Onsite Wastewater Issue Papers

Delivered to US EPA by the State Regulators and Captains of Industry

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Table of Contents

Appendices

Introduction

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The Third Annual National Small Flows Clearinghouse (NSFC) Onsite Wastewater State Regulators Conference was held in Arlington, Virginia, from April 17 through April 21, 2001. The conference was co-sponsored by the National Small Flows Clearinghouse; the National Capacity Development Project; NSF, International; the U.S. Environmental Protection Agency (US EPA); and a number of onsite wastewater product manufacturers.

The purpose of holding the conference near Washington D.C. was to facilitate a meeting between the State Regulators and USEPA officials to discuss issues related to recent federal decentralized wastewater initiatives.

Peter Casey opens the issue paper presentation session the morning of April 20, 2001 in Washington D.C.

During the planning phase of the conference, five topics were selected from which issue papers would be developed and presented to the USEPA officials. These issue papers were drafted by committees working via the NSFC State Regulators Listserv (email system). At the conference itself, these draft papers were presented to the entire group for input and consensus. Afterward, the papers were finalized in break- out sessions comprised of an NSFC facilitator and the issue paper work group. Finally, PowerPoint presentations based on the issue papers were developed.

In addition to the state regulators conference, NSFC sponsored a concurrent conference for onsite wastewater product manufacturers called the "Captains of Industry Conference." Prior to the meeting with USEPA officials, the industry representatives developed their own issue paper and accompanying PowerPoint presentation.

This presentation, along with the five developed by the state regulators was presented to USEPA officials on the morning of April 20, 2001, at the Horizon Ballroom in the Ronald Reagan Building in downtown Washington D.C. The session was attended by the state regulators, the industry representatives, USEPA officials, NSFC staff, and representatives of invited environmental organizations. The session was facilitated by Peter Casey, Program Coordinator of the National Small Flows Clearinghouse.

What follows is the text of the presentation given at the April 20 session.

Onsite Wastewater Research Needs and Technology Transfer

Tom Groves, New England Interstate Pollution Control Commission, and
Robert L. Uebler, North Carolina Department of Environment and Natural Resources

Design Performance and Management of Onsite Wastewater Soil Absorption Systems (WSAS) and Advanced Systems

Wastewater Soil Absorption Systems are said to be properly functioning, by the vast majority of those served by them, when sewage is not backing up into the house or coming to the ground surface in the back yard. Although much more is known about system performance, the information is often not readily available in a usable form to regulators and the general public. Compilation of what has already been researched is therefore viewed as the first priority. Next, it is important to investigate the performance issues that have not yet been researched. This will assist regulators in assessing the performance of conventional WSAS as well as what to expect from newer more advanced wastewater treatment systems.

Bob Uebler presents his issue paper on research needs and technology transfer on the morning of April 20, 2001.

Research needs fall into four broad categories: 1) Treatment performance, 2) Hydraulic performance, 3) Expected longevity of performance, and 4) Management needed to sustain performance. Under category 1, practitioners feel the need for further detail on the transformation of influent constituents once they enter the soil both in terms of species and concentration. Clearer understanding of the potential effects on Public Health and Environment is needed. Site and soil factors, which affect treatment, need to be better characterized.

Under category 2, the movement of pollutants to ground and surface waters through the connecting hydrologic paths needs further characterization if strategies to minimize the impact of WSAS are to be developed. Can we model performance with accuracy? Under category 3, we still do not have a good grasp of the expected longevity of "conventional" technologies, let alone innovative technologies that are coming to the market daily. The sustainable levels of BOD loading that will maintain adequate infiltration to prevent the surfacing of sewage (clogging) are not well known for the site and soil conditions where WSAS are used. Are "stress tests" adequate predictors of the long-term performance of new technologies? Finally, under category 4, the levels of management needed for all system types must be established. Also, have existing management efforts affected system performance?

The following is a list of questions that raise some of the issues that regulators have determined are a high priority to examine in more detail.

Treatment Performance/Efficiency:

- What are the appropriate methods for evaluating the performance of WSAS that protect public health and the environment in a given setting?
- What is the relationship between performance and age of operation for similar WSAS in similar environments? What short-term tests can be used to predict long-term performance? There is a lack of published research on the expected longevity of "conventional systems."
- We need empirical data on the long-term performance of the new performance-based systems.
- What methods can be used to estimate the contribution of new or existing WSAS to pollutant loads in a watershed?
- What is the treatment efficiency achieved in a WSAS designed with different methods of application or extreme environmental conditions?
- What models are appropriate for predicting efficiency as a function of siting, design, and operation?
- What are easily measured "indicators" of WSAS function that can be used to predict the performance of treatment?
- What methods can be reliably used to provide performance data on the purification and the flux of pollutants from a WSAS into the underlying groundwater?
- What methods can be applied to assess the treatment capacity of a site for nutrients, bacteria, and virus?
- What are the effluent characteristics of different emerging tank-based treatment units?
- Several levels or classifications of treatment. example: Class I -primary treatment, Class II- secondary treatment, Class III - tertiary treatment, Class IV treatment with nitrification-denitrification (nutrient removal).
- What are the real input values for modeling parameters and processes?
- What is the real BOD loading to and the efficiency of the infiltrative surface?

Hydraulics

- What is the relationship of infiltrative surface character on short- and long-term hydraulic properties of the infiltrative surface?
- What are the essential field data needed to support understanding and/or modeling of unsaturated flow and hydraulic conductivity?
- What methods can be used to assess the hydraulic capacity of a site for larger and clustered WSAS?
- Obtain updated research on LTAR.

Soil Clogging

- What is the effect of pretreatment on soil clogging and WSAS hydraulic and purification performance?
- What is the relationship between clogging zone genesis and resulting loss in infiltration rate with common WSAS designs?
- How can the natural soil properties that impact soil-clogging development be assessed in the field?
- What methods can be used to restore the infiltrative capacity of a WSAS with excessive existing clogging?

Management

- What is the role and impact of remote sensing and monitoring on performance assurance for decentralized systems?
- What WSAS performance improvements can be attributed to training and certification programs?
- More management studies are needed to assist regulators and local authorities in the planning and implementation of good onsite sewage management programs.
- We as regulators need to know what happens once the technology is in the hands of the end user. Problems with technologies are frequently not reported.

- Develop a standardized index of complexity that could be used to establish the necessary levels of oversight or maintenance needed for technology, for example, ranging from 1=Septic system to 5 = UV disinfection.

Fate and Transport of Pathogens

Until we understand the fate and transport of pathogens, we will not fully comprehend the effect we have on the environment and what steps we should take to ensure its protection. With the advent of new onsite technologies in wastewater treatment, many manufacturers are asking for certain reductions, such as leach-field size and/or isolation distances or higher loading rates. These claims are based on the quality of the effluent that is produced by the advanced treatment system. In most cases, it is expected to meet or exceed the quality of effluent produced by conventional systems. But what type of pathogen treatment do we achieve with conventional systems? Are we even providing an acceptable degree of treatment with conventional systems and our traditional leach-field sizes and isolation distances?

Pathogens

- What are the basic methods by which pathogens are contained or inactivated by conventional and innovative onsite systems? How is pathogen containment or inactivation by innovative systems influenced by septic tanks or shallow water table disposal systems? How does pathogen discharge result from the abrupt failure of an innovative system?
- What is the effectiveness of pathogen retention during passage through the vadose zone? Quantify the survival and transport of pathogens in saturated soil.
- How do cluster systems meet the requirements of pathogen containment or inactivation? How will catastrophic events impact cluster systems, and how long will it take for adequate performance to be re-established?
- What are the effects of biomat development on pathogen retention in the soil and on alternative engineered infiltrative surfaces?
- How does pathogen mobilization occur during a catastrophic event and how long does it take for normal operation to be re-established?
- Research needed into a risk-based approach to pathogen that should look at things like isolation distances from leach-fields to wells and whether these distances should depend on the type of system installed.
- What is the fate of viruses in conventional systems as well as alternative systems that ask for reductions to the groundwater table?

Sludge

- How can solids generated from onsite systems be removed without threatening public health? Quantify the removal of pathogens from wastewater by retention of solids in septic tanks.
- What are the effects of sludge accumulation and surge loads on pathogen retention and on the inactivation of pathogens retained in the sludge?
- What special pathogen problems are associated with the combined disposal of domestic waste from several sources at a common site?
- What are the economically feasible means for disposing of pathogen-rich septage that adequately protect public health?
- What pathogen loads are likely in solids generated by aerated treatment systems or in material backwashed from filters?

Nutrient Contamination

Knowledge of the fate of wastewater nutrients in groundwater following onsite treatment has been problematic for state regulators. If contaminate levels can be measured or calculated, having adequate treatment technologies is even more problematic. In the last decade, some good research has been conducted on nutrient contamination; however, dissemination of these results has been limited to the literature. Certification of adequate treatment technologies through a universally accepted approval protocol is another problem. As a result, research needs exist for nitrate-nitrogen as a groundwater pollutant with public health implications and

phosphorus as a limiting factor nutrient in watershed enrichment. Specific research questions include the following:

Performance

- What site characteristics affect the long-term performance of nutrient removal from Domestic Wastewater Treatment Systems (DWTS)?
- What is the range of soil textures and saturation under pressure dosing that promote denitrification without generating hydraulic failure?
- How does aerobic pre-treatment impact long-term denitrification and hydraulic performance?
- What factors impact the long-term performance for nutrient removal in different alternative DWTS?
- What conditions and designs promote denitrification in aerobic filters and pre-treatment tanks?
- What is the long-term removal expected from plant uptakeand microbial immobilization in root zone and wetland systems?
- What is the viability of dosing DTWS or amending filters with chemical additives to precipitate phosphorous?
- What are the performance parameters for nitrate removal in pressure dosed, shallow placed, and at-grade systems discharging to A and A/B soil horizons?
- What is the maximum possible contamination of total nitrogen expected from standard onsite systems?
- What is the biological cause and effect of denitrification and existence of denitrifying bacteria?

Watersheds

- What is the role of in-stream and streamside removal in reducing watershed nutrient loads from DTWS, and what are the site factors and management practices that impact the capacity of streamside areas to remove nutrients from groundwater?
- Are there mappable attributes that relate to the streamside characteristics that generate high nutrient removal capacities?
- Can nutrient dilution and removal capacities be determined in different aquifers?
- Can the interaction between nutrients in groundwater from DTWS and biologically active streamside nutrient sinks be predicted?

Economics of Decentralized Wastewater Treatment Systems

As the competition increases for government tax dollars through grants and loans, it has become increasingly important that local wastewater providers examine the use of onsite decentralized wastewater treatment and disposal systems. Direct and indirect benefits including cost of the use of decentralized wastewater systems must be provided to local officials so that sound choices for wastewater management can be made. Education of the homeowners on the benefits to using decentralized wastewater treatment and disposal systems is a must to over come past negative labeling.

