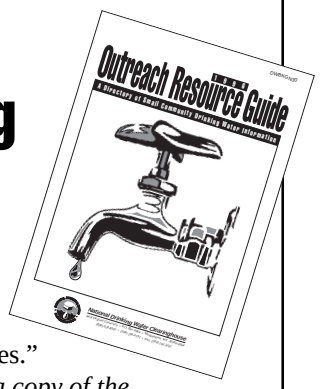
To learn more about BESM or to place an order, contact NETCSC and ask for Lisa Butterworth, ext. 5552, at (800) 624-8301 or (304) 293-4191.

NDWC Offers Drinking Water Resource Guide

The National Drinking Water Clearinghouse (NDWC) has developed a drinking water resource guide that lists nearly 75 federal, national, professional, and trade organizations.

Developed for people interested in drinking water issues, the *Outreach Resource Guide: A Directory of Small Community Drinking Water Information* includes each organization's address and phone number, mission statement, water-related activities, publications, and area offices, if applicable.

"Many organizations are interested in and conduct activities that have to do with drinking water," says Sanjay Saxena, NDWC program coordinator. "This guide includes the major federal, national, professional, and trade organizations in one document for easy reference, with the hope of spurring additional partnerships among groups to address small community issues."



To receive a copy of the resource guide, call the NDWC at (800) 624-8301 and request item #DWBKGN30. The cost for the publication is $6, plus shipping and handling charges.

The resource guide is also available via the NDWC's Drinking Water Information Exchange Bulletin Board System (DWIE–BBS) . To access DWIE, you need a computer with a modem and communications software. There are no toll charges to access the system, which can be reached by calling (800) 932-7459. DWIE may also be accessed through the Internet at NDWC's web site at http://ndwc.wvu.edu. or by connecting to the FedWorld bulletin board. Once in FedWorld, select the gateway option, then choose #81 from the menu.

NSFC Staff Continues to Search for New Information

by Chris Berry
NSFC Contributing Writer

During the last several months, the staff of the National Small Flows Clearinghouse (NSFC) has continued to gather new information and make it available to its customers.

In May, when the snow finally melted in **Benzie County, Michigan**, the local National Onsite Demonstration Project (NODP) participants were very busy installing alternative onsite systems. Patricia Miller, Ph.D., NSFC outreach coordinator and an NODP technical coordinator, visited the site and documented the installation of a phosphate absorption treatment system and the associated monitoring devices. She also wielded a shovel to help with construction of the system. Also assisting Bill Crawford, R.S., Benzie County's project supervisor were Ted Loudon, Ph.D., P.E., the project's engineer from Michigan State University Extension, and Mike Baker ***(Patricia is trying to find out his title)*** of the University of Waterloo (Ontario) Groundwater Research Centre.

On May 24, Tamara Vandivort and Todd Olson, technical assistance specialists, Cathie Falvey, editor of *Pipeline* and *The Small Flows Journal*, and Crystal Stevens, administrative assistant, attended the first of a two-part seminar entitled **Low-Cost Wastewater Alternative and Management Solutions for Pennsylvania's Rural Communities** at **Altoona, Pennsylvania**. The seminar provided an overview of alternative technology issues for local governments that manage wastewater and cited specific case studies.

Attending the seminar helped make Vandivort, Olson, Falvey, and Stevens aware of the challenges that Pennsylvania regulators face in choosing an alternative system, managing the system, and getting communities to accept the new systems. They also learned how the communities are implementing management policies.

The group also collected literature for the NSFC databases regarding wastewater planning and management and received an update on the progress of the Delaware Valley College Demonstration Project.

The **Watershed '96** conference was held June 8-12 in **Baltimore, Maryland**. Miller, Vandivort, and Andrew Lake, graduate research assistant, attended the conference. It covered topics such as nonpoint source and land-use patterns, coastal zone management, floodplain management, computer modeling, and database management.

Vandivort and Lake also participated in a field trip at the conference aboard the Environmental Protection Agency's (EPA) research vessel the *Peter W. Anderson*. While on board, they observed survey equipment and specific water sampling techniques and processes used for the Chesapeake Bay.

At the conference, Lake participated in another field trip—this time to Quail Creek, the site of a successful stream restoration project.

Through their participation in **Watershed '96**, the NSFC staff gained an awareness of efforts to protect watersheds from nonpoint source pollutants, including storm sewers, combined sewer overflows, and failing septic systems. They also learned how communities are getting involved in protecting their own watersheds. In addition, staff collected more than 100 documents, brochures, and manuals for use as reference materials, products, and database resources.

