

# Pipeline



Small Community Wastewater Issues Explained to the Public

## EPA's Voluntary Management Guidelines – An Overview

In response to concerns about the performance of onsite and clustered wastewater treatment systems, the U.S. Environmental Protection Agency (EPA) recently published a comprehensive set of management practices titled, *Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems*, for use by state, tribal, or local entities, management or service providers, and owners of decentralized systems.

The EPA designed these guidelines for state, tribal, and local authorities to help communities meet water quality and public health standards. Additional goals of these guidelines are to protect the consumer's investment of home and business, increase treatment system life, and eliminate the need to use a community's tax base to pay for public sewers.

These guidelines are intended to improve (and monitor) the performance of onsite and clustered wastewater treatment systems through improved management programs. The underlying premise is that if onsite wastewater systems are monitored and properly maintained, they will be less prone to failure, and, therefore, reduce threats to public health or the environment. The key concepts of these guidelines are listed at right.

Few systems receive proper maintenance because homeowners are either unaware of the need for maintenance or find it a distasteful task. In addition, most regulatory programs do not require homeowner accountability for system performance after installation. This issue of *Pipeline* is the first of a series explaining these voluntary management guidelines.

Although voluntary, the EPA strongly encourages communities to use these guidelines to improve existing management programs, as well as to create new ones.

Decentralized wastewater treatment systems are defined as individual onsite or clustered systems, commonly referred to as septic systems, private sewage systems, individual sewage treatment systems, onsite sewage disposal systems, or package plants used to

collect, treat, and disperse wastewater from individual homes, businesses or small communities.

In deciding when to use onsite systems, it is important to consider the risks they pose to the environment and public health. There may be cases where onsite systems are not appropriate because of the environmental sensitivity or public health concerns of an area. In the cases where onsite systems are appropriate, it is critical that they be properly managed to prevent environmental and public health impacts.

### KEY CONCEPTS

- An increase in the level of management, as the level of risk and technical complexity increase
- Inventorying existing systems and their level of performance as a minimum
- Operating permits for large systems and clusters of onsite systems
- Discharge permits for systems that discharge to surface waters
- Increased requirements for certification and licensing of practitioners
- Elimination of illicit discharges to storm drains or sewers



If decentralized wastewater treatment systems are properly planned, sited, designed, constructed, operated, and maintained, they can provide excellent protection of public health and water quality. These guidelines suggest minimum levels of action for optimum performance of these systems. These programs are not intended to replace existing federal, state, tribal, or local laws and regulations, but, instead, to complement them in protecting public health and water quality.

## The need

According to the EPA Voluntary Guidelines, 25 percent of the homes in the U.S. utilize decentralized systems, and onsite and cluster systems are the treatment choice of almost 33 percent of new development. Unfortunately,

many of the systems in use are improperly managed and do not provide the level of treatment necessary to adequately protect public health and surface and groundwater quality.

Half of the systems in the U.S. were installed more than 30 years ago, and few of these systems receive proper maintenance. The quality of our water resources is being jeopardized. *The National Water Quality Inventory 1996 Report to Congress* states that "improperly constructed and poorly maintained septic systems are believed to cause substantial and widespread nutrient and microbial contamination to groundwater." The potential for health and water quality problems resulting from poorly managed systems is increasing.

Inadequately maintained and improperly functioning onsite and clustered wastewater treatment systems can contaminate drinking water sources. The EPA estimates the 168,000 viral illnesses and 34,000 bacterial illnesses occur annually because of drinking water from systems that rely on poorly treated ground water. The contaminants of primary concern are waterborne pathogens from fecal contamination. Malfunctioning septic systems are identified as a potential source of this contamination.

The EPA contends that if effectively implemented by the appropriate governing body (whether it be state, tribal, or local), these guidelines provide a long-term solution for meeting public health and water quality goals, particularly for small and rural communities. In addition, proper management programs will support several of the other EPA programs that were designed to achieve similar goals of water quality and public safety, such as National Pollutant Discharge Elimination System (NPDES) and the Nonpoint Source Control Program.

## Benefits of a Management Program

Besides protecting public health and local water resources, well-managed (and, therefore, properly functioning) onsite wastewater treatment systems benefit communities in other important ways.

### Replenishing groundwater—

Onsite systems contribute to groundwater recharge. Many areas of the U.S. that have undergone rapid development and sewerage are experiencing rapidly declining water tables or water shortages because groundwater is not being recharged by onsite systems.