The following is a list of questions that describe some of the issues that regulators have determined are a high priority to examine in more detail.

- What are the actual life spans and failure rates of onsite and decentralized systems?
- Can national performance standards for decentralized systems increase their acceptance?
- What are the costs and benefits of performance-based codes?
- How does the scale of wastewater services affect costs and benefits?
- When are management and remote monitoring systems cost effective?
- What effects do advanced onsite treatment technologies have on land-use patterns?
- How can decentralized treatment play a part in smart growth goals?

- How can we improve decision-making models used by communities to evaluate wastewater management alternatives?
- What are the costs, benefits, and issues that need to be addressed for water reuse and blackwater separation systems?
- What is the value of releasing water near where it is used rather than discharging it from a centralized treatment facility?
- What are the preferences and values of homeowners and how do these affect their choices of wastewater technologies?
- How can education campaigns be developed to increase acceptance of decentralized wastewater management and increased costs to manage them?

Technology Transfer

Many states wrestle with the question of how best to approve alternative systems and components. Several protocols exist and others are being considered. Yet the need for each state to "reinvent the wheel" in its own attempts to develop a satisfactory approval method often proves frustrating.

A better system for promulgating information and relaying examples of alternative system successes and failures between states would do much to ease this frustration. Such a technology transfer system would require an easily accessible database of research along with copies of the original research publications. Properly constructed, this system would enable a more expeditious review of alternate technology. This, in turn, would inspire industries to invest more resources into developing better and more reasonably priced products for furthering the nation's water protection goals.

For developing such a technology transfer system, regulators have targeted the following issues for further examination:

- The need for new technology testing and assessment protocol that can be accepted nationally or at least regionally (i.e., New Jersey's "A Protocol for Testing, Assessing and Approving Innovative or Alternative Onsite Wastewater Disposal Systems").
- Assessment of alternative system complexity, and how to evaluate products and material replacements, such as shredded tires, for use as gravel surrogate.
- The coordination of information derived from all national demonstration projects (i.e., National Onsite Demonstration Program, USEPA Part 319 projects, etc.) into meaningful reports that everyone can share and benefit from.
- The need for an easily accessible communication clearinghouse to provide resources, model plans, research findings, etc.
- The need for a comprehensive literature review and dissemination of studies done on Topic #1 (system performance).
- The need for a comprehensive literature review and dissemination of virus studies - Topic #2 (Pathogen Fate and Transport).
- A more easily accessible national clearinghouse for regulator research.
- A system for evaluating modifications to approved innovative/alternative technologies and how these modifications affect their performance and/or approvals.

Performance-Based Regulation for Onsite Systems

By Edwin K. Swanson
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Introduction

Performance-based standards have been adopted for many regulated activities. Onsite systems regulation has a legacy of prescriptive standards that are typically difficult to administer when applying new technology or addressing unusual site conditions. Prescriptive onsite system standards can often get to a "no permit" decision without scientific basis, pleasing those that would rather limit development of private property outside the local zoning process. Many states and local government officials are contemplating adoption of performance-based onsite system standards, but there is no common vision about what these standards should be. Several have contributed to the national dialog about the topic (Corry, 2000; Hoover, et al., 1998; Nelson, 2001; and Bowers, 2001).

Ed Swanson presents his issue paper on performance-based regulation the morning of April 20, 2001.

Discussion

The 1972 Amendments to the Federal Water Pollution Control Act provided a standardized national framework and substantial grants to designated state water pollution control agencies for planning and program activities for surface water quality restoration and protection. No similar program exists today to steer state efforts to develop performance-based technical standards for onsite wastewater systems within a standardized framework. Yet regulators are under substantial pressure either to update existing prescriptive regulations, or to allow industry to revise the agenda through the political process. Without a guiding framework, state and local updating efforts will result in disparate rules that are likely to amplify industry frustration. The question is how state and local onsite technical standards should be structured to integrate performance-based regulation and better serve the public.

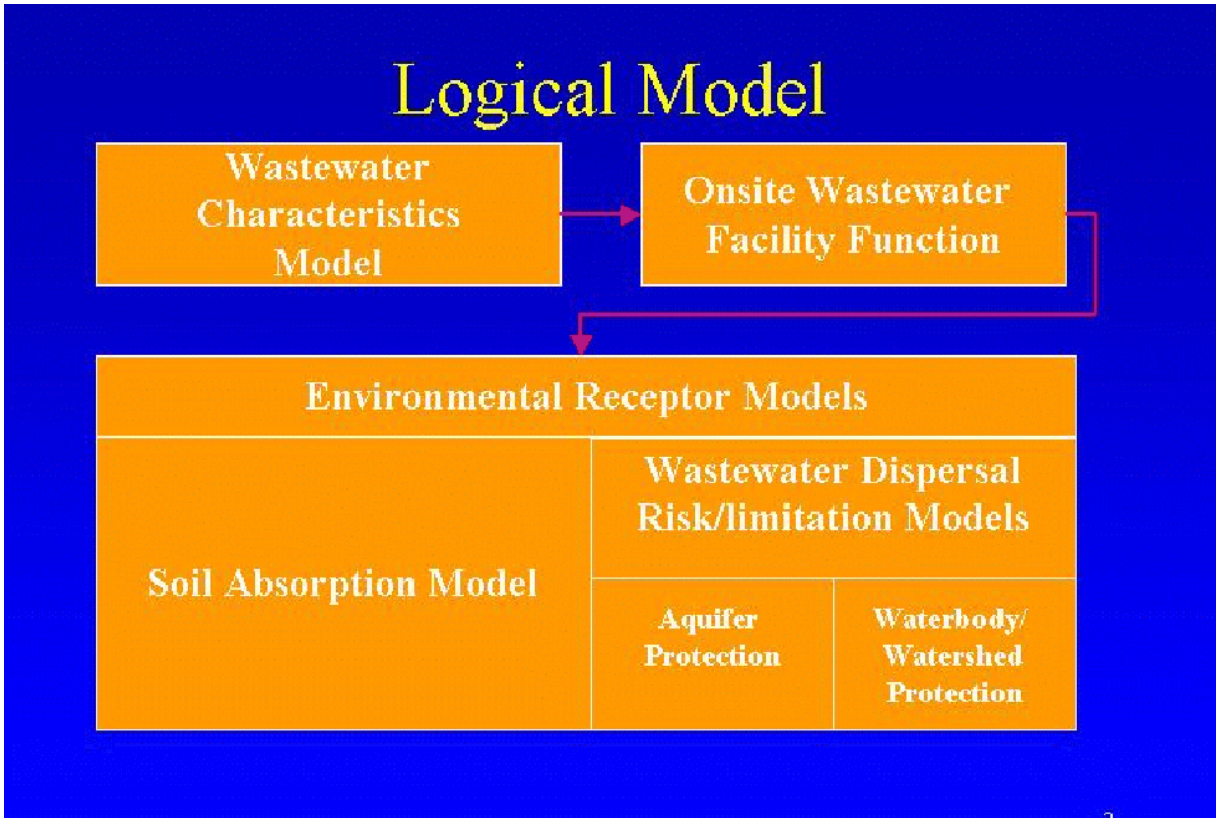
Management guidelines (U.S. EPA, 2000) have been proposed for an onsite/ decentralized management framework with 13 key elements. The first five Program Elements (Planning, Performance Requirements, Site Evaluation, Design, and Construction) focus components of an "Installation Authorization" (IA), which is based on planning and permitting functions that result in approved construction for a specific application. The draft EPA document also provides substantial details about options and methods in the "Management/ Institutional" (M/I) area, Program Elements six through 13 (Operation and Maintenance, Residuals Management, Certification/Licensing, Education/ Training, Inspections/Monitoring, Corrective Actions, Record Keeping & Reporting, and Financial Assistance). Although these program elements are vital to ensure that the planning and permitting objectives for onsite/decentralized wastewater systems

are achieved, details about a performance-based technical standards are missing from both the I/A and M/I sections.

The I/A functions should focus on information about site characteristics, wastewater characterization, wastewater treatment (unit processes and soil) and wastewater dispersal risk (health and environmental). Questions need be explored about (a) what scientific information is necessary to utilize performance-based approaches for onsite planning and permitting, and (b) how much of this information is readily available? Some answers may be relatively simple because environmental and health standards and models address few parameters that are pertinent to residential onsite systems (nitrogen, phosphorus, pathogens, and indicator organisms) with statistical terms (arithmetic mean, geometric mean, maximum allowable limit, percentile reduction, etc.) commonly specified. It has been suggested that any onsite framework proposal should consider scaled down NPDES and RCRA models (Bowers, 2001).

A simple input/output model seems to adequately illustrate the process. For lack of a better descriptor, let's refer to it as the Logical Model. It incorporates three basic algorithms: wastewater characterization, facility hydraulic and unit process functions, and environmental receptor models (Figure 1). Each algorithm needs to be expressed in terms of its own relationships and those necessary to relate to the other models. For example, wastewater characterization must be defined for itself but also include terms relevant to facility function and the environmental receptor model. The receptor model is the most complex element. Agencies responsible for prescriptive onsite programs are often expert in either the absorption or dispersal models, but not both. Receptor models are most sensitive to complex regional conditions such as (a) physical, chemical, and

Figure 1



biological assimilation processes and sinks, (b) climate, (c) risk, and (d) consideration of social-economic-political-legal issues.
If performance-based technical standards are to be an effective tool for onsite system regulation, success (defined as achieving planning and permitting objectives) hinges not only on the scientific defensibility of the I/A component but also the effectiveness of the M/I component (EPA Program Elements six through 13). A key link between the Logical Model and M/I is that the collected data are sufficient to confirm compliance with the performance-based technical standards related to the fundamental algorithms (environmental and health risk, unit process performance, soil hydraulics, and soil treatment).

Summary

Performance-based technical standards for onsite wastewater systems are an integral part of the first five Program Elements (Planning, Performance Requirements, Site Evaluation, Design, and Construction) of the EPA Onsite/Decentralized Management Guidelines Program. These technical standards are yet to be defined within a programmatic EPA document.

A three-component Logical Model has been shown to identify the principle elements that describe the relevant parameters for performance-based technical standards. Such standards must consider constituents, statistical determinations, and/or site measurements related to the following:

1. Health and environmental risk models,
2. Wastewater characteristics,
3. Wastewater treatment,
4. Soil infiltration ,
5. Soil treatment, and
6. Site hydraulic capacity.