Staff also distributed NSFC publications and information to many of the attendees and informed them of NSFC's ongoing activities, such as the NODP and Environmental Technology Initiative (ETI) projects. They also had the opportunity to meet staff from other EPA programs and learn about their projects and resources, which is especially helpful information to pass on to callers to NSFC technical assistance.

Miller returned to **Benzie County, Michigan**, in mid-June, accompanied by Jennifer Hause, senior technical assistance specialist, Olson, and Lake. While there, they assisted with the installation of a biofilter system, observed installation of several other systems, and visited systems which had already been installed. Through information gained during these visits, NSFC staff will be able to answer callers' questions about these systems, and to explain some methods of monitoring the systems.

In June, Falvey, Miller, Olson, Tricia Angoli, technical assistance specialist, and Laurie Klappauf, editor of the National Drinking Water Clearinghouse's (NDWC) *Water Sense*, attended the second part of the two-part seminar, **Low-Cost Wastewater Alternatives and Management Solutions for Rural Communities**, in **Altoona, Pennsylvania**. Miller presented key wastewater management issues by highlighting case studies from the NODP and from NSFC's experiences nationwide.

NSFC staff learned about administrative, management, financial, and educational programs which can benefit our callers from Pennsylvania and other northeastern and mid-Atlantic states.

On June 25–28, Clement Solomon, technical assistance specialist, Ed Winant, Ph.D., graduate research assistant, and Angoli, Lake, Vandivort, and Olson attended the **Small Wastewater Treatment Works Operators' Short Course and Examination** to obtain the I-S Operator's Certificate in **Clarksburg, West Virginia**.

This short course was designed to present basic operational, maintenance, sampling procedures, and troubleshooting techniques, which helps operators of small sewage package treatment plants and stabilization ponds maximize the efficiency of their facilities.

While attending, the NSFC group gained knowledge that will help them better answer callers' questions about operation and maintenance, sampling procedures, and troubleshooting for package plants, stabilization ponds, and sand filter systems.

Construction activities at the **Chestnut Ridge Park NODP** in Monongalia County, West Virginia, also kept NSFC staff busy this summer. Angoli, Hause, Lake, Miller, Olson, Solomon, Winant, David Pask, an NODP project coordinator and NDWC technical service coordinator, Scott Fogarty, NODP graduate research assistant, and Salam Murtada, National Drinking Water Clearinghouse graduate research assistant, helped with installation of several systems at the park. They installed connectors for the tubing on the drip irrigation system, connected individual laterals to form runs, acquired and planted vegetation in the subsurface flow wetland, and observed pressure testing of the LPP absorption system.

Through their hands-on work with these systems, the staff will be able to answer callers' questions about the technologies, and they also gained a better understanding of installers' experiences with alternative systems and some of the needs for installer training.

Miller and Angoli also attended the **National Environmental Health Association Annual Conference** in **Chicago** in July. Miller also attended a meeting of the **Board of Directors of the National Onsite Wastewater Recycling Association**, held in conjunction with the conference, and met with several participants and expert panel members from the NODP. Angoli made a presentation about NSFC's local health department project. (For more information about the health department project, see the article on page 1.) Both Angoli and Miller attended the onsite wastewater workshop and participated in the discussion groups.

Information from these sessions will be particularly useful in NSFC's information dissemination about onsite wastewater standards and in preparing the local health department project report. Miller, Angoli, Sanjay Saxena of the National Drinking Water Clearinghouse (NDWC), and Mohamed Lahlou, also of the NDWC, distributed NSFC and NODP literature at the workshop and in the exhibition hall.

In July Miller traveled to **Ann Arbor, Michigan**, for a meeting of the **Joint Committee on Wastewater** at NSF International. Committee members discussed standards for waterless composting toilets, grinder pumps, and aerobic treatment units.

Following the committee meetings, Miller attended the **Global Rivers Environmental Education Network (GREEN) International Conference** in **Ann Arbor, Michigan** where she acquired educational materials for NSFC's public education programs and learned of many new resources for our callers. She also attended workshops on electronic media in water quality education, where she

Continued on next page

NSFC Staff Continues to Search

Continued from previous page

obtained test copies of educational software and acquired many new ideas for alternative outreach mechanisms at NSFC.

Cliff Livengood, R.S., of the Monongalia County (WV) Health Department and supervisor of the Chestnut Ridge NODP, made a presentation about the Chestnut Ridge site at the **Interstate Environmental Health Association Conference** in **Canaan Valley** in July, where he also distributed information about the Clearinghouse to conference attendees.