### Preserving the tax base—

Well-managed onsite systems keep small communities from having to finance the high cost of centralized sewers. Many small communities have exhausted their tax base, at the expense of other public safety and education programs, to pay for those sewers. Community leaders are often then forced to entice growth in an effort to pay for the systems, altering the small community appeal that originally attracted residents.

**Saving life-cycle costs—**It is clear that good management pays for itself in terms of lower failure rates and alleviation of the need for premature system replacement.

Improving management practices benefits individual property owners as well as the entire community. A good management program monitors the performance of wastewater treatment systems and keeps them functioning properly protecting public health and local water resources.

## The Models

The Management Guidelines introduce five management models as conceptual approaches where the amount of management activity increases as environment sensitivity and/or



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## Pipeline

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treatment system complexity increases. Each model consists of activities to be performed in order to achieve the management goal. Typical program elements are public education and participation and training and certification. A complete listing of program elements can be found at right. Under each program element are listed the party responsible for the activity. Specific duties are assigned to each party.

For instance, in the first and simplest model, under the performance category, the regulatory authority and the system owner are the responsible parties. Activity for the regulatory authority related to performance is "establish system failure criteria to protect public health, e.g., wastewater backups in buildings, wastewater ponding on ground surfaces, insufficient separation from groundwater or wells."

Communities should use the models to match the needed level of management to the potential risk. The models are flexible, and may be customized by substituting elements of one program into another to meet local needs and conditions.

The guidelines for each of the five models increase in the level of management as the level of risk to the environment and the technical complexity of the systems increase. At a minimum, an inventory must be made of existing systems and their level of performance determined. Operating permits are required for large systems and clusters of onsite

systems. Discharge permits are required for any system that discharges to surface waters. As the risks and complexity increases, so do the requirements for certification and licensing of service providers.

The models require accountability and competency of regulators and service providers through certification and continuing education, of owners through education and/or inspection requirements, and of third-party managers through contract stipulations. The best model provides the most appropriate management controls for the potential risks in a particular location.

It is possible, and perhaps recommended, to use more than one management model within a district as appropriate for the circumstances. Special considerations include housing density, new development, high-volume, or high-strength wastewater, or fragile environmental characteristics, would influence what is included in the model.

Communities should use the models to select appropriate management objectives for its own particular wastewater treatment needs, to evaluate the strengths and weaknesses of its current program, to design a management program that meets the unique local considerations, and to develop a plan for implementing the management program. The exact configuration of local management programs should be based on the resources available, the nature of public health and

## Program Elements

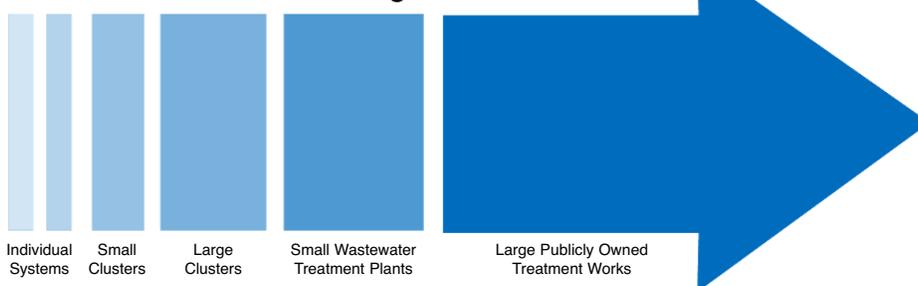
- Public education and participation
- Planning
- Performance
- Training and certification/licensing
- Site evaluation
- Design
- Construction
- Operation and maintenance
- Residuals management
- Compliance inspections and monitoring
- Corrective actions
- Recordkeeping, inventory, and reporting
- Financial assistance and funding

water resource threats posed by onsite systems, and the creativity and dedication of the regulatory authorities and the public.

A copy of the guidelines titled *Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems* (U.S. EPA, 2003) is available on line at [www.epa.gov/owm/septic/pubs/septic\\_guidelines.pdf](http://www.epa.gov/owm/septic/pubs/septic_guidelines.pdf). You may also order a printed copy from the National Environmental Service Center. Ordering information is on Page 8. A brief summary of each model is presented in Table 1. A general description of each model follows.

**Management Model 1 – "Homeowner Awareness"** specifies appropriate activities where treatment systems are owned and operated by individual property owners in areas of low environmental sensitivity. This program is aimed at conventional systems that require little owner attention. To ensure that timely maintenance is performed, the regulatory authority mails maintenance reminders to owners at appropriate intervals. This is a minimum level of management.