A key link between the Logical Model and the management component of the draft EPA management guidelines program is the need for collecting appropriate data to confirm compliance with the performance-based technical standards related to the fundamental algorithms used in the Logical Model.

Regional conditions, such as (a) physical, chemical, and biological assimilation processes and sinks, (b) risk, (c) climate, and (d) consideration of social-economic-political-legal issues, are complex factors in the algorithms for the receiving environment.

Illustrations

An early proposal (Hoover, et al. 1998) to codify performance-based technical standards for onsite wastewater treatment systems included seven treatment categories for seven physical, chemical, and biological parameters (Figure 2). The objective of the presentation was to propose a series of voluntary national standards to replace existing prescriptive onsite codes and reduce the number of local standards to a more manageable few. No statistical terms were specified.

National Onsite Wastewater Recycling Association (NOWRA) approved a proposal (Corry, 2000) to develop a process for a model onsite system code. The motivation for the model code proposal included a need to address several serious problems, including the widely held view that “the onsite industry is in a state of regulatory anarchy” similar to the building industry in the 1920s when the first model building codes were created. There are seven major objectives, and a matrix for performance standards based on risk-based effluent quality and quality assurance (Corry, 2000). The discussion included considerations in setting standards for a point of standards application and the statistical measure to be used.

The Arizona Department of Environmental Quality (Arizona Secretary of State, 2001) adopted performance-based technical standards in rule for onsite wastewater treatment facilities with design flow under 24,000 gallons per day. Key provisions include site investigation, identification of site limitations (needing an alternative system), design adjustments for better than primary treatment to overcome site limitations, and design criteria and nominal performance values for more than 20 treatment and/or dispersal technologies (Figure 3). Design submittals are required to determine wastewater characteristics, select an appropriate system to overcome identified site limitations, to calculate maximum septage application rate and minimum soil treatment depth using accepted facility performance values, and to

Figure 2. Proposed Categories for National Standards for Onsite Wastewater Treatment Performance (Hoover, et al, 1998)

	Constituent Concentrations						
	BOD_5	TSS	PO4-P	NH4-N	NO3-N	Total Nitrogen	Fecal Coliform Colony Density
Proposed Standard	mg/l	mg/l	mg/l	mg/l	mg/l	% Removed (Note A)	Count/100mL
TSI - Primary treatment							
TS1u - unfiltered	300	300	15	80	NA	NA	10,000,000
TS1f - filtered	200	80	15	80	NA	NA	10,000,000
TS2 - Secondary treatment	30	30	15	10	NA	NA	50,000
TS3 - Tertiary treatment	10	10	15	10	NA	NA	10,000
TS4 - Nutrient reduction							
TS4n - nitrogen	10	10	15	5	NA	50%	10,000
TS4p - phosphorus reduction	10	10	2	10	NA	25%	10,000
TS4np - nitrogen and phosphorus reduction	10	10	2	5	NA	50%	10,000
TS5 - Bodily contact disinfection	10	10	15	10	NA	25%	200
TS6 - Wastewater reuse	5	5	15	5	NA	50%	14
TS7 - Near drinking water	5	5	1	5	10	75%	<1(Note B)

NOTES:

A: Minimum % reduction of total nitrogen (as nitrate-nitrogen plus ammonium-nitrogen) concentration in the raw untreated wastewater

B: Total Coliform colony densities <50/100mL

Figure 3. Design Performance Values for Onsite Wastewater Treatment Technologies for General Aquifer Protection Permit Program for State of Arizona

General Permit	Technology	TSS (mg/l) (Note 1)	BOD (mg/l) (Note 1)	Log_{10} Total Coliform (cfu / 100 ml) (Note 2)	Total Nitrogen (mg/l) (Note 3)	NOTES
4.02	Septic tank w/disposal by trench, bed, chamber, or seepage pit	75	150	8	53	Standard for comparison to other technologies.
4.03	Composting toilet	0	0	0	0	No discharge of black water to native soil.
4.04	Pressure distribution system	N/A	N/A	N/A	N/A	Does not materially change wastewater quality.
4.05	Gravelless trench	75	150	8	53	
4.06	Natural seal evapotranspiration bed	N/A	N/A	See **NOTES**	See **NOTES**	TC and nitrogen reduction dependent on design (reduction is due to reduced discharge of waste-water to native soil).
4.07	Lined evapotranspiration bed	N/A	N/A	0	0	No discharge of wastewater to native soil.
4.08	Wisconsin mound	30	30	5.5	53	
4.09	Engineered pad system	50	50	6	53	
4.10	Intermittent sand filter a. With underdrain system b. With bottomless filter design	 10 20	 10 20	 3 5	 40 53	
4.11	Peat filter	15	15	5	53	
4.12	Textile filter	15	15	5	30* 15**	*Assumed performance for standard design. **With submittal of corroborating performance data.
4.13	RUCK® system	30	30	6	30* 15**	*Assumed performance for standard design. **With submittal of corroborating performance data.
4.14	Sewage vault	0	0	0	0	No discharge of wastewater to native soil.
4.15	Aerobic system w/subsurface disposal	30	30	5.5	53* 15**	*Assumed performance for standard design. **With submittal of corroborating performance data.
4.16	Aerobic system w/surface disposal	30	30	0*	53	*Requires disinfection by a system covered under GP 4.20.
4.17	Cap system	75	150	8	53	
4.18	Constructed wetland	20	20	5	45	
4.19	Sand lined trench	20	20	5	53	
4.20	Disinfection device	N/A	N/A	0*	N/A	*Required for surface disposal. Can be designed for less effective performance if full disinfection is not needed.
4.21	Sequencing batch reactor	30	30	5.5	53* 15**	*Assumed performance for standard design. **With submittal of corroborating performance data.
4.22	Subsurface drip irrigation	N/A	N/A	N/A	N/A	High quality wastewater source is required.

Note 1 - 30-day arithmetic mean.
Note 2 - 95^{th} percentile, except 99^{th} percentile for General Permits 4.16 and 4.20.
Note 3 - Five-month arithmetic mean.

calculate soil dispersal areas. Products with satisfactory third party performance data may receive additional credits for continuing performance improvement.

The Arizona performance-based framework includes:

1. The 30-day arithmetic average values for BOD and TSS to establish corrected SAR values for various soil conditions (the proposed onsite rule has an equation to adjust the STE SAR for reduced TSS and BOD),
2. The 95th percentile Total Coliform value (TC is a parameter in the Arizona aquifer water quality standards) final effluent treatment in an acceptable soil interval that is capable of functioning as the minimum zone of unsaturated flow,
3. The 99th percentile Total Coliform value for surface discharge (it's a parameter in the Arizona reclaimed wastewater standards) plus a treatment train design standard that "incorporates a fail safe mechanism to prevent inadequately treated wastewater from being discharged," and
4. The five-month arithmetic average for Total Nitrogen value (another Arizona aquifer water quality parameter) to establish the nitrogen disposal density.

Final Points

Implementation of performance-based technical standards must rely on data collected under enhanced protocols that produce pertinent, credible data by more cost effective methods. The current NSF/ANSI 40 protocol for influent and effluent statistical data are very useful, but it is short of what regulators and manufacturers need in order to conduct efficient and orderly business. Arguments have been made that it is more appropriate to consider virus and other pathogens. If the Safe Drinking Water Act (SDWA) requires testing for new constituents for source water testing, then it should be considered for the NSF/ ANSI.

The use of a "manageable few" pre-qualified performance category groups for treatment technology could retreat into simple technology labeling without performance enhancement and associated performance-based incentives. If regulators and other stakeholders get bogged down in technology labeling (as opposed to deciding what/how performance measures should be quantified), the common framework based on the Logical Model may be elusive. Up-to-date data collected under enhanced protocols will deliver improved performance to the marketplace sooner and in a manner that can be approved by regulators. Performance is expected to remain the continuing focus of the Arizona program because of the prominent role that performance values and design credits (parameters, values, statistical quantification and science-based application algorithms) have for each treatment technology during facility design.

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Effective Onsite Wastewater Management

by Jay Prager
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The concept of Onsite Wastewater Management has been ubiquitous within the onsite wastewater community for the past few years and has been the focus of recent initiatives by U.S. Environmental Protection Agency. Indeed, the agency has made it a major priority as evidenced by the publication of the Voluntary Management Guidelines and Coastal Zone Mandatory Management Measures (CZM 6217).

The onsite wastewater state regulators concur that onsite wastewater management is essential to the improvement of onsite wastewater system performance. However, they have identified a number of barriers to implementing management nationwide.

Jay Prager presents his issue paper on effective onsite wastewater management the morning of April 20, 2001.

First, there is a lack of useful information and resources to implement management programs. Perhaps the Guidance document that will eventually supplement the Voluntary Management Guidelines will help lower this barrier.

Second, there is insufficient information available to support claims that water quality improvement and public health protection will result from management programs.

Finally, there is resistance at the local government, local regulatory, and general public levels to assume additional onsite wastewater management responsibilities.

What can USEPA do to help?

First, they can provide synthesized data to show how onsite wastewater management can reduce ground-water and surface water contamination as well as public health risk.

Second, they can provide onsite wastewater state regulators an opportunity for input into the development of the Voluntary Management Guidelines Guidance Document. They can also continue the dialogue with the state regulators on onsite wastewater issues.

Third, USEPA can require the states to proportion infrastructure, Safe Drinking Water Act, Clean Water Act, and other funding by population served by onsite wastewater systems. This funding could be used to support all management functions including training centers and certification programs.

Finally, USEPA can provide flexible funding and support without disincentives.

Funding of Onsite Wastewater Initiatives

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Background:

No one can argue the success of the construction grants program during the 70's and 80's. Tens of billions of dollars have been spent to provide centralized wastewater facilities across the country. The State Revolving Loan Programs have assets exceeding $28 billion in 1998. Since 1989, the State Revolving Funds (SRF) have lent $22.9 billion to communities nationwide with $5.2 billion going to small communities of 10,000 population or fewer. Another $2.3 billion went to communities of 3,500 population or fewer.[1] Only ten percent goes to these small communities, averaging $870,000 per applicant and at a rate of 263 loan agreements per year.

For the period 1992 to 1998 the Rural Utility Service invested $2.8 billion in small communities' wastewater needs of 10,000 population or fewer, averaging $1.3 million per loan/grant applicant and reaching 366 loan/grant agreements per year.[2]

Ed Corriveau presents his issue paper on onsite wastewater education the morning of April 20, 2001.

Since August 1992, Ohio obligated ten loans totaling $53,335 with plans to spend $1.1 million per year from 1998 to 2001 to address onsite wastewater needs.

Through 1998, Maine made 294 loans totaling $1.27 million for its onsite needs.

Through 1999, Pennsylvania made 230 loans totaling $1.8 million for individual onsite repairs.