In August, Miller made a trip to **Anne Arundel County's NODP site**, where she met with Richard Piluk, R.S., P.H.E., and Ed Peters, R.S., the county's project supervisors. Joining them were Steve Hogye, U.S. EPA project officer for NSFC and NODP, George Tchobanoglous, Ph.D., P.E., of the NODP expert panel, Don Alexander, R.S., Anish Jantrania, Ph.D., P.E., of the Virginia Department of Health, and Bob Mayer, P.E., from Richmond, Virginia. The group observed NODP installations and monitoring, visited a shale filter manufacturing operation, and discussed recommendations for operations, modifications, and educational efforts. Piluk, Peters, Miller, and Tchobanoglous also visited the Mayo treatment facility in Anne Arundel County.

Miller also traveled through the Appalachian mountains to **Riverfest 96**, a river awareness festival held in **Capon Bridge, West Virginia**, where she distributed NSFC and NODP literature. Attendees included many state and federal agency employees who work with water quality, a number of university teachers/researchers, and many homeowners from Baltimore, Washington, and West Virginia's eastern panhandle.

Government agency employees and university faculty were particularly interested in learning more about the nearby NODP sites in Maryland and West Virginia, and discussions with the homeowners provided Miller with useful information concerning homeowner education needs and homeowner experiences with the onsite permitting practices.

Throughout the summer, NSFC conducted field visits to the **Chestnut Ridge NODP** site to share and collect information about the project. Visitors included Joyce Hudson, U.S. EPA project officer for the ETI Project; Glenn Marshall, Australian researcher and Queen's Trust Grant recipient (see article on this page); and David Ehrlenbach, water and wastewater research engineer at the U.S. Forest Service research facility in San Dimas, California. Ehrlenbach visited Chestnut Ridge and the Gloucester, Massachusetts, NODP as part of his field research for a series of onsite wastewater manuals for U.S. Forest Service campground operators.

In June, Clement Solomon and Andrew Lake met with Jim Kreissl and Jim Heidman, Ph.D., P.E., both EPA senior environmental engineers, to discuss the Environmental Technology Initiative (ETI). They reviewed and revised the current list of proposed environmental or ETI technologies to be developed as fact sheets.

The four discussed classifying and packaging fact sheets into categories that could provide more information to the intended audiences. They reviewed the proposed outline for fact sheets, and the dissemination strategy to be followed for targeting groups across the country. (For more information about ETI, see the article on page 9.)

Finally, in August, Miller traveled to a meeting in Cameron, Missouri, organized by the **National Rural Electric Cooperatives** and the **Northwest Missouri Rural Electric Cooperatives**. Miller distributed NSFC, NODP, ETI, and NDWC literature at the meeting and made a presentation about these organizations and projects. Attendees included rural electric cooperative personnel, federal and state agency staff, consulting engineers, research scientists, biologists, RCAP and Rural Water staff.

In addition, Miller had the opportunity to learn and collect information about water and wastewater planning and financing; water quality programs; electric cooperatives' role in water and wastewater management; Missouri's new onsite wastewater association and onsite training center; RCAP and Rural Water programs; and the National Resource Conservation Services' constructed wetlands projects in northern Missouri.

Glenn Marshall, a geologist and environmentalist from outback Australia, visited the National Small Flows Clearinghouse over the summer to collect information.

NSFC gets visitor from "down under"

by Cathie Falvey
NSFC Editor

Word is spreading about the National Small Flows Clearinghouse (NSFC)'s resources. Evidence to that effect arrived on our doorstep recently in the person of Glenn Marshall, geologist and environmentalist from outback Australia.

Marshall was one of the many visitors to NSFC from international locations this year. Greek, _____ delegations also have visited the NSFC in 1996.

Marshall was awarded a Queen's Trust Grant to collect information about graywater reuse and small community wastewater treatment technologies. In August, he came to Morgantown, West Virginia, to visit the NSFC and the National Onsite Demonstration Project.

"It's been a good trip," said Marshall as he tried to rearrange the contents of his overstuffed pack. "The demonstration project was particularly impressive—we don't have anything quite like that yet back home."

As part of his U.S. trip, Marshall also visited sites in Santa Barbara and San Francisco, California, areas using onsite wastewater treatment and single-household graywater reuse systems.

"Where I live in the Northern Territory of Australia, the climate is very arid and there are hundreds of remote aboriginal communities that have typically less than a hundred people. In these remote areas, there are a lot of problems with wastewater management and inadequate water supply and infrastructure.

"So, as you can imagine, the potential for graywater reuse for garden irrigation is huge! In Australia, regulators are still reluctant to allow direct graywater reuse, but they are prepared to look at the issue. One of the main goals of my trip is to collect information to distribute to regulators, as well to the general public."

After his U.S. trip, Marshall traveled to England to collect information about "flow forms," manmade rhythmic waterfalls used to aerate wastewater.