## The Wastewater Management Continuum



**TABLE 1: SUMMARY OF MANAGEMENT MODELS**

TYPICAL APPLICATIONS	PROGRAM DESCRIPTION	BENEFITS	LIMITATIONS
<b>MODEL 1 HOMEOWNER AWARENESS MODEL</b>			
<ul style="list-style-type: none"> <li>• Areas of low environmental sensitivity where sites are suitable for conventional onsite systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Systems properly sited and constructed based on prescribed criteria.</li> <li>• Owners made aware of maintenance needs through reminders.</li> <li>• Inventory of all systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Code-compliant system.</li> <li>• Ease of implementation based on existing, prescriptive system design and site criteria.</li> <li>• Provides an inventory of systems that is useful in system tracking and area-wide planning.</li> </ul>	<ul style="list-style-type: none"> <li>• No compliance/problem identification mechanism.</li> <li>• Sites must meet siting requirements.</li> <li>• Cost to maintain database and owner education program.</li> </ul>
<b>MODEL 2 MAINTENANCE CONTRACT MODEL</b>			
<ul style="list-style-type: none"> <li>• Areas of low to moderate environmental sensitivity where sites are marginally suitable for conventional onsite systems due to small lots, shallow soils, or low-permeability soils.</li> <li>• Small clustered systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Systems properly sited and constructed.</li> <li>• More complex treatment options, including mechanical components or small clusters of homes.</li> <li>• Requires service contracts to be maintained.</li> <li>• Inventory of all systems.</li> <li>• Service contract tracking system.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces the risk of treatment system malfunctions.</li> <li>• Protects homeowner investment.</li> </ul>	<ul style="list-style-type: none"> <li>• Difficulty in tracking and enforcing compliance, because it must rely on the owner or contractor to report a lapse in a valid contract for services.</li> <li>• No mechanism provided to assess effectiveness of maintenance program.</li> </ul>
<b>MODEL 3 OPERATING PERMIT MODEL</b>			
<ul style="list-style-type: none"> <li>• Areas of moderate environmental sensitivity, such as wellhead or source water protection zones, shellfish growing waters, or bathing/water contact recreation.</li> <li>• Systems treating high-strength wastes or large-capacity systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes system performance and monitoring requirements.</li> <li>• Allows engineered designs but may provide prescriptive designs for specific receiving environments.</li> <li>• Regulatory oversight by issuing renewable operating permits that may be revoked for noncompliance.</li> <li>• Inventory of all systems.</li> <li>• Tracking system for operating</li> </ul>	<ul style="list-style-type: none"> <li>• Allows systems in more environmentally sensitive areas.</li> <li>• Operating permit requires regular compliance monitoring reports.</li> <li>• Identifies noncompliant systems and initiates corrective actions.</li> <li>• Decreases need for regulation of large systems.</li> <li>• Protects homeowner investment.</li> </ul>	<ul style="list-style-type: none"> <li>• Higher level of expertise and resources for regulatory authority to implement.</li> <li>• Requires permit tracking system.</li> <li>• Regulatory authority needs enforcement powers.</li> </ul>

- Tracking system for operating permit and compliance monitoring.
- Minimum for large-capacity systems.

### MODEL 4 RESPONSIBLE MANAGEMENT ENTITY (RME) OPERATION AND MAINTENANCE MODEL

- Areas of moderate to high environmental sensitivity where reliable and sustainable system operation and maintenance (O&M) is required, e.g., sole source aquifers, wellhead or source water protection zones, critical aquatic habitats, or outstanding value resource waters.
- Clustered systems.

- Establishes system performance and monitoring requirements.
- Professional O&M services through RME (either public or private).
- Provides regulatory oversight by issuing operating or NPDES permits directly to the RME. (System ownership remains with the property owner.)
- Inventory of all systems.
- Tracking system for operating permit and compliance monitoring.

- O&M responsibility transferred from the system owner to a professional RME that is the holder of the operating permit.
- Identifies problems needing attention before failures occur.
- Allows use of onsite treatment in more environmentally sensitive areas or for treatment of high-strength wastes.
- Can issue one permit for a group of systems.
- Protects homeowner investment.

- Enabling legislation may be necessary to allow RME to hold operating permit for an individual system owner.
- RME must have owner approval for repairs; may be conflict if performance problems are identified and not corrected.
- Need for easement/right of entry.
- Need for oversight of RME by regulatory authority.