In 1997 Minnesota lent $1.2 million to six communities and an additional $1.57 million for onsite repairs.[3]

That's only 0.32 percent for onsite repairs of the above states SRF budgets during this period.

Clearly the funds are not getting to the needed on-sit repairs. Why? What are the obstacles?

1) Lack of Good Area-wide Planning:

The funding reality, as presented by the above figures, indicates that the bigger systems always get bigger and get most of the limited funds available. Channels to funding are well established; larger systems have the capacity and technical expertise to access funding, so centralized systems continue to grow proportionately larger. This leads to a cycle of urban sprawl connecting to an ever-growing central sewer system creating more and more discharges to streams. This cycle will never end; costs and the need for funds will always increase over time.

Breaking this cycle necessitates developing new funding strategies! This was first recognized back in 1996 where "In order for a state to fund non-traditional water quality projects with SRF funds, it must use an integrated planning and priority setting system" and, "EPA strongly encourages all

states to enhance their SRF planning and priority systems," according to the document, "The Clean Water State Revolving Fund Funding Framework."[4] These are great ideas, but they lack implementation oomph!

2) **Fragmented State Programs :**

Many States have separate or indirect coordination between their Environmental Protection and Public Health Programs. The strongest ties to the SRF and RUS and other funding sources are through programs that deal with direct stream discharge systems that tend to promote centralized sewer systems. Professionals in the wastewater programs are familiar and comfortable with central sewer. Onsite and public health specialists often have to overcome institutional barriers to educate and demonstrate that centrally managed onsite systems are valid alternatives to central sewer alternatives. A unified and integrated water quality management program incorporating the strengths of both the Environmental Protection and Public Health Officials needs to be developed to allow creative solutions using onsite technology, and a utility-like infrastructure to emerge.

3) **Responsible Management Entities (RME) Are Not Encouraged or Supported:**

"Who will manage these onsite systems" has always been and will continue to be the critical question in the wastewater industry? Capacity development defines the viability of any utility system. Work has progressed on the drinking water side to develop local capacity to better manage water but little progress has been made to develop the Technical, Managerial and Financial (TMF) capacity of managed individual and cluster wastewater systems. Start-up of RMEs is critical since initially the number of users is low and the RME may not be able to fully fund the true cost of their TMF responsibilities.[5] This important area needs to be specifically targeted by EPA and the States.

4) **More Working Examples of RMEs Are Needed :**

Examples such as Lake Panorama, IA; Crystal Lakes, CO; Auburn Lake Trails, CA; Stinson Beach, CA; Will County, IL; SCPUD, WA, and Hamilton County, OH all prove RMEs to be successful![6]

The lessons learned from these programs and others indicate that: 1) Creative problem solving, 2) Strategic and empathic thinking staff, 3) Dependable financing and keeping useful records to be keys to sustaining a successful management entity.

Locally based, professionally operated and managed onsite systems are equivalent to centralized sewer systems and are demonstrated to be more than cost-effective to solve our rural wastewater needs. RMEs are an essential element to smart growth.

EPA says that the costs associated with the establishment of a centralized management entity and their associated capital costs may be eligible for funding.[3]

It's time to believe and replicate.

Observations: Solving the Problem

EPA and the States have a new vision, a "Watershed Approach Framework."[3] Nowhere in this document does it even mention onsite system problems to be a water quality issue or need!

According to the 1995 census statistics, at least 2.5 million onsite systems, with total flows exceeding 750 million gallons per day, are in failure. This estimate is probably conservative.[3] These systems, which are located in people's yards and near streams and wells, have the potential for impacting public health among individuals and in their communities. Something needs to be done and soon.

EPA got it correct in their "Watershed Approach Framework." Community-based environmental

protection is an iterative approach in which diverse stakeholders strive to achieve environmental objectives, including:

- Adoption of local environmental goals compatible with economic sustainability
- Characterization of environmental problems and solutions and
- Implementation of solutions that are coordinated and tailored to the goals and needs of the community.

This sounds like a centrally managed water resource plan and implementation approach. This parallels the development of good area wide wastewater planning under the oversight of a unified State wastewater (and water) program utilizing responsible management entities to solve wastewater problems in an overall community based environmental protection program.

Promoting centrally managed onsite wastewater systems, and getting funds to this important program will be a nucleus to grow and accomplish the watershed framework we all so desperately need.

Recommendations To Promote This Framework

- TMDL and 303(d) requirements and limited funding necessitate evaluation of onsite alternatives. Require SRF applicants to include and consider managed onsite alternatives.
- Non-point source and SWAP plans must include an onsite component with specific achievable short- and long-term numeric goals.
- EPA should communicate effectively with the appropriate state agency responsible for onsite programs.
- Since onsite wastewater is not federally mandated, EPA has to go beyond the primacy agency.
- EPA should evaluate each primacy agency and SRF program to ensure onsite staff is adequate and supported.
- EPA should review with each state how onsite needs are being addressed and prioritized, not just to get funding, but to target funding to enhance and support onsite management.
- Provide more flexibility for 319 funds to address onsite management planning and implementation.
- Target funds for hardship conditions.
- Realign existing capacity development program funds to include development of RMEs.
- Use existing funding sources to target and overcome the start-up barriers.
- Get the message out that sewage management is a critical element in watershed programs.

References

1 EPA 832F – 99-057, Funding of Small Community Needs Through the Clean Water State Revolving Fund, Oct ’99

2 EPA 832F – 99-059, USDA Loan and Grant Funding for Small Community Wastewater Projects, Oct ‘99

3 EPA 832F – 99-001, Funding Decentralized Wastewater Systems Using the Clean Water State Revolving Fund, June ‘99

4 EPA 832-B-96-005, The Clean Water State Revolving Fund Funding Framework, Oct ‘96

5 Considerations about the Formation of Responsible Management Entities (RME) as a Method to Insure the Viability of Decentralized Wastewater Management (DWM) Systems, Chris English & Tom Yeager, Feb ‘01

6 Onsite Wastewater Management : A Model for Success, K. Mancl, ASAE Conference, Mar ‘01

Proposal for Professionalizing the Onsite/Decentralized Wastewater Treatment Industry

Douglas J. Ebelherr, L.E.H.P.
Illinois Department of Public Health

Introduction

There is a national need for professionalizing the onsite/decentralized wastewater industry. In 1997, USEPA stated in its *Response to Congress on the Use of Decentralized Wastewater Systems*, that 25% of the U.S. population is served by onsite wastewater systems. Further, nearly 40% of new development uses onsite wastewater treatment systems. Finally, USEPA stated that *properly managed* onsite/ decentralized wastewater systems are a viable alternative, equal to public sewer systems. However, at present most of the these systems are in unmanaged environments, meaning that there is minimal attention paid to site evaluation and design and little or no attention paid to the operation, maintenance, and monitoring of these systems. In an effort to address this issue, USEPA last year placed for review in the Federal Register, *Draft Guidelines for Management of Onsite/ Decentralized Wastewater Systems.* These guidelines propose a set of model programs that communities can use to develop and enhance the management of onsite/decentralized wastewater systems. Future initiatives being discussed by USEPA include the regulation of the Total Maximum Daily Load (TMDL) of pollutants on a watershed basis and Pathogen Strategies to protect public health and the environment. These and other new national initiatives are handicapped by a lack of research, public and political understanding and support, the lack of resources, and practitioner education. With onsite wastewater treatment systems being considered equal to public sewer comes an industry responsibility to provide better site evaluation, design, construction, and management of onsite wastewater treatment systems. There is also a responsibility that those that regulate and oversee this industry become equally competent. As the population expands into the finite land available, there will be a demand that treatment levels for bacteria, nutrients and all pollutants improve. There are numerous new technologies becoming available, including performance-based regulations that allow for individual, site-specific solutions.

Doug Ebelherr presents his issue paper on onsite wastewater education the morning of April 20, 2001.

Nationally, there is increased pressure to develop in areas with poor soils and an unwillingness to provide the infrastructure of public sewers. There is an increased pressure to use onsite wastewater treatment systems, especially discharging systems. Systems that utilize soils for subsurface treatment and disposal do so in many places with minimal regard for the protection of groundwater resources. In many states, there is only cursory regulation or monitoring of installed systems, if any. The licensing system for contractors is archaic and ineffective and does not exist in some states. Few states have any system in place to train regulators or contractors about current or new technologies. The process for technology transfer is cumbersome and burdensome for those who would bring new technologies to the state. States have few resources to test or review the myriad of treatment claims made by numerous companies with new wastewater treatment systems and components. The number one issue on

the table at the annual State Onsite Regulators Conference is technology transfer and the regulatory community's inability to verify all the claims being made about new products. The regulatory system at the local (county) level is often exercised in an arbitrary and capricious manner by public officials without credentials or the necessary skills in onsite wastewater to do an effective job. Public perception is that septic systems should be installed as cheaply as possible and then forgotten. Public policy supports a system that considers economics first and gives a back seat to public health and the environment.

The situation points to the need to provide the onsite wastewater research and training that is so urgently needed across the nation. It is essential to learn more about using soil as the treatment system or to use technology that can treat sewage prior to dispersal into the soil. Effective treatment or dispersal can be protective of public health and the environment and can supplement groundwater recharge. There is a tremendous need by regulators to have a resource that can verify claims made by manufacturers about new and existing systems and components.

There is an immediate need to improve the knowledge of and to professionalize the onsite wastewater industry. Many regulators and industry personnel have only basic knowledge of the onsite treatment systems and install them based upon "cookbook" prescriptive codes that provide only assumed public health and environmental protection. The vast majority of this industry are not prepared to cope with complex solutions for sensitive environments. Basic and advanced curricula must be developed and taught to all segments of this industry to meet the expanding complexities of solutions and to properly operate, maintain, and monitor these complex systems to meet existing and future federal and state public health and groundwater protection standards. Advances in technology, performance, and treatment will require an increased level of competence by all members of the industry including contractors, regulators, manufacturers, etc.

USEPA needs to recognize the simplicity of the current onsite/decentralized industry. There is a lack of any formal training and the insufficiency of any requirement for competence. We look to USEPA to provide leadership, to provide resources, and to require demonstrated competency at all levels to deal with the simplicity of the present and the complexities of the future. Achievement of future public health and environmental treatment goals can only be attained if all participants in the onsite wastewater industry are required to achieve the same, and a higher, level of competence.

We need to change public policy and the American public view that an onsite wastewater treatment system is not just a backyard nuisance connected to a modern indoor convenience, but rather, a sewage treatment system that is infrastructure that needs to be competently managed.

Observations

State primacy agencies are typically **not** the agency delivering onsite/decentralized system services in the states.