Another goal Marshall has for his trip is to collect ideas about creating a network for Australia's onsite wastewater professionals. "Right now, we don't have anything—no network for onsite wastewater practitioners, researchers, and regulators. In November, an affiliation of people who are into onsite issues will be getting together in Northern New South Wales with the possible goal of establishing a loose network of some kind."

Anyone who has ideas or questions for Marshall is invited to contact him at his e-mail address: gmarshall@d130.aone.net.au, or write to Glenn Marshall, Environmental Water and Wastewater Consultant, WaterWays Asia-Pacific, P.O. Box 921 Nightcliff, Darwin NT 0814, Australia. Phone: (08) 89 489 134.

advice

WATS LINE Q & A

Editor's Note: The following questions were received over the National Small Flows Clearinghouse's (NSFC) WATS line. Answers to these questions were researched and written by Todd Olson, technical assistance specialist. If you have a question, please call NSFC technical assistance staff at (800) 624-8301 or (304) 293-4191.

Why should septic tanks be watertight?

Septic tanks are used as the initial collection point for wastewater from your business or home. When a septic tank is leaky, it interferes with a septic system's ability to properly treat the wastewater. According to the book, *Artificial Recharge of Groundwater*, by Charles Gerba and Sagar Goyal, leaking sewers, septic tanks, and lagoons account for at least a trillion gallons of untreated sewage introduced into surface and groundwaters each year.

Leaks in septic tanks occur in three main areas: the seams, the inlet or outlet, or within the walls of the tank. Normally, seam or inlet/outlet leaks occur because the tank has not been properly sealed. Leaks within the tank walls occur as a result of poor tank construction, usually because of inadequately prepared concrete or fiberglass.

Untreated sewage contains bacteria, viruses, and parasites that can be harmful to humans, and nutrients that can contaminate drinking or surface water sources. Therefore, it is essential that a septic system's tank is watertight.

A septic tank should be watertight for two reasons: (1) to prevent unwanted exfiltration to groundwater sources (water leaking from the septic tank to the surroundings) and (2) to prevent unwanted groundwater infiltration (surrounding water entering the septic tank).

Exfiltration can pollute groundwater sources quickly by discharging untreated sewage directly to subsurface drinking aquifers. *Artificial Recharge of Groundwater* states that about 20 percent of all individuals get their drinking water from subsurface sources—a figure that is expected to rise to 33 percent by the year 2000. Therefore, a primary concern is the protection of groundwater for human consumption.

Contaminants that leach from a septic tank have a direct path to drinking water aquifers. When conditions are right, this pollution can cause the spread of waterborne diseases such as typhoid and cholera, or viral infections such as hepatitis A and polio.

Infiltration can shorten the life of a septic system or a system component. For example, suppose you have an onsite system consisting of a septic tank, followed by a dosing tank with pump, and a disposal field. If the septic tank or dosing tank is not watertight, and groundwater infiltrates the tank, then the level of water in that tank is equivalent to the amount of wastewater your family or business is generating *plus* the additional water that seeps into the tank.

The drainfield is designed to handle a specific amount of wastewater each day (based on the amount generated by your family or business). Excess water infiltrating the tank causes the pump to operate more frequently, which forces the excess water from the dosing chamber into the drainfield. The excess water saturates the drainfield causing hydraulic overload, which prevents the septic tank effluent from infiltrating the soil and receiving proper treatment.

Another problem with excess water in the tank is that it can cause solids to be flushed out into the drainfield. Once in the drainfield, solids can clog soil pores, blocking infiltration and preventing the system from operating properly. This can result in ponding of sewage on the surface or a sewage backup into the home. Replacement of a drainfield can often be expensive, sometimes costing as much as $10,000. Systems with pumps suffer more because, in addition to replacing a drainfield, it may be necessary to spend another $300–$800 to replace a worn-out pump.

How are watertight standards for septic tanks regulated and tested?

Nearly every state's onsite wastewater regulations require watertight septic tanks. However, there is no uniform construction code accepted by every state that determines what defines a watertight septic tank.

Some states use standards developed by the American Society for Testing and Materials (ASTM), *Standard Specification for Precast Concrete Septic Tanks*, which specifies requirements for construction of a tank. Other states simply indicate that a septic tank must be certified as watertight and structurally sound. This certification is usually conducted by a registered structural professional engineer or through a series of vacuum or water-holding tests.

The type of watertightness test used depends on the material used for construction of the tank. Most septic tanks are constructed of fiber- or steel-reinforced concrete, composite fiberglass, or plastics. A watertightness test is performed on a concrete tank by filling the tank with water and allowing it to sit for 24 hours. At the end of this period, the tank is then refilled with water and allowed to sit for another hour. If the tank can hold the water at the same level for one hour after the second filling, then it is certified as watertight.