### MODEL 5 RESPONSIBLE MANAGEMENT ENTITY (RME) OWNERSHIP MODEL

- Areas of greatest environmental sensitivity where reliable management is required. Includes sole source aquifers, wellhead or source water protection zones, critical aquatic habitats, or outstanding value resource waters.
- Preferred management program for clustered systems serving multiple properties under different ownership (e.g., subdivisions).

- Establishes system performance and monitoring requirements.
- Professional management of all aspects of decentralized systems through public/private RMEs that own or manage individual systems.
- Qualified, trained, owners and licensed professional owners/operators.
- Provides regulatory oversight by issuing operating or NPDES permit.
- Inventory of all systems.
- Tracking system for operating permit and compliance monitoring.

- High level of oversight if system performance problems occur.
- Simulates model of central sewerage, reducing the risk of noncompliance.
- Allows use of onsite treatment in more environmentally sensitive areas.
- Allows effective area-wide planning/watershed management.
- Removes potential conflicts between the user and RME.
- Greatest protection of environmental resources and owner investment.

- Enabling legislation and/or formation of special district may be required.
- May require greater financial investment by RME for installation and/or purchase of existing systems or components.
- Need for oversight of RME by regulatory authority.
- Private RMEs may limit competition.
- Homeowner associations may not have adequate authority.

Note: If applicable, NPDES requirements under the CWA or UIC requirements under the SDWA supercede any less stringent or inconsistent provision.

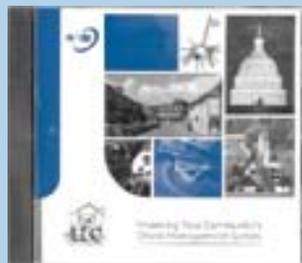
## ***NODP Phase IV products provide additional management information***



### **Insights Into Community Onsite Management Systems: A National Overview**

Product number: DPBLMG10

Small communities increasingly address public health and water quality issues by installing community onsite management systems (OMSs) that minimize the overall impact onsite/decentralized wastewater systems have on their community environment. This 18-page booklet shows characteristics, commonalities, and effective onsite/decentralized wastewater management in communities operating, maintaining, and managing effective OMSs across America. This report is the result of a survey of environmental and public health professionals, along with practitioners from 60 communities across 17 states. The survey defines how a community manages its onsite system, the methodology used in OMSs, discusses survey findings, and concludes with recommendations for communities considering OMSs. The findings section is well documented with statistical tables, graphs, and analyzed data. Local officials, community leaders, public health professionals, and others involved in the wastewater industry will find this information useful when considering OMSs for their community.



### **Financing Your Community's Onsite Management System**

Product number: DPCDFN01

The objective of this interactive CD-ROM is to provide information on the types of funding streams that may be available to your community through various agencies and organizations to finance your community onsite wastewater management efforts. From a main menu, a click on a financing source icon brings up a brief overview of the agency or organization, and it also includes additional options such as who can apply for funding, key features, key points, and contact information. The agencies and organizations listed in the CD include:

· Administration for Native Americans · Appalachian Regional Commission · Clean Water State Revolving Fund · Community Development Block Grant Program · Community Self-Help · Economic Development Administration · EPA General Assistance Program · EPA Indian Set-Aside Program · EPA Section 319 Program · Indian Community Development Block Grant · Program for Colonias · Private Sources of Support · Rural Housing Service · Rural Utilities Service · Sanitation Facilities Program · State Funding Programs · Additional Resources This tool is a valuable resource for community leaders, local officials, and community spark plugs, as well as others seeking to identify and secure financing for onsite wastewater management initiatives (general public, planners, managers, state officials, public health officials, finance officers).

***Please call (800) 624-8301 for pricing and availability.***

The objectives of this model ensure that all systems are sited, designed, and constructed in compliance with sound engineering practices, that all systems are inventoried by the regulatory authority, and that system owners are educated about the maintenance needs of their systems. Intended to provide an accurate record of the types and location of installed systems, to raise homeowners' awareness of basic maintenance requirements, and to ensure that homeowners tend to their responsibility towards their system, this model is a starting point for communities.