Regulations alone are not enough to solve onsite wastewater treatment issues.

Recommendations

There is a need for trained persons in the onsite wastewater treatment industry, including regulators and contractors. Unless competent people evaluate sites, design, construct/install, and monitor/maintain (manage) systems, and unless competent regulators review and oversee this work, onsite/decentralized wastewater treatment systems will not become equal to public sewer. Without additional competency, this industry will never advance past the present of just installing septic systems and hoping they work for some time.

There is a need to establish national requirements for credentialing people who conduct site evaluation; design, construction and maintenance of onsite wastewater treatment systems; or for people who review/inspect or oversee these activities. There also needs to be requirements for continuing education to maintain these credentials.

There is a need to support nationally recognized onsite/decentralized training programs to help people obtain the needed credentials to conduct skilled activities and training to continue to maintain these credentials. Wastewater biology may be able to be taught through the current system of training

wastewater treatment plant operators; however, specialized training about onsite/decentralized systems needs to be developed.

USEPA should seek funding to establish a training center/network/program in each state, to train persons prior to credentialing, to provide continuing education of credentialed persons, and to educate the public. Logistically, it is not feasible to have contractors or local health department personnel travel outside their state. In addition, while basic wastewater classes are the same, specific training about each states rules and procedures is necessary.

USEPA should provide a grant or appropriation of funds for the purpose of creating a National Research and Training Center for the Studies of Onsite Wastewater Management.

This proposal of a National Research and Training Center for the Studies of Onsite Wastewater Management is a three-part proposal.

It proposes funding to support model undergraduate, graduate, and adult education curricula in onsite wastewater studies that could be used by multiple universities and training centers.

It proposes the establishment of a National Onsite/ Decentralized Training Center or a centralized coordination of training centers that reaches out to the states and would be a model and a resource for all training centers.

It proposes the establishment of a National Onsite/ Decentralized Research Center for basic and advanced research into onsite wastewater technology creation and verification, public policy, public awareness, regulation, technical, and other issues.

The goal is to create a nationally holistic set of programs that meet the education, training, and research needs of the national onsite/decentralized wastewater community.

Undergraduate, Graduate, and Adult Education Curricula

This proposal is to support at least three sets of courses that will meet the education needs of the onsite wastewater treatment industry.

A set of undergraduate courses for engineering, soil science, environmental science, and other related disciplines that would train the next generation of onsite/decentralized wastewater professionals.

A set of graduate courses to train university graduates and current professionals in advanced concepts in onsite/decentralized wastewater practice, including technical issues, public policy, public awareness, regulation, etc. Perhaps even a "Leadership Institute," could be developed for the onsite/decentralized wastewater community.

A set of adult education courses for training regulators, contractors, practitioners, and others who need onsite wastewater treatment credentials/ licensing, and/or continuing education to maintain those credentials, and to educate the public, to be used in conjunction with the National Environmental Training Center for Small Communities.

The curricula for all three groups should be built around the skill needs for onsite/decentralized wastewater professionals. These needs include planning, performance requirements, site evaluation, design, construction, operation and maintenance, residuals management, certification and licensing, education and training, inspection and monitoring, corrective actions and enforcement, record keeping and reporting, and financial assistance.

National Onsite/Decentralized Training Center

The development of a National Onsite/Decentralized Training Center or centralized coordination of training centers that would provide hands-on training for onsite wastewater professionals and others with an interest in the field. The National Environmental Training Center for Small Communities (NETCSC) program was created in 1991 in revisions to the federal Clean Water Act and is currently part of the National Environmental Services Center (NESC) at West Virginia University. The NETCSC program activities include assisting states in developing their own training centers, facilitating curriculum development that can be shared among the training centers, and training the trainers. NETCSC does not provide funding for the actual establishment of training centers but will assist in that endeavor.

Training centers in other states are usually, but not exclusively, associated with universities and with many cooperating partners. The most common model for the physical set up of a training center is to have classroom facilities and an outdoor area with stations that demonstrate actual onsite wastewater technologies or other facets of onsite wastewater practice. For example, the training center at Texas A&M University in Weslaco has a large indoor classroom and an area with stations that contain full scale onsite wastewater systems with tanks, pumps, dispersal systems, etc. Many of these stations are equipped to run clear water through them to demonstrate the hydraulic principles that make them work. Many different technologies are on display, and proper operation and maintenance of the systems can be taught. They also have stations that include soil samples for training in soils classification. The training center at North Carolina State University in Raleigh uses soil pits for soils training.

National Onsite/Decentralized Research Center

The bulk of the funding for this project would be spent on establishing a National Research Center. It is estimated that such an endeavor would cost 20 to 30 times the cost of developing an education program and training center. Research needs mirror training needs in terms of subject matter, including research in planning, performance requirements, site evaluation, design, construction, operation and maintenance, residuals management, certification and licensing, education and training, inspection and monitoring, corrective actions and enforcement, record keeping and reporting, and financial assistance.

A research center with ample land area is needed to conduct research into using onsite wastewater systems in ways that protect public health and the environment. This facility must also be able to conduct technology verification to support state and local regulatory programs. Technology verification could be paid for by manufacturers of new technologies. The research center must be completely staffed by experts with onsite/ decentralized knowledge as well as soils, hydrology, geology, and supporting disciplines in order to research technical issues that impact public health and the environment. A well equipped laboratory capable of supporting this research and collaborative academic programs is essential. The research center must also be able to access and share the resources of other university departments in order to examine barriers in onsite/decentralized public education and support, public policy, regulation, planning, and other issues.

Many individual efforts to professionalize the industry are currently underway; however, there is no central focus. These include projects supported by the National Capacity Development Program, National Environmental Training Center for Small Communities, National Onsite Demonstration Program, Consortium of Institutes for Decentralized Wastewater Management and individual onsite training centers. In addition, there are efforts underway by other national organizations.

Onsite Wastewater Industry Issues Related to USEPA Initiatives

By Leonard J. Moore
Chase, Moore and Associates, Inc.

Who We Are

Those who developed this issue paper represent 11 manufacturers of wastewater treatment and disposal equipment for the onsite/decentralized wastewater industry in the United States. There are hundreds of such manufacturers, and the number grows annually. Estimated annual sales of these manufacturers are more than $500,000,000.

Support of the USEPA's Response to Congress on the Use of Decentralized Wastewater Treatment Systems

Raymond Peat presents the industry issue paper on the morning of April 20, 2001.

The manufacturers support the conclusions of the *USEPA's Response to Congress on the Use of Decentralized Wastewater Treatment Systems, 1997*. Especially pertinent is the first sentence from the document's Executive Summary: "Adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas." Although we agree with the statement, we also believe that properly managed manufactured treatment and/or disposal systems are appropriate in areas of mid to high population density.

Support of the USEPA's Guidelines for Management of Onsite/Decentralized Wastewater Systems

No onsite/decentralized system will function properly any length of time unless it is properly managed. Since most of us manufacture products that require periodic maintenance and monitoring, we support the universal implementation of the Voluntary Management Guidelines.

Particularly encouraging from the Guidelines are the performance requirements, owner responsibility of operation and maintenance, and the education/training requirements.

Performance Requirements

The products we make, either by themselves or in combination with other system components, can meet any performance standard required by any site. We support performance-based codes and standards, provided that they are fairly written and implemented.

Operation and Maintenance

We welcome provisions within the Voluntary Management Guidelines that place the responsibility for operation and maintenance of decentralized wastewater systems on the user or the management entity. All to often, manufacturers are unfairly held responsible for system failures when the real problem is misuse or lack of maintenance. Placing responsibility on the user or management entity provides an opportunity for education of system designers, regulators, users, and maintenance entities. It is hoped that this education will create a better understanding of the proper application and expected performance of the decentralized/onsite wastewater products we manufacture.

Education/Training

We share USEPA's vision of education/training laid out in the Guidelines. We agree that a greater emphasis must be placed on owner education regarding the systems purpose, use, and care. We also agree that technical guidelines and training should be published for service providers.

Technology Transfer

There is increasing pressure to develop sites with severe limitations for conventional decentralized wastewater systems. These sites include high-density development and ecologically sensitive areas where public sewers are not available.

There are technologies available today to properly treat and dispose of wastewater on any site. A problem exists in getting these products approved by the regulatory community for use on these sites. There are significant regulatory barriers that discourage the widespread acceptance and use of these technologies. There is no uniform process for evaluating and approving onsite/decentralized technologies. These barriers discourage American innovation and our ability to assist the regulatory community in meeting the water quality goals of the Clean Water Act.

Manufacturers are committed to working with the State Regulators, US EPA, and other interested parties to create a uniform technology approval process.

We ask USEPA to encourage reforms that allow a fair, consistent, and defensible process for widespread technology acceptance.

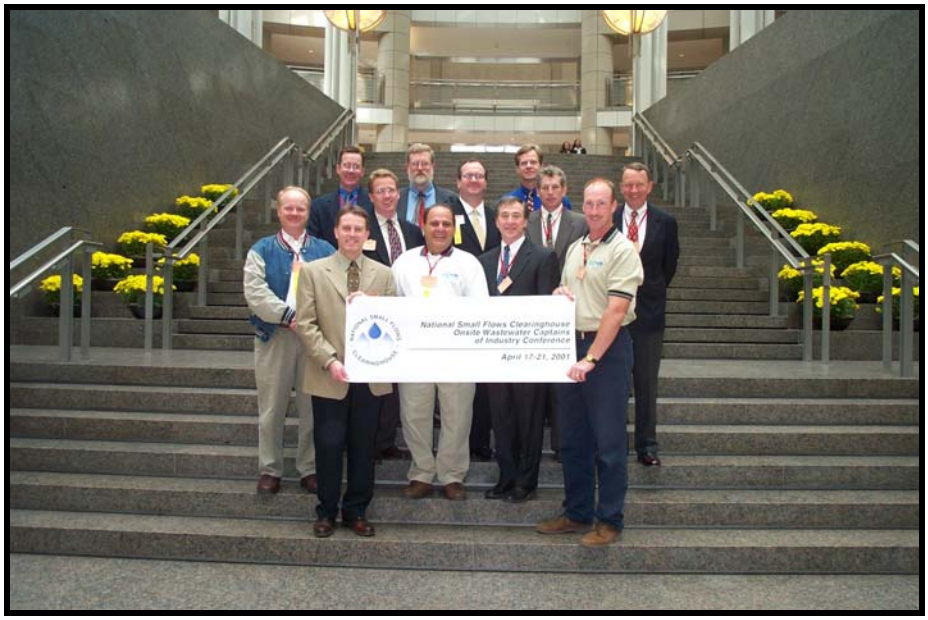
Allocation of Resources

As stated in USEPA's Response to Congress on the Use of Decentralized Wastewater Treatment Systems, 1997, decentralized systems serve approximately 25 percent of the U.S. population, and approximately 37 percent of new development. Currently USEPA's resource allocation does not reflect these percentages.