If the tank is made of a composite plastic or fiberglass, then watertightness can be determined with a vacuum test. This test exerts negative pressure (vacuum) on the tank with a pump. To pass this test, a tank must withstand 50 millimeters of mercury (Hg). This is approximately 1 lb/in^2 of negative pressure. The vacuum test is used for plastic or fiberglass tanks because of its simplicity; the water-holding test is used for concrete tanks almost exclusively.

How are septic tanks constructed?

Fiberglass or composite plastic septic tanks are produced in-factory only. They are formed using sheets of carbon fiber composite, plastic or loose fiberglass, and then molded while malleable. The pieces are adhered to one another in the desired shape.

Then they are placed in an oven where they are baked until the individual sheets join in one seamless form. After baking, the tanks cool off slowly, thus hardening exterior and interior surfaces. Composite, monolithic-cast tanks form a near perfect watertight seal, but cost more than concrete tanks—anywhere from $600–$1,000—and cannot be produced quite as rapidly.

Concrete septic tanks are normally constructed using one of three configurations: mid-seal, top-seal, or monolithic cast. All are cast with forms (reusable steel or wooden guides that shape the sidewalls, top, and bottom of the tank), and a reinforcing material consisting of either steel bar or fiberglass threads, which add physical strength to the tank. Concrete tanks can either be factory-cast or field-cast, although the latter is rarely done or permitted.

A mid-seal tank is cast in two sections, consisting of two nearly identical top and bottom halves. The lower half is placed in the desired location, and a sticky tar - like sealant, called butyl mastic (sometimes known as bitumastic), is rolled along the seams of the tank. The top half is lowered into place and seated firmly on the butyl mastic seal. A top-seal tank is constructed in a similar manner, except that the tank is in almost one piece and is covered with a butyl mastic seal and concrete lid. The monolithic cast tank is a septic tank that is cast or factory-formed in one piece, thereby limiting the need for mastic to inlet and outlet pipe connections only.

The mid-seal tank has the advantage of being simple to manufacture, but is more difficult to make watertight. Top-seal tanks are fairly cheap to manufacture and form a watertight seal, but are slightly more difficult to produce. A monolithic cast tank forms a very good watertight seal, but is more expensive to produce. Typical cost for a concrete septic tank is between $400–$500 for a mid or top-seal cast, and around $800 for a composite or fiberglass monolithic cast.

You can order the four-page Standard Specification for Precast Concrete Septic Tanks *from ASTM for $15 plus shipping and handling. To order, call ASTM customer service at (610) 832-9691 and order Designation C1227-96. You can also write ASTM Customer Service, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.*

The National Small Flows Clearinghouse (NSFC) offers a comprehensive list of state regulations for septic tanks. To order the 197-page photocopied document, Septic Tanks from the State Regulations, *contact the NSFC at (800) 624-8301 and order Item #WWPCRG26. The cost is $28.30. A shipping and handling charge applies.*

Exploring the liability of small flows consultants

by Kent Seitzinger
NSFC Legal Advice Columnist

Editor's Note: This article is the first in a two-part series that outlines some general guidelines that small flows consultants should consider in their day-to-day practice.

There is considerable potential liability for consultants who are involved with various steps in the site testing, design, and inspection of small flows systems.

Before I outline some guidelines consultants should consider to protect themselves against such liability, I need to define a few terms used in this article:

- *liability:* legal responsibility
- *small flows systems:* all sys tems exclusive of conven tional municipal sewage systems.
- *consultants:* those people with appropriate education and experience who are permitted under each state's laws to perform site evaluations, de sign systems, and/or inspect systems.

Following the suggestions outlined here cannot guarantee that a consultant will not be sued and cannot guarantee that, if sued, that consultant will successfully defend the case. However, following these suggestions should minimize one's exposure to being sued and should significantly increase the likelihood of being able to successfully defend one's self if sued.

Who are consultants?

It is impossible to explore the laws of all the states in this article. However, many, if not most, states have laws that describe what state license(s), if any, must be held to work in the small flows field. Most states recognize certain types of engineers and sanitarians as qualified; many states recognize geologists as qualified; a few states recognize soil scientists as qualified; and some states recognize system installers as qualified.

Why would you be sued?

The most common basis for a lawsuit is a failed septic system, which frequently means extensive and expensive repairs or the construction of an entirely new system.

Another basis for a lawsuit is improper site analysis. While an improper site analysis may result in the same liability as for failed systems, it also may provide the basis for other consequences. For example, the sale of a particular lot or parcel of land may be contingent upon the site qualifying for a septic system. A site analysis that indicates the site is suitable for a septic system would normally remove that contingency and allow the buy/sell transaction to be completed. A subsequent determination that this site was really unsuitable would result in the buyer having purchased property that cannot be used in the intended way. It is also possible that an incorrect site analysis may result in the use of an unnecessarily complex, and therefore, extraordinarily expensive, system.