**Management Model 2 – "Maintenance Contracts"** specifies activities where more complex system designs are used to enhance the capacity of conventional systems to accept and treat wastewater or where small clusters are used. Because of the treatment complexity, contracts with qualified technicians are needed to ensure proper and timely maintenance. This model addresses more complex onsite systems where special enhancements are employed or for small clusters systems. An example of a special enhancement might be to add an effluent filter in the septic tank to prevent particulate mat-

ter from passing into the drain-field system. This pretreatment would improve the function of the subsurface dispersal system and would commonly be recommended in areas of slowly permeable soils or other restrictions. Typically, these enhancements have mechanical components and delicate treatment processes that require more routine observation and maintenance if they are to perform and function properly. These enhanced onsite systems or small cluster systems should be permitted only where trained operators are under contract to perform the operation and maintenance. The objectives

of this model build on the Homeowner Awareness Model by ensuring that property owners keep maintenance contracts with trained operators.

**Management Model 3 – “Operating Permits”** describes activities where sustained performance of treatment system is critical to protect public health and water quality. Limited-term operating permits are issued to the owner and are renewable for another term if the owner demonstrates that the system is in compliance. Performance-based designs may be incorporated into programs with management controls at this level.

This model is recommended where sustained performance of onsite wastewater treatment systems is critical. Examples of locations where this program might be appropriate include areas adjacent to lakes where excessive nutrient concentrations may be a concern or where onsite systems have been determined to be potential threats to drinking water supplies. This is the minimum model for large-capacity systems or systems treating high-strength wastewaters.

The principal objective of this management program is to ensure that the treatment systems continuously meet their performance criteria. The operating permit provides a mechanism for continuous oversight of system performance and negotiating timely corrective actions or assessing penalties if compliance is not maintained. Depending on the system, the property owner should be encouraged (or required) to hire a licensed maintenance provider or operator.

**Management Model 4 – “Responsible Management Entity (RME) Operation and Maintenance”** specifies activities where frequent and highly reliable operation and maintenance of decentralized systems is required. The operating permit is

issued to an RME instead of the property owner to provide the assurance that the proper maintenance is performed. This model addresses issues associated with large numbers of onsite and clustered systems that are in position to affect very sensitive bodies of water. Drinking water wells or shellfish beds are examples of such fragile waters. The operating permit is issued to the RME instead of the property owner providing great assurance of compliance. For a service fee, the RME takes responsibility for the operation and maintenance. This approach reduces the number of permits issued and administrative functions. States must establish a regulatory structure to oversee the rates the RMEs charge. (This operating permit system is identical to that of the Operating Permit Model except the permittee is a public or private RME.)

**Management Model 5 – “RME Ownership”** details activities for treatment systems that are owner-operated, maintained by the RME, which removes the responsibility for the system from the property owner. This is similar to central sewerage and provides the greatest assurance of system performance in the most sensitive of environments.

Model 5 is a variation of the RME operation and maintenance concept with the exception that ownership of the system is no longer with the property owner. The RME owns, operates and manages the decentralized systems. The RME is also in control of planning and can readily replace existing systems with higher-performance units or clustered systems when necessary. This model is especially appropriate in new, high-density development areas adjacent to sensitive waters.

### How to Get Started

A phasing in of any of these management efforts should be done in a thoughtful manner.

A steering committee composed of stakeholders (of like minds and with good leadership qualities) is a great way to get started. Keep in mind these points:

- Understand the problems clearly before seeking solutions.
- Gather information from as many sources as possible.
- Take responsibility for the problems.
- Have a clearly defined vision and goal.
- Keep all affected parties informed and involved in the process.

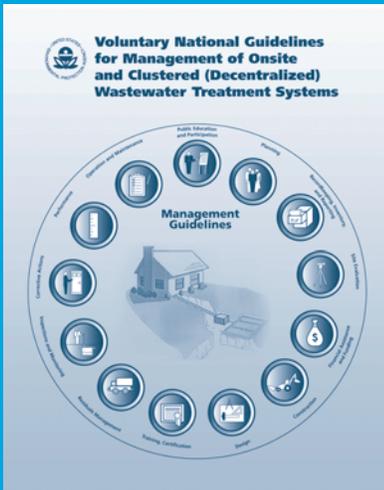
If resources are limited, it is wise to target higher-density or environmentally sensitive areas.

As implementation of these management progresses, it is expected that as the performance of problematic systems will increase, so will public support. This raised awareness should result in more public resources being available, allowing the community to move into even higher levels of management.

Subsequent issues of *Pipeline* will more completely describe the models, as well as provide case studies of how actual communities are using these guidelines to help manage their onsite systems.

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# *Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems*

(U.S. EPA, 2003).

Available for download at [www.epa.gov/owm/septic/pub/septic\\_guidelines.pdf](http://www.epa.gov/owm/septic/pub/septic_guidelines.pdf).  
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