We ask the USEPA to work toward a more equitable distribution of resources to better reflect the growing use of decentralized wastewater systems.

Conclusion

We would like to thank USEPA for allowing us this opportunity to express our views, and we look forward to the agency's continued leadership and support of decentralized wastewater treatment systems. We also look forward to continued dialogue with USEPA on issues of mutual interest.



Appendix A

Summary of April 20, 2001 Meeting

Stephen Hogye, U.S. Environmental Protection Agency

On April 20, 2001 State onsite regulators met with USEPA representatives in Washington, D.C. to present issues of concern identified in their State Regulators Conference held the previous two days. The meeting was sponsored and facilitated by the National Small Flows Clearinghouse. Some 32 States were represented, along with representatives of 12 manufacturing firms, National Onsite Wastewater Recycling Association (NOWRA), the National Association of Counties (NACo), Environmental Council of the States (ECOS) and USDA Rural Utilities Service. EPA offices represented included OWM, OWOW, OGWDW, ORD, and Region 9 UIC. Mike Cook provided introductory remarks on behalf of EPA and expressed continued interest in the partnership between EPA and the State regulators. The State regulators then reported on their five issues of concern: research needs, management programs, performance-based regulation, education, and funding. The following significant issues were identified by the regulators:

- The regulators and manufacturers support the need for management and are in general agreement with the draft EPA guidelines;

- State regulators and the manufacturers generally support the need for a model/uniform national performance code for onsite wastewater systems. A process has been initiated by NOWRA for developing such a code. The current patchwork of reviews and approvals is a barrier to the acceptance of promising technologies.

- EPA's allocation of resources to onsite issues is insufficient, given that 25% of the nation's homes are served by onsite systems. The SRF and other funding programs should require applicants to evaluate both centralized and decentralized alternatives and require management of decentralized systems as with centralized systems;

- EPA needs to help promote a better working relationship between State-level health departments and water quality agencies;

- Better data is needed at a national level regarding water quality impacts of onsite systems, numbers and types of systems, and other information. This should be integrated in EPA's Needs Survey;

- There is a need to professionalize the industry by requiring certification, licensing and training of practitioners;

- States need a nationally consistent process for evaluating and approving alternative technologies.

The State regulators also expressed continued interest in the Onsite Wastewater Treatment System (OWTS) Manual that OWOW and ORD are developing to update the 1980 Onsite Disposal System Design Manual.

EPA acknowledged the States' concerns and agreed to follow-up with more dialog. EPA also noted that, in addition to EPA leadership in several of these areas, industry leaders should take the lead on pertinent issues; EPA could serve as facilitator.

More detailed notes from the meeting are attached for your information.

EPA Discussions with State Regulators of Onsite Wastewater Systems

Washington, D.C. April 20 - 21, 2001

ISSUES PRESENTED BY REGULATORS
(32 states were represented)

- Research Needs (Bob Uebler, NC)
  - Performance of systems
    - How to evaluate impacts of onsites on the environment and public health?
    - What is the long term performance of onsite systems?
    - What rehabilitation methods are available?
    - What parameters need to be monitored to assure performance?
    - How well do training and certification programs work?

  - Fate & transport of pathogens

- What should minimum separation distances be? What is the role of the biomat?
- Nutrients
  - What is impact of nitrogen from septic systems on watersheds?
  - How much loading should be allowed?
  - How much dilution/removal occurs?
- Economics
  - Need cost/benefit business models and community decision-making tools as well as education.
- Technology transfer
  - What should be included in a national protocol for approval of alternative technologies?
  - Regulators need easier access to national data bases to facilitate technology transfer.
  - What should be included in a national performance-based code?

- Management (Jay Prager, MD)
  - The regulators concur that management is essential
  - Information and resources are needed.
  - Local governments don't want the burden of another program.
  - Data is needed to show how management reduces water quality problems.
  - Regulators need input in EPA's guidance manual on management guidelines.
  - EPA should prevail on states to set aside funds from SRF for onsite systems.

- Performance Standards (Ed Swanson, AZ)
  - Current inconsistency in regulatory approaches is undesirable.
  - Regulatory "inertia" must be overcome to implement changes.
  - .Regulators support a "performance-based" approach; the NOWRA proposed process for developing a "model performance code" is a good one.
  - .Resources needed include:
    - A common "glossary" of terms
    - Statistical quantification of performance
    - Guidance on health/risk assessment techniques
    - Process for implementing a national performance code
  - Recommendations for EPA:
    - Support the national code concept and process for developing a unified code
    - Postpone any regulatory program for large capacity septic systems (Class V UIC rules)
    - Don't combine onsite systems with other non-point source pollutant generators when conducting water quality analyses and reports
      - Define what constitutes "failure" for onsite systems

- Education (Doug Ebelherr, IL)
  - Local regulators don't have the credentials or skills for doing their job; a "cookbook" approach is typically used, without understanding of the treatment process
  - Need to increase the competence of regulators
  - The complexity of the onsite industry is increasing
  - Need national requirements for credentialing practitioners (inspectors, installers, designers, etc.) and include continuing education as a requirement for maintaining certification status
  - Need to support national training programs
  - Funding is needed to support an onsite system training center in <u>each</u> <u>State</u>
  - A national center is needed for studies and training in onsite management. A national training center is needed as a model for States
  - .Curricula on onsite technologies and management need to be developed for graduate and undergraduate programs

- Funding (Ed Corriveau, PA)
  - Up to 40% of new construction is being served by onsite systems, but the SRF

program has applied only 0.32% of its funds for such systems
- .SRF applicants should be required to examine managed onsite system alternatives to the "big pipe" approach
- Need better overall, approved State wastewater planning criteria
- Need set-asides, lower rates or other special funding targeted for onsite systems
- .Need coordination between State health agencies and the State environmental agencies so that onsite systems can get better access to funding streams
- More flexibility is needed for the application of CWA Section 319 funds
- Management entities need to be created before funds are steered toward onsite systems
- EPA needs to intensively continue the dialogue with State regulators
- May need grants in addition to loans, especially to overcome startup barriers
- .HUD should be a more active participant in our discussion on onsite system funding and management

ISSUES PRESENTED BY PRIVATE INDUSTRY REPRESENTATIVES
(note: 12 firms were represented)

- The industry generally supports EPA's management guidelines and the conclusions of the 1997 Response to Congress
- Onsite technology now exists to meet environmental requirements even in sensitive areas.
- Manufacturers generally concur that there is a need for certification, licensing, training of practitioners
- EPA needs to redistribute resources to allow funding of onsite systems. Industry is concerned about the "disconnect" between the number of homes served by onsite systems (25%) and EPA's allocation of resources (SRF funds, research, etc.).
- Regulatory inflexibility stifles the development of new products. Currently there is no uniform process for evaluating and approving alternative technologies. Industry is willing to work with EPA and others to create a uniform approval process.

DISCUSSION WITH STATE REGULATORS ON SATURDAY, APRIL 21

- EPA's Overall Reaction to Issues Presented:
  - Many good issues; EPA cannot address each; need to look to organizations and leaders in the industry to take the lead on certain issues
  - Want to have continued, open dialogue with State regulators
  - .EPA will include State representative(s) on steering committee to develop guidance manual
  - .Performance code is necessary and will help take politics out of local decision-making/ land use planning

- EPA Presentation of Draft Analysis of Data on Failures:
  - .Synopsis of Census data presented; shows 10% failure rate; Failure defined as backups in homes and/or ponding of effluent
  - Other data was presented showing higher rates of failure/malfunctions

- Reactions from States:
  - States concerned about lack of credible data; tendency is to use and misrepresent data. Concerned that we are overstating the problem.
  - When quoting data sources, include the caveats/assumptions in each citation because background tends to get lost
  - Better to collect good data over the long term; need to work with States to collect good data
  - Disagreement over definition of failure
  - Don't use the term "failure" due to lack of agreement on definition; use another word, such as malfunctions, noncompliance, non-performance. Need to look at onsite systems within the context of noting that centralized systems have their problems, too (overflows, exfiltration, pump station malfunctions, etc.)
  - A national database is needed for keeping track of onsite systems. Onsite system needs should be included in EPA's Needs Survey.

EPA-FUNDED ACTIVITIES TO SUPPORT BETTER MANAGEMENT OF ONSITE WASTEWATER TREATMENT SYSTEMS April 24, 2001

ACTIVITY	DESCRIPTION	FUNDING
National Guidelines for Management of Decentralized Wastewater Systems	Voluntary guidelines to assist states and communities in developing programs to systematically manage onsite and cluster wastewater treatment systems. Include design, siting, installation, inspection, monitoring, funding and maintenance of systems. Published in Federal Register on October 6, 2000. Expect to finalize guidelines by Fall, 2001. Contact: Joyce Hudson, 564-0657.	Internal EPA
Guidance Manual for Management Guidelines	Guidance to assist in the implementation of the voluntary management guidelines. Tools to be developed may include sample ordinances, case studies, computer software, cost data, description of funding sources, and fact sheets. Contact: Joyce Hudson, 564-0657.	Internal EPA
Onsite Wastewater System Design Manual	Performance-based design manual for use by engineers and regulators in the design and evaluation of onsite systems, including new alternative technologies. Comprehensive update of EPA's popular 1980 design manual, of which over 60,000 copies have been distributed. Will include management concepts throughout, consistent with the management guidelines. Completion expected by Fall, 2001. Contact: Rod Frederick, 260-7054.	Internal EPA
National Onsite Demonstration Project	Multi-phase project administered by the National Small Flows Clearinghouse, which demonstrates alternative onsite and cluster wastewater technologies, management concepts, funding strategies, education and training through in-the-field applications. Currently entering phase 7 of the program.	$8.5 million, Congressional Earmarks FY 93-01
National Decentralized Wastewater Demonstration Project	Congressionally-directed demonstration project providing funds to 6 communities to demonstrate onsite wastewater technologies, water quality improvements and management concepts. Recipient communities are La Pine (OR), Warren (VT), Block Island and Green Hill Pond (RI), Lake Skaneateles (NY), Monroe County (FL), and Mobile (AL). Contact: Joyce Hudson, 564-0657.	$15.9 Million Congressional Earmarks
National Decentralized Capacity Development Project	Congressionally-directed program to set the agenda and implement a program of research and investigative studies in the decentralized wastewater technology, education and management field. Currently funded projects include development of college engineering curriculum, curriculum for training centers, investigation of how states are managing onsite systems, development of a state model ordinance, quantification of watershed impacts, and developing risk-based management approaches. Contact: Don Brown, ORD, 513-569-7630.	$5 Million Congressional Earmarks