One final possibility, though unusual, is at least a theoretical consequence of a faulty site analysis. In this scenario, a prospective buyer sees an opportunity to purchase a piece of property for $25,000 when it would otherwise appear that the property is really worth $50,000. However, as a condition of purchase, the buyer has a contingency that requires the site to qualify for an onsite system permit. The consultant evaluates the property and advises the prospective buyer that the property will not support an onsite system. The buyer rescinds the purchase agreement because of the failed contingency. Later, the buyer learns that the property was, in fact, suitable for development and as a consequence of the mistaken site evaluation, the first buyer has, for most intents and purpose, just lost $25,000 and an investment opportunity!

What's a consultant to do?

First, one needs to understand a few general legal principals. The legal exposure of a small flows consultant could be based in either contract law or tort law. An examination of each of these potential theories of liability needs to be considered. (Tort law will be covered in the second part of this column that will appear in the Winter 1997 issue of *Small Flows*.)

The contract aspect can arise from the agreement between the consultant and the client to perform soil tests, design a system, and/or to inspect the system during construction. One of the most critical aspects is the form of the contract. While it is true that most states recognize an oral contract for certain things, an oral contract in this instance is ill-advised.

If nothing else, one would want a written contract to provide the following disclaimer: *The consultant does not represent nor warrant the operation or proper functioning of this system for any period of time.* Without such a disclaimer, a consultant could easily end up in a serious legal fight simply because a system does not function properly, even if the consultant's work was performed properly. (Even if a successful defense can be offered, the legal fees in fighting such a battle could exceed $35,000 and in most states those fees cannot be recovered from the other side.)

The contract also should be sufficiently explicit to clearly indicate what services are being provided, the price of those services, and what is not being provided. For example, suppose I retain the services of Joe Engineer to perform a soil profile evaluation and percolation test at a cost of $500. if Joe's tests showed my building site to be unsuitable, I might be inclined not to pay him. (Believe me, this happens more frequently than you might expect when a site is found to be unsuitable.) If Joe decides to sue me for his fee, I will probably sue him for negligently doing his job. (Who knows, I *might* even be right!)

A written contract should have appropriate disclaimers including those relative to a guarantee of system functioning, a guarantee of site suitability, the scope of work to be performed, the fees to be charged, and any other particulars. This is critical in maximizing one's protection from legal actions.

It is also usually advisable to have an attorney's fees clause that provides for the prevailing party to get attorney's fees from the losing party in any dispute arising out of the contract.

One final consideration to include in the contract is a mandatory arbitration clause. While there are some potential drawbacks to mandatory arbitration, carefully selected arbitrators can both expedite the process and save a considerable amount of legal fees while providing a reasonably good result.

New Facilities Database To Be A Networking Tool

Continued from page 14

tance specialist will search the Facilities Database and generate a listing of these facilities, their contacts, and other relevant information.

This database also will house information on Environmental Technology Initiative (ETI) facilities. These facilities were funded as part of the U.S. EPA's Construction Grants program as an incentive for POTW's to use innovative and alternative wastewater treatment technologies. ETI technologies include aeration, clarifiers, lagoons, land treatment, digestion, nutrient removal, disinfection, energy conservation and recovery, filtration, and upgrades to ponds and lagoons. (See article on page __ for more information on ETI.)

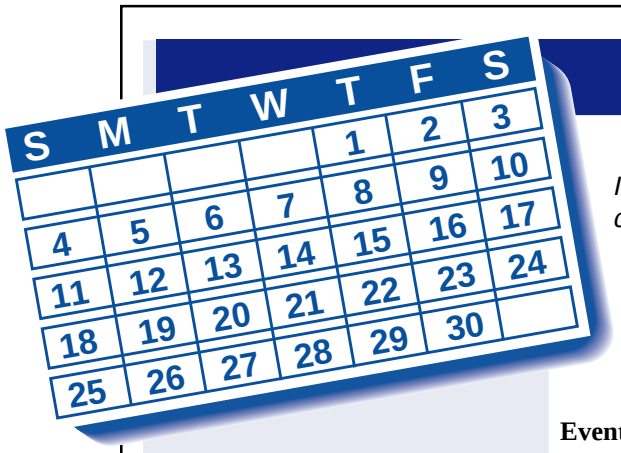
Information needed

To make this database a useful network, the NSFC needs your help in locating current information on small wastewater facilities across the country to include in the database. Therefore, if you are the owner, operator, or manager of a small wastewater treatment facility, the NSFC would appreciate hearing from you so your facility can be considered for inclusion in the database. (Please fill out and return the completed form on this page.) If you are a health department sanitarian, regulator, or town manager, tell the person who actually works with the small wastewater treatment system about the database. (You may wish to give them a copy of the form.)