EPA-FUNDED ACTIVITIES TO SUPPORT BETTER MANAGEMENT OF ONSITE WASTEWATER TREATMENT SYSTEMS April 24, 2001 (cont'd)

ACTIVITY	DESCRIPTION	FUNDING
Environmental Technology Verification (ETV) Project	As part of the broader ETV program, the "Source Water Protection Pilot" program is examining alternative onsite wastewater technologies to develop a protocol for testing manufacturer's performance claims. The goal is to gain wider acceptance among regulatory agencies for application of the technologies in their respective states. Contact: Penny Hansen, ORD, 564-3212.	$3 Million
National Small Flows Clearinghouse	The National Small Flows Clearinghouse, based at West Virginia University, offers a range of services to promote the understanding, acceptance and appropriate implementation of alternative wastewater treatment technologies and approaches in small communities. Activities which specifically benefit onsite systems include convening national meetings of state regulators and onsite training center staff, publication of periodicals, fact sheets and technical guides, maintenance of national databases, providing toll-free telephone consultation, in-the-field technical assistance, and maintenance of a comprehensive web site. Contact: Steve Hogye, 564-0631.	$1.5 + Million annually, Congressional Earmark
Outreach Partnerships	104(b)(3) funding provided to various national organizations to disseminate information on decentralized wastewater technologies and management and promote the education and training of their membership. Partners so far (funded and unfunded) include: the National Association of Counties (NACo), National Association of City and County Health Officials (NACCHO), National Small Flows Clearinghouse, Rural Community Assistance Program (RCAP), National Association of Towns and Townships (NATaT), National Environmental Health Association (NEHA), National Onsite Wastewater Recycling Association (NOWRA), Association of State and Interstate Water Pollution Control Administrators (ASIWPCA), Environmental Council of the States (ECOS), and Association of State and Territorial Health Administrators (ASTHO). Contact: Steve Hogye, 564-0631.	NEHA: $60,000 NACo: $200,000

EPA-FUNDED ACTIVITIES TO SUPPORT BETTER MANAGEMENT OF ONSITE WASTEWATER TREATMENT SYSTEMS April 24, 2001 (cont'd)

ACTIVITY	DESCRIPTION	FUNDING
Other Outreach Activities	Using EPA staff, a USDA Extension Agent (on IPA loan to EPA) and contractor support, EPA has developed articles, PowerPoint presentations, fact sheets, CD's, information packets and other resources explaining the voluntary national guidelines for management. Presentations have been made at national and regional conferences for various organizations such as NOWRA, NEHA, NSF, WEF, NACo, ASAE, and others. EPA has also developed a web site specifically dedicated to decentralized wastewater technology and management, and maintains a "listserve" to facilitate communication among those interested in the decentralized field. Contact: Steve Hogye, 564-0631.	Internal EPA
Funding of Activities to Support Adoption of Appropriate Onsite Technologies	104(b)(3) and other funding to support: development of NSF certification program for onsite system inspectors, development of descriptive catalogue of alternative onsite technologies (Rocky Mountain Institute), management districts in NC, demonstration grant in San Francisco, and state management program development in NM. Contact: Joyce Hudson, 564-0657.	NSF: $95,000 RMI: $80,000 NC: $20,000 SF: $150,000 NM: $79,000
Support of State Development of Management Programs	104(b)(3) funding in FY 2001 to support development and implementation of decentralized wastewater management programs in 5 states: FL, CA, IL, PA, MN. Contact: Joyce Hudson, 564-0657.	FL: $145,000 CA: $32,000 IL: $159,500 PA: $65,900 MN: $225,000

Appendix B

Slides for Issue Paper Presentation on Research Needs and Technology Transfer

2001 National On-Site Regulators Conference

Research Needs for Wastewater Soil Absorption Systems (WSAS)

Five Major Areas of Research

- **PERFORMANCE of ONSITE SYSTEMS**
- **FATE AND TRANSPORT OF PATHOGENS**
- **NUTRIENT CONTAMINATION**
- **ECONOMICS**
- **TECHNOLOGY TRANSFER**

PERFORMANCE OF WASA

1A. Treatment Performance

1B. Hydraulic Performance

1C. Longevity (clogging) of Performance

1D. Management to Optimize Performance

A.) Treatment Performance

1.) What methods should be used to evaluate the effect of WASA on Public Health and the Environment?

2.) Data is needed on the long term performance of systems.

3.) Site and soil factors, which effect treatment, need to be better characterized.

B.) Hydraulic Performance

1.) The movement of pollutants to ground and surface waters through the connecting hydrologic paths needs further characterization if strategies to minimize the impact of WSAS are to be developed.

2.) Can we model performance with accuracy? (mounding, etc.)

C.) Longevity of Performance

1.) We still do not have a good grasp on the expected longevity of "conventional" technologies, let alone innovative technologies that are coming to the market daily.

C.) Longevity of Performance

2.) What are sustainable levels of BOD loading, that will maintain adequate infiltration to prevent the surfacing of sewage (clogging)?

3.) Can failed systems be rehabilitated instead of replaced?

D.) Management Needed Sustain to Performance

1.) What are the levels of management needed to sustain performance for all system types ?

2.) What parameters can be monitored remotely to assure system performance?

3.) Can the effect of training and certification on system performance be quantified?

Fate and Transport of Pathogens

A.) What degree of pathogen treatment is achieved with conventional systems?

B.) What should required separation distances be to minimize health risk?

C.) What is the role of bio-mat formation in pathogen removal and how is it affected by innovative technologies?

Nutrient Contamination

A.) How can we reliably predict the impact of nitrogen from systems on watersheds?

-Quantity

-Transformations (denitrification)

-Risk Analysis (models)

Nutrient Contamination

B.) What are the maximum possible nutrient loads to ground and surface waters from systems?

C.) What is the dilution and removal capability of different hydrologic paths?

Economics of Decentralized Systems

A.) Accurate business models are needed for cost/benefit analysis.

B.) Improved decision-making models are needed to help communities evaluate alternatives and implement smart growth.

C.) Educational strategies are needed to overcome negative labels associated with onsite technologies.

Technology Transfer

A.) What are the essential elements for the development of a nationally accepted protocol for approval of new technology?

B.) Easier access to national data base must be developed to assist regulators with technology transfer?

C.) What are the necessary elements of a performance based code?

Appendix C

Slides for Issue Paper Presentation on Performance-Based Regulation

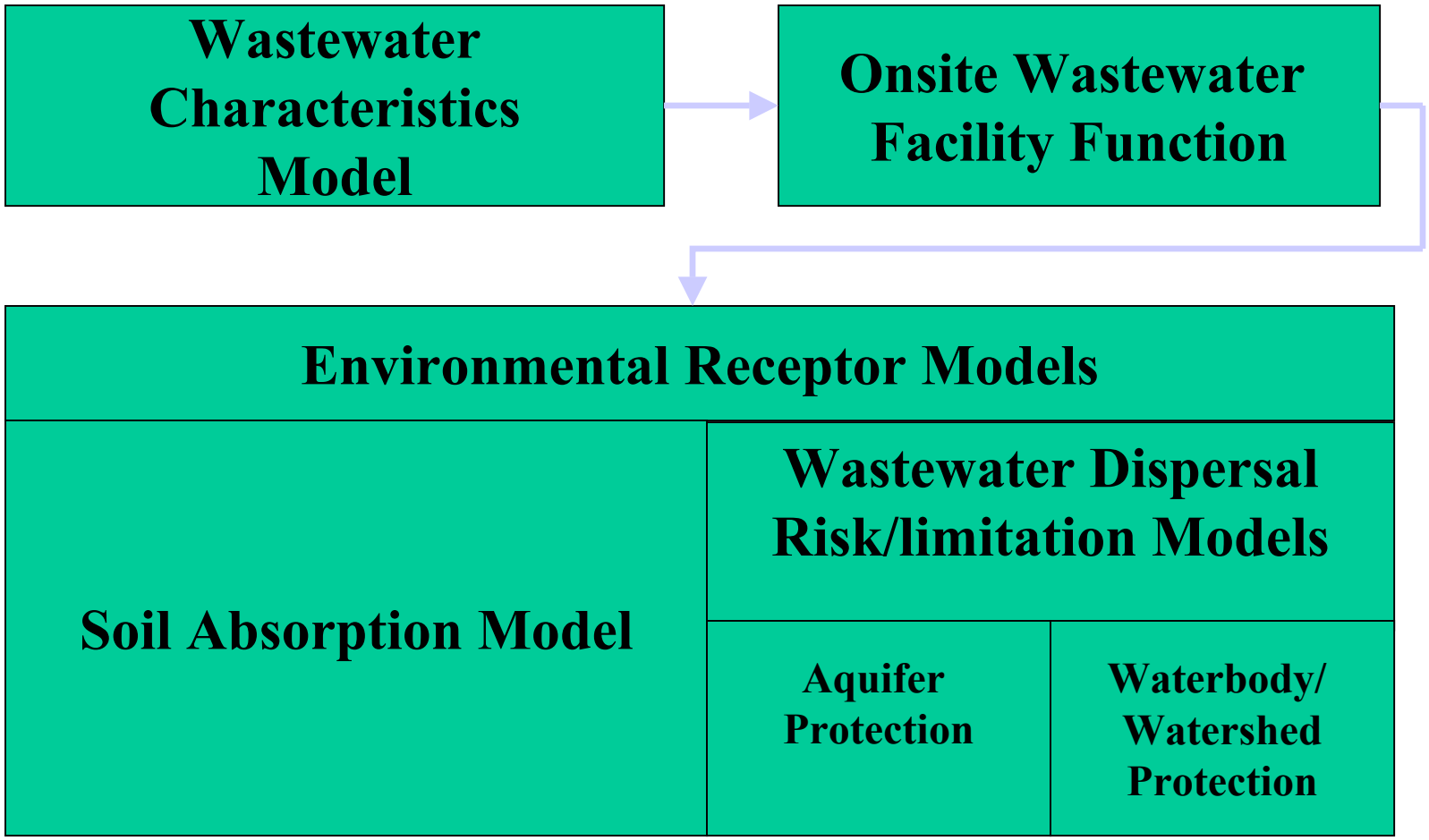
Performance-based Onsite Wastewater Regulation Workgroup

Report to USEPA
April 20, 2001

Problem Statements

- Regulatory variability
- Prescriptive codes without performance foundation are limiting in today's business environment
- Regulatory inertia
- Link between prescription and output performance protective of the public health and environment may have been lost

Logical Model



Consensus Statement

Most state regulators support a performance-based approach to facilitate the siting, design, installation, and management of onsite wastewater facilities.