To learn more about the NSFC's Facilities Database, please contact Tamara Vandivort, technical assistance specialist at (800) 624-8301, or e-mail her at tvandivo@wvu.edu. Completed Facilities Database forms should be mailed to Vandivort: NSFC, P.O. Box 6064, Morgantown, WV 26506. They may also be faxed to her at (304) 293-3161.

For more information on ETI, contact Clement Soloman at the number listed above.

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.*

OCTOBER

Event: Onsite Wastewater System Operation and Maintenance
By: National Environmental Training Center for Small Communities
Date: October 22–24
Place: Laughlin, NV
Phone: (800) 624-8301, ext. 5536 Sandy Miller

Event: Nonpoint Source Pollution Information/Education Programs
By: Illinois Environmental Protection Agency, U.S Environmental Protection Agency Region 5, Northeastern Illinois Planning Commission
Date: October 22–24
Place: Chicago, IL
Phone: (312) 454-0400

Event: International Wastewater Treatment Conference
By: Texas A&M University
Date: October 23
Place: Weslaco, TX
Phone: (409) 845-7451

Event: 28th Annual Water Resources Conference
By: University of Minnesota
Date: October 24–25
Place: Minneapolis, MN
Phone: (612) 625-6616

Event: Seminars for Public School Teachers
By: Global Rivers Environmental Education Network and Water Education Teachers
Date: October 24–26
Place: Caddo Lake, TX
Phone: (313) 761-8142

Event: The Bioneers Conference: Practical Solutions for Restoring the Earth
By: Collective Heritage Institute
Date: October 25–27
Place: San Francisco, CA
Phone: (505) 986-0366

Event: National Safety Council's 84th Congress and Exposition
By: National Safety Council
Date: October 27–November 1
Place: Orlando, FL
Phone: (708) 775-2304

Event: Understanding ISO 14001: A Systems Approach to Environmental Management
By: George Washington University Continuing Engineering Education Program
Date: October 28–29
Place: Washington, DC
Phone: (800) 424-9773

Event: Chemtech Expo '96 Envirotech India's 17th International Exhibition and Conference
Date: October 28–November 2
Place: Bombay, India
Phone: 49-221-821-2509

NOVEMBER

Event: Agricultural Equipment Technology Conference II
By: American Society of Agricultural Engineers
Date: November 1–2
Place: Atlanta, GA
Phone: (616) 429-0300

Event: Evaportranspiration and Irrigation Scheduling for Agricultural Landscape and Turf
By: American Society of Agricultural Engineers
Date: November 3–6
Place: San Antonio, TX
Phone: (616) 429-0300

Event: 4th Seoul Technomart '96
By: Korea Institute of Industry and Technology Information
Date: November 5–8
Place: Seoul, Republic of Korea
Phone: 82-2-966-5879, 962-6211 ext. 553, 554, 556

Event: Fifth Annual National Onsite Wastewater Recycling Association Conference and Exhibit
By: National Onsite Wastewater Recycling Association
Date: November 9–12
Place: Milwaukee, WI
Phone: (800) 966-2942

Event: Overview of Air, Liquid, and Solid Waste Treatment #1499
By: George Washington University Continuing Engineering Education Program
Date: November 11–12
Place: Washington, DC
Phone: (800) 424-9773

Event: Land Application of Wastewater: Operation and Maintenance of Overland Flow and Surface (Spray) Irrigation Systems
By: National Environmental Training Center for Small Communities
Date: November 12–14
Place: Atlanta, GA
Phone: (800) 624-8301, ext. 5536 Sandy Miller

Event: Design of Alternative Onsite Wastewater Systems Short Course
By: Montana State University
Date: November 13–14
Place: Polson, MT
Phone: (406) 994-1748

Event: Water, Wastewater, and Hazardous Treatment Course # 1500
By: George Washington University Continuing Engineering Education Program
Date: November 13–15
Place: Washington, DC
Phone: (800) 424-9773

Event: 16th Annual International Symposium People, Lakes, and Land: Puzzling Relationships
By: North American Lake Management Society
Date: November 13–16
Place: Minneapolis, MN
Phone: (612) 297-8683 Steven Heiskary

Event: Policy Conference XVI: Wastewater Choices in Minnesota-Community Issues and Initiatives
By: Minnesota Environmental Initiative
Date: November 20
Place: St. Cloud, MN
Phone: (612) 334-3388 Anne Frisch

Event: Aquatic Ecological Risk Assessment: Methods for Screening-Level and Probabilistic Risk Assessments
By: Water Environment Federation
Date: November 22–23
Place: Washington, D.C.
Phone: 1-800-666-0206

Event: Onsite Wastewater Treatment System Comference
By: Society of Soil Scientists of Southern New England
Date: November 25–26
Place: Sturbridge, MA
Phone: (860) 429-3902 Ed Sautter

DECEMBER

Event: Total Quality Environmental Management Principles and Applications Course #1978
By: George Washington University Continuing Engineering Education Program
Date: December 5–6
Place: Washington, DC
Phone: (800) 424-9773

events

Event: 1996 Annual Meeting and State Leadership Forum
By: Council of State Governments
Date: December 6–10
Place: Cleveland, OH
Phone: (606) 244-8096

Event: Environmental Compliance Auditing Course #2047
By: George Washington University Continuing Engineering Education Program
Date: December 9–10
Place: Washington, DC
Phone: (800) 424-9773

Event: Second Annual Kentucky Onsite Wastewater Association Conference
By: Kentucky Onsite Wastewater Association
Date: December 10–12
Place: Louisville, KY
Phone: (502) 227-6253
Matt Byers

Event: Animal Agriculture and the Environment: Nutrients, Pathogens, and Community Relations
By: Northeast Regional Agricultural Engi neering Service
Date: December 11- 13
Place: Rochester, NY
Phone: (607) 255-7654

Event: Negotiating Environmental Agreements
By: Massachusetts Institute of Technology Environmental Policy Group
Date: December 12–13
Place: Cambridge, MA
Phone: (617) 239-1111

NSFC Is on the Web!

Site Offers Program Information, Education, Links

As *Small Flows* goes to press, final adjustments are being made to the National Small Flows Clearinghouse's (NSFC) new World Wide Web site. The address—or "URL," universal resource locator—is **http://www.nsfc.wvu.edu.**

Included on the Web site are general information about NSFC services and related projects (the National Onsite Demonstration Project and Environmental Technology Initiative), NSFC's products catalog, a public education section called "Wastewater Trivia," and links to other wastewater-related organizations. There is also a direct link to NSFC's bulletin board system, the Wastewater Treatment Information Exchange (WTIE).

Through the link to WTIE, users have access to additional information, including a calendar of wastewater-related events, *Small Flows* newsletter articles, and the U.S. Environmental Protection Agency's Environmental Financing Information Network.

Information Systems Specialist Mike Salkovick is serving as "Web master" of NSFC's site, as well as those of its "sister" programs, the National Environmental Training Center for Small Communities and the National Drinking Water Clearinghouse. These programs' Web sites are linked to NSFC's. Salkovick will be monitoring feedback from site users, who are encouraged to discuss what they find useful by leaving him a message via his e-mail link.

A plan has been developed to gradually increase information and services provided via the Web, according to Diana Knott, promotions supervisor for the Environmental Services and Training Division at West Virginia University, of which the NSFC is a part.

"Our Web sites provide only basic information about our programs and services right now, but we plan to enhance them as time goes on," Knott said. "We're using existing staff to develop and maintain our Web sites, and we will be assessing their usage and the impact on our programs.

"Of course, we know that many of our customers don't have access to the Internet, so we will continue to offer the same level of personalized service through our toll-free assistance line, regardless of our eventual Web capabilities."

For more information about NSFC's Web page, call Knott at (800) 624-8301.

CALLS FOR PAPERS

SFJ Seeks Manuscripts

Papers are now being accepted for upcoming issues of *The Small Flows Journal*, the only juried technical journal devoted specifically to onsite and small community wastewater issues (i.e., communities with populations of less than 10,000 or communities that handle less than one million gallons of wastewater flows per day).

For information about the journal, manuscript submission guidelines, and publication deadlines, contact Cathleen Falvey, editor at (800) 624-8301, ext. 526, or write to Editor, *The Small Flows Journal,* National Small Flows Clearinghouse, West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064.

WEF, ASAE Issue Calls for Papers

Calls for papers with December 1996 deadlines have been issued for two upcoming conferences.

The Water Environment Federation (WEF) has issued a call for abstracts for its WEFTEC '97. The deadline for submissions is December 16, 1996. WEF's 70th annual conference and exposition will be held October 18–22, 1997, in Chicago, Illinois.

For more information regarding WEFTEC '97, or to request an abstract submission form, contact WEF at (703) 684-2452.

The Amercian Society of Agricultural Engineers (ASAE) is requesting paper proposals for the Eighth National Symposium on Individual and Small Community Sewage Systems to be held March 1998 in Orlando, Florida.

Submittals must be received by December 1, 1996. To obtain a submittal form, contact Susan Buntjer, ASAE meeting and conference manager, at (616) 429-0300.

photo of Dewees Island here

Small Flows

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