NOWRA has proposed development of a National Onsite Model Performance Code.

Needs that should be met

- Common glossary
- Parameters / numeric values / statistical quantification
- Performance testing and assessment
- Guidance on health risk assessment and protection of environmental receptors
- Process for implementing a national model code
- Allows for state/local decision making

Recommendations to USEPA

- Support national model performance code in concept, with funds and participation
- Postpone action on Class V regulations on large capacity septic systems (i.e. don't drive developer away from using cluster system as a performance option)
- NPS: disaggregate onsite from other sources in 305(b) reports; and then, differentiate between adequate and failing onsite systems when discussing onsite pollution sources

Benefits to USEPA

- Complements Voluntary Management Guidelines
- Deploys science and technology to solve siting and design problems
- Encourages national consensus
- Supports TMDL implementation
- Simplifies life for USEPA

<table>
<tr><th colspan="3">Environmental Receptor Models</th></tr>
<tr><th>Soil Absorption Model</th><th colspan="2">Wastewater Dispersal Risk/limitation Models</th></tr>
<tr><td rowspan="2">A</td><td>Aquifer Protection</td><td>Waterbody/ Watershed Protection</td></tr>
<tr><td>B</td><td>C</td></tr>
</table>

Soil Absorption Model A

Parameters based on

- Soil classification relationships
- Percolation test relationships
- BOD, TSS, FOG
- Absorption surface
- Operational life
- Site hydraulic capacity

Aquifer Protection
B

Parameters based on

- Appropriate indicator organisms
- Pathogens
- Acceptable soil horizons
- Hydraulic loading
- Aquifer water quality
- Aquifer standards
- Pollutant transport and storage processes

Waterbody/Watershed Protection C

Parameters based on

- Water quality standards
- Waste loading analyses
- Seasonal conditions
- Pollutant transport and storage processes

Appendix D

Slides for Issue Paper Presentation on Effective Onsite Wastewater Management

Management Implementation

State Regulators Presentation

Why Management ?

- High Priority for USEPA as evidenced by Voluntary Guidance Doc and CZM 6217 Mandatory Management Measures
- State Regulators concur that onsite management is essential to onsite performance improvement.

Management Barriers

- Lack of useful information and resources to implement management requirements.
- Insufficient information to support WQ improvement and public health protection.
- Resistance of the public and local governments to assume additional management responsibilities.

What Can EPA Do to Help?

- Synthesize data to show how management can reduce gw/sw contamination and public health risk.
- Provide onsite regulators the opportunity for input in the Voluntary Management Guidance Manual and to continue dialog with EPA on onsite issues.

What Can EPA Do To Help?

- Require states to proportion Infrastructure, SDWA, CWA, etc., funding by population served by onsite systems to support all management functions including training centers and certification programs.
- Provide flexible funding and support without disincentives.

Appendix E

Slides for Issue Paper Presentation on Funding Onsite Wastewater Initiatives

Funding of On-Site Wastewater Initiatives

Ed Corriveau - Pennsylvania

Deb Baker - Kansas

Gerry Chartier - New York

Ken Graber - Texas

Mike Kucinski - Oregon

Deb Knauss - Rhode Island

Brent Parker - Iowa

Duke Price - Virginia

Colleen Mackne - NSFC

Issue: Need for Good Areawide Planning

Background

- Estimated 2.5 million failing onsite systems nationwide totaling 750 MGD of sewage
- 40 % of new construction is onsite
- Less than 0.32% of state SRF dollars have gone for needed onsite repairs in states that have loan programs for individual repair

Problems:

- Good areawide planning and alternative analysis are not happening under the loan program
- Program history has developed a culture of promoting centralized sewer
- Continuing to sewer is more expensive and never ends the cycle if onsite issues are not resolved

Recommendations:

- TMDLs and 303(d) requirements and limited funding necessitate evaluation of onsite alternatives. Require SRF applicants to include and consider managed onsite alternatives.
- Non-point source and SWAP plans must include an onsite component with specific achievable short- and long-term numeric goals.

Recommendations:

- Planning should be consistent with an EPA approved state wastewater planning criteria and include solutions for all the needs, every site that generates wastewater within the funding applicant's boundaries.
- Provide incentives for applicants that go beyond the pipe and also promote managed onsite solutions, including set asides offering lower rates and special targeted funding.

Issue: Reduce Fragmented Programs

Background

- Many state programs evolved out of the construction grants program and the SRF loan program has paralleled the environmental protection program.
- The onsite program has stronger ties to the public health program. This leads to coordination problems and unfair access to funding streams.

Problems

- Deep institutional bias toward promoting expensive sewer with limited consideration of using onsite options.
- Total solutions for a large watershed area will need to promote the best combination of alternatives.
- With sewer come sprawl and ag impacts.

Recommendations

- EPA should communicate effectively with the appropriate state agency responsible for onsite programs.
- Since onsite wastewater is not Federally mandated, EPA has to go beyond the primacy agency.
- EPA should evaluate each primacy agency and SRF program to ensure onsite staff is adequate and supported.

Recommendations

- EPA should review with each state how onsite needs are being addressed and prioritized. Not just to get funding, but targeting funding to enhance and support onsite management.
- Provide more flexibility for 319 funds to address onsite management planning and implementation.
- Target funds for hardship conditions

Issue: Responsible Management Entities must be promoted and developed now

Background

- In order to use new technologies, they need to be managed.
- Capacity development takes time and dedicated trained staff.

Problems

- Startup of RMEs is difficult due to small customer base and high initial costs.
- Loans may not be sufficient to overcome the startup barrier.

Recommendations

- Realign existing capacity development program funds to include development of RMEs.
- Use existing funding sources to target and overcome the startup barriers.
- Get the message out that sewage management is a critical element in watershed programs.

Appendix F

Slides for Issue Paper Presentation on Onsite Wastewater Education

Professionalizing the Onsite/Decentralized Wastewater Industry

- Unwillingness to provide the infrastructure of public sewer
- Increased pressure to use onsite treatment and dispersal systems
- Increased pressure to develop on poor soils

- Cursory monitoring and maintenance of systems
- Credentialing of contractors is archaic, ineffective and may not exist
- Few states have any system to train regulators or contractors

Technology Transfer

- Few states have the resources to test or review the myriad of treatment and disposal claims made by numerous companies with new wastewater treatment and component technologies

- The regulatory system at the local (county) level is often exercised in an arbitrary and capricious manner by public officials without credentials or the necessary skills in onsite wastewater to do an effective job.

- Many regulators and industry personnel have only basic knowledge of the onsite treatment systems and use “cookbook≅ prescriptive codes that provide only assumed public health and environmental protection.

- Current onsite/decentralized industry is very simple
- There is a lack of any formal training and the insufficiency of any requirement for competence

- The vast majority of this industry are not prepared to cope with complex solutions for sensitive environments.

- Advances in technology, performance and treatment will require an increased level of competence by all members of the industry including contractors, regulators, manufacturers, etc.

- We look to USEPA to provide leadership, to provide resources and to require demonstrated competency at all levels to deal with the simplicity of the present and the complexities of the future.

Observation

- State primacy agencies are typically **not** the agency delivering onsite/decentralized system services in the states

Observation

- Regulations alone are not enough to solve onsite wastewater treatment issues.

Recommendation

- There is a need for trained and competent persons in the onsite wastewater treatment industry including regulators and contractors.
- Without competency, onsite/decentralized systems will never become equal to public sewer

Recommendation

- There is a need to establish national requirements for credentialing people who conduct site evaluation, design, construction/installation and operation, maintenance and monitoring of onsite wastewater treatment systems or for people who review/inspect or oversee these activities.
- There also needs to be requirements for continuing education to maintain these credentials.

Recommendation

- There is a need to support nationally recognized onsite/decentralized training programs to help people obtain the needed credentials to conduct skilled activities and training to continue to maintain these credentials.

Recommendation

- USEPA should seek funding to establish a training center/network/program in each state, to train persons prior to credentialing, to provide continuing education of credentialed persons and to educate the public.
- Logistically, it is not feasible to have contractors or local health department personnel travel outside their state.

Recommendation

- USEPA should provide a grant or appropriation of funds for the purpose of creating a National Research and Training Center for the Studies of Onsite Wastewater Management

National Research and Training Center for the Studies of Onsite Wastewater Management

- Funding to support model undergraduate, graduate and adult education curricula in onsite wastewater studies that could be used by multiple universities and training centers.

National Research and Training Center for the Studies of Onsite Wastewater Management

- The establishment of a National Onsite/Decentralized Training Center or a centralized coordination of training centers that reaches out to the states and would be a model and a resource for all training centers.

National Research and Training Center for the Studies of Onsite Wastewater Management

- The establishment of a National Onsite/Decentralized Research Center for basic and advanced research into onsite wastewater technology creation and verification, public policy, public awareness, regulation, technical and other issues.

Appendix G

Slides for Issue Paper Presentation on Onsite Wastewater Industry Issues

Presentation to USEPA

Presented by
Decentralized
Wastewater Equipment
Manufacturers

April 20, 2001

Who we are

- Manufacturers of Decentralized Wastewater Treatment and Disposal Systems
- We support the conclusions of the USEPA's Response to Congress on the Use of Decentralized Wastewater Treatment Systems, 1997
- We support the universal implementation of USEPA's Draft Guidelines for the Management of Onsite/Decentralized Wastewater Systems

Technology Transfer

- There is increasing pressure to develop sites with severe limitations for conventional decentralized wastewater systems
  - High-density development
  - Ecologically sensitive areas
- Technology exists to properly treat and dispose of wastewater on any site

Technology Transfer

- Significant regulatory barriers exist which discourage widespread acceptance and utilization of technologies
  (There is no uniform process for evaluating and approving technologies)
- These barriers discourage American innovation and our ability to assist the regulatory community in meeting the water quality goals of the Clean Water Act
- We are committed to working with the State Regulators, USEPA and other interested parties to create a uniform technology approval process

Technology Transfer

- We ask USEPA to encourage reforms which will allow a fair, consistent and defensible process for widespread technology acceptance

Allocation of Resources

- Over 25% of the US population is served by decentralized wastewater systems
- Nearly 40% of all new development is served by decentralized wastewater systems
- USEPA resource allocation do not reflect these percentages

Allocation of Resources

- We ask USEPA to work toward a more equitable distribution of resources to better reflect the growing use of decentralized wastewater systems

Summary

- We would like to thank the USEPA for allowing us this opportunity.
- We look forward to the USEPA's continued leadership and support of decentralized wastewater treatment systems.

Appendix H

Contact Information for Attendees of the State Regulators and Captains of Industry Conferences

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